IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
AT CHARLESTON

B.P.J., by her next friend and mother, HEATHER JACKSON,

Plaintiff,

vs.

Civil Action No. 2:21-cv-00316
Hon. Joseph R. Goodwin

WEST VIRGINIA STATE BOARD OF EDUCATION, et al.,

Defendants,

and

THE STATE OF WEST VIRGINIA,

Defendant-Intervenor.

THE STATE OF WEST VIRGINIA'S RESPONSE IN OPPOSITION TO PLAINTIFF'S MOTION FOR PRELIMINARY INJUNCTION

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INTRODUCTION

Today is the 49th anniversary of the passage of the landmark gender equality legislation Title IX. Recognizing its importance, the West Virginia Legislature passed West Virginia Code § 18-2-25d ("Section 25d") "to promote equal athletic opportunities" for girls and women in West Virginia in light of the "inherent differences" between biological men and women. *Id.* §§ 18-2-25d(a)(5), (1). Section 25d provides for the commonsense rule that male athletes are not permitted to compete in women's sports. In passing Section 25d, the Legislature expressly relied on Justice Ginsburg's opinion for the Court in *United States v. Virginia*, in which she recognized that "[p]hysical differences between men and women . . . are enduring." 518 U.S. 515, 533 (1996). Justice Ginsburg's recognition is no less true today than when she wrote it.

Plaintiff's experts dispute those differences; but they cannot change physiology. *See* Exs. A & B. Plaintiff is a biological male who has the undisputed opportunity to try out for the boys' teams at Bridgeport Middle School. Plaintiff, however, wants to try out for the girls' cross-country and track team because Plaintiff identifies as female. Because this would cause a biological male to unfairly compete against biological females, Section 25d bars Plaintiff from doing so. Plaintiff's claim that this violates the Constitution and Title IX are unavailing.

As to the Equal Protection claim, Plaintiff rightly concedes that the State's interest is an important one. Yet Plaintiff argues that Section 25d's prohibition on men competing in women's sports is "not substantially related" to the State's interest in promoting equal opportunity in athletics. Rather, Plaintiff contends that Section 25d's objective can be served *by different* policies. The fact that athletic opportunities could be somehow equalized through other means is of *no constitutional consequence*. *See Tuan Anh Nguyen v. INS*, 533 U.S. 53, 70 (2001) (intermediate scrutiny does not "require[] that the statute under consideration must be capable of achieving its

ultimate objective in every instance"). The equal protection analysis has never required a perfect fit between the Legislature's goal and the means used to achieve it, *see id.*, even though Section 25d fits tighly with the State's interest. This claims therefore fails.

Plaintiff's Title IX claim fares no better. To begin with, Section 25d *furthers* the goals of Title IX, as it promotes the equal opportunity for the sexes in athletics. Nor does it violate the text of the law. Regulations interpreting the law (and relevant case law) have long recognized "sex" to refer to biological sex. But even assuming Plaintiff's preferred definition applied, the claim still fails. Although Plaintiff argues that Section 25d discriminates on the basis of sex because it targets transgender female students—that is, biological males who identify as female—the law does no such thing. Rather, it is *Plaintiff* who is asking this Court to compel the State to discriminate—to define eligibility for participation in women's sports—on the basis of gender identity. Indeed, by defining such eligibility on the basis of biological sex, Section 25d takes no account of gender identity, thus hardly discriminating "on the basis" of it.

Without a doubt, all persons should be afforded the dignity owed to them by virtue of their humanity, which is a core value underlying our civil society. However, the role of federal courts is limited to applying the law, while determinations of policy must be left to the representative branches of government. For the reasons explained below, Section 25d fully complies with both the Equal Protection Clause and Title IX, as Plaintiff fails to demonstrate a "clear showing" of a likelihood of success on a claim under either.

Plaintiff's motion for preliminary injunction should therefore be denied.

BACKGROUND

West Virginia, after extensive legislative debate addressing all views, enacted HB 3293, now codified as West Virginia Code § 18-2-25d ("Section 25d") and effective July 8, 2021. Section

25d is straightforward. Subsection (a) contains the legislative findings, which recognizes the inherent differences between biological males and biological females and the valid justification for sex-based classifications in sports. § 18-2-25d(a). Subsection (b) contains definitions. § 18-2-25d(b). Subsection (c) contains the requirements for public school-sponsored sports. *First*, it requires designation of sports by category based on biological sex. § 18-2-25d(c)(1) (any "sports that are sponsored by any public secondary school or a state institution of higher education . . . shall be expressly designated as one of the following based on biological sex: (A) Males, men, or boys; (B) Females, women, or girls; or (C) Coed or mixed"). *Second*, it prohibits participation of biological males in sports designated for biological females. *See id*. § 18-2-25d(c)(2) ("Athletic teams or sports designated for females, women, or girls shall not be open to students of the male sex where selection for such teams is based upon competitive skill or the activity involved is a contact sport.").

Notably, the Legislature did not directly address or endorse affirmation therapy, including the use of puberty blocking drugs. Nor does the statute say anything about "transgender" boys or girls. Although not necessary to deny the motion, the State includes expert declarations opposing the science-based arguments advanced by Plaintiff. *See* Ex. A (Expert Decl. of Dr. Stephen B. Levine) (explaining the lack of consensus among professionals that "social transition"—treating an individual as if he or she were of the opposite sex for all purposes, including athletic performance—is the *only* or even most effective approach for young people who suffer from gender dysphoria); Ex. B (Expert Decl. of Dr. Gregory A. Brown) (detailing physiological differences between the sexes that affect athletic performance).; Ex. E (Expert Report of Dr. James M. Cantor, PhD) (addressing types and causes of gender dysphoria and the range of legitimate treatments therefore and possible harms from certain treatments); Ex. F (*Quincy Bell & Mrs A v.*

Tavistock & Portman NHS Found. Trust [2020] EWHC 3274 (Admin.)) (finding it is "highly unlikely" that children under 13 could give informed consent to use puberty blocking drugs)).

On May 26, 2021, Plaintiff filed a 106-paragraph complaint seeking declaratory and injunctive relief against an array of state and local officials and public entities, as well as nominal damages and attorney's fees. On June 18, 2021, the State's motion to intervene as a defendant was granted, allowing for this response. *See* ECF No. 44.

ARGUMENT

Plaintiffs "seeking a preliminary injunction must establish that [they are] likely to succeed on the merits, likely to suffer irreparable harm in the absence of preliminary relief, that the balance of equities tips in [their] favor, and that an injunction is in the public interest." *Id.* at 20. Plaintiff fails to make a "clear showing" of these factors and is thus not entitled to the "extraordinary remedy" of a preliminary injunction. *Winter v. Nat. Res. Def. Council, Inc.*, 555 U.S. 7, 22 (2008).

I. Plaintiff Is Unlikely To Succeed On The Merits.

A. Plaintiff's Equal Protection Claim Is Unlikely To Succeed On The Merits.

The Equal Protection Clause provides that no State shall "deny to any person within its jurisdiction the equal protection of the laws." U.S. Const. amend. XIV, § 1. As long recognized by the Supreme Court, the Clause is "essentially a direction that all persons *similarly situated* should be treated alike." *City of Cleburne v. Cleburne Living Ctr.*, 473 U.S. 432, 439 (1985) (emphasis added). In this manner, the provision "simply keeps governmental decisionmakers from treating differently persons who are in all relevant respects alike." *Nordlinger v. Hahn*, 505 U.S. 1, 10 (1992). As such, plaintiffs asserting a violation of the Equal Protection Clause must "demonstrate that [they have] been treated differently from others with whom [they are] similarly situated and that the unequal treatment was the result of intentional or purposeful discrimination." *Morrison v. Garraghty*, 239 F.3d 648, 654 (4th Cir. 2001).

The Equal Protection Clause "does not make sex a proscribed classification." *United States v. Virginia*, 518 U.S. 515, 533 (1996).[1] Plaintiff argues that heightened scrutiny should apply because Section 25d discriminates against transgender and female athletes. Although the State disagrees, the State acknowledges that the Fourth Circuit has held that heightened scrutiny applies if a law or policy treats transgender persons in a less favorable way than it treats all others. *See Grimm v. Gloucester Cty. Sch. Bd.*, 972 F.3d 586, 610 (4th Cir. 2020), *as amended* (Aug. 28, 2020).[2]

But Section 25d is different. It does not single out and treat transgender athletes differently. Indeed, it treats all biological males *the same* and prohibits them from participating in female sports to protect athletic opportunities for biological females. Therefore, Plaintiff cannot show it discriminates against transgender athletes. *Cf. Doe 2 v. Shanahan*, 755 F. App'x. 19, 23-25 (D.C. Cir. 2019) (reversing finding that requiring military personnel to serve in their biological sex was a blanket transgender ban and acknowledging that the military had substantial arguments that the plan complied with equal protection principles).

Setting that aside, the intermediate scrutiny analysis in this context is straightforward. The government first must prove that the "classification serves important governmental objectives." *Virginia*, 518 U.S. at 524 (internal quotation marks omitted). For an objective to be "important," it cannot stem from "overbroad generalizations about the different talents, capacities, or preferences of males and females." *Id.* at 533. The objective must also be "genuine, not

[1] Because Section 25d survives heightened scrutiny applied to sex-based classifications, it also would survive rational basis review if the statute was viewed as not a sex-based classification.

[2] Although *Grimm* is distinguishable from this case, the State believes that *Grimm* was wrongly decided on its own terms. *See Grimm*, 972 F.3d at 627-37 (Niemeyer, J., dissenting). A petition for certiorari is pending. *See* Petition for Writ of Certiorari, *Grimm v. Gloucester Cty. Sch. Bd.*, No. 20-1163, 2021 WL 723101 (Feb. 19, 2021).

hypothesized or invented post hoc in response to litigation." *Id*. In addition to proving that its policy serves important objectives, the government must show that "the discriminatory means employed are substantially related to the achievement of those objectives." *Id*. at 524 (internal quotation marks omitted). Nonetheless, as the Supreme Court has made clear, "[t]o fail to acknowledge even our most basic biological differences . . . risks making the guarantee of equal protection superficial, and so disserving it." *Tuan Anh Nguyen v. INS*, 533 U.S. 53, 73 (2001).

Importantly, this heightened standard does not mandate that all sex-based classifications must fail; rather, as Justice Ginsburg stated for the Court, the "[p]hysical differences between men and women . . . are enduring" and render "the two sexes . . . not fungible." *Virginia*, 518 U.S. at 533 (cleaned up); *accord Nguyen*, 533 U.S. at 68. Accordingly, laws may acknowledge the physical differences between men and women, so long as such sex-based classifications do not "create or perpetuate the legal, social, and economic inferiority of women." *Virginia*, 518 U.S. at 534; *see, e.g., Nguyen*, 533 U.S. 53 (upholding law requiring unmarried citizen fathers, but not mothers, to officially acknowledge relationship to foreign-born child in order to pass U.S. citizenship to such child because of biological differences between the sexes). In short, when applying this standard, "the Supreme Court is willing to take into account actual differences between the sexes, including physical ones." *Clark v. Ariz. Interscholastic Ass'n.*, 695 F.2d 1126, 1129 (9th Cir. 1982) (citing *Michael M. v. Sonoma Cty. Superior Ct.*, 450 U.S. 464, 468-69 (1981)); *see Nguyen*, 533 U.S. at 73.

Section 25d easily satisifies intermediate scrutiny. It serves the important objection of providing equal athletic opportunities, including as to biological females. The law also fits tightly

with that interest. By precluding biological males from competing on teams designated for biological females, Section 25d directly protects this interest.[3]

1. The State's Objective Is Important.

The State's objective, as codified by the Legislature in Section 25d(a)—to provide equal athletic opportunities—is important. It is also conceded by Plaintiff here. *See* ECF No. 19 at 20. And for good reason: It is well-established that "[t]here is no question" that "redressing past discrimination against women in athletics and promoting equality of athletic opportunity between the sexes" is "a legitimate and important governmental interest" justifying rules excluding males from female sports. *Clark*, 695 F.2d at 1131. Excluding males from female sports to "promote sex equality" and promote fair opportunities for female athletes is precisely what Section 25d does.[4]

2. Section 25d Serves The State's Objective.

Plaintiff takes issue with the second prong of the intermediate scrutiny test, contending that Section 25d is not substantially related to the important goal of ensuring equal opportunities for females in sports. Yet, despite its expert declarations, Plaintiff's argument cannot overcome the well-established physiological fact recognized by numerous courts and recently confirmed by the U.S. Department of Education's Office of Civil Rights ("OCR"): Allowing biological males to compete in female sports is unfair to biological females due to males' inherent physical advantages. Ex. D; Ex. B; *e.g.*, *Clark*, 695 F.2d at 1131 (noting that rule excluding boys from girls' team "is simply recognizing the physiological fact that males would have an undue advantage competing against women," and would diminish opportunities for females). Section 25d's

[3] The law does not have an overly broad sweep. For example, it does not prohibit biological females from joining teams of biological males.

[4] While protection of female sports is the central purpose for Section 25d, it also protects female athletes' safety. Ex. G. (Decl. of Dr. Chad T. Carlson, M.D., FACSM) (documenting safety reasons for sex-segregated sports); Ex. H (World Rugby, *Transgender Guidelines*) (explaining that biological women's safety is endangered if transgender women participate in women's rugby).

legislative findings specifically cite this physiological fact and governing case law recognizing it. W. Va. Code §§ 18-2-25d(a)(1)-(5). Indeed, at least one study found that even nine-year-old males are 9.8% faster than females in short sprint races and 16.6% faster in one mile races. Ex. I, at 3 & n.22. To protect biological female athletes' opportunities in light of biological males' inherent physical advantage, Section 25d provides that female sports "shall not be open to students of the male sex." *Id*. § 18-2-25d(c)(2). Just as the rule in *Clark* excluding boys from the girls' volleyball team was substantially related to the important objective of preserving equal opportunities for females to participate in sports, so too is Section 25d.

It is thus plain that a public school may lawfully prohibit, consistent with the Constitution, males from participating in women's sports in order to protect equal opportunity concerns that arise from the physiological differences between the two sexes. In light of this rationale, Plaintiff cannot claim discrimination when denied access to the female sports teams because Plaintiff is not, in fact, similarly situated to the biologically female students who play on those teams. While Plaintiff no doubt identifies as female and has taken steps to chemically alter Plaintiff's adolescent body, Plaintiff will always remain biologically different from females. Because such physiological differences are at the root of why sports teams are generally separated on the basis of sex, by adopting a policy pursuant to which Plaintiff is not permitted to join a women's sports team, the State did not "treat[ ] differently persons who are in all *relevant* respects alike," *Nordlinger*, 505 U.S. at 10 (emphasis added), and therefore did not violate the Equal Protection Clause. And there is no claim or evidence in the record that Plaintiff was treated differently from any other transgender student.

Plaintiff cannot validly challenge these conclusions. Instead, Plaintiff argues that Section 25d's objective can be served by *different rules*. Specifically, Plaintiff argues that athletic

opportunities for females *could* be adequately protected by requiring transgender male-to-female athletes to undergo a year or more of chemical hormone therapy, such that "puberty blockers" would eliminate biological males' athletic advantages, thus freeing so-treated biological males to compete against women "fairly."

As the Supreme Court has made clear in applying intermediate scrutiny, the fact that athletic opportunities could be somehow equalized through other means is of no constitutional consequence. *Nguyen*, 533 U.S. at 70 (intermediate scrutiny does not "require[] that the statute under consideration must be capable of achieving its ultimate objective *in every instance*" (emphasis added)). Put another way, "even wiser alternatives than the one chosen does not serve to invalidate the policy [of excluding males from female sports] since it is substantially related to the goal" of providing fair and equal opportunities for females to participate in athletics. *Clark*, 695 F.2d at 1132. Demanding that the statute satisfy its interest of equal opportunity as to each plaintiff who brings an as-applied challenge, like Plaintiff here, would disregard intermediate scrutiny by demanding a perfect fit between the sex-based classification and the government interest at issue. And it would be directly counter to Supreme Court instructions. This is fatal to Plaintiff's claim.

Ignoring *Nguyen*, Plaintiff argues that athletic opportunities for biological females *could* be adequately protected by requiring transgender male-to-female athletes to undergo one year of hormone therapy. Plaintiff argues that current circulating testosterone is the "only" thing that gives males a competitive advantage. ECF No. 19 at 6, 10 ("[t]he only sex-related characteristic with any documented relationship to athletic ability [is] circulating testosterone") (citing Safer Decl.).[5]

[5] Plaintiff argues that Section 25d is not substantially related to the State's interest because puberty blockers can eliminate biological males' athletic advantages. This argument is without merit. Even if this argument were relevant, it is based on the false premise that prepubertal boys have no athletic

Even if Plaintiff's premises were legally relevant, they are false. Indeed, the very source that Plaintiff's expert, Dr. Safer, relies on *refutes* this argument:

> The striking male postpubertal increase in circulating testosterone provides a *major, ongoing, cumulative, and durable physical advantage* in sporting contests by creating larger and stronger bones, greater muscle mass and strength, and higher circulating hemoglobin as well as possible psychological (behavioral) differences. In concert, these render women, on average, unable to compete effectively against men in power-based or endurance-based sports.

DJ HANDELSMAN, ET AL., CIRCULATING TESTOSTERONE AS THE HORMONAL BASIS OF SEX DIFFERENCES IN ATHLETIC PERFORMANCE, 39 *Endocrine Reviews* 803, 805 (2018), https://academic.oup.com/edrv/article/39/5/803/5052770 ("Handelsman Paper") (cited in Shafer Decl., ECF No. 2-1, ¶ 25) (emphasis added).

This "major, ongoing, cumulative, and durable physical advantage" that Plaintiff's own expert validates is a problem Section 25d aims to address—and does so directly and constitutionally. And as the authors of the Handelsman Paper note, males' larger and stronger bones generally result in males having a height advantage over females, which provides an obvious physical advantage in many sports; "greater leverage for muscular limb power exerted in jumping, throwing, or other explosive power activities"; and greater bone density, helping them to avoid stress fractures. Handelsman Paper, at 818-19. The hormone therapy Plaintiff touts does not change this. Moreover, other scientific studies confirm that hormone therapy *does not* eliminate the physical advantages males enjoy over females. *See* Ex. B ¶ 11.c. (administration of testosterone suppressing drugs "does not eliminate the performance advantage of men or adolescent boys over

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advantages over girls. In fact, studies have shown that boys have athletic advantages over girls that manifest themselves as early as six years of age. Ex. B ¶ 23 (Expert Decl. of Dr. Gregory A. Brown) ("a number of studies indicate that males' athletic advantages over females begin before puberty, and may be apparent as early as six years of age"); *id*. ¶¶ 65–68 (discussing relevant studies comparing boys' and girls' athletic abilities).

women or adolescent girls in almost all athletic contests"); *see also id.* ¶¶ 127-53 (and cited authorities and data); Ex. I (Hilton & Lundberg Sports Medicine Article regarding testosterone suppression and performance advantage).

Plaintiffs' expert, Dr. Safer, is an endocrinologist—not an expert in athletic performance. ECF No. 2-1, ¶¶ 5-13. His opinion about hormone therapy's effect on athletic performance is based not on his expertise studying athletic performance, but in reliance on one article, whose reliability is questionable. This article compares performances of eight transgender women before and after testosterone therapy. *Id.* ¶ 55 (citing Joanna Harper, *Race Times For Transgender Athletes*, 6 J. of Sporting Cultures & Identities, no. 1 at 1-9 (2015) ("Harper Article")). The Harper Article contains shortcomings and limitations "rendering the data and conclusions to be of little to no scientific validity" in proving the overall efficacy of testosterone therapy's ability to eliminate performance advantages. Ex. B ¶ 154-61 (discussing the flaws of the Harper Article).

In contrast to Dr. Safer, Dr. Gregory Brown is an expert in sports science and professor of exercise science at the University of Nebraska. Ex. B, ¶ 1. His thorough opinion, supported by scientific studies and data, is that biological male physiology—not merely currently circulating testosterone—is why males have a decided advantage over females in athletic contests. *Id.* ¶ 11.b; *see also id.* ¶¶ 77-125 (relying on numerous authorities to describe physiological differences between the sexes). Due to males' physiological differences from women, the administration of androgen inhibitors (i.e., drugs designed to reduce circulating testosterone levels) to male-to-female transgender persons *does not* eliminate their performance advantages. *See id.* ¶¶ 11.c. ¶¶ 127-53. Plaintiff's suggestion that limited hormone therapy is enough to equal the playing field between males and females does not stand up to scientific scrutiny much less the demanding preliminary injunction standard.

In an effort to promote Plaintiff's narrative that Section 25d was the product of animus toward transgender persons and was based on unfounded stereotypes, Plaintiff argues that there is no need to protect athletic opportunities for biological females by excluding biological males from their sports.[6] Rather, as the OCR determined, allowing male-to-female transgender athletes to compete in female sports "place[s] female student athletes in athletic events against male student-athletes, resulting in competitive disadvantages for female student-athletes," denying female student-athletes "the opportunity to compete in events that [are] exclusively female," and denying "female student-athletes athletic opportunities that [are] provided to male student-athletes." Ex. D at 4. Through Section 25d, the Legislature has provided a reasonable, legally permissible means to prevent these wrongs from occurring. Thus Plaintiff fails to show unconstitutional different treatment under the Equal Protection Clause.

B. Plaintiff's Title IX Claim Is Unlikely To Succeed On The Merits.

Plaintiff also fails to appreciate Title IX *requires* some different treatment between the biological sexes. So not only does Section 25d *not* violate Title IX, the law strengthens the goals of Title IX in West Virginia. Thus Plaintiff has not made a clear showing of a likelihood of success on the merits on the Title IX challenge to Section 25d.

1. The Purposes And Achievements Of Title IX.

Title IX was designed to eliminate significant "discrimination against women in education." *Neal v. Bd. of Trs. of Cal. State Univs.*, 198 F.3d 763, 766 (9th Cir. 1999) (citing *N. Haven Bd. of Educ. v. Bell*, 456 U.S. 512, 523-24 & n.13 (1982)). It mandates that no person "shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to

[6] This Court should reject Plaintiff's attempt to impute to the State an illegal bias or animus. In doing so, Plaintiff fails to appreciate that it is permissible for schools to provide single-sex sports teams. Thus, it was not animus or illegal bias for the State to conclude that, in establishing sports teams separated by biological sex, the student's biological sex was relevant.

discrimination under any education program or activity receiving Federal financial assistance." 20 U.S.C. § 1681(a).

While Title IX does not mention athletics specifically, it applies as rigorously to athletic programs of schools as to academic programs. 34 C.F.R. § 106.41(a). In 1975, at Congress' express direction, the executive branch promulgated implementing regulations for Title IX, which made explicit Title IX's application to school athletic programs. 34 C.F.R. § 106.41. Section (a) declares that "[n]o person shall, on the basis of sex, be excluded from participation in, be denied the benefits of, be treated differently from another person or otherwise be discriminated against in any interscholastic, intercollegiate, club or intramural athletics offered by a recipient, and no recipient shall provide any such athletics separately on such basis." 34 C.F.R. § 106.41(a). Like the text of Title IX itself, the regulation is sex-neutral on its face, but "it would require blinders to ignore that the motivation for the promulgation of the regulation" was to increase opportunities for girls. *Williams v. Sch. Dist. of Bethlehem*, 998 F.2d 168, 175 (3d Cir. 1993).

The regulation authorizes "separate teams for members of each sex where selection for such teams is based upon competitive skill or the activity involved is a contact sport," which is provided "nowithstanding" the requirements of subsection (a). 34 C.F.R. § 106.41(b). And § 106.41(c) requires that all subject entities "shall provide equal athletic opportunity for members of both sexes." The factors to consider in determining whether equal opportunities are available include whether the program provides "levels of competition" that "effectively accommodate the . . . abilities of members of *both* sexes," and whether the program provides equal opportunities for public recognition or "publicity" to *both* sexes. *Id.* §§ 106.41(c)(1), (10) (emphases added).

Title IX does not require that all athletic teams and competitions be co-ed. In many sports, Title IX's goal of non-discrimination could not be achieved with sex-blind programs. Thus Title

IX is different from the civil rights statutes that are concerned with race, such as Title VI and VII and the court cases interpreting those statutes. Indeed, the U.S. Department of Education's Office of Civil Rights in a 1996 "Dear Colleague" letter accompanying a formal "Clarification of Intercollegiate Athletics Policy Guidance: The Three-Part Test" (the "1996 Clarification"), noted that Title IX is "unique" in this respect and in "contrast" to Title VI, which would prohibit without exception "separate athletic programs on the basis of race or national origin."[7] Indeed, the Supreme Court recently recognized that Title IX is different than Title VII. *Bostock v. Clayton Cty.*, 140 S. Ct. 1731, 1753 (2020).[8]

Before the enactment of Title IX in 1972, schools often emphasized boys' athletic programs "to the exclusion of girls' athletic programs," *Williams*, 998 F.2d at 175, and vastly fewer girls participated in competitive interscholastic athletics than boys. Title IX has been strikingly successful in changing this. "For example, between 1972 and 2011, girls' participation in high school athletics increased from approximately 250,000 to 3.25 million students."[9] Title IX is regularly given substantial credit for this sea change. *E.g.*, *Neal*, 198 F.3d at 773.

As the historical agency interpretations, implementing regulations, and controlling case law establish, the term "sex" in this context can only reasonably be understood to mean biological

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[7] U.S. DEP'T OF EDUC., OFFICE OF C.R., OCR-00016, CLARIFICATION OF INTERCOLLEGIATE ATHLETICS POLICY GUIDANCE: THE THREE-PART TEST (Jan. 16 1996), *available at* https://www2.ed.gov/about/offices/list/ocr/docs/clarific.html. The Second Circuit has found the 1996 Clarification is "entitled to substantial deference under *Auer v. Robbins*, [519 U.S. 452, 461 (1997)]." *Biediger v. Quinnipiac Univ.*, 691 F.3d 85, 97 (2d Cir. 2012) (citation omitted).

[8] *See also* U.S. DEP'T OF EDUC., OFFICE OF GEN. COUNSEL, MEMORANDUM FOR KIMBERLY M. RICHEY ACTING ASSISTANT SECRETARY OF THE OFFICE FOR CIVIL RIGHTS (Jan. 8. 2021), https://www2.ed.gov/about/offices/list/ocr/correspondence/other/ogc-memorandum-01082021.pdf?utm_content=&utm_medium=email&utm_name=&utmsource=govdelivery&utm_term=.

[9] U.S. DEP'T OF EDUC., OFFICE OF C.R., PROTECTING CIVIL RIGHTS, ADVANCING EQUITY 33 (Apr. 2015), https://www2.ed.gov/about/reports/annual/ocr/report-to-president-and-secretary-of-education-2013-14.pdf.

sex—not the person's internal sense of being male or female, or their outward presentation of that internally felt sense ("gender identity"), as Plaintiff argues.

It has long been recognized in law that biological females and biological males are different in ways that are relevant to athletics because of physiological differences between males and females. *See Virginia*, 518 U.S. at 533. The Ninth Circuit, ruling against a boy's challenge to a high school policy excluding males from participating on the girls' volleyball team, affirmed that the exclusion of boys was necessary to secure equal opportunity and treatment for female athletes. *See Clark*, 695 F.2d 1126. It found it a "physiological fact" to reveal that "males would have an undue advantage competing against women," and that the evidence was clear that "due to average physiological differences, males would displace females to a substantial extent if they were allowed to compete for positions" on the women's team. *Id*. at 1131. The result would be that "athletic opportunities for women would be diminished." *Id*.; *see also Williams,* 998 F.2d at 178. Accordingly, under Title IX and its implementing regulations as currently written and interpreted—which Plaintiff *does not* challenge—schools *must* consider students' biological sex when determining whether male and female student athletes have equal opportunities to participate. *McCormick v. Sch. Dist. of Mamaroneck*, 370 F.3d 275, 287 (2d Cir. 2004).

2. Section 25d Furthers, Not Violates, Title IX.

With this background, nothing in Section 25d is contrary to Title IX or its implementing regulations. Plaintiff argues that the case does not challenge sex separation in sports. ECF No. 19 at 16. But that is precisely the logical implication of Plaintiff's position. Title IX uses the term "sex." The interpretive regulations use the term "sex" to mean the two biological sexes, male and female. Moreover, even the Supreme Court has consistently recognized the term to identify *only two* sexes—male and female. *Bostock,* S. Ct. at 1739 (proceeding on the assumption that at the time Title VII's passage, the term sex "referr[ed] only to biological distinctions between male and

female" and did not include "norms concerning gender identity"); *see* 34 C.F.R. § 106.41(c) (recipients "shall provide equal athletic opportunity for members of *both* sexes") (emphasis added). The ordinary meaning of "both" connotes two. Contrary to this regulation—which Plaintiff does not challenge—Plaintiff asserts at least four "genders" or "gender identities." Plaintiff's firmly held belief does not make it the law, and it certainly is not consistent with the text of Title IX and its regulations.

In fact, statutory and regulatory text and structure, contemporaneous Supreme Court authorities, and historic practices demonstrate that the ordinary public meaning of the term "sex" at the time of Title IX's enactment could only have been, as Justice Gorsuch put it, "biological distinctions between male and female." *Bostock*, S. Ct. at 1739; *see* 20 U.S.C. §§ 1681(a), 1686; *Frontiero v. Richardson*, 411 U.S. 677, 686 (1973) (plurality op.) ("[S]ex, like race and national origin, is an immutable characteristic determined solely by the accident of birth."); 34 C.F.R. §§ 106.32(b)(1), 106.33, 106.34, 106.40, 106.41, 106.43, 106.52, 106.59, 106.61. *Bostock* continued this understanding that the ordinary public meaning of the term "sex" in Title VII means biological distinctions between male and female. *Bostock*, 140 S. Ct. at 1738-39; *see also id*. at 1784-91 (Alito, J. dissenting). This is consistent with, and further supports, the long-standing and unchallenged agency construction of the term "sex" in Title IX to mean *biological* sex, male or female. In short, the physical differences between biological males and biological females and the resulting need to consider those differences for purposes of ensuring equal opportunity for "both sexes" is precisely what the exceptions for separate sports in the longstanding Title IX regulations are all about. 34 C.F.R. § 106.41.

Plaintiff's argument otherwise is unpersuasive. While Plaintiff accepts the fact that Title IX authorizes sports teams separated by sex—indeed, Plaintiff seeks to join the female teams that

are separated from male teams—the implementation of Plaintiff's position would allow Plaintiff to participate on teams contrary to the basis for the separation. Bridgeport Middle maintains sex-separated cross-country and track teams, and under Section 25d, Plaintiff would be entitled to join the boys' teams. But requiring the school to allow Plaintiff, a biological male who identifies as female, to join the female team compromises the separation of athletics as explicitly authorized by Title IX and its implementing regulations—which again, go unchallenged here.

Seeking to overcome this logical barrier, Plaintiff argues that the State applied its own "discriminatory" notions of what "sex" means. ECF No. 19 at 20. To the contrary, the Legislature relied on the commonly accepted definition of the word "sex" as referring to the physiological differences between biological males and females, including in statute, regulations, and controlling caselaw from the Supreme Court. Any other reading would impede the purposes of Title IX because sex—not gender identity—governs physiological athletic ability. Thus, for purposes of access to sex-separated athletics, Plaintiff's sex is male.

To be sure, Plaintiff is correct that Section 25d does make distinctions "based on sex," as Title IX actually requires in this context. Indeed, the statute uses language *specifically condoned* by the Supreme Court as recently as last year. *Compare Bostock*, 140 S. Ct. at 1751 (referring to the term "biological sex.") *with* § 18-2-25d(b)(1) ("biological sex"). The Supreme Court-approved language, therefore, treats similarly situated persons equally and is in compliance with Title IX's directives.

Plaintiff's pervasive reliance on the Fourth Circuit's decision in *Grimm* to assert an different interpretation of Title IX is unpersuasive. First, *Grimm* simply has no application here because it does not interpret the provisions of Title IX relating to athletics, including its implementing regulations. Those regulations are separate and different from other Title IX

provisions. Moreover, *Bostock* and other Supreme Court decisions control on this point, absent a clear direction from the Fourth Circuit, which simply does not appear in *Grimm*. Using *Grimm*'s question of whether the law treats similarly situated people the same, Plaintiff claims that Section 25d does not. But under *Bostock and the* controlling regulations, Section 25d *does* treat similarly situated people the same. As noted, Title IX athletic regulations contemplate two sexes based on *biological* sex. It does not contemplate segregating sports based on "gender identity," which can, and according to Plaintiff does, change from time to time. Athletic teams are separated into male and female athletes. The statute, the regulations, and all relevant circuit court cases consistently look at this based on *biological* sex, which is precisely what Section 25d does.

Ultimately, it is Plaintiff who asks the State to discriminate on the basis of gender identity by redefining eligibility for participation in women's sports. By defining such eligibility on the basis of (biological) sex, however, Section 25d disregards gender identity, thus hardly discriminating "on the basis" of it. There is no Title IX violation here.[10]

II. Neither The Balance Of Hardships Nor The Public Interest Favors An Injunction.

In evaluating Plaintiff's entitlement to a preliminary injunction, this Court "must balance the competing claims of injury and must consider the effect on each party of the granting or withholding of the requested relief. In exercising their sound discretion, courts of equity should pay particular regard for the public consequences in employing the extraordinary remedy of

[11] From the enactment of the Title IX women's athletics regulations until as late as January 2021, the U.S. Department of Education and the Department of Justice have repeatedly taken a position consistent with that set forth in Section 25d, both before and after *Bostock*. *See supra* notes 7 & 8; *see also* ECF No. 75, Statement of Interest of the United States, *Soule v. Conn Ass'n of Sch*s., 3:20-cv-00201 (D. Conn. Mar. 24, 2020); ECF No. 45, Br. of United States as Amicus Curiae, *Hecox v. Little*, No. 20-35813 (9th Cir. Nov. 19, 2020). Thus the United States' Statement of Interest in this case contradicts its long-held view without subjecting this new interpretation to public review and comment.

injunction." *Winter*, 555 U.S. at 24 (citations omitted). Plaintiff does not satisfy these requirements, either.

To begin with, in arguing that the equities favor an injunction, the focus is solely on Plaintiff's experience—yet this ignores the interests of *all* female athletes who will benefit from Section 25d. *See* Ex. B. Plaintiff simply asserts that an injunction "would not harm Defendants," explaining that "no 'problems'" have been "reported" in West Virginia, according to snippets of reports on statements from certain members of state government. ECF No. 19 at 26.

Plaintiff's say-so assertion that no harm will come from an injunction is wrong. On the contrary, nationwide attention has recently been given to the U.S. Department of Education Office for Civil Rights investigation and litigation in Connecticut, where opportunities for participation, advancement, victory opportunities, and public recognition have been taken from many girls as a result of the participation of just two biologically male athletes in Connecticut girls' track competitions. Ex. D, at 18-27. Chelsea Mitchell, one of the girls harmed in this way and one of the complainants to OCR, details the harms that she personally suffered in a sworn declaration. Ex. C. Those harms included being denied "four state championship titles, two All New England awards, medals, points, and publicity"—all as a result of the state athletic conference policy that grants male athletes entrance to female competitions. *Id*. ¶ 6. And when a biologically male athlete swept several female state championships and titles and was named "girls . . . athlete of the year" by the local paper, Chelsea understandably felt the injustice this implied against those who are in fact biologically female athletes. *Id*., ¶ 33. She hopes that future female athletes may be spared the "anxiety, stress, and performance losses" that she suffered due to biological male competition in female events. *Id*. ¶ 47. Chelsea's narrative shows the real harm that is both predictable and experienced when biological males compete in girls' or women's leagues based on claims of

gender identity. While Plaintiff ignores this, this Court should not. Indeed, it was the harms that Chelsea describes that caused OCR to conclude that "by permitting the participation of biologically male students in girls' interscholastic track in the state of Connecticut, [the Connecticut league and member schools] denied female student-athletes benefits and opportunities" including equal opportunities "to place higher in . . . events; to receive awards and other recognition; and possibly to obtain greater visibility to colleges and other benefits," and so *violated* Title IX. Ex. D, at 37.

Finally, unlike the plaintiffs in *Clark* who had no boys' volleyball team to play on, there is no dispute that Plaintiff has options to participate in school sports under Section 25d. It is undisputed Plaintiff can try out for the boys' cross-country and track teams. Thus Plaintiff does not satisfy that the balance of hardships and the public interest weighs in favor of injunctive relief.

CONCLUSION

For these reasons, Plaintiff's motion for preliminary injunction should be denied.

Respectfully submitted,

THE STATE OF WEST VIRGINIA,

PATRICK MORRISEY
ATTORNEY GENERAL OF WEST VIRGINIA

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EXHIBIT A

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT TACOMA

BRIAN TINGLEY,

Plaintiff,

v.

ROBERT W. FERGUSON, in his official capacity as Attorney General for the State of Washington; **UMAIR A. SHAH**, in his official capacity as Secretary of Health for the State of Washington; and **KRISTIN PETERSON** in her official capacity as Assistant Secretary of the Health Systems Quality Assurance division of the Washington State Department of Health,

Defendants.

Civil No. ____-_____

EXPERT DECLARATION OF DR. STEPHEN B. LEVINE IN SUPPORT OF PLAINTIFF'S MOTION FOR PRELIMINARY INJUNCTION

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I, Dr. Stephen B. Levine, declare as follows:

I. CREDENTIALS & SUMMARY

1. I am Clinical Professor of Psychiatry at Case Western Reserve University School of Medicine and maintain an active private clinical practice. I received my MD from Case Western Reserve University in 1967 and completed a psychiatric residency at the University Hospitals of Cleveland in 1973. I became an Assistant Professor of Psychiatry at Case Western in 1973 and became a Full Professor in 1985.

2. Since July 1973, my specialties have included psychological problems and conditions relating to individuals' sexuality and sexual relations, therapies for sexual problems, and the relationship between love, intimate relationships, and wider mental health. In 2005, I received the Masters and Johnson Lifetime Achievement Award from the Society of Sex Therapy and Research which "recognizes extraordinary contributions to clinical sexuality and/or sexual research over the course of a lifetime and achievement of excellence in clinical and/or research areas of sexual disorders."[1] I am a Distinguished Life Fellow of the American Psychiatric Association.

3. I have served as a book and manuscript reviewer for numerous professional publications. I have been the Senior Editor of the first (2003), second (2010), and third (2016) editions of the *Handbook of Clinical Sexuality for Mental Health Professionals*. In addition to five previously solo-authored books for

[1] Society for Sex Therapy & Research Awards, https://sstarnet.org/awards/.

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professionals, I have recently published *Psychotherapeutic Approaches to Sexual Problems* (2020). The book has a chapter titled "The Gender Revolution."

4. I first encountered a patient suffering what we would now call gender dysphoria in July 1973. In 1974, I founded the Case Western Reserve University Gender Identity Clinic and have served as Co-Director of that clinic since that time. Across the years, our Clinic treated hundreds of patients who were experiencing a transgender identity. An occasional child was seen during this era. I was the primary psychiatric care-giver for several dozen of our patients and supervisor of the work of other therapists. As the incidence of gender dysphoria has increased among children and youth in recent years, larger numbers of minors presenting with actual or potential gender dysphoria have presented to our clinic. I currently am providing psychotherapy for several minors in this area. I also counsel distressed parents of these teens.

5. I was an early member of the Harry Benjamin International Gender Dysphoria Association (now known as the World Professional Association for Transgender Health or WPATH) and served as the Chairman of the committee that developed the 5th version of its Standards of Care. The vast majority of the 6th version contains the exact prose that my committee wrote for the 5th version. In 1993 our Gender Identity Clinic was renamed, moved to a new location, and became independent of Case Western Reserve University. I continue to serve as Co-Director.

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6. In 2006, Judge Mark Wolf of the Eastern District of Massachusetts asked me to serve as an independent, court-appointed expert in litigation involving the treatment of a transgender inmate within the Massachusetts prison system. I have been retained by the Massachusetts Department of Corrections as a consultant on the treatment of transgender inmates since 2007.

7. In 2019, I was qualified as an expert and testified concerning the diagnosis, understanding, developmental paths and outcomes, and therapeutic treatment of transgenderism and gender dysphoria, particularly as it relates to children, in the matter of *In the Interest of J.A.D.Y. and J.U.D.Y.*, Case No. DF-15-09887-S, 255th Judicial District, Dallas County, TX.

8. A fuller review of my professional experience, publications, and awards is provided in my curriculum vitae, a copy of which is attached hereto as Exhibit A.

9. My many years of experience in working with adults or older young adults who are living in a transgender identity or who suffer from gender dysphoria provide a wide lifecycle view which, along with my familiarity with the literature concerning them, provides an important cautionary perspective. The psychiatrist or psychologist treating a trans child or adolescent of course seeks to make the young patient happy, but the overriding consideration is the creation of a happy, highly functional, mentally healthy person for the next 50 to 70 years of life. I refer to treatment that keeps this goal in view as the "life course" perspective.

10. A summary of the key points that I explain in this statement is as follows:

a. Sex as defined by biology and reproductive function cannot be changed. While hormonal and surgical procedures may enable a female-identifying male to "pass" as being female (or vice versa) during some or all of their lives, such procedures carry with them physical, psychological, and social risks, and no procedures can enable an individual to perform the reproductive role of the opposite sex. (Section II.A.)

b. The diagnosis of "gender dysphoria" encompasses a diverse array of conditions, with widely differing pathways and characteristics depending on age of onset, biological sex, mental health, intelligence, motivations for gender transition, socioeconomic status, country of origin, etc. Data from one population (e.g., adults) cannot be assumed to be applicable to others (e.g., children). (Section II.B.) Generalizations about the treatment children in one country (e.g., Holland) do not necessarily apply to another (e.g., United States).

c. Among psychiatrists and psychotherapists who practice in the area, there are currently widely varying views concerning both the causes of and appropriate therapeutic response to gender dysphoria in children. Existing studies do not provide a basis for a scientific conclusion as to which therapeutic response results in the best long-term outcomes for affected individuals. (Sections II.E, II.F.)

d. A majority of children (in several studies, a large majority) who are diagnosed with gender dysphoria "desist"—that is, their gender dysphoria

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does not persist—by puberty or adulthood unless transgender-affirming therapeutic or medical interventions modify the normal course of maturation. It is not currently known how to distinguish children who will persist from those who will not. (Section III.)

e. Some recent studies suggest that active affirmation of transgender identity in young children will substantially reduce the number of children who would desist from transgender identity through the course of puberty. This raises the ethical concern that this will increase the number of individuals who suffer the multiple long-term physical, mental, and social harms and limitations that are strongly associated with living life as a transgender person. (Sections III, V.)

f. Typically, social transition is a first step in gender affirmation. It is itself an important intervention with profound implications for the long-term mental and physical health of the child. When a mental health professional (MHP) evaluates a child or adolescent and then recommends social transition, that professional should be available to help with interpersonal, familial, and psychological problems that may already exist and will likely arise after transition. However, today many children are started on puberty blockers, and adolescents are medically transitioned, without a thorough, long-lasting mental health assessment and psychological ongoing care, leaving themselves and their families on their own to deal with ongoing and subsequent problems. (Sections III, V.)

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g. The knowledge base concerning the cause and treatment of gender dysphoria available today has low scientific quality. (Section IV.)

h. There are no studies that show with any methodological and statistical validity that affirmation of transgender identity in young children reduces suicide or suicidal ideation, or improves long-term outcomes as compared to other therapeutic approaches. Meanwhile, multiple studies show that adult individuals living transgender lives suffer much higher rates of suicidal ideation, completed suicide, and negative physical and mental health conditions than does the general population before and after transition, hormones, and surgery. There are no randomized studies that compare outcomes among older teens and adults with gender dysphoria who have affirmation treatment with those who do not. (Section IV.)

i. In light of what is known and not known about the impact of affirmation on the incidence of suicide, suicidal ideation, and other indicators of mental and physical health, it is scientifically baseless, and therefore unethical, to assert that a child or adolescent who expresses an interest in a transgender identity will kill him- or herself unless adults and peers affirm that child in a transgender identity. (Section IV.)

j. Putting a child or adolescent on a pathway towards life as a transgender person puts that individual at risk of a wide range of long-term or even life-long harms, including: sterilization (first chemical, then surgical) and associated regret and sense of loss; inability to experience orgasm (for

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trans women); physical health risks associated with exposure to elevated levels of cross-sex hormones; surgical complications and life-long after-care; alienation of family relationships; inability to form lasting romantic relationships and attract a desirable mate; and elevated mental health risks of depression, anxiety, and substance abuse. (Section V.)

II. BACKGROUND ON THE FIELD

A. The biological baseline of sex

11. Gender identity advocates commonly refer to the sex of an individual as "assigned at birth." This phrase is misleading. The sex of a human individual at its core structures the individual's biological reproductive capabilities—to produce ova and bear children as a mother, or to produce semen and beget children as a father. As physicians know, sex determination occurs at the instant of conception, depending on whether a sperm's X or Y chromosome fertilizes the egg. Medical technology can now determine a fetus's sex before birth almost as easily as after birth. It is thus not correct to assert that doctors "assign" the sex of a child at birth. Instead, they simply recognize the existing fact of that child's sex. Barring rare disorders of sexual development, anyone can identify the sex of an infant by genital inspection. What the general public may not understand, however, is that every nucleated cell of an individual's body is chromosomally identifiably male or female—XY or XX.

12. The self-perceived gender of a child, in contrast, arises in part from how others label the infant: "I love you, son (daughter)." This designation occurs thousands of times in the first two years of life when a child begins to show

awareness of the two possibilities. As acceptance of the designated gender corresponding to the child's sex is the outcome in >99% of children everywhere, anomalous gender identity formation begs for understanding. Is it biologically shaped? Is it biologically determined? Is it the product of how the child was privately regarded and treated? Does it stem from trauma-based rejection of maleness or femaleness, and if so, flowing from what trauma? Does it derive from a tense, chaotic interpersonal parental relationship without physical or sexual abuse? Is it a symptom of another, as of yet unrevealed, emotional disturbance or neuropsychiatric condition such as autism? The answers to these relevant questions are not scientifically known.

13. Under the influence of hormones secreted by the testes or ovaries, numerous additional sex-specific differences between male and female bodies continuously develop postnatally, culminating in the dramatic maturation of the primary and secondary sex characteristics with puberty. These include differences in hormone levels, height, weight, bone mass, shape and development, musculature, body fat levels and distribution, and hair patterns, as well as physiological differences such as menstruation. These are genetically programmed biological consequences of sex, which also serve to influence the consolidation of gender identity during and after puberty.

14. Despite the increasing use of cross-sex hormones and various surgical procedures to reconfigure some male bodies to visually pass as female, or vice versa, the biology of the person remains as defined by his (XY) or her (XX) chromosomes,

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including cellular, anatomic, and physiologic characteristics and the particular disease vulnerabilities associated with that chromosomally-defined sex. For instance, the XX (genetically female) individual who takes testosterone to stimulate certain male secondary sex characteristics will nevertheless remain unable to produce sperm and father children. Thus in critical respects, gender affirmation changes can only be anatomically "skin deep." Contrary to assertions and hopes that medicine and society can fulfill the aspiration of the trans individual to become "a complete man" or "a complete woman," this is not biologically attainable.[2] It is possible for some adolescents and adults to pass unnoticed in daily life as the opposite sex that they aspire to be—but with limitations, costs, and risks, as I detail later. These risks include a continuing sense of inauthenticity as a member of the opposite sex.

B. Definition and diagnosis of gender dysphoria

15. Specialists have used a variety of terms over time, with somewhat shifting definitions, to identify and speak about a distressing incongruence between an individual's sex as determined by their chromosomes and their thousands of genes, and the gender with which they eventually subjectively identify or to which they aspire. Today's American Psychiatric Association *Diagnostic and Statistical Manual of Mental Disorders* ("DSM-5") employs the term Gender Dysphoria and

[2] S. Levine (2018), *Informed Consent for Transgendered Patients*, J. OF SEX & MARITAL THERAPY at 6 ("*Informed Consent*"); S. Levine (2016), *Reflections on the Legal Battles Over Prisoners with Gender Dysphoria*, J. AM. ACAD. PSYCHIATRY LAW 44, 236 at 238 ("*Reflections*").

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defines it with separate sets of criteria for adolescents and adults on the one hand, and children on the other.

16. There are at least five distinct pathways to gender dysphoria: early childhood onset; onset near or after puberty with no prior cross gender patterns; onset after defining oneself as gay or lesbian for several or more years and participating in a homosexual life style; adult onset after years of heterosexual transvestism; and onset in later adulthood with few or no prior indications of cross-gender tendencies or identity.

17. Gender dysphoria has very different characteristics depending on age and sex at onset. Young children who are living a transgender identity commonly suffer materially fewer symptoms of concurrent mental distress than do older patients.[3] The developmental and mental health patterns for each of these groups are sufficiently different that data developed in connection with one of these populations cannot be assumed to be applicable to another.

18. The criteria used in DSM-5 to identify Gender Dysphoria include a number of signs of discomfort with one's natal sex and vary somewhat depending on the age of the patient, but in all cases require "clinically significant distress or impairment in . . . important areas of functioning" such as social, school, or occupational settings.

[3] K. Zucker (2018), *The Myth of Persistence: Response to "A Critical Commentary on Follow-Up Studies & 'Desistance' Theories about Transgender & Gender Non-Conforming Children"* by Temple Newhook et al., INT'L J. OF TRANSGENDERISM at 10 ("*Myth of Persistence*").

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19. When these criteria in children (or adolescents, or adults) are not met, two other diagnoses may be given. These are: Other Specified Gender Dysphoria and Unspecified Gender Dysphoria. Specialists sometimes refer to children who do not meet criteria as being "subthreshold."

20. Children who conclude that they are transgender are often unaware of a vast array of adaptive possibilities for how to live life as a man or a woman—possibilities that become increasingly apparent over time to both males and females. A boy or a girl who claims or expresses interest in pursuing a transgender identity often does so based on stereotypical notions of femaleness and maleness that reflect constrictive notions of what men and women can be.[4] A young child's—or even an adolescent's—understanding of this topic is quite limited. Nor can they grasp what it may mean for their future to be sterile. These children and adolescents consider themselves to be relatively unique; they do not realize that discomfort with the body and perceived social role is neither rare nor new to civilization. What is new is that such discomfort is thought to indicate that they must be a trans person.

21. "Gender identity," as that term is commonly used in public discourse as well as academic publication, is distinct from sex. Unfortunately, "gender identity" has no distinct objective definition by which a subject's gender identity may be confirmed. The Department of Health and Human Services has defined

[4] S. Levine (2017), *Ethical Concerns About Emerging Treatment Paradigms for Gender Dysphoria*, J. OF SEX & MARITAL THERAPY at 7 ("*Ethical Concerns*") (available at http://dx.doi.org/10.1080/0092623X.2017.1309482.)

"gender identity" as "an individual's internal sense of gender, which may be male, female, neither, or a combination of male and female, and which may be different from an individual's sex assigned at birth.[5] A publication sponsored by the ACLU, National Center for Lesbian Rights, Human Rights Campaign, and National Education Association asserts that gender identity encompasses any "deeply-felt sense of being male, female, both or neither," and can include a "gender spectrum" "encompassing a wide range of identities and expressions." That source goes on to say that an individual may have an "internal sense of self as male, female, both or neither," and that "each person is in the best position to define their own place on the gender spectrum."[6] The medical text *Principles of Transgender Medicine and Surgery*, states that "Gender identity can be conceptualized as a continuum, a Mobius, or patchwork."[7]

22. In sum, gender identity is said to refer to an individual's subjective perceptions of where that person falls on a continuum of genders ranging from very masculine gender to very feminine, but is also said to include genders which are some of either or something else entirely, or no gender at all (e.g., agender). There are no objective indicia that define or establish one's gender within this paradigm.

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[5] Nondiscrimination in Health Programs and Activities, 81 Fed. Reg. 31,376 (May 18, 2016) at 31,384.

[6] Asaf Orr et al., NATIONAL CENTER FOR LESBIAN RIGHTS, *Schools in Transition: A Guide for Supporting Transgender Students in K-12 Schools*, at 5-7 (2015), https://www.nclrights.org/wp-content/uploads/2015/08/Schools-in-Transition-2015-Online.pdf.

[7] R. Ettner, et al. (2016), *Principles of Transgender Medicine and Surgery* (Routledge 2nd ed.) at 43.

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23. In clinical experience, I observe patients experiencing gender identity as an often-evolving mixture of male and female identification, which may be influenced by the patient's reactions to cultural stereotypes, and/or by the patient's past and present family dynamics. The gender identity composite, however, is just one-third of the self-labels that constitute sexual identity. The other two components are the dimensions of sexual orientation—heterosexual, homosexual, and bisexual--and the generally avoided dimension of sexual intention—what one wants to do with a partner's body and what one wants done to his or her body. In my view gender identity is merely a part of sexual identity, and an even smaller part of the individual's total self-identification.

C. Impact of gender dysphoria on minority and vulnerable groups

24. In considering the appropriate response to gender dysphoria, it is important to know that certain groups of children and adolescents have an increased prevalence and incidence of trans identities. These include: children of color,[8] children with mental developmental disabilities,[9] including children on the autistic spectrum (at a rate more than 7x the general population),[10] children residing in foster care homes, adopted children (at a rate more than 3x the general

[8] G. Rider et al. (2018), *Health and Care Utilization of Transgender/Gender Non-Conforming Youth: A Population Based Study*, PEDIATRICS 141:3 at 4 (In a large sample, non-white youth made up 41% of the set who claimed a transgender or gender-nonconforming identity, but only 29% of the set who had a gender identity consistent with their sex.).

[9] D. Shumer & A. Tishelman (2015), *The Role of Assent in the Treatment of Transgender Adolescents*, INT. J. TRANSGENDERISM at 1 (available at doi: 10.1080/15532739.2015.1075929).

[10] D. Shumer et al. (2016), *Evaluation of Asperger Syndrome in Youth Presenting to a Gender Dysphoria Clinic*, LGBT HEALTH, 3(5) 387 at 387.

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population),[11] children with a prior history of psychiatric illness,[12] and more recently adolescent girls (in a large recent study, at a rate more than 2x that of boys) (Rider, 2018 at 4).

25. The social transitioning, hormonal, and surgical paths often recommended and facilitated by gender clinics may lead to sterilization by the time the patient reaches young adulthood. They may add a future source of despair in an already vulnerable person. Caution and time to reflect as the patient matures are prudent when dealing with a teen's sense of urgency about transition.

D. Three competing conceptual models of gender dysphoria and transgender identity

26. Discussions about appropriate responses by MHPs to actual or sub-threshold gender dysphoria are complicated by the fact that various speakers and advocates (or a single speaker at different times) view transgenderism through at least three very different paradigms, often without being aware of, or at least without acknowledging, the distinctions.

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[11] D. Shumer et al. (2017), *Overrepresentation of Adopted Adolescents at a Hospital-Based Gender Dysphoria Clinic*, TRANSGENDER HEALTH Vol. 2(1) 76 at 77.

[12] L. Edwards-Leeper et al. (2017), *Psychological Profile of the First Sample of Transgender Youth Presenting for Medical Intervention in a U.S. Pediatric Gender Center*, PSYCHOLOGY OF SEXUAL ORIENTATION AND GENDER DIVERSITY, 4(3) 374 at 375; R. Kaltiala-Heino et al. (2015), *Two Years of Gender Identity Service for Minors: Overrepresentation of Natal Girls with Severe Problems in Adolescent Development*, CHILD & ADOLESCENT PSYCHIATRY & MENTAL HEALTH 9(9) 1 at 5. (In 2015 Finland gender identity service statistics, 75% of adolescents assessed "had been or were currently undergoing child and adolescent psychiatric treatment for reasons other than gender dysphoria."); L. Littman (2018), *Parent Reports of Adolescents & Young Adults Perceived to Show Signs of a Rapid Onset of Gender Dysphoria*, PLoS ONE 13(8): e0202330 at 13 (Parental survey concerning adolescents exhibiting Rapid Onset Gender Dysphoria reported that 62.5% of gender dysphoric adolescents had "a psychiatric disorder or neurodevelopmental disability preceding the onset of gender dysphoria.").

27. Gender dysphoria is **conceptualized and described by some professionals and laypersons as though it were a serious, physical medical illness that causes suffering**, comparable, for example, to prostate cancer, a disease that is curable before it spreads. Within this paradigm, whatever is causing distress associated with gender dysphoria—whether secondary sex characteristics such as facial hair, nose and jaw shape, presence or absence of breasts, or the primary anatomical sex organs of testes, ovaries, penis, or vagina—should be removed to alleviate the illness. The promise of these interventions is the cure of the gender dysphoria.

28. It should be noted, however, that gender dysphoria is a psychiatric, not a medical, diagnosis even though that is how it is often introduced into court settings. Since its inception in DSM-III in 1983, it has always been specified in the psychiatric DSM manuals and is not specified in medical diagnostic manuals. Notably, gender dysphoria is the only psychiatric condition to be treated by surgery, even though no endocrine or surgical intervention package corrects any identified biological abnormality. (Levine, *Reflections,* at 240.) This medicalization of gender dysphoria is at some level at odds with psychologists' longstanding concerns about or even opposition to "practice guidelines that recommend the use of medications over psychological interventions in the absence of data supporting such recommendations.[13]

[13] AM. PSYCH. ASS'N (2005) *Report of the 2005 Presidential Task Force on Evidence-Based Practice* at 2 (available at https://www.apa.org/practice/resources/evidence/evidence-based-report.pdf.)

29. Gender dysphoria is alternatively **conceptualized in developmental terms**, as an adaptation to a psychological problem that was first manifested as a failure to establish a comfortable conventional sense of self in early childhood or confusion about the self that intensifies with puberty. This paradigm starts from the premise that all human lives are influenced by past processes and events. Trans lives are not exceptions to this axiom. (Levine, *Reflections* at 238.) MHPs who think of gender dysphoria through this paradigm may work both to identify and address the apparent causes of the basic problem of the deeply uncomfortable self, and also to ameliorate suffering when the underlying problem cannot be solved. They work with the patient and (ideally) the patient's family to inquire what forces may have led to the trans person repudiating the gender associated with his sex. The developmental paradigm is mindful of temperamental, parental bonding, psychological, sexual, and physical trauma influences, and the fact that young children work out their psychological issues through fantasy and play. The developmental paradigm does not preclude a biological temperamental contribution to some patients' lives; it merely objects to assuming these problems are biological in origin. All sexual behaviors and experiences involve the brain and the body.

30. In addition, the developmental paradigm recognizes that, with the important exception of genetic sex, essentially all aspects of an individual's identity evolve—often markedly—across the individual's lifetime. This includes gender.

31. Some advocates assert that a transgender identity is biologically caused, fixed from early life, and invariably persists through life in an unchanging manner. This assertion, however, is not supported by science.[14] Although numerous studies have been undertaken to attempt to demonstrate a distinctive physical brain structure associated with transgender identity, as of yet there is no evidence that these patients have any defining abnormality in brain structure that precedes the onset of gender dysphoria. The belief that gender dysphoria is the consequence of brain structure is challenged by the sudden increase in incidence of child and adolescent gender dysphoria over the last twenty years in North America and Europe. Meanwhile, multiple studies have documented rapid shifts in gender ratios of patients presenting for care with gender-related issues, pointing to cultural influences,[15] while a recent study documented "clustering" of new presentations in specific schools and among specific friend groups, pointing to social influences.[16] Both of these findings strongly suggest cultural factors. From the beginning of epidemiological research into this arena, there have always been some countries (Poland and Australia, for example) where the sex ratios were reversed as compared to North America and Europe, again demonstrating a powerful effect of cultural influences.

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[14] Even the advocacy organization The Human Rights Campaign asserts that a person can have "a fluid or unfixed gender identity." https://www.hrc.org/resources/glossary-of-terms.

[15] Levine, *Ethical Concerns*, at 8 (citing M. Aitken et al. (2015), *Evidence for an Altered Sex Ratio in Clinic-Referred Adolescents with Gender Dysphoria*, J. OF SEXUAL MED.12(3) 756 at 756-63.)

[16] Lisa Littman (2018), *Parent reports of adolescents and young adults perceived to show signs of a rapid onset of dysphoria*, PLoS ONE 13(8): e0202330.

32. Further, as I detail later below, many studies and clinical observations confirm that gender identity can and does change or evolve over time for many individuals. And recent studies and anecdotal reports provide strong if preliminary evidence that therapeutic choices can have a powerful effect on whether and how gender identity does change, or gender dysphoria desists.

33. In recent years, for adolescent patients, intense involvement with online transgender communities or "friends" is the rule rather than the exception, and the MHP will also be alert to this as a potentially significant influence on the identity development of the patient. Finally, the large accumulating reports of late adolescent and young adult individuals who return to their natally assigned gender identity highlight the error of assuming a trans identity is a permanent feature[17].

34. The third paradigm through which gender dysphoria is alternatively conceptualized is from **a sexual minority rights perspective**. Under this paradigm, any response other than medical and societal affirmation and implementation of a patient's claim to "be" the opposite gender is a violation of the individual's civil right to self-expression. Any effort to ask "why" questions about the patient's condition, or to address underlying causes, is viewed as a violation of autonomy and civil rights. Any attempt to slowly review the risks of affirmative and alternative interventions in detail is viewed as irrelevant. In the last few years, this paradigm has been successful in influencing public policy and the education of

[17] P. Expósito-Campos (2021). *A Typology of Gender Detransition and Its Implications for Healthcare Providers*. J. OF SEX & MARITAL THERAPY, 47(3), 270–280.

pediatricians, endocrinologists, and many mental health professionals. Obviously, however, this is not a medical, psychiatric, or scientific perspective.

E. Four competing models of therapy

35. Because of the complexity of the human psyche and the difficulty of running controlled experiments in this area, substantial disagreements among professionals about the causes of psychological disorders, and about the appropriate therapeutic responses, are not unusual. When we add to this the very different paradigms for understanding transgender phenomena discussed above, it is not surprising that such disagreements also exist with regard to appropriate therapies for patients experiencing gender-related distress. I summarize below the leading approaches, and offer certain observations and opinions concerning them.

(1) The "watchful waiting" therapy model

36. I review below the uniform finding of follow-up studies that the large majority of children who present with gender dysphoria will desist from desiring a transgender identity by adulthood if left untreated. (Section III.A)

37. When a pre-adolescent child presents with gender dysphoria, a "watchful waiting" approach seeks to allow for the fluid nature of gender identity in children to naturally evolve—that is, take its course from forces within and surrounding the child. Watchful waiting has two versions:

a. Treating any other psychological co-morbidities—that is, other mental illnesses as defined by DSM-5—that the child may exhibit (e.g., separation anxiety, bedwetting, attention deficit disorder, obsessive-compulsive disorder) without a focus on gender (model #1); and

b. No treatment at all for anything but a regular follow-up appointment. This might be labeled a "hands off" approach (model #2).

(2) The psychotherapy model: Alleviate distress by identifying and addressing causes (model #3)

38. One of the foundational principles of psychotherapy has long been to work with a patient to identify the causes of observed psychological distress and then to address those causes as a means of alleviating the distress. The National Institute of Mental Health has promulgated the idea that 75% of adult psychopathology has its origins in childhood experience.

39. Many experienced practitioners in the field of gender dysphoria, including myself, have believed that it makes sense to employ these long-standing tools of psychotherapy for patients suffering gender dysphoria, asking the question as to what factors in the patient's life are the determinants of the patient's repudiation of his or her natal sex. (Levine, *Ethical Concerns*, at 8.) I and others have reported success in alleviating distress in this way for at least some patients, whether or not the patient's sense of discomfort or incongruence with his or her natal sex entirely disappeared. Relieving accompanying psychological co-morbidities leaves the patient freer to consider the pros and cons of transition as he or she matures.

40. Among other things, the psychotherapist who is applying traditional methods of psychotherapy may help—for example—the male patient appreciate the wide range of masculine emotional and behavioral patterns as he grows older. He may discuss with his patient, for example, that one does not have to become a

"woman" in order to be kind, compassionate, caring, noncompetitive, and devoted to others' feelings and needs.[18] Many biologically male trans individuals, from childhood to older ages, speak of their perceptions of femaleness as enabling them to discuss their feelings openly, whereas they perceive boys and men to be constrained from emotional expression within the family and larger culture. Men, of course, can be emotionally expressive, just as they can wear pink. Converse examples can be given for girls and women. These types of ideas regularly arise during psychotherapies.

41. As I note above, many gender-nonconforming children and adolescents in recent years derive from minority and vulnerable groups who have reasons to feel isolated and have an uncomfortable sense of self. A trans identity may be the individual's hopeful attempt to redefine the self in a manner that increases their comfort and decreases their anxiety. The clinician who uses traditional methods of psychotherapy may not focus on their gender identity, but instead work to help them to address the actual sources of their discomfort. Success in this effort may remove or reduce the desire for a redefined identity. This often involves a focus on disruptions in their attachment to parents in vulnerable children, for instance, those in the foster care system.

42. Because "watchful waiting" can include treatment of accompanying psychological co-morbidities, and the psychotherapist who hopes to relieve gender

[18] S. Levine (2017), *Transitioning Back to Maleness*, ARCH. OF SEXUAL BEHAVIOR 47(4) at 7 ("*Transitioning*") (available at https://link.springer.com/article/10.1007/s10508-017-1136-9.)

dysphoria may focus on potentially causal sources of psychological distress rather than on the gender dysphoria itself, there is no sharp line between "watchful waiting" and the psychotherapy model in the case of prepubescent children.

43. To my knowledge, there is no evidence beyond anecdotal reports that psychotherapy can predictably enable a return to male identification for gender dysphoric genetically male boys, adolescents, and men, or return to female identification for gender dysphoric genetically female girls, adolescents, and women. On the other hand, anecdotal evidence of such outcomes does exist. I and other clinicians have witnessed reinvestment in the patient's biological sex in some individual patients who are undergoing psychotherapy. And from the earliest days of my career, traditional psychotherapy showed both promise and beneficial outcomes in reducing the distress of gender dysphoria. It did so without presuming gender affirmation as a preferred or mandated approach. When distress is significantly lessened, the person may find some comfortable adaptation short of bodily change.

44. More recently, I myself have published a paper on a patient who sought my therapeutic assistance to reclaim his male gender identity after 30 years living as a woman and is in fact living as a man today, (Levine, *Transitioning*), I have seen children desist even before puberty in response to thoughtful parental interactions and a few meetings of the child with a therapist. I have seen patients desist when their intimate relationships change.

(3) The affirmation therapy model (model #4)

45. While it is widely agreed that the therapist should not directly challenge a claimed transgender identity in a child, some advocates and practitioners go much further, and promote and recommend that any expression of transgender identity should be immediately accepted as decisive, and thoroughly affirmed by means of consistent use of clothing, toys, pronouns, etc., associated with the transgender identity to which the child expresses an attraction. These advocates treat any question about the causes of the child's transgender identification as inappropriate and assume that observed psychological co-morbidities in the children or their families are unrelated or will get better with transition and need not be addressed by the MHP who is providing supportive guidance concerning the child's gender identity.

46. Some advocates, indeed, assert that unquestioning affirmation of any claim of transgender identity in children is essential, and that the child will otherwise face a high risk of suicide or severe psychological damage. I address claims about suicide and health outcomes in Sections IV and V below.

47. The idea that social transition is the only accepted treatment for prepubertal children is not correct. On the contrary, one respected academic in the field has recently written that "almost all clinics and professional associations in the world" do not use "gender affirmation" for prepubescent children and instead "delay any transitions after the onset of puberty."[19] This approach is widely

[19] J. Cantor (2020), *Transgender and Gender Diverse Children and Adolescents: Fact-Checking of AAP Policy*, J. OF SEX & MARITAL THERAPY VOL. 46, NO. 4, 307-313.

practiced because when the intrapsychic, biological, and social developmental processes of puberty are allowed to act unimpaired (but accompanied by supporting therapy), resolution of the gender dysphoria is by far the most common outcome.[20] Natural desistance offers a reasonable likelihood of sparing the individual the life-long physical, mental, and social stresses associated with living in a transgender identity, which I discuss in Section V.

48. It is notable that even the Standards of Care published by WPATH, an organization which in general leans strongly towards affirmation in the case of adults, do not specify affirmation of transgender identity as the indicated therapeutic response for young children. Instead, the WPATH Standards of Care recognize that social transition in early childhood "is a controversial issue, and divergent views are held by health professionals"; state that "[t]he current evidence base is insufficient to predict the long-term outcomes of completing a gender role transition during early childhood"; and acknowledge that "previously described relatively low persistence rates of childhood gender dysphoria" are "relevant" to the wisdom of social transition in childhood.[21]

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[20] D. Singh et al. (2021), *A Follow-Up Study of Boys With Gender Identity Disorder*, FRONTIERS IN PSYCHIATRY Vol. 12:632784 at 12 (available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8039393/.)

[21] WORLD PROF'L ASS'N FOR TRANSGENDER HEALTH (2011), *Standards of Care for the Health of Transsexual, Transgender, and Gender-Nonconforming People* (7th Version) at 17. I note that I regretfully resigned from the precursor organization of WPATH in 2002 after concluding that many of its positions of enthusiastic and unqualified support of transition for individuals suffering from gender dysphoria were dictated by politics and ideology, rather than by any scientific basis. WPATH is composed of a mix of practitioners and transgender activists with little or no scientific training, and its most recent self-designated "Standards of Care" are not reflective of the practices of a large number of psychiatrists and Ph.D. psychologists who practice in this area. For this reason, WPATH's cautious position with regard to transition of children who suffer from gender dysphoria is all the more notable.

49. In contrast to WPATH's cautious position with respect to children, in 2018 the American Academy of Pediatrics issued a statement asserting that "gender transition" "is safe, effective, and medically necessary treatment for the health and wellbeing of children and adolescents suffering from gender dysphoria."[22] But in a peer-reviewed paper, based on a careful review of the sources cited in the AAP statement, prominent researcher James Cantor concluded that "In its policy statement, AAP told neither the truth nor the whole truth, committing sins both of commission and of omission, asserting claims easily falsified by anyone caring to do any fact-checking at all," and described Rafferty 2018 as "a systematic exclusion and misrepresentation of entire literatures." (Cantor at 312.) Based on my professional expertise and my review of the literature, I agree with Dr. Cantor's evaluation of Rafferty 2018.

50. In fact, the DSM-5 added—for both children and adolescents—a requirement that a sense of incongruence between biological and felt gender must last at least six months as a precondition for a diagnosis of gender dysphoria, precisely because of the risk of "transitory" symptoms and "hasty" diagnosis that might lead to "inappropriate" treatments.[23]

51. I do not know what proportion of practitioners are using which model. However, in my opinion, in the case of young children, prompt and thorough

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[22] J. Rafferty (2018), *Committee on Psychosocial Aspects of Child and Family Health, Committee on Adolescence and Section on Lesbian, Gay, Bisexual, and Transgender Health and Wellness*, PEDIATRICS 142(4): 2018-2162.

[23] K. Zucker (2015), *The DSM-5 Diagnostic Criteria for Gender Dysphoria*, in C. Trombetta et al. (eds.), MANAGEMENT OF GENDER DYSPHORIA: A MULTIDISCIPLINARY APPROACH (Springer-Verlag Italia).

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affirmation of a transgender identity disregards the principles of child development and family dynamics and is not supported by science. Rather, the MHP must focus attention on the child's underlying internal and familial issues. Ongoing relationships between the MHP and the parents, and the MHP and the child, are vital to help the parents, child, other family members, and the MHP to understand over time the issues that need to be dealt with over time by each of them.

52. Likewise, since the child's sense of gender develops in interaction with his parents and their own gender roles and relationships, the responsible MHP will almost certainly need to delve into family and marital dynamics.

F. Patients differ widely and must be considered individually.

53. In my opinion, it is not possible to make a single, categorical statement about the proper treatment of children or adolescents presenting with gender dysphoria or other gender-related issues. There is no single pathway of development and outcomes governing transgender identity, nor one that predominates over the large majority of cases. Instead, as individuals grow up and age, depending on their differing psychological, social, familial, and life experiences, their outcomes differ widely.

54. As to causes in children and adolescents, details about the onset of gender dysphoria may be found in an understanding of family relationship dynamics. In particular, the relationship between the parents and each of the parents and the child, and each of the siblings and the child, should be well known by the MHP. Further, a disturbingly large proportion of children and adolescents who seek professional care in connection with gender issues have a wider history of

psychiatric co-morbidities. (*See supra* n. 12.) A 2017 study from the Boston Children's Hospital Gender Management Service program reported that: "Consistent with the data reported from other sites, this investigation documented that 43.3% of patients presenting for services had significant psychiatric history, with 37.1% having been prescribed psychotropic medications, 20.6% with a history of self-injurious behavior, 9.3% with a prior psychiatric hospitalization, and 9.3% with a history of suicide attempts." (Edwards-Leeper at 375.) It seems likely that an even higher proportion will have had prior undiagnosed psychiatric conditions.

55. In the case of adolescents, as I have noted above, there is evidence that peer social influences through "friend groups" (Littman) or through the internet can increase the incidence of gender dysphoria or claims of transgender identity, so the responsible MHP will want to probe these potential influences to better understand what is truly deeply tied to the psychology of this particular individual, and what may instead be "tried on" by the youth as part of the adolescent process of self-exploration and self-definition.

III. GENDER IDENTITY, GENDER DYSPHORIA, AND THERAPIES FOR GENDER DYSPHORIA IN YOUNGER CHILDREN

A. Natural desistance is by far the most frequent resolution of gender dysphoria in young children absent social transition.

56. A distinctive and critical characteristic of juvenile gender dysphoria is that multiple studies from separate groups and at different times have reported that in the large majority of patients, absent a substantial intervention such as social transition and/or hormone therapy, the dysphoria does *not* persist through puberty. A recent article reviewed all existing follow-up studies that the author

could identify of children diagnosed with gender dysphoria (11 studies) and reported that "every follow-up study of GD children, without exception, found the same thing: By puberty, the majority of GD children ceased to want to transition." (Cantor at 307.) Another author reviewed the existing studies and reported that in "prepubertal boys with gender discordance . . . the cross gender wishes usually fade over time and do not persist into adulthood, with only 2.2% to 11.9% continuing to experience gender discordance."[24] A third summarized the existing data as showing that "Symptoms of GID at prepubertal ages decrease or disappear in a considerable percentage of children (estimates range from 80-95%)."[25] As cited above, a 2021 extended follow-up of originally evaluated prepubertal boys found a persistence rate of only 12 percent. (Singh 2021.)

57. It is not yet known how to distinguish those children who will desist from that small minority whose trans identity will persist. (Levine, *Ethical Concerns*, at 9.)

58. Desistance within a relatively short period may also be a common outcome for post-pubertal youths who exhibit recently described "rapid onset gender disorder." I observe an increasingly vocal online community of young women who have reclaimed a female identity after claiming a male gender identity at some

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[24] S. Adelson & American Academy of Child & Adolescent Psychiatry (2012), *Practice Parameter on Gay, Lesbian, or Bisexual Sexual Orientation, Gender Nonconformity, and Gender Discordance in Children and Adolescents*, J. AM. ACAD. CHILD ADOLESCENT PSYCHIATRY 51(9) 957 at 963 ("*Practice Parameter*").

[25] P. T. Cohen-Kettenis et al. (2008), *The Treatment of Adolescent Transsexuals: Changing Insights*, J. SEXUAL MED. 5(8) 1892 at 1895.

point during their teen years. However, data on outcomes for this age group with and without therapeutic interventions is not yet available to my knowledge.

B. Social transition of young children is a powerful psychotherapeutic intervention that changes outcomes.

59. In contrast, there is now data that suggests that a therapy that encourages social transition before or during puberty dramatically changes outcomes. A prominent group of authors has written that "The gender identity affirmed during puberty appears to predict the gender identity that will persist into adulthood," and "Youth with persistent TNG [transgender, nonbinary, or gender-nonconforming] identity into adulthood . . . are more likely to have experienced social transition, such as using a different name . . . which is stereotypically associated with another gender at some point during childhood."[26] Similarly, a comparison of recent and older studies suggests that when an "affirming" methodology is used with children, a substantial proportion of children who would otherwise have desisted by adolescence—that is, achieved comfort identifying with their sex—instead persist in a transgender identity. (Zucker, *Myth of Persistence*, at 7).[27]

60. Indeed, a review of multiple studies of children treated for gender dysphoria across the last three decades found that early social transition to living as

[26] C. Guss et al. (2015), *Transgender and gender nonconforming adolescent care: psychosocial and medical considerations*. CURR. OPIN. PEDIATR. 27(4):421 ("*TGN Adolescent Care*").

[27] One study found that social transition by the child was found to be strongly correlated with persistence for natal boys, but not for girls. (Zucker, *Myth of Persistence,* at 5 (citing T. D. Steensma, et al. (2013), *Factors Associated with Desistance & Persistence of Childhood Gender Dysphoria: A Qualitative Follow-up Study*, J. OF THE AM. ACAD. OF CHILD & ADOLESCENT PSYCHIATRY 52, 582.))

the opposite sex severely reduces the likelihood that the child will revert to identifying with the child's natal sex, at least in the case of boys. That is, while, as I review above, studies conducted before the widespread use of social transition for young children reported desistance rates in the range of 80-98%, a more recent study reported that fewer than 20% of boys who engaged in a partial or complete social transition before puberty had desisted when surveyed at age 15 or older. (Zucker, *Myth of Persistence*, at 7; Steensma (2013).)[28] Some vocal practitioners of prompt affirmation and social transition even claim that essentially *no* children who come to their clinics exhibiting gender dysphoria or cross-gender identification desist in that identification and return to a gender identity consistent with their biological sex. As one internationally prominent practitioner stated, "In my own clinical practice . . . of those children who are carefully assessed as transgender and who are allowed to transition to their affirmed gender, we have no documentation of a child who has 'desisted' and asked to return to his or her assigned gender."[29] Given the consensus that no method exists to reliably predict which children suffering from gender dysphoria will desist and which persist, and given the absence of any study demonstrating the validity of any such method, this is a disconcerting statement. Certainly, it reflects a very large change as compared to the desistance rates documented apart from social transition.

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[28] Only 2 (3.6%) of 56 of the male desisters observed by Steensma et al. had made a complete or partial transition prior to puberty, and of the twelve males who made a complete or partial transition prior to puberty, only two had desisted when surveyed at age 15 or older. Steensma (2013) at 584.

[29] D. Ehrensaft (2015), *Listening and Learning from Gender-Nonconforming Children,* THE PSYCHOANALYTIC STUDY OF THE CHILD 68(1) 28 at 34.

61. Accordingly, I agree with noted researcher in the field Ken Zucker, who has written that social transition in children must be considered "a form of psychosocial treatment." (Zucker, *Debate,* at 1.)

62. I also agree with Dr. Zucker's further observation that "…we cannot rule out the possibility that early successful treatment of childhood GID [Gender Identity Disorder] will diminish the role of a continuation of GID into adulthood. If so, successful treatment would also reduce the need for the long and difficult process of sex reassignment which includes hormonal and surgical procedures with substantial medical risks and complications."[30]

63. By the same token, a therapeutic methodology for children that *increases* the likelihood that the child will continue to identify as the opposite gender into adulthood will *increase* the need for the long and potentially problematic processes of hormonal and genital and cosmetic surgical procedures.

64. Given these facts, it is the cross-gender affirming methods endorsed by gender identity advocates that are changing the identity outcomes that would otherwise naturally result for the large majority of prepubertal children who suffer from gender dysphoria. It is thus these methods that could most properly be described as "conversion therapy." By contrast, the watchful waiting approach which monitors the child's mental health while working to resolve co-morbidities and reduce life stress, and while allowing time for the natural psychosocial

[30] Zucker, *Myth of Persistence*, at 8 (citing H. Meyer-Bahlburg (2002), *Gender Identity Disorder in Young Boys: A Parent- & Peer-Based Treatment Protocol*, CLINICAL CHILD PSYCHOLOGY & PSYCHIATRY 7, 360 at 362.)

developmental processes of adolescence to shape the child's identity, is properly seen as the far less invasive therapeutic approach.

65. Not surprisingly, given these facts, encouraging social transition in children remains controversial. Supporters of such transition acknowledge that "Controversies among providers in the mental health and medical fields are abundant. . . . These include differing assumptions regarding . . . the age at which children . . . should be encouraged or permitted to socially transition . . . . These are complex and providers in the field continue to be at odds in their efforts to work in the best interests of the youth they serve."[31]

66. In sum, therapy for young children that encourages transition (including use of names, pronouns, clothing, and restrooms associated with the opposite sex) cannot be considered to be neutral, but instead is an experimental procedure that has a high likelihood of changing the life path of the child, with highly unpredictable effects on mental and physical health, suicidality, and life expectancy. Claims that a civil right is at stake do not change the fact that what is proposed is a social and medical experiment. (Levine, *Reflections,* at 241.) Ethically, then, it should be undertaken only subject to standards, protocols, and reviews appropriate to such experimentation. In my judgment, many gender clinics today are encouraging and assisting children to transition without following these ethically required procedures.

[31] A. Tishelman et al. (2015), *Serving Transgender Youth: Challenges, Dilemmas and Clinical Examples*, PROF. PSYCHOL. RES. PR. at 11 ("*Serving TG Youth*") (available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4719579/pdf/nihms706503.pdf).

67. Moreover, it is not clear how these clinics could create a legal, ethical, and practical informed consent process. Parents would need to understand the risks and benefits of the recommended therapy and of alternative approaches, and to grapple with the scientific deficiencies in this arena, including: the absence of randomized controlled studies, the absence of long follow-up studies of previous children who have undergone these interventions, and the rates of success and failure of the intervention. And it is a difficult question when either minors or parents can ethically (and perhaps legally) grant consent to a medical or therapeutic pathway that carries a high probability of leading to prescription of potentially sterilizing drugs while the child is still a minor. In every case, the professional has an ethical obligation to ensure that meaningful and legal informed consent is obtained.

C. The administration of puberty blockers to children as a treatment for gender dysphoria is experimental, presents obvious medical risks, and appears to affect identity outcomes.

68. Gender clinics are increasingly prescribing puberty blockers for children as young as ten, as a component of a regime that commonly includes social transition. Puberty blockers are often described as merely providing a completely reversible "pause," which supposedly gives the child additional time to determine his or her gender identity while avoiding distress which would be caused by pubertal development of the body consistent with the child's biological sex. The language used about puberty blockers often states or implies that this major hormonal disruption of some of the most basic aspects of ordinary human development is a small thing, and entirely benign.

69. In fact, it is important to recognize that the available (limited) evidence suggests that clinically, puberty blockers administered to children at these ages, for this purpose, and in conjunction with social transition, do not operate as a "pause." After reviewing the evidence provided by experts from different perspectives, including an expert declaration that I submitted, the U.K. High Court recently concluded that "the vast majority of children who take [puberty blockers] move on to take cross-sex hormones," and thus that puberty blockers in practice act as a "stepping stone to cross-sex hormones."[32] In my opinion, this finding accurately summarizes the available data.

70. It is equally important to recognize that administration of puberty blockers as a treatment for gender dysphoria is an off-label use of these powerful drugs which is entirely experimental. This application can by no means be considered equivalent to the only application for which puberty blockers have been tested for efficacy and safety and approved—which is for the delay of precocious puberty until the normal time for pubertal development. The U. K. High Court panel accurately summarized the science when they described the use of puberty blockers as "experimental" and as putting children on a "clinical pathway" which is a "lifelong and life changing treatment . . . with very limited knowledge of the degree to which it will or will not benefit them." (*Tavistock*, ¶¶136, 143.)

[32] Opinion of the United Kingdom High Court of Justice Administrative Court, Divisional Court (December 1, 2020), in *Bell and A. v. Tavistock and Portman NHS Trust and Others*, Case No: CO/60/2020, at ¶¶136-137 (available at https://www.judiciary.uk/wp-content/uploads/2020/12/Bell-v-Tavistock-Judgment.pdf.)

71. This is a very profound experiment being conducted on children. It is well known that the hormonal changes associated with ordinary puberty drive not only the obvious physical and sexual changes in the adolescent, but also drive important steps in cognitive development—that is, in brain functioning—as well as increases in bone density. As the bodies and interests of peers change, the trans adolescent who—as a result of puberty blockade hormones— maintains a puerile appearance and development, risks isolation and social anxiety. This risk is not given adequate weight when the treatment is justified as creating merely a useful pause.

72. We simply do not have meaningful data concerning the long-term effects on brain, bone, and other organs of interrupting or preventing this natural developmental process between the ages of 10 and 16. Psychology likewise does not know the long-term effects on coping skills, interpersonal comfort, and intimate relationships of pubertal blockade and, as it were, standing on the sideline in the years when one's peers are undergoing their maturational gains in these vital arenas of future mental health.

73. A number of recent papers have claimed to report beneficent or at least neutral short-term effects of use of puberty blockers. None of these even purports to address long-term effects as the subjects mature into adulthood, and even as to short-term effects these studies suffer from methodological deficiencies that prevent them from supporting such conclusions. Recently, the British National Health Service commissioned the respected National Institute for Health and Care

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Excellence (NICE) to conduct a thorough evidence review of all available studies that touch on the efficacy and safety of use of puberty blockers for children with gender dysphoria. The exhaustive, 130-page results of this review were published in October 2020. While of course this report provides extensive detail, its overall summary was that, according to widely accepted criteria for measuring the reliability of clinical evidence, "The quality of evidence for [all claims concerning safety and efficacy of this use of puberty blockers] was assessed as very low certainty."[33] They found that "the studies all lack appropriate controls" and "were not reliable," that "the studies that reported safety outcomes provided very low certainty evidence," and that studies that claimed marginally positive outcomes "could represent changes that are either of questionable clinical value, or the studies themselves are not reliable and changes could be due to confounding bias or chance." (NICE at 13.)

74. So far as I am aware, no study yet reveals whether the life-course mental and physical health outcomes for the relatively new class of "persisters" (that is, those who would have desisted absent a transgender-affirming social and/or pharmaceutical intervention, but instead persisted as a result of such interventions) are more similar to those of the general non-transgender population, or to the notably worse outcomes exhibited by the transgender population generally.

[33] NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE (2020), Evidence review: Gonadotrophin releasing hormone analogues for children and adolescence with gender dysphoria (available at https://arms.nice.org.uk/resources/hub/1070905/attachment.)

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75. Taking into account the risks, the lack of any reliable evidence concerning long-term outcomes from the use of puberty blockers, and the inability of pre-adolescents and even adolescents to comprehend the physical, relational, and emotional significance of life as a sexually mature adult, I also agree with the conclusion of the U. K. High Court that "it is highly unlikely that a child age 13 or under would ever be . . . competent to give consent to being treated with [puberty blockers]," and that it is "very doubtful" that a child of 14 or 15 "could understand the long-term risks and consequences of treatment in such a way as to have sufficient understanding to give consent." (*Tavistock*, ¶ 145.)

IV. THE AVAILABLE DATA DOES NOT SUPPORT THE CONTENTION THAT "AFFIRMATION" OF TRANSGENDER IDENTITY IN CHILDREN AND ADOLESCENTS REDUCES SUICIDE OR RESULTS IN BETTER PHYSICAL OR MENTAL HEALTH OUTCOMES GENERALLY.

76. I am aware that organizations including The Academy of Pediatrics and Parents and Friends of Lesbians and Gays (PFLAG) have published statements that suggest that all children who express a desire for a transgender identity should be promptly supported in that claimed identity. Recently, the governing counsel of the American Psychological Association adopted the *APA Resolution on Gender Identity Change Efforts*, which broadly (and wrongly) categorizes any approach to gender dysphoria other than gender affirming methods as unethical and dangerous. These positions appear to rest on the belief—which is widely promulgated by certain advocacy organizations—that science has already established that prompt "affirmance" is best for all patients, including all children and adolescents, who

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present indicia of transgender identity.[34] As I have discussed above and further discuss later below, this belief is scientifically incorrect, and ignores both what is known and what is unknown.

77. The knowledge base concerning the causes and treatment of gender dysphoria has low scientific quality.

78. In evaluating claims of scientific or medical knowledge, it is important to understand that it is axiomatic in science that no knowledge is absolute, and to recognize the widely-accepted hierarchy of reliability when it comes to "knowledge" about medical or psychiatric phenomena and treatments. Unfortunately, in this field opinion is too often confused with knowledge, rather than clearly locating what exactly is scientifically known. In order of increasing confidence, such "knowledge" may be based upon data comprising:

a. Expert opinion—it is perhaps surprising to educated laypersons that expert opinion standing alone is the lowest form of knowledge, the least likely to be proven correct in the future, and therefore does not garner as much respect from professionals as what follows;

b. A single case or series of cases (what could be called anecdotal evidence) (Levine, *Reflections*, at 239.);

c. A series of cases with a control group;

d. A cohort study;

[34] The APA Resolution on Gender Identity Change Efforts (APA GICE Resolution) is available at https://www.apa.org/about/policy/ resolution-gender-identity-change-efforts.pdf.

e. A randomized double-blind clinical trial;

f. A review of multiple trials;

g. A meta-analysis of multiple trials that maximizes the number of patients treated despite their methodological differences to detect trends from larger data sets.

79. The strongest forms of scientific knowledge emerge from the latter three types of research—randomized, blind trials; reviews of multiple randomized, blind trials, and meta-analyses. When the APA Task Force on Promotion and Dissemination of Psychological Procedures considered what criteria would empirically validate a treatment, the task force relied heavily on whether a procedure had been "tested in randomized controlled trials (RCT) with a specific population and implemented using a treatment manual."[35] Social affirmation of children, use of puberty blockers as a treatment for gender dysphoria, and administration of cross-sex hormones to adolescents, have never been clinically tested and validated in this way.

80. Critically, "there are no randomized control trials with regard to treatment of children with gender dysphoria." (Zucker, *Myth of Persistence,* at 8.) On numerous critical questions relating to cause, developmental path if untreated, and the effect of alternative treatments, the knowledge base remains primarily at the level of the practitioner's exposure to individual cases, or multiple individual

[35] Am. Psych. Assoc'n (2006), *Evidence-Based Practice in Psychology*, AM. PSYCHOLOGIST, Vol. 61, No. 4, 271 at 272.

cases. As a result, claims to certainty are not justifiable. (Levine, *Reflections*, at 239.)

81. Unfortunately, advocates of unquestioning affirmation further complicate efforts to understand the available science by speaking indistinctly, ignoring differences between approaches that are likely to be clinically important. For example, the recent APA resolution speaks of "individuals who have experienced pressure or coercion to conform to their sex assigned at birth." (APA GICE at 1.) "Pressure or coercion" does not describe either the "watchful waiting" or psychotherapy models I have described above, nor therapy structured around a patient's own desire to become comfortable with his or her natal sex. Nor is it possible to extrapolate from outcomes experienced by those who have been subjected to "coercive" techniques to predict outcomes for patients who receive responsible "watchful waiting" or psychotherapeutic care as I have described and as many experienced practitioners practice.

82. Unsurprisingly, prominent voices in the field have emphasized the severe lack of scientific knowledge in this field. The American Academy of Child and Adolescent Psychiatry has recognized that "Different clinical approaches have been advocated for childhood gender discordance. . . . There have been no randomized controlled trials of any treatment. . . . [T]he proposed benefits of treatment to eliminate gender discordance … must be carefully weighed against … possible deleterious effects." (Adelson et al., *Practice Parameter,* at 968–69.) Similarly, the APA has stated, "because no approach to working with [transgender and gender

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nonconforming] children has been adequately, empirically validated, consensus does not exist regarding best practice with pre-pubertal children."[36]

83. Contrary to the impression that statements in the recent APA GICE Resolution might leave, recent published research has not changed this situation. It remains the case that no randomized controlled trials of any treatment for gender dysphoria have been conducted, and recently published studies suffer from other serious methodological defects as well.

84. For example, the APA GICE Resolution cites Turban et al. (2020), *Association between recalled exposure to gender identity conversion efforts and psychological distress and suicide attempts among transgender adults*,[37] ("*Association*"), and this article has been cited to support claims that failing to affirm a transgender identity in children presenting with gender dysphoria results in a higher risk of their attempting suicide.

85. But the sample and methodology of Turban, *Association* (2020) are profoundly flawed and cannot support such a conclusion. A group of researchers has published a detailed critique of these defects,[38] which I will not attempt to replicate here. To highlight the most obvious defects, however, *Association* (2020) relied entirely on data drawn from an online convenience sampling of transgender-identified and genderqueer adults recruited from trans-affirming websites. It is well

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[36] Am. Psych. Assoc'n (2015), *Guidelines for Psychological Practice with Transgender & Gender Nonconforming People*, AM. PSYCHOLOGIST 70(9) 832 at 842.

[37] 77 JAMA PSYCHIATRY 77(1) 68-76.

[38] R. D'Angelo, et al., *One Size Does Not Fit All: In Support of Psychotherapy for Gender Dysphoria* (2021), ARCH. SEX BEHAV. 50, 7-16.

known that one "cannot make statistical generalizations from research that relies on convenience sampling."[39] Nor did the authors of *Association* (2020) control for the subjects' mental health status prior to the reported exposure to what the study deemed a "gender identity change effort." I agree with D'Angelo et al. (2021) that "failure to control for the subjects' baseline mental health makes it impossible to determine whether the mental health or the suicidality of subjects worsened, stayed the same, or potentially even improved after the non-affirming encounter." (D'Angelo (2021) at 10.)

86. Looking at the literature in this area more broadly, a review of 28 studies of outcomes from hormonal therapy in connection with sex reassignment reported that these studies provided only "very low quality evidence" for a variety of reasons.[40] Large gaps exist in the medical community's knowledge regarding the long-term effects of sex-reassignment surgery (SRS) and other gender identity disorder treatments in relation to their positive or negative correlation to suicidal ideation, attempts, and completion.

87. What is known is not encouraging. With respect to suicide, individuals with gender dysphoria are well known to commit suicide or otherwise suffer increased mortality before and after not only social transition, but also before and

[39] *Handbook of Survey Methodology for the Social Sciences* (2021) (Lior Gideon, ed. Springer).

[40] H. Murad et al. (2010), *Hormonal therapy and sex reassignment: a systematic review and meta-analysis of quality of life and psychosocial outcomes.* CLINICAL ENDOCRINOLOGY; 72(2): 214-231. See also R. D'Angelo (2018), *Psychiatry's ethical involvement in gender-affirming care*, AUSTRALASIAN PSYCHIATRY Vol 26(5) 460-463, noting the large number of non-responders in follow-up outcome studies, and observing that "it is generally not known whether they are alive or dead," and that "it is . . . pure speculation to assume that none committed suicide."

after SRS. (Levine, *Reflections,* at 242.) For example, in the United States, the death rates of trans veterans are comparable to those with schizophrenia and bipolar diagnoses—20 years earlier than expected. These crude death rates include significantly elevated suicide rates. (Levine, *Ethical Concerns,* at 10.) Similarly, researchers in Sweden and Denmark have reported on almost all individuals who underwent sex-reassignment surgery over a 30-year period.[41] The Swedish follow-up study found a suicide rate in the post-SRS population 19.1 times greater than that of the controls; both studies demonstrated elevated mortality rates from medical and psychiatric conditions. (Levine, *Ethical Concerns,* at 10.)

88. Advocates of immediate and unquestioning affirmation of social transition in children who indicate a desire for a transgender identity sometimes assert that any other course will result in a high risk of suicide in the affected children and young people. Contrary to these assertions, no studies show that affirmation of children (or anyone else) reduces suicide, prevents suicidal ideation, or improves long-term outcomes, as compared to either a "watchful waiting" or a psychotherapeutic model of response, as I have described above.[42]

89. In considering "suicide," mental health professionals distinguish between suicidal thoughts (ideation), suicide gestures, suicide attempts with a

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[41] C. Dhejne et al. (2011), *Long-Term Follow-Up of Transsexual Persons Undergoing Sex Reassignment Surgery: Cohort Study in Sweden*, PLoS ONE 6(2) e16885 ("*Long Term*"); R. K. Simonsen et al. (2016), *Long-Term Follow-Up of Individuals Undergoing Sex Reassignment Surgery: Psychiatric Morbidity & Mortality*, NORDIC J. OF PSYCHIATRY 70(4):241-7

[42] A recent article, J. Turban et al. (2020), *Puberty Suppression for Transgender Youth and Risk of Suicidal Ideation*, PEDIATRICS 145(2), has been described in press reports as demonstrating that administration of puberty-suppressing hormones to transgender adolescents reduces suicide or suicidal ideation. The paper itself does not make that claim, nor permit that conclusion.

lethal potential, and completed suicide. Numerous studies have found suicidal ideation to have been present at some time in life in ~40-50% of trans-identifying persons. This figure is approximately twice that reported in gay and lesbian communities. In the heteronormative communities, ideation is approximately 4%. Mental health professionals distinguish clearly between gestures and potentially lethal attempts, which often result in hospitalization.

90. I will also note that any discussion of suicide when considering younger children involves very long-range and very uncertain prediction. Suicide in pre-pubescent children is rare and the existing studies of gender identity issues in pre-pubescent children do not report significant incidents of suicide. The estimated suicide rate of trans adolescents is the same as teenagers who are in treatment for serious mental illness. What trans teenagers do demonstrate is more suicidal ideation and attempts (however serious) than other teenagers.[43] Their completed suicide rates are not known.

91. In sum, claims that affirmation will reduce the risk of suicide for children are not based on science. Such claims overlook the lack of even short-term supporting data as well as the lack of studies of long-term outcomes resulting from the affirmation or lack of affirmation of transgender identity in children. They also overlook the other tools that the profession does have for addressing depression and

[43] A. Perez-Brumer, et al. (2017), *Prevalence & Correlates of Suicidal Ideation Among Transgender Youth in Cal.: Findings from a Representative, Population-Based Sample of High Sch. Students*, J. AM. ACAD. CHILD ADOLESCENT PSYCHIATRY 56(9) at 739.

suicidal thoughts in a patient once that risk is identified. (Levine, *Reflections*, at 242.)

92. A number of data sets have also indicated significant concerns about wider indicators of physical and mental health, including ongoing functional limitations;[44] substance abuse, depression, and psychiatric hospitalizations;[45] and increased cardiovascular disease, cancer, asthma, and COPD.[46] Worldwide estimates of HIV infection among transgendered individuals are up to 17-fold higher than the cisgender population. (Levine, *Informed Consent,* at 6.)

93. Meanwhile, no studies show that affirmation of pre-pubescent children or adolescents leads to more positive outcomes (mental, physical, social, or romantic) by, e.g., age 25 or older than does "watchful waiting" or ordinary therapy. Because affirmation and social transition for children and adolescents, and the use of puberty blockers for transgender children, are a recent phenomenon, it could hardly be otherwise.

94. Given what is known and what is not known about the incidence and causes of suicide attempts and suicide in children and adolescents who suffer from gender dysphoria, and what is known about the incidence of suicide attempts and suicide in individuals who have transitioned to live in a transgender identity, it is in

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[44] G. Zeluf, et al. (2016), *Health, Disability and Quality of Life Among Trans People in Sweden—A Web-Based Survey*, BMC PUBLIC HEALTH 16, 903.

[45] C. Dhejne, et al. (2016), *Mental Health & Gender Dysphoria: A Review of the Literature*, INT'L REV. OF PSYCHIATRY 28(1) 44.

[46] C. Dragon, et al. (2017), *Transgender Medicare Beneficiaries & Chronic Conditions: Exploring Fee-for-Service Claims Data*, LGBT HEALTH 4(6) 404.

my view unethical for a mental health professional to tell a young patient, or the parents of a young patient, that social transition, puberty blockers, or use of cross-sex hormones will reduce the likelihood that the young person will commit suicide.

95. Instead, transition of any sort must be justified, if at all, as a life-enhancing measure, not a lifesaving measure. (Levine, *Reflections,* at 242.) In my opinion, this is an important fact that patients, parents, and even many MHPs fail to understand.

V. KNOWN, LIKELY, OR POSSIBLE DOWNSIDE RISKS ATTENDANT ON MOVING QUICKLY TO "AFFIRM" TRANSGENDER IDENTITY IN CHILDREN AND ADOLESCENTS.

96. As I have detailed above, enabling and affirming social transition in a prepubescent child appears to be highly likely to increase the odds that the child will in time pursue pubertal suppression and persist in a transgender identity into adulthood. This means that the MHP, patient, and in the case of minors, parents must consider long-term as well as short-term implications of life as a transgender individual when deciding whether to permit or encourage a child to socially transition.

97. Indeed, given the very high rates of children who desist from desiring a trans identity through the course of uninterrupted puberty, it is efforts to "affirm" a sex-discordant gender identity in prepubescent children that should be understood as the therapeutic path that is most likely to "change" or "convert" the child's adult gender identification, diverting the child from his or her probable maturation away from trans-identification.

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98. The APA and other gender identity advocates argue that gender affirmation practices are safe and effective. (APA GICE Resolution at 3.) But if we consider the long term—a life course perspective— a great deal of data point in the opposite direction. The multiple studies from different nations (including societies which pride themselves on being actively inclusive of sexual minorities, such as Sweden and Denmark) that have documented the increased vulnerability of the adult transgender population to substance abuse, mood and anxiety disorders, suicidal ideation, and other health problems warn us that assisting the child or adolescent down the road to becoming a transgender adult is a very serious decision, and stand as a reminder that a casual assumption that transition will improve the young person's life is not justified based on numerous scientific snapshots of cohorts of trans adults and teenagers. American public health professionals repeatedly have published descriptions of trans populations as marginalized and vulnerable to many adversities.[47]

99. The possibility that steps along this pathway, while lessening the pain of gender dysphoria, could lead to additional sources of crippling emotional and psychological pain, are too often not considered by advocates of social transition and not considered at all by the trans child. (Levine, *Reflections,* at 243.)

100. I detail below several classes of predictable, likely, or possible harms to the patient associated with transitioning to live as a transgender individual.

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[47] K. L. Ard, & A. S. Keuroghlian (2018), *Training in Sexual and Gender Minority Health - Expanding Education to Reach All Clinicians*. NEW ENGLAND J. OF MED, 379(25), 2388–2391; W. Liszewski et al. (2018), *Persons of Nonbinary Gender - Awareness, Visibility, and Health Disparities*. NEW ENGLAND J. OF MED., 379(25), 2391–2393.

A. Physical risks associated with transition

101. Sterilization. It is not uncommon for patients who begin down the path defined by puberty blockers and social transition to end up feeling the need to undergo surgical treatment to alleviate gender dysphoria. As I have noted above, there is not good scientific evidence that SRS results in better long-term mental health outcomes. What is certain, however, is that SRS that removes testes, ovaries, or the uterus is inevitably sterilizing, and irreversible. While some patients who have experienced regret after undergoing SRS have then undergone reconstructive surgery, such surgery cannot restore fertility. And while by no means all transgender adults elect SRS, many patients do ultimately feel compelled to take this serious step in their effort to live fully as the opposite sex.

102. More immediately, practitioners recognize that the administration of cross-sex hormones, which is often viewed as a less "radical" measure, and is now increasingly done to minors, creates at least a risk of irreversible sterility. The U.K. High Court in the Tavistock litigation, after reviewing the evidence, concluded that cross-sex hormones "may well lead to a loss of fertility," and in my opinion that finding accurately summarizes the present medical understanding.[48] As a result, even when treating a child, the MHP, patient, and parents must consider loss of reproductive capacity—sterilization—to be one of the major risks of starting down the road. The risk that supporting social transition may put the child on a pathway

[48] *Bell v. Tavistock* Opinion (December 1, 2020), ¶138. *See also* C. Guss et al., *TGN Adolescent Care* at 4 ("a side effect [of cross-sex hormones] may be infertility") and 5 ("cross-sex hormones . . . may have irreversible effects"); Tishelman et al., *Serving TG Youth* at 8 (Cross-sex hormones are "irreversible interventions" with "significant ramifications for fertility").

that leads to intentional or unintentional permanent sterilization is particularly concerning given the disproportionate representation of minority and other vulnerable groups among children reporting a transgender or gender-nonconforming identity. (*See supra* ¶ 24.)

103. Loss of sexual response. Puberty blockers prevent maturation of the sexual organs and response. Some, and perhaps many, transgender individuals who transitioned as children and thus did not go through puberty consistent with their sex face significantly diminished sexual response as they enter adulthood and are unable ever to experience orgasm. In the case of males, the cross-sex administration of estrogen limits penile genital function. Much has been written about the negative psychological and relational consequences of anorgasmia among non-transgender individuals that is ultimately applicable to the transgendered. (Levine, *Informed Consent,* at 6.)

104. Other effects of hormone administration. I have discussed the risks and unknowns associated with puberty blockers above, noting that most children who are started on puberty blockers continue on the pathway to cross-sex hormones. It is well known that many effects of cross-sex hormones cannot be reversed should the patient later regret his transition. After puberty, the individual who wishes to live as the opposite sex will in most cases have to take cross-sex hormones for most of their life, even after undergoing sex reassignment surgery.

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105. The long-term health risks of this major alteration of hormonal levels have not yet been quantified in terms of exact risk.[49] However, a recent study found greatly elevated levels of strokes and other acute cardiovascular events among male-to-female transgender individuals taking estrogen. Those authors concluded, "it is critical to keep in mind that the risk for these cardiovascular events in this population must be weighed against the benefits of hormone treatment."[50] Another group of authors similarly noted that administration of cross-sex hormones creates "an additional risk of thromboembolic events"—which is to say blood clots (Guss et al., *TGN Adolescent Care* at 5), which are associated with strokes, heart attacks, and lung and liver failure. Clinicians must distinguish the apparent short-term safety of hormones from likely or possible long-term consequences, and help the patient or parents understand these implications as well. The young patient may feel, "I don't care if I die young, just as long I get to live as a woman." The mature adult may take a different view.

106. Health risks inherent in complex surgery. Complications of surgery exist for each procedure,[51] and complications in surgery affecting the reproductive organs and urinary tract can have significant anatomical and functional complications for the patient's quality of life.

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[49] *See* Tishelman et al., *Serving TG Youth* at 6-7 (Long-term effect of cross-sex hormones "is an area where we currently have little research to guide us.").

[50] D. Getahun et al. (2018), *Cross-Sex Hormones and Acute Cardiovascular Events in Transgender Persons: A Cohort Study*, ANN. OF INTERN. MED. 169(4) 205 at 8.

[51] Levine, *Informed Consent*, at 5 (citing T. van de Grift, G. Pigot et al. (2017), *A Longitudinal Study of Motivations Before & Psychosexual Outcomes After Genital Gender-Confirming Surgery in Transmen*, J. SEXUAL MED.14(12) 1621).

107. Disease and mortality generally. The MHP, the patient, and in the case of a child, the parent must also be aware of the wide sweep of strongly negative health outcomes among transgender individuals, as I have detailed above.

B. Social risks associated with transition

108. Family and friendship relationships. Gender transition routinely leads to isolation from at least a significant portion of one's family in adulthood. In the case of a juvenile transition, this will be less dramatic while the child is young, but commonly increases over time as the child and his siblings mature into adulthood. By adulthood, the friendships of transgender individuals tend to be confined to other transgender individuals (often "virtual" friends known only online) and the generally limited set of others who are comfortable interacting with transgender individuals. (Levine, *Ethical Concerns,* at 5.)

109. Long term psychological and social impact of sterility. The life-long negative emotional impact of infertility on both men and women has been well studied. While this impact has not been studied specifically within the transgender population, the opportunity to be a parent is likely a human, emotional need, and so should be considered an important risk factor when considering gender transition for any patient. However, it is particularly difficult for parents of a young child to seriously contemplate that child's potential as a future parent and grandparent. This makes it all the more critical that the MHP spend substantial and repeated time with parents to help them see the implications of what they are considering.

110. Sexual-romantic risks associated with transition. After adolescence, transgender individuals find the pool of individuals willing to develop a romantic

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and intimate relationship with them to be greatly diminished. When a trans person who passes well reveals his or her natal sex, many potential cisgender mates lose interest. When a trans person does not pass well, he discovers that the pool of those interested consists largely of individuals looking for exotic sexual experiences rather than genuinely loving relationships. (Levine, *Ethical Concerns*, at 5, 13.) Nor is the problem all on the other side; transgender individuals commonly become strongly narcissistic, unable to give the level of attention to the needs of another that is necessary to sustain a loving relationship.[52]

111. Social risks associated with delayed puberty. The social and psychological impacts of remaining puerile for, e.g., three to five years while one's peers are undergoing pubertal transformations, and of undergoing puberty at a substantially older age, have not been systematically studied, although clinical mental health professionals often hear of distress and social awkwardness in those who naturally have a delayed onset of puberty. In my opinion, individuals in whom puberty is delayed multiple years are likely to suffer at least subtle negative psychosocial and self-confidence effects as they stand on the sidelines while their peers are developing the social relationships (and attendant painful social learning experiences) that come with adolescence. (Levine, *Informed Consent,* at 9.)

C. Mental health costs or risks

112. One would expect the negative physical and social impacts reviewed above to adversely affect the mental health of individuals who have transitioned. In

[52] S. Levine, *Barriers to Loving: A Clinician's Perspective* (Routledge, New York 2013) at 40.

addition, adult transitioned individuals find that living as the other (or, in a manner that is consistent with the stereotypes of the other as the individual perceives them) is a continual challenge and stressor, and many find that they continue to struggle with a sense of inauthenticity in their transgender identity. (Levine, *Informed Consent,* at 9.)

113. In addition, individuals often pin excessive hope in transition, believing that transition will solve what are in fact ordinary social stresses associated with maturation, or mental health co-morbidities. Thus, transition can result in deflection from mastering personal challenges at the appropriate time or addressing conditions that require treatment.

114. Whatever the reason, transgender individuals including transgender youth certainly experience greatly increased rates of mental health problems. I have detailed this above with respect to adults living under a transgender identity. Indeed, Swedish researchers in a long-term study (up to 30 years since SRS, with a median time since SRS of > 10 years) concluded that individuals who have SRS should have postoperative lifelong psychiatric care. (Dhejne, *Long Term*, at 6-7.) With respect to youths a cohort study found that transgender youth had an elevated risk of depression (50.6% vs. 20.6%) and anxiety (26.7% vs. 10.0%); a higher risk of suicidal ideation (31.1% vs. 11.1%), suicide attempts (17.2% vs. 6.1%), and self-harm without lethal intent (16.7% vs. 4.4%) relative to the matched controls; and a significantly greater proportion of transgender youth accessed inpatient mental

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health care (22.8% vs. 11.1%) and outpatient mental health care (45.6% vs. 16.1%) services.[53]

115. The responsible MHP cannot focus narrowly on the short-term happiness of the patient, but must instead consider the happiness and health of the patient from a "life course" perspective. The many studies that I have cited here warn us that as we look ahead to the patient's life as a young adult and adult, the prognosis for the physical health, mental health, and social well-being of the child or adolescent who transitions to live in a transgender identity is not good.

116. A study published in 2019 by the American Journal of Psychiatry reported the high mental health utilization patterns of adults for ten years after surgery for approximately 35% of patients.[54] That is a very high level of mental health distress, compared to the general population.

117. This same 2019 study received considerable attention for its claim to discern "a statistically significant relationship between time since surgery and mental health status" based upon the researchers observing "that as of 2015, patients who had surgeries further in the past had better mental health than patients whose surgeries were more recent."[55] But this claim is another example of the grave methodological defects that are too common in recent publications in this

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[53] S. Reisner et al. (2015), *Mental Health of Transgender Youth in Care at an Adolescent Urban Community Health Center: A Matched Retrospective Cohort Study*, J. OF ADOLESCENT HEALTH 56(3) at 6; see also supra ¶ 24.

[54] Bränström & Pachankis, (2019), *Reduction in Mental Health Treatment Utilization Among Transgender Individuals After Gender-Affirming Surgeries*, AM. J. OF PSYCHIATRY 177(8) 727-734.

[55] *Correction of a Key Study: No Evidence of "Gender-Affirming" Surgeries Improving Mental Health,* Society for Evidence Based Gender Medicine (Aug. 30, 2020), https://www.segm.org /ajp_correction_2020 (citing and summarizing professional critiques of the *Reduction* article).

field. Shortly after publication, the study's analysis and conclusion were trenchantly criticized, among other reasons because of the study's failure to compare subjects' post-surgery mental health with those subjects' mental health *before* undergoing SRS.

118. As a result of two post-publication reviews by independent statisticians that rejected the interpretation of the data and additional critical letters to the editor, the authors corrected the article to retract the claim of a statistically significant relationship between gender affirmation surgery and later-improved mental health (while leaving intact a finding of "no evidence of benefits of hormonal treatments"). Specifically, the American Journal of Psychiatry stated that "the results [of the reanalysis] demonstrated no advantage of surgery in relation to subsequent mood or anxiety disorder-related health care visits or prescriptions or hospitalizations following suicide attempts."[56]

119. The *Reduction* article is notable for another, and positive, reason, as its authors acknowledged valid critiques and corrected the claims in their published work.[57] This is the way science should work—contending views testing the data and conclusions—something that is increasingly difficult to do in the gender identity field when its advocates insist that only gender affirmation treatments are to be contemplated.

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[56] *Correction to Bränström and Pachankis* (2020), AM. J. OF PSYCHIATRY 177:8 at 734.

[57] R. Bränström and J. E. Pachankis (2020), *Toward Rigorous Methodologies for Strengthening Causal Inference in the Association Between Gender-Affirming Care and Transgender Individuals' Mental Health: Response to Letters*, 177 AM. J. OF PSYCHIATRY 769-772.

D. The risk of regret following transition

120. The large numbers of children and young adults who have desisted as documented in both group and case studies each represent "regret" over the initial choice in some sense.

121. The phenomenon of desistance or regret experienced *later* than adolescence or young adulthood, or among older transgender individuals, has to my knowledge not been quantified or well-studied. However, it is a real phenomenon. I myself have worked with multiple individuals who have abandoned trans female identity after living in that identity for years, and who would describe their experiences as "regret."

122. I have seen several Massachusetts inmates and trans individuals in the community abandon their [trans] female identity after several years. (Levine, *Reflections,* at 239.) In the gender clinic which I founded in 1974 and to this day, in a different location, continue to co-direct, we have seen many instances of individuals who claimed a transgender identity for a time, but ultimately changed their minds and reclaimed the gender identity congruent with their sex.

123. More dramatically, a surgical group prominently active in the SRS field has published a report on a series of seven male-to-female patients requesting surgery to transform their surgically constructed female genitalia back to a male form.[58]

[58] Djordjevic et al. (2016), *Reversal Surgery in Regretful Male-to-Female Transsexuals After Sex Reassignment Surgery*, J. SEX MED. 13(6) 1000.

124. I noted above an increasingly visible online community of young women who have desisted after claiming a male gender identity at some point during their teen years. (*See supra* ¶ 58.) Given the rapid increase in the number of girls presenting to gender clinics within the last few years, the phenomena of regret and desistance by young women deserves careful attention and study by MHPs. (See Expósito-Campos, 2021.)

125. Thus, one cannot assert with any degree of certainty that once a transgendered person, always a transgendered person, whether referring to a child, adolescent, or adult, male or female.

I, Dr. Stephen B. Levine, hereby declare under penalty of perjury that the statements in this affidavit are true and accurate to the best of my knowledge, and represent my professional opinions.

By: Stephen B Levine MD
Dr. Stephen B. Levine

Subscribed and sworn to before me
this 10th day of May, 2021.

Mary J Mizner
Notary Public, State of Ohio
My Commission expires 3/9/25

EXHIBIT B

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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF IDAHO

LINDSAY HECOX, and JANE DOE with her next friends JEAN DOE and JOHN DOE, Plaintiffs, v. BRADLEY LITTLE, in his official capacity as Governor of the State of Idaho, *et al.*, Defendants.	Case No. 1:20-cv-00184-DCN **EXPERT DECLARATION OF GREGORY A. BROWN, Ph.D. FACSM**

I, Dr. Gregory A. Brown, declare as follows:

Qualifications

1. I serve as Professor of Exercise Science in the Department of Kinesiology and Sport Sciences at the University of Nebraska Kearney. I have served as a tenured (and non-tenured) professor at universities since 2002.

2. I teach classes in Exercise Physiology and in Research Methods. I have previously taught courses in Human Anatomy & Physiology and in Sports Nutrition.

3. In August 2002, I received a Doctor of Philosophy degree from Iowa State University, where I majored in Health and Human Performance, with an emphasis in the Biological Bases of Physical Activity. In May 1999, I received a Master of Science degree from Iowa State University, where I majored in Exercise and Sport Science, with an emphasis in Exercise Physiology.

4. I have received many awards over the years, including the Mortar Board Faculty Excellence Honors Award, College of Education Outstanding Scholarship / Research Award, and the College of Education Award for Faculty Mentoring of Undergraduate Student Research.

5. I have authored more than 40 refereed publications and more than 50 refereed presentations in the field of Exercise Science. And I have served as a peer reviewer for over 25 professional journals, including The American Journal of Physiology, the International Journal of Exercise Science, the Journal of Strength and Conditioning Research, and The Journal of Applied Physiology.

6. My areas of research have included the endocrine response to testosterone prohormone supplements in men and women, the effects of testosterone prohormone supplements on health and the adaptations to strength training in men, the effects of energy drinks on the physiological response to exercise, and assessment of various athletic training modes in males and females. Articles that I have published that are closely related to topics that I discuss in this declaration, and to articles by other researchers that I cite and discuss in this declaration, include:

a. Studies of the effect of ingestion of a testosterone precursor on circulating testosterone levels in young men. Douglas S. King, Rick L. Sharp, Matthew D. Vukovich, Gregory A. Brown, et al., *Effect of Oral Androstenedione on Serum Testosterone and Adaptations to Resistance Training in Young Men: A Randomized Controlled Trial*, JAMA 281: 2020-2028 (1999); G. A. Brown, M. A. Vukovich, et al., *Effects of Anabolic Precursors on Serum Testosterone Concentrations and Adaptations to Resistance Training in Young Men*, INT J SPORT NUTR EXERC METAB 10: 340-359 (2000).

b. A study of the effect of ingestion of that same testosterone precursor on circulating testosterone levels in young women. G. A. Brown, J. C. Dewey, et al., *Changes in Serum Testosterone and Estradiol Concentrations Following Acute Androstenedione Ingestion in Young Women*, HORM METAB RES 36: 62-66 (2004).

c. A study finding (among other things) that body height, body mass, vertical jump height, maximal oxygen consumption, and leg press maximal strength were higher in a group of physically active men than comparably active women, while the women had higher percent body fat. G. A. Brown, Michael W. Ray, et al., *Oxygen Consumption, Heart Rate, and Blood Lactate Responses to an Acute Bout of Plyometric Depth Jumps in College-Aged Men And Women*, J. STRENGTH COND RES 24: 2475-2482 (2010).

d. A study finding (among other things) that height, body mass, and maximal oxygen consumption were higher in a group of male NCAA Division 2 distance runners, while women NCAA Division 2 distance runners had higher percent body fat. Furthermore, these male athletes had a faster mean competitive running speed (~3.44 min/km) than women (~3.88 km/min), even though the men ran 10 km while the women ran 6 km. Katherine Semin, Alvah C. Stahlnecker, Kate A. Heelan, G. A. Brown, et al,

Discrepancy Between Training, Competition and Laboratory Measures of Maximum Heart Rate in NCAA Division 2 Distance Runners, JOURNAL OF SPORTS SCIENCE AND MEDICINE 7: 455-460 (2008).

7. I attach a copy of my current Professional Vita, which lists my education, appointments, publications, research, and other professional experience. I am also currently providing expert information on a case similar to this one in the state of Connecticut.

8. I have been asked by counsel for defendants in the matter of *Hecox et al. v. Little et al.* to offer my opinions about whether males have inherent advantages in athletic performance over females, and if so the scale and physiological basis of those advantages, to the extent currently understood by science. I have also been asked to offer my opinion as to whether the sex-based performance advantage enjoyed by males is eliminated if feminizing hormones are administered to male athletes who identify as transgender.

9. The opinions in this declaration are my own, and do not necessarily reflect the opinions of my employer, the University of Nebraska.

10. I have been compensated for my time spent in preparing this declaration at the rate of $150 per hour, and may be further compensated for time spent in subsequent testimony in this action.

Overview

11. Based on my professional familiarity with exercise physiology and my review of the currently available science, including that contained in the sources I cite in this declaration, and the competition results and records presented here, I offer three primary professional opinions:

a. At the level of elite, college, high school, and recreational competition, men or boys have an advantage over comparably aged women or girls, in almost all athletic contests;

b. Biological male physiology and anatomy is the basis for the performance advantage that men or boys have over women or girls, in almost all athletic contests; and

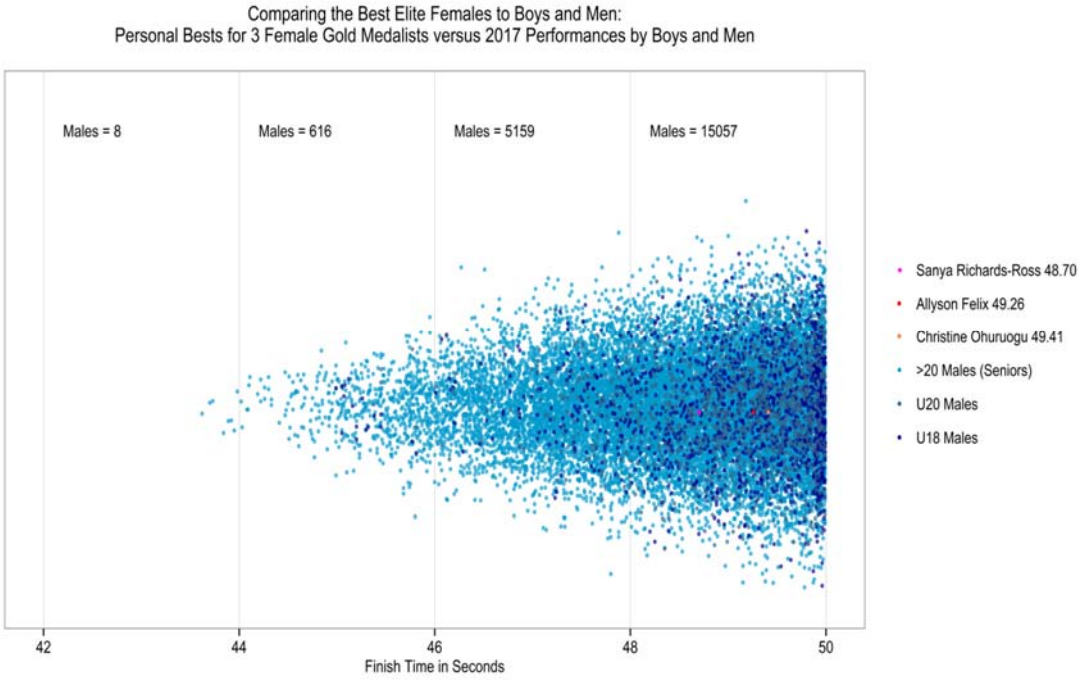
c. Administration of androgen inhibitors and cross-sex hormones to men, or adolescent boys, after male puberty, and administration of testosterone to women or adolescent girls, after female puberty, does not eliminate the performance advantage of men or adolescent boys over women or adolescent girls in almost all athletic contests.

In this declaration, I also provide supporting details, facts, and opinions relating to each of these primary opinions . Each of these opinions is based on my general professional expertise and experience, as well as on particular academic articles, and the competition results and records, that I refer to herein.

12. In short summary, men, and adolescent boys, perform better in almost all sports than women, and adolescent girls, because of their inherent physiological advantages that develop during male puberty. In general, men, and adolescent boys, can run faster, output more physical power, jump higher, and exercise greater physical endurance than women, and adolescent girls.

13. Indeed, while after the onset of puberty males are on average taller and heavier than females, a male performance advantage over females has been measured in weightlifting competitions even between males and females matched for body mass.

14. These performance advantages are also very substantial, such that large numbers of men and even adolescent boys are able to outperform the very top-performing women. To illustrate, Doriane Coleman, Jeff Wald, Wickliffe Shreve, and Richard Clark created the figure below (last accessed on Monday, December 23, 2019 at https://bit.ly/35yOyS4), which shows that the *lifetime best performances* of three female Olympic champions in the 400m event—including Team USA's Sanya Richards-Ross and Allyson Felix—would not match the performances of literally thousands of boys and men, *just in 2017 alone*, including many who would not be considered top tier male performers:



15. Coleman and Shreve also created the table below (last accessed on Monday, December 23, 2019 at https://bit.ly/37E1s2X), which "compares the number of boys—males under the age of 18—whose results in each event in 2017 would rank them above the single very best elite [adult] woman that year:"

TABLE 1 – World's Best Woman v. Under 18 Boys			
Event	Best Women's Result	Best Boys' Result	# of Boys Outperforming
100 Meters	10.71	10.15	124+
200 Meters	21.77	20.51	182
400 Meters	49.46	45.38	285
800 Meters	1:55.16*	1:46.3	201+
1500 Meters	3:56.14	3:37.43	101+
3000 Meters	8:23.14	7:38.90	30
5000 Meters	14:18.37	12:55.58	15
High Jump	2.06 meters	2.25 meters	28
Pole Vault	4.91 meters	5.31 meters	10
Long Jump	7.13 meters	7.88 meters	74
Triple Jump	14.96 meters	17.30 meters	47

16. Coleman and Shreve also created the table below (last accessed on Monday, December 23, 2019 at https://bit.ly/37E1s2X), which compares the number of men—males over 18—whose results in each event in 2017 would have ranked them above the very best elite woman that year.

TABLE 2 – World's Best Woman v. Number of Men Outperforming			
Event	Best Women's Result	Best Men's Result	# of Men Outperforming
100 Meters	10.71	9.69	2,474
200 Meters	21.77	19.77	2,920
400 Meters	49.46	43.62	4,341
800 Meters	1:55.16*	1:43.10	3,992+
1500 Meters	3:56.14	3:28.80	3,216+
3000 Meters	8:23.14	7:28.73	1307+
5000 Meters	14:18.37	12:55.23	1,243
High Jump	2.06 meters	2.40 meters	777
Pole Vault	4.91 meters	6.00 meters	684
Long Jump	7.13 meters	8.65 meters	1,652
Triple Jump	14.96 meters	18.11 meters	969

17. These advantages result, in large part (but not exclusively), from higher testosterone concentrations in men, and adolescent boys, after the onset of male puberty. Higher testosterone levels cause men, and adolescent boys, to develop more muscle mass, greater muscle strength, less body fat, higher bone mineral density, greater bone strength, higher hemoglobin concentrations, larger hearts and larger coronary blood vessels, and larger overall statures than women, and adolescent girls. In addition, maximal oxygen consumption (VO_2max), which correlates to ~30-40% of success in endurance sports, is higher in both elite and average men and boys than in comparable women and girls when measured in regards to absolute volume of oxygen consumed and when measured relative to body mass. Testosterone is also associated with increased aggressiveness, which may offer competitive advantages for men over women.

18. Although androgen deprivation may modestly decrease some physiological advantages that men and adolescent boys have over women and adolescent girls, it cannot fully eliminate those physiological advantages once an individual has passed through male puberty. For example, androgen deprivation does not reduce bone size, does not alter bone structure, and does not decrease lung volume or heart size. Nor does androgen deprivation in adult men completely reverse the increased muscle mass acquired during male puberty.

19. In this declaration, I present, in the headings marked with Roman numerals, certain of my opinions about sex-based differences in human physiology and the impact of those differences on the athletic performance of men and women. For each of these opinions, I then provide a brief overview, and a non-exhaustive summary of studies published in science journals or other respected sources that support and provide in part the basis of my opinion, also quoting relevant findings of each article.

20. In particular, in addition to the article by Coleman and Schreve that I discuss above, I cite twenty-two articles published in scientific journals. I provide capsule summaries of those articles below. These studies form part of the basis of the opinions I set forth in this declaration, which are also informed by my general professional expertise and experience. In support of the opinions I offer, I expect to explain and testify concerning the findings and conclusions of these articles that I detail in this declaration. I expect to use any or all of the tables and charts that I have reproduced in this declaration, as well as any other tables or charts contained in the articles I reference, to present and explain my opinions to the court.

a. The first resource I cite is David J. Handelsman, Angelica L. Hirschberg, et al., *Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance*, 39:5 ENDOCRINE REVIEWS 803 (2018). This article correlates data about performance differences between males and females with data from over 15 liquid chromatography-mass spectrometry studies of circulating testosterone in adults, as a function of age. The authors conclude, among other things, that "[f]rom male puberty onward, the sex difference in athletic performance emerges as circulating concentrations rise as the testes produce 30 times more testosterone than before puberty, resulting in men having 15- to 20-fold greater circulating testosterone than children or women at any age." (804)

b. The second resource I cite is Valérie Thibault, Marion Guillaume, et al., *Women & Men in Sport Performance: The Gender Gap Has Not Evolved Since 1983*, 9 J. OF SPORTS SCIENCE & MEDICINE 214 (2010). This article analyzes results from 82 athletic events since the beginning of the modern Olympic era, and concludes in part that while a wide sex-based performance gap existed before 1983, due to a likely combination

of physiological and non-physiological reasons, the sex-based performance gap stabilized in 1983, at a mean difference of 10.0 % ± 2.94 between men and women for all events. (214)

c. The third resource I cite is Beat Knechtle, Pantelis T. Nikolaidis, et al., *World Single Age Records in Running from 5 km to Marathon*, 9 FRONTIERS IN PSYCHOLOGY 1 (2013). This article analyzes results from a study of the relationship between performance and age in races of several lengths, and reports in part that "[i]n all races [studied], women were significantly slower than men." (7)

d. The fourth resource I cite is Romuald Lepers, Beat Knechtle, et al., *Trends in Triathlon Performance: Effects of Sex & Age*, 43 SPORTS MED 851 (2013). This article analyzes results from various triathlon events over the course of about 15 years, and reports in part a sex-based performance gap between the sexes of no less than 10% in every component event, with this sex-based performance gap increasing with age.

e. The fifth resource I cite is Espen Tønnessen, Ida Siobhan Svendsen, et al., *Performance Development in Adolescent Track & Field Athletes According to Age, Sex, and Sport Discipline*, 10:6 PLOS ONE 1 (2015). This article analyzes the 100 all-time best Norwegian male and female track and field results (in persons aged 11 to 18) from the 60m and 800m races, and the long jump and high jump events. The results show that sex-specific differences that arise during puberty significantly affect event results, with males regularly outperforming females after age 12.

f. The sixth resource I cite is David J. Handelsman, *Sex Differences in Athletic Performance Emerge Coinciding with the Onset of Male Puberty*, 87 CLINICAL ENDOCRINOLOGY 68 (2017). This article analyzes results from a secondary quantitative

analysis of four published sources that report performance measures in swimming meets, track and field events, and hand-grip strength. The results show in part that the onset and tempo of sex-based performance divergence were very similar for all performance measures, and that this divergence closely paralleled the rise of circulating testosterone in adolescent boys.

g. The seventh article I cite is Moran Gershoni & Shmuel Pietrokovski, *The landscape of sex-differential transcriptome and its consequent selection in human adults*, 15 BMC BIOL 7 (2017). This article details the results of an evaluation of the differences in genetic expression between men and women. The results show that in humans, out of 18,670 protein coding genes that were evaluated, over 6,500 are differentially expressed based on the sex of the person. The main relevance of this article to the case at hand is to help illustrate that the differences between males and females cannot be eliminated by reducing testosterone and increasing estrogen concentrations in a biological male.

h. The eighth article I cite is K. M. Haizlip, et al., *Sex-based differences in skeletal muscle kinetics and fiber-type composition*, 30 PHYSIOLOGY (BETHESDA) 30 (2015). This is a review article summarizing the findings of 56 other articles evaluating the differential expression of genes in skeletal muscles in males and females and how these differences in gene expression influence (among many things) muscle mass, muscle fiber type, and muscle function. The main relevance of this article to the case at hand is to help illustrate that the current scientific evidence indicates that the genetic differences in skeletal muscle size and function between males and females that give males an

athletic performance advantage cannot be eliminated by reducing testosterone and increasing estrogen concentrations in a biological male.

i. The ninth, tenth, and eleventh resources I cite are Konstantinos D. Tambalis, et al., *Physical fitness normative values for 6-18-year-old Greek boys and girls, using the empirical distribution and the lambda, mu, and sigma statistical method*, 16 EUR J SPORT SCI 736 (2016). Mark J. Catley & G. R. Tomkinson, *Normative health-related fitness values for children: analysis of 85347 test results on 9-17-year-old Australians since 1985*, 47 BR J SPORTS MED 98 (2013).Grant R. Tomkinson, et al., *European normative values for physical fitness in children and adolescents aged 9-17 years: results from 2 779 165 Eurofit performances representing 30 countries*, 52 BR J SPORTS MED 1445 (2018). Individually and combined these articles illustrate that boys as young as six years old perform better than comparable age matched girls in health related measures of physical fitness including strength, speed, endurance, and jumping ability. These advantages in health related measures of fitness translate to improved athletic performance in boys when compared to girls likely before and certainly during and after puberty.

j. The twelfth and thirteenth resources I cite are Daniel M. Fessler, et al., *Sexual dimorphism in foot length proportionate to stature*, 32 ANN HUM BIOL 44 (2005). Roshna E. Wunderlich & P. R. Cavanagh, *Gender differences in adult foot shape: implications for shoe design*, 33 MED SCI SPORTS EXERC 605 (2001). These articles evaluate and describe the differences in the feet of men and women, particularly noting that the differences between the sexes are not just a matter of stature but also include morphological traits that can influence runner performance.

k. The fourteenth, fifteenth, and sixteenth resources I cite are Daichi Tomita, et al., *A pilot study on the importance of forefoot bone length in male 400-m sprinters: is there a key morphological factor for superior long sprint performance?,* 11 BMC RES NOTES 583 (2018). Hiromasa Ueno, et al., *The Potential Relationship Between Leg Bone Length and Running Performance in Well-Trained Endurance Runners*, 70 J HUM KINET 165 (2019). Hiromasa Ueno, et al., *Association between Forefoot Bone Length and Performance in Male Endurance Runners*, 39 INT J SPORTS MED 275 (2018). Building upon the information from Fessler (2005) and Wunderlich (2001), these studies collectively illustrate that the length of the bones in the foot and lower leg can contribute to successful competitive running performance, which likely gives men a performance advantage over women in running due to the differences in lower limb sizes described by Fessler et al. (2005) and Wunderlich and Cavanaugh (2001).

l. The seventeenth resource I cite is Louis Gooren, *The Significance of Testosterone for Fair Participation of the Female Sex in Competitive Sports*, 13 ASIAN J. OF ANDROLOGY 653 (2011). This article highlights specific research that indicates pubertal testosterone increases result in significant physiological advantages for men and adolescent boys, compared to women and adolescent girls, after the onset of male puberty.

m. The eighteenth resource I cite is Taryn Knox, Lynley C. Anderson, et al., *Transwomen in Elite Sport: Scientific & Ethical Considerations*, 45 J. MED ETHICS 395 (2019). This article confirms from available science that higher testosterone levels provide an all-purpose benefit in sport, and that the current International Olympic Guidelines rule requiring males who identify as transgender to keep testosterone levels

under 10 nmol/L for one year does not eliminate (or even come close to eliminating) the performance advantage of their male physiology.

n. The nineteenth resource I cite is Louis J. G. Gooren & Mathijs C. M. Bunck, *Transsexuals & Competitive Sports*, 151 EUROPEAN J. OF ENDOCRINOLOGY 425 (2004). This article analyzes results from a study that compared pretreatment physiological measurements in 17 female-to-male transsexuals with the measurements after one year of cross-sexual treatment in 19 male-to-female transsexuals undergoing sex reassignment therapy. The results in part confirmed that androgen deprivation in male-to-female transsexuals decreases muscle mass to some extent but does not eliminate the male muscular advantage and does not reverse certain other effects of androgenization that had occurred during male puberty.

o. The twentieth resource I cite is Anna Wiik et al., *Muscle Strength, Size, and Composition Following 12 Months of Gender-affirming Treatment in Transgender Individuals*, J. CLIN. METAB., 105(3):e805-e813 (2020). This article analyzes the impact of (a) suppression of endogenous hormones and (b) hormone replacement therapy on metrics of transgender individuals including strength, muscle size, and radiological density. After 12 months, strength in male-to-female subjects did not decrease, and muscle volume remained higher in male-to-female subjects than in female-to-male subjects after the latter subjects had undergone 12 months of testosterone injections.

p. The twenty-first resource I cite is Miranda Scharff et al., *Change in Grip Strength in Trans People and Its Association with Lean Body Mass and Bone Density*, ENDOCRINE CONNECTIONS (2019) 8, 1020-1028. This article measured grip strength and multiple parameters of lean body mass and bone density in both male-to-female and

female-to-male populations across their first year of hormone therapy. After 12 months, "the median grip strength in [male-to-female] subjects still [fell] into the 95th percentile for age-matched females."

q. The twenty-second resource I cite is Johanna Harper. *Race Times for Transgender Athletes.* J Sporting Cultures and Identities 6 (2019) 1. This article is oft cited as evidence supporting a lack of performance advantage for male-to-female transgender athletes. Herein I provide a critique of the methodological shortcomings of this study for the purpose of demonstrating the extreme lack of scientific validity or reliability of the results.

21. I explain my opinions and the results of these studies in more detail below.

Opinions

I. Biological men or boys have an advantage over women or girls, in almost all athletic contests.

22. As one team of researchers has recently written, "Virtually all elite sports are segregated into male and female competitions. The main justification is to allow women a chance to win, as women have major disadvantages against men who are, on average, taller, stronger, and faster and have greater endurance due to their larger, stronger, muscles and bones as well as a higher circulating hemoglobin level." David J. Handelsman, Angelic L. Hirschberg, et al., *Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance*, 39:5 ENDOCRINE REVIEWS 803 (2018).

23. In fact, biological men, and adolescent boys, substantially outperform comparably aged women, and adolescent girls, in competitions involving running speed, swimming speed, cycling speed, jumping height, jumping distance, and strength (to name a few, but not all, of the

performance differences). These performance advantages for men, and adolescent boys, are inherent to the biological differences between the sexes and are not due to social or cultural factors, as evidenced by minimal to no change in the percentage differences between males and females in world class and record setting performances in the past 40 years. In addition, a number of studies indicate that males' athletic advantages over females begin before puberty, and may be apparent as early as six years of age.

24. I highlight below key findings about male performance advantages from eighteen studies or datasets.

A. David J. Handelsman, Angelica L. Hirschberg, et al., *Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance,* 39:5 ENDOCRINE REVIEWS 803 (2018):

25. The Handelsman et al. (2018) authors demonstrate a consistent pattern of divergence of athletic performance, in favor of males, across the years of puberty and strongly correlating to increasing testosterone levels in adolescent males. The pattern is observed in events exercising a variety of muscle systems. In sum, the Handelsman et al. (2018) authors report: "Corresponding to the endogenous circulating testosterone increasing in males after puberty to 15 to 20 nmol/L (sharply diverging from the circulating levels that remain <2 nmol/L in females), male athletic performances go from being equal on average to those of age-matched females to 10% to 20% better in running and swimming events, and 20% better in jumping events." (812)

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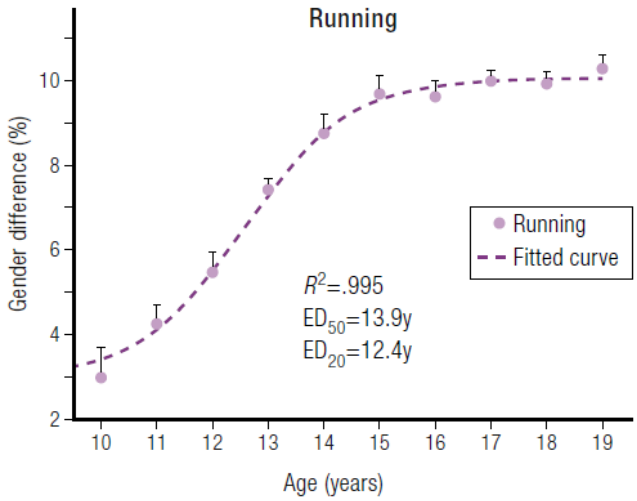
26. Taken from Handelsman's Figure 1, the chart below indicates "sex differences in performance (in percentage) according to age (in years) in running events, including 50m to 2 miles." (813)



27. Taken from Handelsman's Figure 1, the chart below indicates "sex differences in performance (in percentage) according to age (in years) … in jumping events, including high jump, pole vault, triple jump, long jump, and standing jump." (813)

28. Taken from Handelsman's Figure 1, the chart below indicates "a fitted sigmoidal curve plot of sex differences in performance (in percentage) according to age (in years) in running, jumping, and swimming events, as well as the rising serum testosterone concentrations from a large dataset of serum testosterone of males. Note that in the same dataset, female serum testosterone concentrations did not change over those ages, remaining the same as in prepubertal

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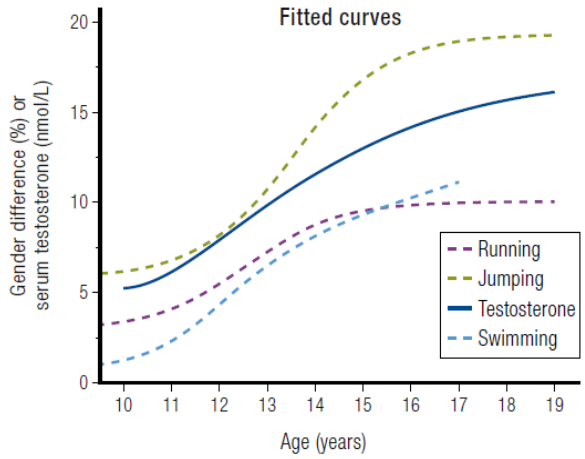
boys and girls. Data are shown as mean and SEM of the pooled sex differences by age." (813)



29. These authors also note the significance, for athletic competition, of the subjective nature of "gender identity" in current understanding: "Prompted by biological, personal, and societal factors, volitional expression of gender can take on virtually any form limited only by the imagination, with some individuals asserting they have not just a single natal gender but two genders, none, a distinct third gender, or gender that varies (fluidly) from time to time…." For this reason, the authors conclude: "[I]f gender identity were the basis for eligibility for female sports, an athlete could conceivably be eligible to compete at the same Olympics in both female and male events. These features render the unassailable personal assertion of gender identity incapable of forming a fair, consistent sex classification in elite sports." (804)

B. Valérie Thibault, Marion Guillaume, et al., *Women & Men in Sport Performance: The Gender Gap has not Evolved Since 1983,* 9 J. OF SPORTS SCIENCE & MEDICINE 214 (2010):

30. The Thibault et al. (2010) authors note that there was a large but narrowing sex-based performance gap between men's and women's Olympic athletic performances before 1983, which could hypothetically be attributed to a combination of social, political, or other non-physiological reasons, in addition to physiological reasons. However, "the gender gap in

Olympic sport performance has been stable since 1983" (219) "at a mean difference of 10.0% ± 2.94 between men and women for all [Olympic] events." (222)

31. Since then, even when performances improve, the "progressions are proportional for each gender." (219-20)

32. The results of this study "suggest that women's performances at the high level will never match those of men" (219) and that "women will not run, jump, swim or ride as fast as men." (222) The authors conclude that this gap, now stable for 30+ years, is likely attributable to physiology, and thus that "[s]ex is a major factor influencing best performances and world records." (222)

33. Breaking these performance advantages out by event, the authors report the following sex-based performance gaps in Olympic sport competitions since 1983:

a. "The gender gap ranges from 5.5% (800-m freestyle, swimming) to 36.8% (weightlifting)." (222)

b. Olympic world records in running events indicate that men perform "10.7% (± 1.85)" better than women since gender gap stabilization. (217)

c. Olympic world records in jumping events indicate that men perform "17.5% (± 1.11)" better than women since gender gap stabilization. (217)

d. Olympic world records in swimming events indicate that men perform "8.9 % (± 1.54)" better than women since gender gap stabilization. (218)

e. Olympic world records in cycling sprint events indicate that men perform "6.95% (± 0.16)" better than women since gender gap stabilization. (219)

f. Olympic world records in weightlifting events indicate that men perform "36.8% (± 6.2)" better than women since gender gap stabilization. Note that the

Olympics first introduced women's weightlifting events in 1998, and "no breakpoint date has been detected yet." (219)

34. "The top ten performers' analysis reveals a similar gender gap trend with a stabilization in 1982 at 11.7%" when averaged across all events. (222)

C. Beat Knechtle, Pantelis T. Nikolaidis, et al., *World Single Age Records in Running from 5 km to Marathon*, 9 FRONTIERS IN PSYCHOLOGY 1 (2013):

35. A comparison of performances in races of a variety of distances showed that "[i]n all races, women were significantly slower than men. The estimated sex differences … were increasing" as race distances increased from 8 km.[1]

D. Romuald Lepers, Beat Knechtle, et al., *Trends in Triathlon Performance: Effects of Sex & Age*, 43 SPORTS MED 851 (2013):

36. Based on data from a variety of elite triathlon and ultra-triathlon events spanning 22 years, the Lepers et al. (2013) authors reported that "elite males appear to run approximately 10–12 % faster than elite females across all endurance running race distances up to marathon, with the sex difference narrowing as the race distance increases. However, at distances greater than 100 km, such as the 161-km ultramarathon, the difference seems even larger, with females 20–30 % slower than males." (853)

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[1] Throughout this declaration, in the interest of readability I have omitted internal citations from my quotations from the articles I cite. The sources cited by these authors may of course be found by reference to those articles.

37. Lepers and Knechtle Table 1 below shows the "[m]ean sex differences in time performance for swimming, cycling, running and total time at different national and international triathlons." (854)

Event	Sex difference in time performance (%)			
	Swim	Cycle	Run	Total
Short distance (1.5–40–10 km): [30, 79]				
Zurich (Switzerland) from 2000 to 2010				
Top five elite overall	15.2	13.4	17.1	14.8
Top five AG, from 18 to 54 years	18.5	15.5	18.5	17.1
World Championship from 2009 to 2011				
Top ten AG, from 18 to 64 years	13.3	10.7	7.5	12.0
Half Ironman (1.9–90–21 km): [31, 79]				
Rapperswil (Switzerland) from 2007 to 2010				
Top five elite overall	14.1	12.3	12.5	12.6
Top five AG, from 18 to 54 years	22.3	16.4	19.2	17.6
World Championship from 2009 to 2011				
Top ten AG, from 18 to 64 years	12.4	11.2	14.5	12.6
Off-road triathlon (1.5–30–10 km): [9]				
World championship (Maui, USA) from 2007 to 2009				
Top ten elite overall	12.4	19.6	18.4	18.2
Ironman (3.8–180–42 km): [2, 32, 34]				
World championship (Kona, Hawaii, USA) from 1988 to 2007				
Top ten elite overall	9.8	12.7	13.3	12.6
Top ten AG, from 18 to 64 years	12.1	15.4	18.2	15.8
Zurich (Switzerland) from 1995 to 2010				
Top ten elite overall	14.0	13.2	18.2	14.9

38. "[F]or ultratriathlons, it has been shown that with increasing length of the event, the best females became relatively slower compared with the best males. Indeed, if the world's best performances are considered, males were 19 % faster than the females in both Double and Triple Ironman distance, and 30 % faster in the Deca-Ironman distance." (854)

39. "The average sex difference in swimming performance during triathlon for race distances between 1.5 and 3.8 km ranged between approximately 10 and 15 % for elite triathletes." (854)

40. Lepers and Knechtle Table 2 below shows the "[m]ean percentage differences in times for swimming, cycling, running and total event between the top ten females and males … in 2012 at four international triathlons:" (855)

Event	Sex difference in performance in top ten athletes in 2012 (mean ± SD)			
	Swim	Cycle	Run	Total
Hawaii Ironman Triathlon (3.8–180–42 km)	14.1 ± 7.9	13.1 ± 2.3	7.3 ± 2.9	11.3 ± 0.5
Olympics Triathlon (1.5–40–10 km) with drafting	11.8 ± 2.0	11.3 ± 0.6	14.7 ± 0.8	14.1 ± 7.9
Hy-Vee Triathlon (1.5–40–10 km) without drafting	8.6 ± 4.8	10.2 ± 3.5	8.6 ± 4.4	9.3 ± 0.5
World Championship Off-Road Triathlon (1.5–30–10 km)	15.2 ± 15.5	22.6 ± 4.4	15.1 ± 6.7	17.3 ± 2.9

41. "[T]he sex difference in performance between the best male and female ultraswimmers is more generally close to 11–12 %, which corresponds to values observed for swimming in triathlon." (855)

42. "Sex differences in triathlon cycling vary from 12 to 16% according to the level of expertise of participating triathletes for road-based triathlons." (855)

43. "In track cycling, where females are generally weaker than males in terms of power/weight ratios, the performance gap between males and females appears to be constant (<11 %) and independent of the race distance from 200 to 1,000 m." (855)

44. "In ultra-cycling events, such as the 'Race Across America,' sex difference in performance was around 15 % among top competitors. Greater muscle mass and aerobic capacity in males, even expressed relative to the lean body mass, may represent an advantage during long-distance cycling, especially on a relatively flat course such as Ironman cycling, where cycling approximates to a non-weight-bearing sport. Indeed, it has been shown that absolute power output (which is greater for males than for females) is associated with successful cycling

endurance performance because the primary force inhibiting forward motion on a flat course is air resistance." (855-56)

45. "Interestingly, for elite triathletes, the sex difference in mountain bike cycling during off-road triathlon (<20 %) is greater than cycling sex differences in conventional road-based events. Mountain biking differs in many ways from road cycling. Factors other than aerobic power and capacity, such as off-road cycling economy, anaerobic power and capacity, and technical ability might influence off-road cycling performance. Bouts of high-intensity exercise frequently encountered during the mountain biking leg of off-road triathlon (lasting <1 h 30 min for elite males and <2 h for elite females) can result from (1) having to overcome the constraints of gravity associated with steep climbs, (2) variable terrain necessitating wider tires and thus greater rolling resistance, and (3) isometric muscle contractions associated with the needs of more skilled bike-handling skills, not so often encountered in road cycling. However, in particular, lower power-to-weight ratios for female than for male triathletes inevitably leave them at a disadvantage during steep climbs." (856)

46. "During the 1988–2007 period, the top ten elite males have run the Hawaii Ironman marathon on average 13.3 % faster than the top ten females." (856)

E. Espen Tønnessen, Ida Siobhan Svendsen, et al., *Performance Development in Adolescent Track & Field Athletes According to Age, Sex & Sport Discipline,* 10:6 PLoS ONE 1 (2015):

47. While both sexes increase performance across the teen years, the Tønnessen et al. (2015) authors found performance advantages for male athletes associated with the onset of puberty and becoming increasingly larger across the years of puberty, in a chronological progression that was closely similar across diverse track and field events.

48. "The current results indicate that the sex difference evolves from < 5% to 10–18% in all the analyzed disciplines from age 11 to 18 yr. The gap widens considerably during early adolescence before gradually stabilizing when approaching the age of 18. This evolution is practically identical for the running and jumping disciplines. The observed sex differences at the age of 18 are in line with previous studies of world-class athletes where a sex difference of 10–12% for running events and ~19% for jumping events has been reported." (8)

49. "Male and female athletes perform almost equally in running and jumping events up to the age of 12. Beyond this age, males outperform females. Relative annual performance development in females gradually decreases throughout the analyzed age period. In males, annual relative performance development accelerates up to the age of 13 (for running events) or 14 (for jumping events) and then gradually declines when approaching 18 years of age. The relative improvement from age 11 to 18 was twice as high in jumping events compared to running events. For all of the analyzed disciplines, overall improvement rates were >50% higher for males than for females. The performance sex difference evolves from < 5% to 10-18% in all the analyzed disciplines from age 11 to 18 yr." (1)

50. "Recent studies of world-class athletes indicate that the sex difference is 10–12% for running events and ~19% for jumping events." (2)

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51. Tønnessen and Svendsen's Table 1 below shows the "[e]xpected progressions in running and jumping performance for 11-18 [year] old males and females," as deduced from "[t]he 100 all-time best Norwegian male and female 60-m, 800-m, long jump and high jump athletes in each age category . . . ." (1, 4)

Table 1. Expected progressions in running and jumping performance for 11–18 yr old males and females.

Age *(yr)*	60 m		800 m		Long Jump		High Jump	
	Boys *Progression (s and %)*	Girls *Progression (s and %)*	Boys *Progression (s and %)*	Girls *Progression (s and %)*	Boys *Progression m (%)*	Girls *Progression m (%)*	Boys *Progression m (%)*	Girls *Progression m (%)*
11–12	-0.35 (4.1)	-0.35 (4.0)	-6.4 (4.4)	-7.3 (4.8)	+0.35 (7.4)	+0.36 (7.9)	+0.11 (7.4)	+0.10 (7.2)
12–13	-0.48 (5.8)	-0.25 (2.9)	-8.7 (6.2)	-5.5 (3.8)	+0.43 (8.6)	+0.30 (6.0)	+0.12 (7.9)	+0.09 (6.3)
13–14	-0.29 (3.7)	-0.16 (2.0)	-5.9 (4.5)	-3.6 (2.6)	+0.50 (9.0)	+0.21 (4.1)	+0.13 (8.1)	+0.06 (3.6)
14–15	-0.10 (1.3)	-0.02 (0.2)	-5.2 (4.1)	-2.2 (1.6)	+0.34 (5.6)	+0.13 (2.4)	+0.08 (4.3)	+0.04 (2.4)
15–16	-0.17 (2.3)	-0.08 (1.0)	-3.2 (2.7)	-1.6 (1.2)	+0.28 (4.4)	+0.10 (1.8)	+0.07 (3.6)	+0.03 (1.8)
16–17	-0.10 (1.4)	-0.07 (0.8)	-2.3 (1.9)	-1.5 (1.2)	+0.19 (2.9)	+0.06 (1.1)	+0.05 (2.5)	+0.01 (0.6)
17–18	-0.05 (0.7)	-0.02 (0.2)	-1.5 (1.4)	-0.6 (0.4)	+0.17 (2.5)	+0.02 (0.4)	+0.04 (1.9)	+0.01 (0.5)

Data are mean (standard deviation) for top 100 Norwegian male and female performers in each discipline.

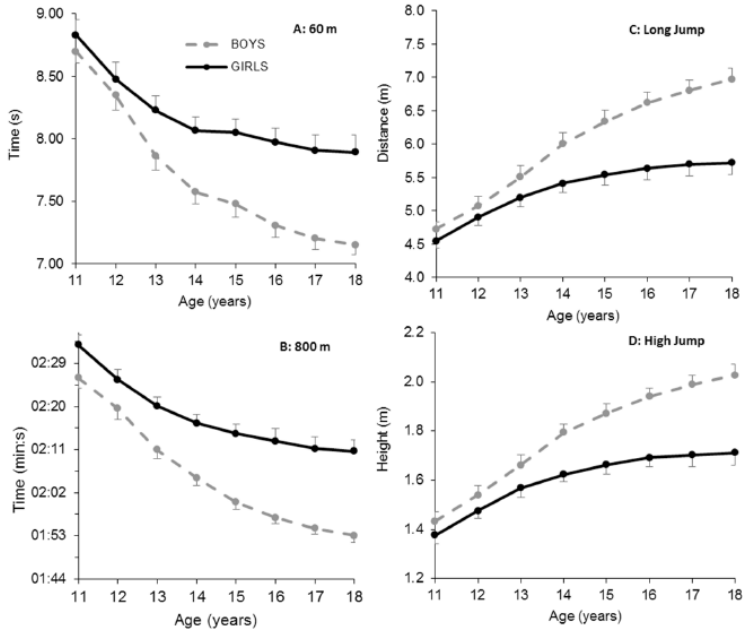
52. Tønnessen and Svendsen's Table 2 below shows the "[s]ex ratio in running and jumping performance for 11-18 [year] old males and females," as deduced from "[t]he 100 all-time best Norwegian male and female 60-m, 800-m, long jump and high jump athletes in each age category . . . ." (1, 6)

Table 2. Sex ratio in running and jumping performance for 11–18 yr old males and females.

	60 m	*800 m*	*Long Jump*	*High Jump*
11	0.99	0.95	0.96	0.97
12	0.98	0.96	0.97	0.96
13	0.96	0.93	0.94	0.95
14	0.94	0.92	0.90	0.90
15	0.93	0.89	0.87	0.89
16	0.92	0.88	0.85	0.87
17	0.91	0.87	0.84	0.85
18	0.91	0.86	0.82	0.84

Data are calculated from mean results of top 100 Norwegian male and female performers in each discipline.

53. Tønnessen and Svendsen's Figure 1 below shows "[p]erformance development from age 11 to 18 in running and jumping disciplines. Data are mean ± [standard deviation] for 60 m, 600 m, long jump, and high jump for top 100 Norwegian male and female performers in



each discipline:" (4)

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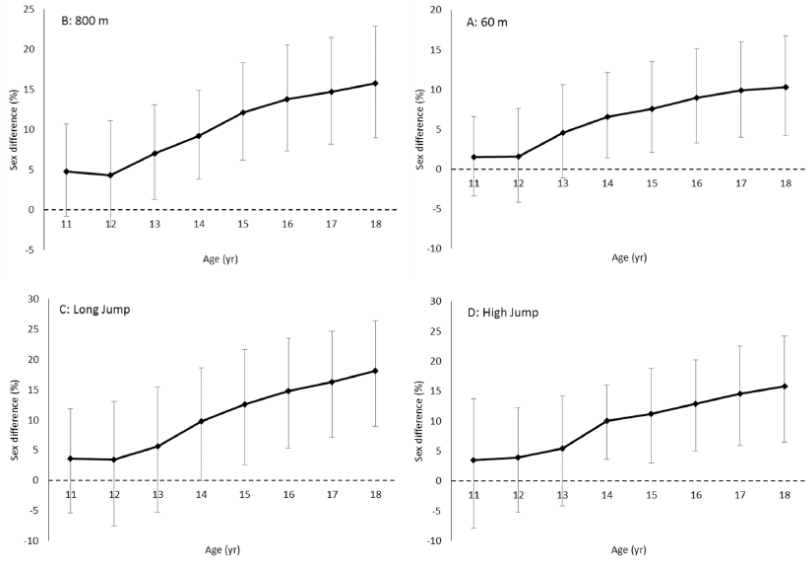
54. Tønnessen and Svendsen's Figure 3 below shows the "[s]ex difference for performance in running and jumping disciplines from age 11 to 18. Data are mean and 95% [confidence intervals] for 60 m, 600 m, long jump, and high jump for top 100 Norwegian male and female performers in each discipline:" (6)



55. As for the 60m race, the tables and charts above illustrate:

a. "[B]oys improve 0.3–0.5 [seconds] over 60 m sprint each year up to the age of 14 [years] (very large to nearly perfect annual effect), 0.1–0.2 [seconds] annually from 14 to 17 [years] (moderate to large annual effect), and 0.05 [seconds] from age 17 to 18 [years] (moderate effect). Relative annual improvement peaks between 12 and 13 [years] (5.8%; nearly perfect effect), and then gradually declines to 0.7% between age 17 and 18 [years] (moderate effect)." (3)

b. "On average, boys improve their 60 m performance by 18% from age 11 to 18 [years]. Girls improve 0.35 [seconds] over 60 m from age 11 to 12 [years] (4%; very large effect). Then, absolute and relative annual improvement gradually slows and almost plateaus between age 14 and 15 (0.02 s; 0.2%; trivial effect). From age 15 to 17,

annual improvement increases somewhat to 0.07–0.08 [seconds] (~1%; moderate effect) before plateauing again between age 17 and 18 (0.02 s; 0.2%; trivial effect). In total, girls improve their 60-m performance by 11% from age 11 to 18 [years]…. [T]he sex difference for 60 m sprint evolves from 1.5% at age 11 to 10.3% at the age of 18…. [T]he sex ratio for 60 m running performance develops from 0.99 at age 11 to 0.91 at age 18." (4-5)

56. As for the 800m race, the tables and charts above illustrate:

a. "[B]oys improve 6–9 [seconds] over 800 m each year up to age 14 [years] (very large to nearly perfect annual effect). Relative annual improvement peaks between age 12 and 13 (6.2%; nearly perfect effect), then gradually decreases to 1.5 [seconds] between age 17 and 18 (1.4%; moderate effect)." (5)

b. "On average, boys enhance their 800-m performance by 23% from age 11 to 18. For girls, both absolute and relative annual performance development gradually decreases across the analysed age stages. The improvement is slightly above 7 [seconds] between age 11 and 12 [years] (4.8%: very large effect), decreasing to only 0.6 [seconds] from age 17 to 18 (0.4%; small effect)…. [G]irls enhance their 800-m performance by 15% from age 11 to 18. The 800 m performance sex difference evolves from 4.8% at the age of 11 to 15.7% at the age of 18…. [T]he sex ratio for 800 m running performance develops from 0.95 at age 11 to 0.86 at age 18." (5)

57. As for the long jump, the tables and charts above illustrate:

a. "[A]nnual long jump improvement among boys gradually increases from 35 cm between age 11 and 12 [years] (7.4%; very large effect) to 50 cm between age 13

and 14 (9%; very large effect). Both absolute and relative annual development then gradually falls to 17 cm between age 17 and 18 (2.5%; moderate effect)." (5)

b. "[B]oys, on average, improve their long jump performance by 48% from age 11 to 18 yr. For girls, both absolute and relative annual performance enhancement gradually falls from age 11 to 12 [years] (36 cm; 7.9%; very large effect) until nearly plateauing between 17 and 18 [years] (2 cm; 0.4%; trivial effect). Overall, girls typically improve their long jump performance by 26% throughout the analysed age stages. The sex difference in long jump evolves from 3.6% at the age of 11 to 18% at the age of 18…. [T]he sex ratio for long jump performance develops from 0.96 at age 11 to 0.82 at age 18." (5)

58. As for the high jump, the tables and charts above illustrate:

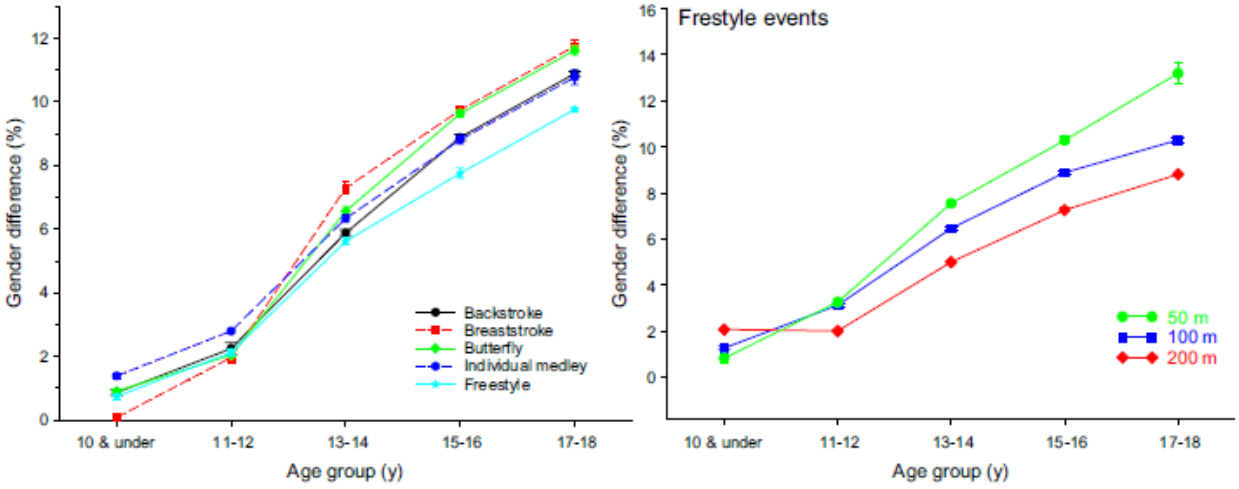
a. "[B]oys improve their high jump performance by 11–13 cm each year up to the age of 14 (7–8%; very large annual effects). Both absolute and relative annual improvement peaks between age 13 and 14 (13 cm; 8.1%; very large effect), then gradually decreases to 4 cm from age 17 to 18 (1.9%; moderate annual effect)." (6)

b. "Overall, boys improve their high jump performance by, on average, 41% from age 11 to 18. For girls, both absolute and relative annual improvement decreases from 10 cm from age 11 to 12 [years] (7.2%; very large effect) until it plateaus from age 16 (1 cm; ~0.5%; small annual effects). Overall, girls typically improve their high jump performance by 24% from age 11 to 18. The sex difference in high jump performance evolves from 3.5% at the age of 11 to 16% at the age of 18…. [T]he sex ratio for high jump performance develops from 0.97 at age 11 to 0.84 at age 18." (6-7)

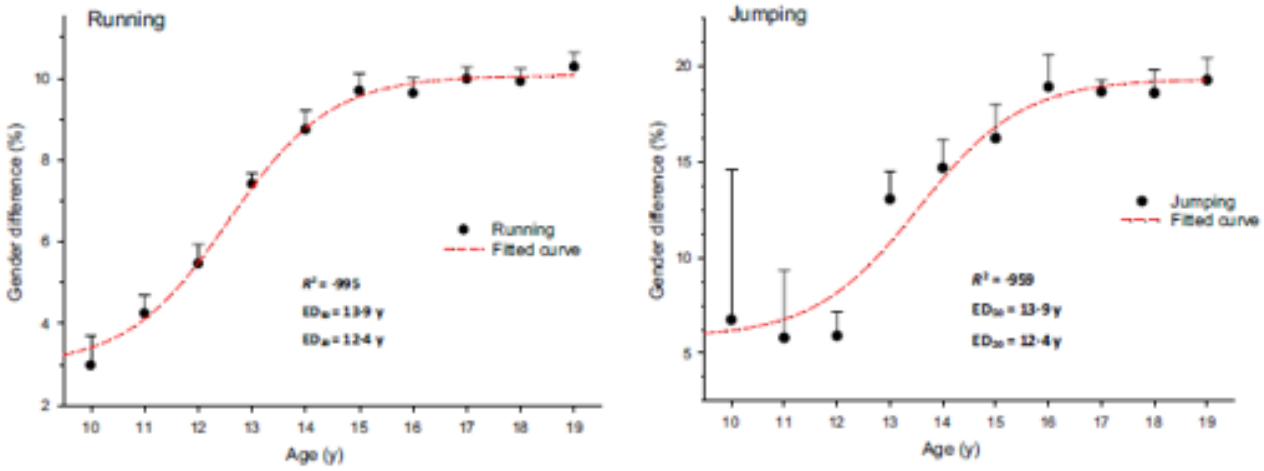
F. David J. Handelsman, *Sex Differences in Athletic Performance Emerge Coinciding with the Onset of Male Puberty*, 87 CLINICAL ENDOCRINOLOGY 68 (2017):

59. Analyzing four separate studies, Handelsman (2017) found very closely similar trajectories of divergence of athletic performance between the sexes across the adolescent years, in all measured events.

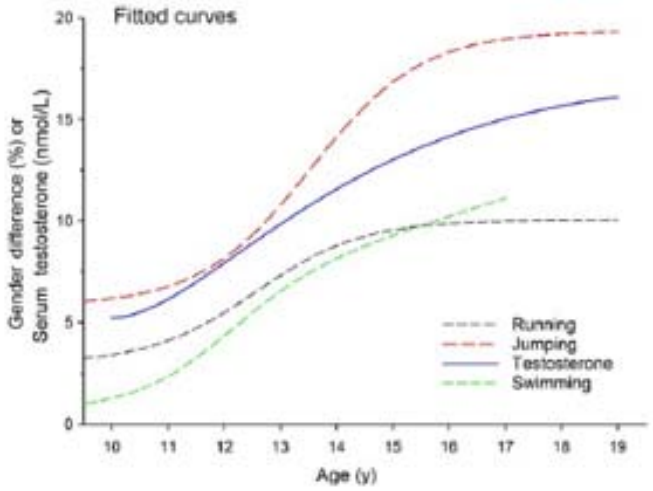
60. As illustrated by Figure 1 of Handelsman (2017) below, study results showed that "[i]n swimming performance, the overall gender differences were highly significant . . . ." (69)



61. As illustrated by Figure 2 of Handelsman (2017) below, "[i]n track and field athletics, the effects of age on running performance showed that the prepubertal differences of 3.0% increased to a plateau of 10.1% with an onset (ED_{20}) at 12.4 years and reaching midway (ED_{50}) at 13.9 years. For jumping, the prepubertal difference of 5.8% increased to 19.4% starting at 12.4 years and reaching midway at 13.9 years." (70)



62. As also illustrated in Figure 2 of Handelsman (2017), the author found a strong correlation between the increasing male performance advantage and blood serum testosterone levels, and reported: "The timing of the male advantage in running, jumping and swimming was similar [across events] and corresponded to the increases in serum testosterone in males." (70)



G. Moran Gershoni & Shmuel Pietrokovski, *The landscape of sex-differential transcriptome and its consequent selection in human adults*, 15 BMC BIOL 7 (2017):

63. The authors of this article evaluated "18,670 out of 19,644 informative protein-coding genes in men versus women" (2) and reported that "there are over 6500 protein-coding

genes with significant S[ex-]D[ifferential]E[xpression] in at least one tissue. Most of these genes have SDE in just one tissue, but about 650 have SDE in two or more tissues, 31 have SDE in more than five tissues, and 22 have SDE in nine or more tissues." (2) Some examples of tissues identified by these authors that have SDE genes include breast mammary tissue, skeletal muscle, skin, thyroid gland, pituitary gland, subcutaneous adipose, lung, and heart left ventricle. Based on these observations the authors state "As expected, Y-linked genes that are normally carried only by men show SDE in many tissues." (3) This evaluation of SDE in protein coding genes helps illustrate that the differences between men and women are intrinsically part of the chromosomal and genetic makeup of humans which can influence many tissues that are inherent to the athletic competitive advantages of men compared to women.

H. K. M. Haizlip, et al., Sex-based differences in skeletal muscle kinetics and fiber-type composition, 30 PHYSIOLOGY (BETHESDA) 30 (2015):

64. In a review of 56 articles on the topic of sex-based differences in skeletal muscle, the authors state that "More than 3,000 genes have been identified as being differentially expressed between male and female skeletal muscle []." (30) Furthermore, the authors state that "Overall, evidence to date suggests that skeletal muscle fiber-type composition is dependent on species, anatomical location/function, and sex." (30) The differences in genetic expression between males and females influence the skeletal muscle fiber composition (i.e. fast twitch and fast twitch sub-type and slow twitch), the skeletal muscle fiber size, the muscle contractile rate, and other aspects of muscle function that influence athletic performance. As the authors review the differences in skeletal muscle between males and females they conclude "Additionally, all of the fibers measured in men have significantly larger cross-sectional areas (CSA) compared with women []." (31) The authors also explore the effects of thyroid hormone, estrogen, and

testosterone on gene expression and skeletal muscle function in males and females. One major conclusion by the authors is that "The complexity of skeletal muscle and the role of sex adding to that complexity cannot be overlooked." (37).

I. Konstantinos D. Tambalis, et al., Physical fitness normative values for 6-18-year-old Greek boys and girls, using the empirical distribution and the lambda, mu, and sigma statistical method, 16 EUR J SPORT SCI 736 (2016). Mark J. Catley & G. R. Tomkinson, Normative health-related fitness values for children: analysis of 85347 test results on 9-17-year-old Australians since 1985, 47 BR J SPORTS MED 98 (2013). Grant R. Tomkinson, et al., *European normative values for physical fitness in children and adolescents aged 9-17 years: results from 2 779 165 Eurofit performances representing 30 countries*. 52 Br J Sports Med. 1445 (2018):

65. The purpose in citing these sources is to illustrate that males possess physical fitness traits that likely provide an advantage in athletic performance, that these male advantages may be apparent in children starting as young as six years of age, and in agreement with previously cited sources the differences become more apparent at the onset of puberty.

66. Tambalis et al. (2016) states that "based on a large data set comprising 424,328 test performances" (736) using standing long jump to measure lower body explosive power, sit and reach to measure flexibility, timed 30 second sit ups to measure abdominal and hip flexor muscle endurance, 10 X 5 meter shuttle run to evaluate speed and agility, and multi-stage 20 meter shuttle run test to estimate aerobic performance (738) "For each of the fitness tests, performance was better in boys compared with girls ($p < 0.001$), except for the S[it and] R[each] test ($p < 0.001$)." (739) In order to illustrate that the findings of Tambalis (2016) are not unique to children in Greece, the authors state "Our findings are in accordance with recent studies from Latvia [ ] Portugal [ ] and Australia [Catley & Tomkinson (2013)].(744)

67. Catley & Tomkinson (2013) observed that "Boys consistently scored higher than girls on health-related fitness tests, except on the sit-and-reach test, with the magnitude of the

differences typically increasing with age and often accelerating from about 12 years of age. Overall, the magnitude of differences between boys and girls was large for the 1.6 km run, 20 m shuttle run, basketball throw and push-ups; moderate for the 50-m sprint, standing broad jump and sit-and-reach; and small for sit-ups and hand-grip strength." (106)

68. Evaluating performance on the "Eurofit tests (measuring balance, muscular strength, muscular endurance, muscular power, flexibility, speed, speed-agility and cardiorespiratory fitness)" in "2,779,165 results on children and adolescents [ages 9-17 years] from 30 European countries" Tomkinson et al. (2018) observed that "On average, boys performed substantially better than girls at each age group on muscular strength (E[ffect]S[ize]: large), muscular power (E[ffect]S[ize]: large), muscular endurance (E[ffect]S[ize]: moderate to large), speed-agility (E[ffect]S[ize]: moderate) and C[ardio]R[espiratory]F[itness] (E[ffect]S[ize]: large) tests, with the magnitude of the sex-specific differences increasing with age and accelerating from about 12 years"" (1451). Given the number of subjects analyzed and that the data represent 30 different European countries, these findings particularly highlight the sex related differences in athletic performance potential between boys and girls both before and during adolescence.

J. Daniel M. Fessler, et al., *Sexual dimorphism in foot length proportionate to stature,* 32 ANN HUM BIOL 44 (2005). Roshna E. Wunderlich & P. R. Cavanagh, *Gender differences in adult foot shape: implications for shoe design,* 33 MED SCI SPORTS EXERC (2001):

69. Combined, these two articles evaluate and demonstrate clear differences in the foot length and structure of men and women. Of relevance to the case at hand is that to the best of my knowledge, no data are available demonstrating that male-to-female transgender hormone or surgical treatment alters the inherent sex related difference in foot structure.

70. Fessler et al. (2005) observes that "female foot length is consistently smaller than male foot length" (44) and conclude that "proportionate foot length is smaller in women"(51) with an overall conclusion that "Our analyses of genetically disparate populations reveal a clear pattern of sexual dimorphism, with women consistently having smaller feet proportionate to stature than men." (53)

71. Wunderlich & Cavanaugh (2001) observe that "a foot length of 257 mm represents a value that is … approximately the 20th percentile men's foot lengths and the 80th percentile women's foot lengths." (607) and "For a man and a woman, both with statures of 170 cm (5 feet 7 inches), the man would have a foot that was approximately 5 mm longer and 2 mm wider than the woman" (608). Based on these, and other analyses, they conclude that "female feet and legs are not simply scaled-down versions of male feet but rather differ in a number of shape characteristics, particularly at the arch, the lateral side of the foot, the first toe, and the ball of the foot." (605)

K. Daichi. Tomita, et al., *A pilot study on the importance of forefoot bone length in male 400-m sprinters: is there a key morphological factor for superior long sprint performance*?, 11 BMC RES NOTES 583 (2018). Hiromasa Ueno, et al., *The Potential Relationship Between Leg Bone Length and Running Performance in Well-Trained Endurance Runners*, 70 J HUM KINET 165 (2019). Hiromasa Ueno, et al., *Association between Forefoot Bone Length and Performance in Male Endurance Runners*, 39 INT J SPORTS MED 275 (2018):

72. As men have longer feet and legs than women as part of their overall larger body stature, collectively these articles build upon the work of Fessler et al. (2005) and Wunderlich & Cavanaugh (2001) by providing some evidence that "morphological factors such as long forefoot bones may play an important role in achieving superior long sprinting performance" (Tomito, 583), "longer forefoot bones may be advantageous for achieving higher running performance in

endurance runners" (Ueno 2018, 275)" and "the leg bone length, especially of the tibia, may be a potential morphological factor for achieving superior running performance in well-trained endurance runners." (Ueno 2019, 165)

L. International Weightlifting Federation "World Records"

73. I accessed weightlifting records as posted by the International Weightlifting Federation at https://www.iwf.net/results/world-records/. The records collected below are as of November 1, 2019.

74. As the chart below illustrates, junior men's and women's world records (age 15-20) for clean and jerk lifts indicate that boys or men perform better than girls or women even when they are matched for body mass. Similar sex differences can be found for the snatch event on the International Weightlifting Federation website.

Junior Men's and Women's World Records (ages 15-20) for Clean and Jerk			
Men's weight (kg)	Record (kg)	Women's weight (kg)	Record (kg)
56	171	58	142
62	183	63	147
69	198	69	157
77	214	75	164
85	220	90	160
94	233	+90	193

M. Selected Results from the 2019 NCAA Division 1 and Division 2 Track & Field Championships

75. I accessed the results for the NCAA 2019 Division 1 Track and Field Championships at https://www.flotrack.org/results/6515701-2019-D1-ncaa-outdoor-championships/26635 on May 14, 2020. I also accessed the results for the NCAA Divisions 2 Track and Field Championships at http://leonetiming.com/2019/Outdoor/NCAAD2/Results.htm on May 14, 2020.

76. A shown in the table below, in this small sampling of Track & Field events at the elite collegiate level of Division 1, the men's eighth place finisher and often all 24 men's qualifiers, outperformed the first place women's athlete in the same event. Furthermore, at the Division 2 level, which is arguably a less elite level of performance than Division 1, in most (if not all) events, the top eight men's finishers outperformed the first place division 1 woman in the same event.

Comparison of selected performance in Men's and Women's events in the 2019 NCAA Division 1 and Division 2 Track and Field Championships.		
100 meter run (seconds)		
D1 Women	D1 Men	D2 Men
10.75	9.86	10.17
10.95	9.93	10.22
10.98	9.97	10.32
11.00	10.01	10.38
11.02	10.06	10.47
11.04	10.06	10.48
11.12	10.12	10.53
11.65	10.12	FS
D1 Men's slowest time in 100 m prelims: 10.67 (23rd place; 24th place DNS)		
D1 Women's fastest time in 100 m prelims: 10.99		
1500 m run (minutes: seconds)		
D1 Women	D1 Men	D2 Men
4:05.98	3:41.39	3:58.24
4:06.27	3:41.39	3:58.74
4:11.96	3:42.14	3:58.90
4:13.02	3:42.29	3:59.02
4:13.57	3:42.32	3:59.47
4:13.62	3:42.73	3:59.55
4:14.30	3:42.77	3:59.65
4:14.73	3:42.81	3:59.93
D1 Men's slowest time in 1500 m prelims: 3:53.53 (24th place)		
D1 Women's fastest time in 1500 m prelims: 4:12.02		
10,000 m run (minutes: Seconds)		
D1 Women	D1 Men	D2 Men
33:10.84	29:16.60	30:12.3
33:11.56	29:18.10	30:59.78

33:17.81	29:19.85	31:05.87
33:20.68	29:19.93	31:07.37
33:20.70	29:20.73	31:11.07
33:25.91	29:25.35	31:13.39
33:32.80	29:26.34	31:14.69
33:34.20	29:30.88	31:18.75
D1 Men's slowest time in 10,000 m prelims: 31:20.16 (24th place)		
Long Jump (meters)		
D1 Women	D1 Men	DII Men
6.84	8.2	8.16
6.71	8.18	8.08
6.63	8.12	7.96
6.55	8.05	7.86
6.49	8.00	7.79
6.44	7.88	7.72
6.43	7.87	7.72
6.40	7.83	7.71
D1 Men's 21st place longest jump 7.38 m (22nd foul, 23rd & 24th DNS)		
Shot Put (meters) Note that men use 7.26 kg (16 lbs.) shot, women use 4 kg (8.82 lbs.) shot		
D1 Women	D1 Men	D II Men
18.14	21.11	21.47
18.11	20.77	19.58
17.88	20.31	18.71
17.67	19.89	18.62
17.46	19.73	18.43
17.24	19.65	18.34
17.13	19.65	18.30
16.94	19.52	18.03
D1 Men's 23rd place longest put 16.90 m (24th Foul)		

II. Biological male physiology is the basis for the performance advantage that men, or adolescent boys, have over women, or adolescent girls, in almost all athletic contests.

77. Common observation and knowledge tell us that, across the years of puberty, boys experience distinctive physical developments that largely explain the performance advantages I have detailed above. These well-known physical developments have now also been the subject of scientific measurement and study.

78. At the onset of male puberty the testes begin to secrete greatly increased amounts of testosterone. Testosterone is the primary "androgenic" hormone. It causes the physical traits associated with males such as facial and body hair growth, deepening of the voice, enlargement of the genitalia, increased bone mineral density, increased bone length in the long bones, and enhanced muscle growth (to name just a few of testosterone's effects). The enhanced muscle growth caused by testosterone is the "anabolic" effect often discussed when testosterone is called an anabolic steroid.

79. Women lack testes and instead have ovaries, so they do not experience similar increases in testosterone secretion. Instead, puberty in women is associated with the onset of menstruation and increased secretion of "estrogens." Estrogens, most notably estradiol, cause the feminizing effects associated with puberty in women which include increased fat tissue growth in the hips, thighs, and buttocks, development of the mammary glands, and closure of the growth plates in long bones. The smaller amount of muscle growth typically seen in women during puberty explains in part the athletic performance gap between men, and boys after the onset of puberty, and women and girls.

A. Handelsman, Hirschberg, et al. (2018):

80. In addition to documenting objective performance advantages enjoyed by males as I have reviewed above, Handelsman and his co-authors also detail physiological differences caused by male puberty—and by developments during puberty under the influence of male levels of testosterone in particular—that account for those advantages. These authors state: "The striking male postpubertal increase in circulating testosterone provides a major, ongoing, cumulative, and durable physical advantage in sporting contests by creating larger and stronger bones, greater muscle mass and strength, and higher circulating hemoglobin as well as possible

psychological (behavioral) differences. In concert, these render women, on average, unable to compete effectively against men in power-based or endurance-based sports." (805)

81. First, Handelsman et al. explain that all of these physiological differences appear to be driven by male levels of circulating testosterone. "The available, albeit incomplete, evidence makes it highly likely that the sex difference in circulating testosterone of adults explains most, if not all, of the sex differences in sporting performance. This is based on the dose-response effects of circulating testosterone to increase muscle mass and strength, bone size and strength (density), and circulating hemoglobin, each of which alone increases athletic capacity, as well as other possible sex dichotomous, androgen-sensitive contributors such as mental effects (mood, motivation, aggression) and muscle myoglobin content. These facts explain the clear sex difference in athletic performance in most sports, on which basis it is commonly accepted that competition has to be divided into male and female categories." (823)

82. "Prior to puberty, levels of circulating testosterone as determined by LC-MS are the same in boys and girls . . . . They remain lower than 2 nmol/L in women of all ages. However, from the onset of male puberty the testes secrete 20 times more testosterone resulting in circulating testosterone levels that are 15 times greater in healthy young men than in age-similar women." (806) "[T]he circulating testosterone of most women never reaches consistently >5 nmol/L, a level that boys must sustain for some time to exhibit the masculinizing effects of male puberty." (808)

83. "The characteristic clinical features of masculinization (e.g., muscle growth, increased height, increased hemoglobin, body hair distribution, voice change) appear only if and when circulating testosterone concentrations rise into the range of males at mid-puberty, which

are higher than in women at any age even after the rise in circulating testosterone in female puberty." (810)

84. "[The] order-of-magnitude difference in circulating testosterone concentrations is the key factor in the sex difference in athletic performance due to androgen effects principally on muscle, bone, and hemoglobin." (811)

85. "Modern knowledge of the molecular and cellular basis for androgen effects on skeletal muscle involves effects due to androgen (testosterone, DHT) binding to the AR that then releases chaperone proteins, dimerizes, and translocates into the nucleus to bind to androgen response elements in the promoter DNA of androgen-sensitive genes. This leads to increases in (1) muscle fiber numbers and size, (2) muscle satellite cell numbers, (3) numbers of myonuclei, and (4) size of motor neurons. Additionally, there is experimental evidence that testosterone increases skeletal muscle myostatin expression, mitochondrial biogenesis, myoglobin expression, and IGF-1 content, which may augment energetic and power generation of skeletal muscular activity." (811)

86. **Muscle mass** is perhaps the most obvious driver of male athletic advantage. "On average, women have 50% to 60% of men's upper arm muscle cross-sectional area and 65% to 70% of men's thigh muscle cross-sectional area, and women have 50% to 60% of men's upper limb strength and 60% to 80% of men's leg strength. Young men have on average a skeletal muscle mass of >12 kg greater than age-matched women at any given body weight. Whereas numerous genes and environmental factors (including genetics, physical activity, and diet) may contribute to muscle mass, the major cause of the sex difference in muscle mass and strength is the sex difference in circulating testosterone." (812)

87. "Dose-response studies show that in men whose endogenous testosterone is fully suppressed, add-back administration of increasing doses of testosterone that produce graded increases in circulating testosterone causes a dose-dependent (whether expressed according to testosterone dose or circulating levels) increase in muscle mass (measured as lean body mass) and strength. Taken together, these studies prove that testosterone doses leading to circulating concentrations from well below to well above the normal male range have unequivocal dose-dependent effects on muscle mass and strength. These data strongly and consistently suggest that the sex difference in lean body mass (muscle) is largely, if not exclusively, due to the differences in circulating testosterone between men and women. These findings have strong implications for power dependent sport performance and largely explain the potent efficacy of androgen doping in sports." (813)

88. "Muscle growth, as well as the increase in strength and power it brings, has an obvious performance enhancing effect, in particular in sports that depend on strength and (explosive) power, such as track and field events. There is convincing evidence that the sex differences in muscle mass and strength are sufficient to account for the increased strength and aerobic performance of men compared with women and is in keeping with the differences in world records between the sexes." (816)

89. Men and adolescent boys also have distinct athletic advantages in **bone size, strength, and configuration**.

90. "Sex differences in height have been the most thoroughly investigated measure of bone size, as adult height is a stable, easily quantified measure in large population samples. Extensive twin studies show that adult height is highly heritable with predominantly additive genetic effects that diverge in a sex-specific manner from the age of puberty onwards, the effects

of which are likely to be due to sex differences in adult circulating testosterone concentrations." "Men have distinctively greater bone size, strength, and density than do women of the same age. As with muscle, sex differences in bone are absent prior to puberty but then accrue progressively from the onset of male puberty due to the sex difference in exposure to adult male circulating testosterone concentrations." (818)

91. "The earlier onset of puberty and the related growth spurt in girls as well as earlier estrogen-dependent epiphyseal fusion explains shorter stature of girls than boys. As a result, on average men are 7% to 8% taller with longer, denser, and stronger bones, whereas women have shorter humerus and femur cross-sectional areas being 65% to 75% and 85%, respectively, those of men. These changes create an advantage of greater bone strength and stronger fulcrum power from longer bones." (818)

92. **Male bone geometry** also provides mechanical advantages. "The major effects of men's larger and stronger bones would be manifest via their taller stature as well as the larger fulcrum with greater leverage for muscular limb power exerted in jumping, throwing, or other explosive power activities." (818) Further, "the widening of the female pelvis during puberty, balancing the evolutionary demands of obstetrics and locomotion, retards the improvement in female physical performance, possibly driven by ovarian hormones rather than the absence of testosterone." (818)

93. Beyond simple performance, the greater density and strength of male bones provides higher protection against stresses associated with extreme physical effort: "[S]tress fractures in athletes, mostly involving the legs, are more frequent in females with the male protection attributable to their larger and thicker bones." (818)

94. In addition to advantages in muscle mass and strength, and bone size and strength, men and adolescent boys have **greater hemoglobin levels** in their blood as compared to women and girls, and thus a greater capability to transport oxygen within the blood, which then provides bioenergetic benefits. "It is well known that levels of circulating hemoglobin are androgen-dependent and consequently higher in men than in women by 12% on average…. Increasing the amount of hemoglobin in the blood has the biological effect of increasing oxygen transport from lungs to tissues, where the increased availability of oxygen enhances aerobic energy expenditure." (816) "It may be estimated that as a result the average maximal oxygen transfer will be ~10% greater in men than in women, which has a direct impact on their respective athletic capacities." (816)

B. Louis Gooren, *The Significance of Testosterone for Fair Participation of the Female Sex in Competitive Sports,* 13 Asian J. of Andrology 653 (2011):

95. Gooren et al. like Handelsman et al., link male advantages in height, bone size, muscle mass, strength, and oxygen carrying capacity to exposure to male testosterone levels: "Before puberty, boys and girls hardly differ in height, muscle and bone mass. Pubertal testosterone exposure leads to an ultimate average greater height in men of 12–15 centimeters, larger bones, greater muscle mass, increased strength and higher hemoglobin levels." (653)

C. Thibault, Guillaume, et al. (2010):

96. In addition to the testosterone-linked advantages examined by Handelsman et al. (2018), Thibault et al. note sex-linked differences in body fat as impacting athletic performance: "Sex has been identified as a major determinant of athletic performance through the impact of height, weight, body fat, muscle mass, aerobic capacity or anaerobic threshold as a result of genetic and hormonal differences []." (214)

D. Taryn Knox, Lynley C. Anderson, et al., *Transwomen in Elite Sport: Scientific & Ethical Considerations*, 45 J. MED ETHICS 395 (2019):

97. Knox et al. analyze specific testosterone-linked physiological differences between men and women that provide advantages in athletic capability, and conclude that "[E]lite male athletes have a performance advantage over their female counterparts due to physiological differences." (395) "Combining all of this information, testosterone has profound effects on key physiological parameters that underlie athletic performance in men. There is substantial evidence regarding the effects on muscle gain, bone strength, and the cardiovascular and respiratory system, all of which drive enhanced strength, speed and recovery. Together the scientific data point to testosterone providing an all-purpose benefit across a range of body systems that contribute to athletic performance for almost all sports." (397-98)

98. "It is well recognised that testosterone contributes to physiological factors including body composition, skeletal structure, and the cardiovascular and respiratory systems across the life span, with significant influence during the pubertal period. These physiological factors underpin strength, speed and recovery with all three elements required to be competitive in almost all sports. An exception is equestrian, and for this reason, elite equestrian competition is not gender-segregated. As testosterone underpins strength, speed and recovery, it follows that testosterone benefits athletic performance." (397)

99. "High testosterone levels and prior male physiology provide an all-purpose benefit, and a substantial advantage. As the IAAF says, 'To the best of our knowledge, there is no other genetic or biological trait encountered in female athletics that confers such a huge performance advantage.'" (399)

100. These authors, like others, describe sex-linked advantages relating to **bone size and muscle mass.** "Testosterone also has a strong influence on bone structure and strength. From puberty onwards, men have, on average, 10% more bone providing more surface area. The larger surface area of bone accommodates more skeletal muscle so, for example, men have broader shoulders allowing more muscle to build. This translates into 44% less upper body strength for women, providing men an advantage for sports like boxing, weightlifting and skiing. In similar fashion, muscle mass differences lead to decreased trunk and lower body strength by 64% and 72%, respectively in women. These differences in body strength can have a significant impact on athletic performance, and largely underwrite the significant differences in world record times and distances set by men and women." (397)

101. Knox et al. also identify the relatively higher percentage of **body fat** in women as both inherently sex-linked, and a disadvantage with respect to athletic performance. "Oestrogens also affect body composition by influencing fat deposition. Women, on average, have higher percentage body fat, and this holds true even for highly trained healthy athletes (men 5%–10%, women 8%–15%). Fat is needed in women for normal reproduction and fertility, but it is not performance enhancing. This means men with higher muscle mass and less body fat will normally be stronger kilogram for kilogram than women." (397)

102. Knox et al. detail the relative performance disadvantage arising from the oestrogen-linked **female pelvis shape**: "[T]he major female hormones, oestrogens, can have effects that disadvantage female athletic performance. For example, women have a wider pelvis changing the hip structure significantly between the sexes. Pelvis shape is established during puberty and is driven by oestrogen. The different angles resulting from the female pelvis leads to decreased joint rotation and muscle recruitment ultimately making them slower." (397)

103. "In short, higher testosterone levels lead to larger and stronger bones as well as more muscle mass providing a body composition-related performance advantage for men for almost all sports. In contrast, higher oestrogen levels lead to changes in skeletal structure and more fat mass that can disadvantage female athletes, in sports in which speed, strength and recovery are important." (397)

104. Knox et al. break out multiple sex-linked contributions to a male advantage in **oxygen intake and delivery**, and thus to energy delivery to muscles. "Testosterone also influences the cardiovascular and respiratory systems such that men have a more efficient system for delivering oxygen to active skeletal muscle. Three key components required for oxygen delivery include lungs, heart and blood haemoglobin levels. Inherent sex differences in the lung are apparent from early in life and throughout the life span with lung capacity larger in men because of a lower diaphragm placement due to Y-chromosome genetic determinants. The greater lung volume is complemented by testosterone-driven **enhanced alveolar multiplication rate** during the early years of life." (397)

105. "Oxygen exchange takes place between the air we breathe and the bloodstream at the alveoli, so more alveoli allows more oxygen to pass into the bloodstream. Therefore, the greater lung capacity allows more air to be inhaled with each breath. This is coupled with an improved uptake system allowing men to absorb more oxygen. Once in the blood, oxygen is carried by haemoglobin. Haemoglobin concentrations are directly modulated by testosterone so men have higher levels and can carry more oxygen than women. Oxygenated blood is pumped to the active skeletal muscle by the heart. The left ventricle chamber of the heart is the reservoir from which blood is pumped to the body. The larger the left ventricle, the more blood it can hold, and therefore, the more blood can be pumped to the body with each heartbeat, a

physiological parameter called 'stroke volume'. The female heart size is, on average, 85% that of a male resulting in the stroke volume of women being around 33% less. Putting all of this together, men have a much more efficient cardiovascular and respiratory system, with testosterone being a major driver of enhanced aerobic capacity." (397)

E. Lepers, Knechtle, et al. (2013):

106. Lepers et al. point to some of these same physiological differences as explaining the large performance advantage they found for men in triathlon performance. "Current explanations for sex differences in [maximal oxygen uptake] among elite athletes, when expressed relative to body mass, provide two major findings. First, elite females have more (<13 vs. <5 %) body fat than males. Indeed, much of the difference in [maximal oxygen uptake] between males and females disappears when it is expressed relative to lean body mass. Second, the hemoglobin concentration of elite athletes is 5–10 % lower in females than in males." (853)

107. "Males possess on average 7–9 % less percent body fat than females, which is likely an advantage for males. Therefore, it appears that sex differences in percentage body fat, oxygen-carrying capacity and muscle mass may be major factors for sex differences in overall triathlon performance. Menstrual cycle, and possibly pregnancy, may also impact training and racing in female athletes, factors that do not affect males." (853)

F. Tønnessen, Svendsen, et al. (2015):

108. Tønnessen et al. likewise point to some of the same puberty and testosterone-triggered physiological differences discussed above to explain the increasing performance advantage of boys across the adolescent years, noting that "[T]here appears to be a strong mechanistic connection between the observed sex-specific performance developments and hormone-dependent changes in body composition during puberty." (7) "Beyond [age 12], males

outperform females because maturation results in a shift in body composition. Our results are in line with previous investigations exploring physical capacities such as [maximal oxygen uptake] and isometric strength in non-competitive or non-specialized adolescents." (7)

109. "[S]ex differences in physical capacities (assessed as [maximal oxygen uptake] or isometric strength in the majority of cases) are negligible prior to the onset of puberty. During the adolescent growth spurt, however, marked sex differences develop. This can primarily be explained by hormone dependent changes in body composition and increased red blood cell mass in boys." (2)

110. "Sexual dimorphism during puberty is highly relevant for understanding sex-specific performance developments in sports. The initiation of the growth spurt in well-nourished girls occurs at about 9–10 yrs of age. Age at peak height velocity (PHV) and peak weight velocity (PWV) in girls is 11–12 and 12–13 yrs, respectively, with an average 7–9 cm and 6–9 kg annual increase. The growth spurt and PHV in girls occurs approximately 2 years earlier than for boys. However, the magnitude of the growth spurt is typically greater in boys, as they on average gain 8–10 cm and 9–10 kg annually at PHV and PWV, respectively. Girls experience an escalation in fat mass compared to boys. Fat free mass (FFM) (also termed lean muscle mass) is nearly identical in males and females up to the age of 12–13 yrs. FFM plateaus in females at 15–16 years of age, but continues increasing in males up to the age of 19–20 yrs. On average, boys and girls increase their FFM by 7.2 and 3.5 kg/year^{-1}, respectively, during the interval near peak height velocity. Corresponding estimates for changes in absolute fat mass are 0.7 and 1.4 kg/year^{-1}, while estimates for relative fatness are -0.5% and +0.9%/year^{-1} in boys and girls, respectively." (2)

111. "During puberty, boys begin to produce higher levels of circulating testosterone. This affects the production of muscle fibers through direct stimulation of protein synthesis. Higher testosterone levels result in more muscle mass, which in turn facilitates greater power production and more advantageous ground reaction forces during running and jumping. Adolescent weight gain in boys is principally due to increased height (skeletal tissue) and muscle mass, while fat mass remains relatively stable. In contrast, during puberty girls begin to produce higher levels of circulating estrogen and other female sex hormones. Compared to their male counterparts, they experience a less pronounced growth spurt and a smaller increase in muscle mass, but a continuous increase in fat mass, thereby lowering the critical ratio between muscular power and total body mass." (7)

112. "The relatively greater progress in jumping exercises can also be explained by growth and increased body height during puberty. The increase in body height means that the center of gravity will be higher, providing better mechanical conditions for performance in jumping events." (8)

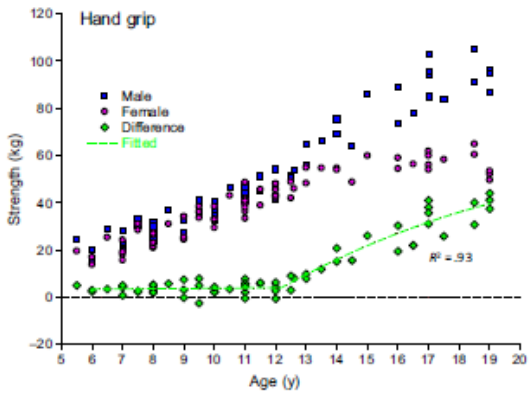
G. Louis J. G. Gooren & Mathijs C. M. Bunck, *Transsexuals & Competitive Sports*, 151 EUROPEAN J. OF ENDOCRINOLOGY 425 (2004):

113. In their study of performance of transsexual athletes, Louis et al. note that "[b]efore puberty, boys and girls do not differ in height, muscle and bone mass. Recent information shows convincingly that actual levels of circulating testosterone determine largely muscle mass and strength." (425) "Testosterone exposure during puberty leads ultimately to an average greater height in men of 12–15 cm, larger bones and muscle mass, and greater strength." (425)

H. Handelsman (2017):

114. Handelsman (2017) notes the existence of a "stable and robust" performance gap between males and females, with no narrowing "over more than three decades" (71), observing that "[i]t is well known that men's athletic performance exceeds that of women especially in power sports because of men's greater strength, speed and endurance. This biological physical advantage of mature males forms the basis for gender segregation in many competitive sports to allow females a realistic chance of winning events. This physical advantage in performance arises during early adolescence when male puberty commences after which men acquire larger muscle mass and greater strength, larger and stronger bones, higher circulating haemoglobin as well as mental and/or psychological differences. After completion of male puberty, circulating testosterone levels in men are consistently 10-15 times higher than in children or women at any age." (68)

115. To illustrate, Figure 3 of Handelsman (2017) below indicates, "the age trends in hand-grip strength showed a difference in hand-grip strength commencing from the age of 12.8 years onwards (Figure 3). Prior to the age of 13 years, boys had a marginally significant greater grip strength than girls (n=45, t=2.0, P=.026), but after the age of 13 years, there was a strong significant relationship between age and difference in grip strength (n=18, r=.89, P<.001)." (70)



116. Handelsman (2017) in particular focuses on the correlation between the development of this performance gap and the progress of male adolescence and circulating testosterone levels in boys. "The strength of the present study is that it includes a wide range of swimming as well as track and field running and jumping events as well as strength for nonathletes for males and females across the ages spanning the onset of male puberty. The similar timing of the gender divergence in each of these settings to that of the rise in circulating testosterone to adult male levels strongly suggests that they all reflect the increase in muscular size and strength although the impact of other androgen-dependent effects on bone, haemoglobin and psychology may also contribute." (71-72)

117. "In this study, the timing and tempo of male puberty effects on running and jumping performance were virtually identical and very similar to those in swimming events. Furthermore, these coincided with the timing of the rise in circulating testosterone due to male puberty. In addition to the strikingly similar timing and tempo, the magnitude of the effects on performance by the end of this study was 10.0% for running and 19.3% for jumping, both consistent with the gender differences in performance of adult athletes previously reported to be 10%-12% for running and 19% for jumping." (71)

118. "In the swimming events, despite the continued progressive improvements in individual male and female event records, the stability of the gender difference over 35 years shown in this study suggests that the gender differences in performance are stable and robust." (71)

119. "The similar time course of the rise in circulating testosterone with that of the gender divergences in swimming and track and field sports is strongly suggestive that these effects arise from the increase in circulating testosterone from the start of male puberty." (71) "It

is concluded that the gender divergence in athletic performance begins at the age of 12-13 years and reaches adult plateau in the late teenage years. Although the magnitude of the divergence varies between athletic skills, the timing and tempo are closely parallel with each other and with the rise in circulating testosterone in boys during puberty to reach adult male levels." (72)

120. Handelsman (2017) notes several specific physiological effects of male levels of circulating testosterone that are relevant to athletic performance:

a. "Adult male circulating testosterone also has marked effects on bone development leading to longer, stronger and denser bone than in age-matched females." (71)

b. "A further biological advantage of adult male circulating testosterone concentrations is the increased circulating haemoglobin. Men have ~10 g/L greater haemoglobin than women with the gender differences also evident from the age of 13-14 years." (71)

121. Handelsman (2017) also observes that "exposure to adult male testosterone concentrations is likely to produce some mental or psychological effects. However, the precise nature of these remains controversial and it is not clear whether, or to what extent, this contributes to the superior elite sporting performance of men in power sports compared with the predominant effects on muscle mass and function." (71)

I. Centers for Disease Control & Prevention, "National Health Statistics Reports Number 122," CDC (2018):

122. To obtain data on height, weight, and body mass differences between men and women, I accessed the "National Health Statistics Reports Number 122" published by the

Centers for Disease Control & Prevention, at https://www.cdc.gov/nchs/data/nhsr/nhsr122-508.pdf, which is based on data through 2016.

123. The average height for a U.S. adult man is 5 feet 9 inches and for a U.S. adult woman the average height is 5 feet 4 inches. (3)

124. The average weight for a U.S. adult man is 197.8 lbs. and for a U.S. adult woman the average weight is 170.5 lbs. (6)

125. The average body mass index for a U.S. adult man is 29.1 kg/m^2, and the average body mass index for a U.S. adult woman is 29.6 kg/m^2. (3)

III. Administration of cross-sex hormones to men, or adolescent boys, after male puberty does not eliminate their performance advantage over women, or adolescent girls, in almost all athletic contests.

126. At the collegiate level, the "NCAA Policy on Transgender Student-Athlete Participation" requires only that such males be on unspecified and unquantified "testosterone suppression treatment" for "one calendar year" prior to competing in women's events.

127. Studies have demonstrated that hormone administration of testosterone suppression does not eliminate the physical advantages males have over females in athletics. Although such studies have not focused specifically on elite athletes, there is no scientific evidence or principle suggesting that the effects of hormone administration of testosterone suppression on elite athletes should be different than they are in the general population.

128. It is obvious that some effects of male puberty that confer advantages for athletic performance—in particular bone size and configuration—cannot be reversed once they have occurred.

129. In addition, some studies have now determined that other physiological advantages conferred by male puberty are also not fully reversed by later hormonal treatments

associated with gender transition. Specifically, studies have shown that the effects of puberty in males including increased muscle mass, increased bone mineral density, increased lung size, and increased heart size, are not completely reversed by suppressing testosterone secretion and administering estrogen during gender transition procedures in males.

130. For example, suppressing testosterone secretion and administering estrogen in post pubescent males does not shrink body height to that of a comparably aged female, nor does it reduce lung size or heart size. Indeed, while testosterone suppression and estrogen administration reduce the size and density of skeletal muscles, the muscles remain larger than would be expected in a typical female even when matched for body height or mass. A general tenet of exercise science is that larger muscles are stronger muscles due to larger muscles containing more contractile proteins. Thus, while gender transition procedures may impair a male's athletic potential, in my opinion it is still highly unlikely to be reduced to that of a comparably aged and trained female due to these physiological factors.

131. Supporting my opinion in this regard, at least two recent prospective studies involving substantial numbers of subjects have found that measured strength did not decrease, or decreased very little, in male-to-female subjects after a full year of hormone therapy including testosterone suppression, leaving these populations with a large strength advantage over baseline female strength.

132. I review relevant findings in more detail below.

A. Handelsman, Hirschberg, et al. (2018):

133. Handelsman et al. (2018) note that in "transgender individuals, the developmental effects of adult male circulating testosterone concentrations will have established the sex difference in muscle, hemoglobin, and bone, some of which is fixed and irreversible

(bone size) and some of which is maintained by the male circulating testosterone concentrations (muscle, hemoglobin)." (824)

134. "[D]evelopmental bone effects of androgens are likely to be irreversible." (818)

135. With respect to muscle mass and strength, Handelsman et al. (2018) observe that suppression of testosterone in males to levels currently accepted for transgender qualification to compete in women's events will still leave those males with a large strength advantage. "Based on the established dose-response relationships, suppression of circulating testosterone to <10 nmol/L would not eliminate all ergogenic benefits of testosterone for athletes competing in female events. For example, according to the Huang *et al.* [] study, reducing circulating testosterone to a mean of 7.3 nmol/L would still deliver a 4.4% increase in muscle size and a 12% to 26% increase in muscle strength compared with circulating testosterone at the normal female mean value of 0.9 nmol/L. Similarly, according to the Karunasena *et al*. [] study, reducing circulating testosterone concentration to 7 nmol/L would still deliver 7.8% more circulating hemoglobin than the normal female mean value. Hence, the magnitude of the athletic performance advantage in DSD athletes, which depends on the magnitude of elevated circulating testosterone concentrations, is considerably greater than the 5% to 9% difference observed in reducing levels to <10 nmol/L." (821)

B. Gooren (2011):

136. In addition to noting that the length and diameter of bones is unchanged by post-pubertal suppression of androgens (including testosterone) (653), Gooren found that "[i]n spite of muscle surface area reduction induced by androgen deprivation, after 1 year the mean muscle surface area in male-to- female transsexuals remained significantly greater than in untreated

female-to-male transsexuals." (653) "Untreated female-to-male transsexuals" refers to biological females, who will have hormonal levels ordinarily associated with women.

137. As I have explained above, greater muscle surface area translates into greater strength assuming comparable levels of fitness.

C. Knox, Anderson, et al. (2019):

138. In their recent article, Knox et al. reviewed the physiological effects of reducing circulating testosterone levels below 10nmol/L, the level current accepted by the International Olympic Committee (IOC) (2015) guidelines as adequate to permit males to enter as women in Olympic competition.

139. Knox et al. note the unarguable fact that 10nmol/L is a far higher level of circulating testosterone than occurs in women, including elite women athletes. "Transwomen [meet IOC guidelines] to compete with testosterone levels just under 10 nmol/L. This is more than five times the upper testosterone level (1.7 nmol/L) of healthy, premenopausal elite cis-women athletes. Given that testosterone (as well as other elements stemming from Y-chromosome-dependent male physiology) provides an all-purpose benefit in sport, suggests that transwomen have a performance advantage." (398)

140. As to **bone strength**, Knox et al. report that a "recent meta-analysis shows that hormone therapy provided to transwomen over 2 years maintains bone density so bone strength is unlikely to fall to levels of cis-women, especially in an elite athlete competing and training at high intensity. Increased bone strength also translates into protection against trauma, helping with recovery and prevention of injury." (398)

141. Based on a review of multiple studies, Knox et al. report that, in addition to bone size, configuration, and strength, "hormone therapy will not alter … **lung volume or heart size**

of the transwoman athlete, especially if [that athlete] transitions postpuberty, so natural advantages including joint articulation, stroke volume and maximal oxygen uptake will be maintained." (398)

142. With respect to **muscle mass and strength**, Knox et al. found that "healthy young men did not lose significant muscle mass (or power) when their circulating testosterone levels were reduced to 8.8 nmol/L (lower than the IOC guideline of 10 nmol/L) for 20 weeks. Moreover, retention of muscle mass could be compensated for by training or other ergogenic methods. In addition, the phenomenon of muscle memory means muscle mass and strength can be rebuilt with previous strength exercise making it easier to regain muscle mass later in life even after long intervening periods of inactivity and mass loss." (398)

143. Indeed, Knox et al. observe that oestradiol—routinely administered as part of hormone therapy for transwomen—is actually known to *increase* muscle mass, potentially providing an *additional* advantage for these athletes over women. "While testosterone is the well-recognised stimulator of muscle mass gain, administration of oestradiol has also been shown to activate muscle gain via oestrogen receptor-β activation. The combination of oestradiol therapy and a baseline testosterone of 10 nmol/L arguably provides transwomen athletes with an added advantage of increased muscle mass, and therefore power." (398)

144. Summing up these facts, Knox et al. observe: "A transwoman athlete with testosterone levels under 10 nmol/L for 1 year will retain at least some of the physiological parameters that underpin athletic performance. This, coupled with the fact that [under IOC rules] transwomen athletes are allowed to compete with more than five times the testosterone level of a cis-woman, suggests transwomen have a performance advantage." (398) Indeed, considering the magnitude of the advantages involved, Knox et al. conclude that the physiological advantages

resulting from male puberty that are not negated by post-pubertal hormonal therapy "provide a strong argument that transwomen have an intolerable advantage over cis-women." (399)

D. Gooren & Bunck (2004):

145. Measuring the concrete significance of the fact that bone size and configuration cannot be changed after puberty, Gooren and Bunk reported that "[Male-to-female transsexuals] were on average 10.7 cm taller (95% CI 5.4–16.0 cm) than [female-to-male transsexuals] (7)." (427)

146. With respect to muscle mass, Gooren and Bunk reported what other authors have since described in more detail: "After 1 year of androgen deprivation, mean muscle area in [male-to-female transsexuals] had decreased significantly but remained significantly greater than in [female-to-male transsexuals] before testosterone treatment." (427) To be clear, female-to-male transsexuals "before testosterone treatment" are biological females with natural female hormone levels.

> "The conclusion is that androgen deprivation in [male-to-female transsexuals] increases the overlap in muscle mass with women but does not reverse it, statistically." (425) In other words, for the overall sample of 19 male-to female transsexuals, before ("306.9 ± 46.5 cm^2") and after ("277.8 ± 37.0 cm^2") 1 year of cross-sex hormone administration these subjects had statistically significantly more muscle mass than the 17 untreated females ("238.8 ± 33.1 cm^2") (427). Before treatment, an unstated number of male-to-female transsexuals on the low end of the range for muscle mass in this sample were similar to an unstated number of untreated females on the high end of the range for muscle mass. As the muscle mass decreased in male-to-female transsexuals due to cross-sex hormone treatment there were an unstated number of male-to-female subjects whose

muscle mass was similar to the untreated women on the high end of the range for muscle mass. But, the overlap in muscle mass between male-to-female and untreated female subjects was insufficient to alter the statistical analysis.

147. Gooren and Bunk provide an insightful conclusion regarding whether it is fair for male-to-female transgender individuals to compete with biological females "The question of whether reassigned M–F can fairly compete with [biological] women depends on what degree of arbitrariness one wishes to accept". (425)

E. Wiik et al. (2020):

148. Taking measurements one month after start of testosterone-suppression in male-to-female subjects, and again 3 and 11 months after start of feminizing hormone replacement therapy in these subjects, Wiik et al. found that total lean tissue (i.e. primarily muscle) did not decrease significantly across the entire period. And even though they observed a small decrease in thigh muscle mass, they found that isometric strength levels measured at the knee "were maintained over the [study period]." (e808) "At T12 [the conclusion of the one-year study], the absolute levels of strength and muscle volume were greater in [male-to-female subjects] than in [female-to-male subjects] and CW [women who had not undergone any hormonal therapy]." (e808)

149. While female-to-male subjects "experienced robust changes in lower-limb muscle mass and strength" after 11 months of testosterone injection (e812), even after the female-to-male subjects had undergone testosterone injection, and the male-to-female subjects had undergone testosterone suppression and feminizing hormone replacement therapy, the male-to-female subjects "still had larger muscle volumes and quadriceps area" (e811).

150. In other words, biologically male subjects remained stronger than biologically female subjects after undergoing a year of testosterone suppression, and even remained stronger than biologically female subjects who had undergone 11 months of testosterone-driven "robust" increases in muscle mass and strength. I note that outside the context of transgender athletes, the testosterone-driven increase in strength enjoyed by these female-to-male subjects would constitute a disqualifying doping violation under all league anti-doping rules with which I am familiar.

F. Scharff et al. (2019):

151. Scharff et al. measured grip strength in a large cohort of male-to-female subjects from before the start of hormone therapy through one year of hormone therapy. The hormone therapy included suppression of testosterone to less than 2 nml/L "in the majority of the transwomen," (1024), as well as administration of estradiol (1021). These researchers observed a small decrease in grip strength in these subjects over that time, but mean grip strength of this group remained far higher than mean grip strength of females—specifically, "After 12 months, the median grip strength of transwomen [male-to-female subjects] still falls in the 95th percentile for age-matched females." (1026)

152. As further evidence that male-to-female transgender treatment does not negate the inherent athletic performance advantages of a post-pubertal male, I present race times for the well-publicized sports performance of Cece Telfer. In 2016 and 2017 Cece Telfer competed as Craig Telfer on the Franklin Pierce University men's track team being ranked 200th and 390th (respectively) against other NCAA Division 2 men and did not qualify for the National Championships in any events. Cece Telfer did not compete in the 2018 season while undergoing male-to-female transgender treatment (per NCAA policy). In 2019 Cece Telfer competed on the

Franklin Pierce University women's team, qualified for the NCAA Division 2 Track and Field National Championships, and placed 1st in the women's 400 meter hurdles and placed third in the women's 100 meter hurdles. (for examples of the media coverage of this please see https://www.washingtontimes.com/news/2019/jun/3/cece-telfer-franklin-pierce-transgender-hurdler-wi/ last accessed May 29, 2020. https://www.newshub.co.nz/home/sport/2019/06/athletics-transgender-woman-cece-telfer-who-previously-competed-as-a-man-wins-ncaa-track-championship.html last accessed May 29, 2020.)

153. The table below shows the best collegiate performance times from the combined 2015 and 2016 seasons for Cece Telfer when competing as a man (Craig Telfer) in men's events, and the best collegiate performance times from the 2019 season when competing as a woman in women's event. Comparing the times for the running events (in which male and female athletes run the same distance) using a two tailed paired sample test there is no statistical difference (P=0.51) between the times. Calculating the difference in time between the male and female times for the best performances in the same running events and dividing that difference by the male performance times, as a female Cece Telfer performed an average of 0.22% *faster* as a female. (Comparing the performance for the hurdle events (marked with H) is of questionable validity due to differences between men's and women's events in hurdle heights and spacing, and distance for the 110m vs. 100 m.) While this is simply one example, and does not represent a controlled experimental analysis, this information provides some evidence that male-to-female transgender treatment does not negate the inherent athletic performance advantages of a post-pubertal male. (these times were obtained from https://www.tfrrs.org/athletes/6994616/Franklin_Pierce/CeCe_Telfer.html and https://www.tfrrs.org/athletes/5108308.html, last accessed May 29, 2020)

As Craig Telfer (male athlete)		As Cece Telfer (female athlete)	
Event	Time (seconds)	Event	Time (seconds)
55	7.01	55	7.02
60	7.67	60	7.63
100	12.17	100	12.24
200	24.03	200	24.30
400	55.77	400	54.41
55 H †	7.98	55 H†	7.91
60 H †	8.52	60 H†	8.33
110 H†	15.17	100 H†	13.41*
400 H‡	57.34	400 H‡	57.53**

* women's 3rd place, NCAA Division 2 National Championships
** women's 1st place, NCAA Division I2 National Championships
† men's hurdle height is 42 inches with differences in hurdle spacing between men and women
‡ men's hurdle height is 36 inches, women's height is 30 inches with the same spacing between hurdles

G. Johanna Harper. (2015):

154. This article is oft cited as evidence supporting a lack of performance advantage for male-to-female transgender athletes (*for an example see the Expert Declaration by Joshua D. Safer, MD, FACP, FACE. Case 1:20-cv-00184-CWD Document 22-9, point 51*). This article purports to show that male-to-female transgender distance runners do not retain post-pubertal athletic advantages over biological females. However, this paper has numerous methodical shortcomings rendering the data and conclusions to be of little to no scientific validity. Herein I provide a detailed critique of a number of the methodical shortcomings of this paper.

155. Of major concern is that the paper does not mention any type of approval from a research ethics committee, documentation of informed consent from the participants, or otherwise state that the study was conducted in accordance with the ethical principles of the World Medical Association Declaration of Helsinki, which raises the specter of overall ethical concerns with this paper (This may simply be an oversight on the part of the journal in not

requiring such a statement, but such an oversight is very unusual given the publication date of 2015). As the data were gathered with the intent of contributing to the scientific knowledge, and there was interaction between the researcher and the subjects with exchange of identifiable and sensitive information, Institutional Review Board approval and documentation of consent are necessary for this type of project.

156. The author states that "The first problem is how to formulate a study to create a meaningful measurement of athletic performance, both before and after testosterone suppression. No methodology has been previously devised to make meaningful measurements." (2) This statement is not correct as there are innumerable publications with validated methodology for comparing physical fitness and/or athletic performance between people of different ages, sexes (some of which have previously been discussed), medical conditions, and before and after medical treatment, any of which could easily have been used with minimal or no adaptation for the purposes of this study (many even before the initiation of the Harper study, which apparently started in 2006).

157. The overall methods as explained within the manuscript are of limited scientific validity and reliability, starting with subject recruitment. The author states "The collection process consisted of seeking out female transgender distance runners, mostly online, and then asking them to submit race times. Even in 2014 few people are open about being transgender, so the submission of race times represented a large leap of faith for the participants." (3) There is no further information regarding how the subjects were recruited (i.e. sampling techniques). Furthermore, based on this description of sampling techniques there is no way to know if these 8 subjects are in any way representative of any population of men, women, or transgender individuals, and especially the overall transgender distance running population. For example,

what websites were used to identify possible subjects? How were the subjects solicited to participate? Was any compensation or coercion offered to the subjects? What inclusion or exclusion criteria were used in subject selection? How were the subjects who were not recruited online identified and enrolled into the research? How many were recruited online vs. not online? Furthermore, no indication is given if the subjects have undergone only hormone treatment, surgical treatment, or both. Furthermore, there is no indication of any verification of testosterone concentrations, compliance with hormone treatments, or other relevant endocrine or transgender treatment information. Lastly, no descriptive data are provided for the subjects' body height, body mass, or other relevant anthropometric characteristics.

158. Similar to the sampling techniques the methods for collecting race times are lacking in validity, reliability, or detailed description. The author states "Race times from eight transgender women runners were collected over a period of seven years and, when possible, verified." And "When possible, race times were then verified using online services listing race results. For six of the eight runners, online checking made it possible to verify approximately half of the submitted times. Two of the subjects, runners three and four, would only participate anonymously, creating an ethical dilemma over the use of their times, versus respect their privacy." (3) No further information regarding which race times were verified is presented, thus the verified race times could be only pre-transition, only post transition, all coming from 3 of the subjects, or some combination thereof. The validity and reliability of self-reported data are overall very questionable, which the author acknowledges by stating "The times submitted by the eight runners were self-selected and self-reported. The self- reporting by the subjects certainly affects the strength of the findings. As mentioned previously, almost half of the race times were double checked by the author for accuracy. None of the subjects incorrectly reported any result"

(6). However, verifying "almost half" of the race times does not validate the other "almost half." The author does not state which race times the runners were asked to self-report (i.e. these could have been the slowest times as a man and the fastest times as a woman, or vice versa. Or the reported races time could be some form of non-representative sample of the subjects' race times). As some of the data represent a span of 29 years between reported race times, and the mean time between reported race times is 7.3 ± 8.4 years the accuracy of the non-verified self-reported race times are very questionable [The means ± sd are not presented in the paper; they were calculated by the author of this declaration]. The author further states that only three of the pairs of race times "were run over the same course within three years' time and represent the best comparison points" (5) (i.e. Runner No. 4 provided one pair of pre-post transition 5K times, Runner No. 6 provided one pair of pre-post transition 10K times, and Runner No 6 provided one pair of pre-post transition Half-marathon times). Runner No 4 was one of the previously described "ethical dilemma" (3) subjects with no verified race times. Once again, it is not stated if any of "the best comparison points" (5) represents verified data. Furthermore, while the race may have been run over the same course, no mention of environmental conditions for the comparison performance is made. To put this in perspective, the 2018 Boston Marathon was run in rain and headwinds resulting in a men's winning time of 2:15:54 (the slowest time since 1976) and a women's winning time of 2:39:54 (the slowest time for a women's winner since 1978). To help further illustrate the challenges in year to year comparison of race time that may be exacerbated by weather, in 2017 the men's winning time for the Boston Marathon was 2:09:37 and the women's winning time was 2:21:52.

159. The author notes that "both runner two and runner six reported stable training patterns over this time range" (5), but once again, there is no indication of how these data were

collected or verified. Furthermore, what does a "stable training pattern mean"? Is it mileage, or pace, or combination of training techniques? This also further illustrates the methodological weaknesses in the study as runner two did not provide times for the "same course within three years' time", which, to quote the author "represent the best comparison points".

160. There is no experimental control for, or mention of, habitual nutrition, pre-event or during-event nutrition, any which (especially hydration and carbohydrate intake) can have a major impact on the outcome of endurance competition.

161. The description of the statistical analysis is insufficient. The author states that "Two tailed t tests were run on both the mean and peak AGs." (5) This is an ambiguous statement. Typically an author would report what kind of t-test was performed. Were these paired sample t-tests, independent sample t-tests, or one-sample t-tests?

162. Despite these methodological shortcomings, the author makes some insightful statements in the discussion. In the discussion section of the paper the author states "Transgender women are taller and larger, on average, than 46,XX women [], and these differences probably would result in performance advantages in events in which height and strength are obvious precursors to success" (7). The author further reasonably states that "It should be noted that this conclusion only applies to distance running and the author makes no claims as to the equality of performances, pre and post gender transition, in any other sport. As such, the study cannot, unequivocally, state that it is fair to allow transgender women to compete against 46,XX women in all sports…" to which the author adds "…although the study does make a powerful statement in favor of such a position."(8) This latter statement cannot be supported based on the data contained in this paper or any presently known research.

Conclusion

163. Once again, based on my professional familiarity with exercise physiology and my review of the currently available science, including that contained in the sources I cite and summarize in this declaration, and the competition results and records presented here, I offer three primary professional opinions:

a. At the level of elite, sub elite, high school, and recreational competition, men or boys have an advantage over comparably aged women or girls, in almost all athletic contests;

b. Biological male physiology and anatomy is the basis for the performance advantage that men or boys have over women or girls, in almost all athletic contests; and

c. Administration of androgen inhibitors and cross-sex hormones to men, or adolescent boys, after male puberty, and administration of testosterone to women or adolescent girls, after female puberty, does not eliminate the performance advantage of men or adolescent boys over women or adolescent girls in almost all athletic contests.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 3rd day of June, 2020.

/s/ Gregory A. Brown
Professor Gregory A. Brown, Ph.D.

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on June 4, 2020, I electronically filed the foregoing with the Clerk of the Court using the CM/ECF system which sent a Notice of Electronic Filing to the following persons:

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ATTACHMENT

EXPERT DECLARATION OF GREGORY A. BROWN, Ph.D. FACSM

Hecox, et al. v. Little, et al.

Case No. 1:20-cv-00184-DCN

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Academic Preparation

Doctor of Philosophy, Iowa State University. August 2002 -- Major in Health and Human Performance, Emphasis in the Biological Bases of Physical Activity, dissertation title: "Androgenic supplementation in men: Effects of age, herbal extracts, and mode of delivery."

Master of Science, Iowa State University, May 1999 -- Major in Exercise and Sport Science, Emphasis in Exercise Physiology, thesis title: "Oral anabolic-androgenic supplements during resistance training: Effects on glucose tolerance, insulin action, and blood lipids."

Bachelor of Science, Utah State University, June 1997 -- Major in Physical Education, Emphasis in Pre-physical Therapy.

Awards

College of Education Outstanding Faculty Teaching Award. University of Nebraska at Kearney 2019

Mortar Board Faculty Excellence Honors. Xi Phi Chapter, University of Nebraska at Kearney, Honored in 2006, 2007, 2008, 2012, 2013, 2015, and 2019

Profiled in New Frontiers, the University of Nebraska Kearney annual publication highlighting excellence in research, scholarship, and creative activity. 2009, 2017

College of Education Outstanding Scholarship / Research Award. University of Nebraska at Kearney 2009, 2014

College of Education Award for Faculty Mentoring of Undergraduate Student Research University of Nebraska at Kearney, 2007, 2010, & 2013

"Pink Tie" award from the Susan G. Komen Nebraska Affiliate, for outstanding service to the Central Nebraska Race for the Cure, 2013

Star Reviewer for the American Physiological Society and Advances in Physiology Education. 2010.

Fellow of the American College of Sports Medicine. Awarded April 23, 2008

UNK Senior Appreciation Program honoree, the University of Nebraska at Kearney

Iowa State University Research Excellence Award, Iowa State University, 2002

The Zaffarano Prize for Graduate Student Research, Iowa State University, 2002

Helen Hilton Lebaron Excellence in Research Award, Dept. of Health and Human Performance, Iowa State University, 2002

Best Paper Award, 2nd Annual Education Research Exchange. Iowa State University Education Research Exchange, 2001

Helen Hilton Lebaron Excellence in Research Award, Dept. of Health and Human Performance, Iowa State University, 2000

Professional Experience

Professor: University of Nebraska Kearney, Dept. of Kinesiology and Sport Sciences (2012-)

Associate Professor: University of Nebraska Kearney, HPERLS Dept. (2007-2012)

Assistant Professor: University of Nebraska Kearney, HPERLS Dept. (2004- 2007) Full Graduate Faculty status awarded on hire, 2004

Assistant Professor: Georgia Southern University, Jiann-Ping Hsu School of Public Health. (2002-2004) Full Graduate Faculty status awarded Nov. 26, 2002

Laboratory Director: Human Performance Laboratory, Georgia Southern University, Jiann-Ping Hsu School of Public Health. (2002-2004)

Research Assistant: Exercise Biochemistry and Physiology Laboratory, Iowa State University, Department of Health and Human Performance. (1997-2002)

Graduate Teaching Assistant: Iowa State University, Department of Health and Human Performance. (1997-2002)

Temporary Instructor: Iowa State University, Department of Health and Human Performance. (1999-2002)

Temporary Adjunct Faculty: Des Moines Area Community College. (2000)

Undergraduate Teaching Intern: Department of Biology, Utah State University. (1995-1996)

Refereed Publications

1. Schneider KM and Brown GA (as Faculty Mentor). What's at Stake: Is it a Vampire or a Virus? International Journal of Undergraduate Research and Creative Activities. 11, Article 4. 2019.
2. Christner C and Brown GA (as Faculty Mentor). Explaining the Vampire Legend through Disease. UNK Undergraduate Research Journal. 23(1), 2019. *this is an on campus publication
3. Schneekloth B and Brown GA. Comparison of Physical Activity during Zumba with a Human or Video Game Instructor. 11(4):1019-1030. International Journal of Exercise Science, 2018.
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6. Kahle A, Brown GA, Shaw I, & Shaw BS. Mechanical and Physiological Analysis of Minimalist versus Traditionally Shod Running. J Sports Med Phys Fitness. 56(9):974-9, 2016
7. Bice MR, Carey J, Brown GA, Adkins M, and Ball JW. The Use of Mobile Applications to Enhance Learning of the Skeletal System in Introductory Anatomy & Physiology Students. Int J Kines Higher Educ 27(1) 16-22, 2016
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9. Brown GA, Bice MR, Shaw BS, & Shaw I. Online Quizzes Promote Inconsistent Improvements on In-Class Test Performance in Introductory Anatomy & Physiology. Adv. Physiol. Educ. 39: 63-6, 2015
10. Brown GA, Heiserman K, Shaw BS, & Shaw I. Rectus abdominis and rectus femoris muscle activity while performing conventional unweighted and weighted seated abdominal trunk curls. Medicina dello Sport. 68: 9-18. 2015
11. Botha DM, Shaw BS, Shaw I & Brown GA. Role of hyperbaric oxygen therapy in the promotion of cardiopulmonary health and rehabilitation. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). Supplement 2 (September), 20: 62-73, 2014
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16. Jarvi MB, Brown GA, Shaw BS & Shaw I. Measurements of Heart Rate and Accelerometry to Determine the Physical Activity Level in Boys Playing Paintball. International Journal of Exercise Science: 6: 199-207, 2013
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30. Shaw I, Shaw BS, & Brown GA. Influence of Strength Training on Cardiac Risk Prevention in Individuals without Cardiovascular Disease. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 15: 424-432. 2009

31. Shaw BS, Shaw I, & Brown GA. Resistance Training and Predicted Risk of Coronary Heart Disease in Sedentary Males. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). Supplement: 247-257. 2009

32. Stahlnecker IV AC, Brown GA, Shaw BS, & Shaw I. Acute Effects of a Weight Loss Supplement on Resting Metabolic Rate and Anaerobic Exercise Performance. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). Supplement: 237-247. 2009

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37. Brown GA, Lynott F, & Heelan KA. A Service Learning Model for Teaching Fitness Assessment and Research Techniques to Undergraduate Exercise Science Students. Adv Physiol Educ. 32: 212-218, 2008

38. Carstensen C, Brown GA, Shaw I, & Shaw BS. Freely-Paced Walking in Healthy Adults Does Not Meet Minimum Intensity Guidelines for Health Improvement. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD), 14: 178-187, 2008

39. Shaw BS, Shaw I, and Brown GA. Self-Reported Dietary Intake Following Endurance, Resistance And Concurrent Endurance And Resistance Training. J Sports Sci & Med 7: 255-259, 2008

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42. Brown GA, & MacKenzie D. Resistance Exercise Does Not Change The Hormonal Response To Sublingual Androstenediol. Eur J Appl Physiol. 97:404-412, 2006

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Refereed Presentations

1. Brown GA, Jackson B, Szekely B, Schramm T, Shaw BS, Shaw I. A Pre-Workout Supplement Does Not Improve 400 M Sprint Running or Bicycle Wingate Test Performance in Recreationally Trained Individuals. Med Sci Sport Exerc. 50(5), 2932. 65th Annual Meeting of the American College of Sports Medicine. Minneapolis, MN. June 2018.

2. Paulsen SM, Brown GA. Neither Coffee Nor A Stimulant Containing “Pre-workout” Drink Alter Cardiovascular Drift During Walking In Young Men. Med Sci Sport Exerc. 50(5), 2409. 65th Annual Meeting of the American College of Sports Medicine. Minneapolis, MN. June 2018.

3. Adkins M, Bice M, Bickford N, Brown GA. Farm to Fresh! A Multidisciplinary Approach to Teaching Health and Physical Activity. 2018 spring SHAPE America central district conference. Sioux Falls, SD. January 2018.

4. Shaw I, Kinsey JE, Richards R, Shaw BS, and Brown GA. Effect Of Resistance Training During Nebulization In Adults With Cystic Fibrosis. International Journal of Arts & Sciences' (IJAS). International Conference for Physical, Life and Health Sciences which will be held at FHWien University of Applied Sciences of WKW, at Währinger Gürtel 97, Vienna, Austria, from 25-29 June 2017.

5. Bongers M, Abbey BM, Heelan K, Steele JE, Brown GA. Nutrition Education Improves Nutrition Knowledge, Not Dietary Habits In Female Collegiate Distance Runners. Med Sci Sport Exerc. 49(5), 389. 64th Annual Meeting of the American College of Sports Medicine. Denver, CO. May 2017.

6. Brown GA, Steele JE, Shaw I, Shaw BS. Using Elisa to Enhance the Biochemistry Laboratory Experience for Exercise Science Students. Med Sci Sport Exerc. 49(5), 1108. 64th Annual Meeting of the American College of Sports Medicine. Denver, CO. May 2017.

7. Brown GA, Shaw BS, and Shaw I. Effects of a 6 Week Conditioning Program on Jumping, Sprinting, and Agility Performance In Youth. Med Sci Sport Exerc. 48(5), 3730. 63rd Annual Meeting of the American College of Sports Medicine. Boston, MA. June 2016.

8. Shaw I, Shaw BS, Boshoff VE, Coetzee S, and Brown GA. Kinanthropometric Responses To Callisthenic Strength Training In Children. Med Sci Sport Exerc. 48(5), 3221. 63rd Annual Meeting of the American College of Sports Medicine. Boston, MA. June 2016.

9. Shaw BS, Shaw I, Gouveia M, McIntyre S, and Brown GA. Kinanthropometric Responses To Moderate-intensity Resistance Training In Postmenopausal Women. Med Sci Sport Exerc. 48(5), 2127. 63rd Annual Meeting of the American College of Sports Medicine. Boston, MA. June 2016.

10. Bice MR, Cary JD, Brown GA, Adkins M, and Ball JW. The use of mobile applications to enhance introductory anatomy & physiology student performance on topic specific in-class tests. National Association for Kinesiology in Higher Education National Conference. January 8, 2016.

11. Shaw I, Shaw BS, Lawrence KE, Brown GA, and Shariat A. Concurrent Resistance and Aerobic Exercise Training Improves Hemodynamics in Normotensive Overweight and Obese Individuals. Med Sci Sport Exerc. 47(5), 559. 62nd Annual Meeting of the American College of Sports Medicine. San Diego, CA. May 2015.

12. Shaw BS, Shaw I, McCrorie C, Turner S., Schnetler A, and Brown GA. Concurrent Resistance and Aerobic Training in the Prevention of Overweight and Obesity in Young Adults. Med Sci Sport Exerc. 47(5), 223. 62nd Annual Meeting of the American College of Sports Medicine. San Diego, CA. May 2015.

13. Schneekloth B, Shaw I, Shaw BS, and Brown GA. Physical Activity Levels Using Kinect™ Zumba Fitness versus Zumba Fitness with a Human Instructor. Med Sci Sport Exerc. 46(5), 326. 61st Annual Meeting of the American College of Sports Medicine. Orlando, FL. June 2014.

14. Shaw I, Lawrence KE, Shaw BS, and Brown GA. Callisthenic Exercise-related Changes in Body Composition in Overweight and Obese Adults. Med Sci Sport Exerc. 46(5), 394. 61st Annual Meeting of the American College of Sports Medicine. Orlando, FL June 2014.

15. Shaw BS, Shaw I, Fourie M, Gildenhuys M, and Brown GA. Variances In The Body Composition Of Elderly Woman Following Progressive Mat Pilates. Med Sci Sport Exerc. 46(5), 558. 61st Annual Meeting of the American College of Sports Medicine. Orlando, FL June 2014.
16. Brown GA, Shaw I, Shaw BS, and Bice M. Online Quizzes Enhance Introductory Anatomy & Physiology Performance on Subsequent Tests, But Not Examinations. Med Sci Sport Exerc. 46(5), 1655. 61st Annual Meeting of the American College of Sports Medicine. Orlando, FL June 2014.
17. Kahle, A. and Brown, G.A. Electromyography in the Gastrocnemius and Tibialis Anterior, and Oxygen Consumption, Ventilation, and Heart Rate During Minimalist versus Traditionally Shod Running. 27th National Conference on Undergraduate Research (NCUR). La Crosse, Wisconsin USA. April 11-13, 2013
18. Shaw, I., Shaw, B.S., and Brown, G.A. Resistive Breathing Effects on Pulmonary Function, Aerobic Capacity and Medication Usage in Adult Asthmatics Med Sci Sports Exerc 45 (5). S1602 2013. 60th Annual Meeting of the American College of Sports Medicine, Indianapolis, IN USA, May 26-30 3013
19. Shaw, B.S. Gildenhuys, G.A., Fourie, M. Shaw I, and Brown, G.A. Function Changes In The Aged Following Pilates Exercise Training. Med Sci Sports Exerc 45 (5). S1566 60th Annual Meeting of the American College of Sports Medicine, Indianapolis, IN USA, May 26-30 2013
20. Brown, G.A., Abbey, B.M., Ray, M.W., Shaw B.S., & Shaw, I. Changes in Plasma Free Testosterone and Cortisol Concentrations During Plyometric Depth Jumps. Med Sci Sports Exerc 44 (5). S598, 2012. 59th Annual Meeting of the American College of Sports Medicine. May 29 - June 2, 2012; San Francisco, California
21. Shaw, I., Fourie, M., Gildenhuys, G.M., Shaw B.S., & Brown, G.A. Group Pilates Program and Muscular Strength and Endurance Among Elderly Woman. Med Sci Sports Exerc 44 (5). S1426. 59th Annual Meeting of the American College of Sports Medicine. May 29 - June 2, 2012; San Francisco, California
22. Shaw B.S., Shaw, I., & Brown, G.A. Concurrent Inspiratory-Expiratory and Aerobic Training Effects On Respiratory Muscle Strength In Asthmatics. Med Sci Sports Exerc 44 (5). S2163. 59th Annual Meeting of the American College of Sports Medicine. May 29 - June 2, 2012; San Francisco, California
23. Scheer, K., Siebrandt, S., Brown, G.A, Shaw B.S., & Shaw, I. Heart Rate, Oxygen Consumption, and Ventilation due to Different Physically Active Video Game Systems. Med Sci Sports Exerc 44 (5). S1763. 59th Annual Meeting of the American College of Sports Medicine. May 29 - June 2, 2012; San Francisco, California
24. Jarvi M.B., Shaw B.S., Shaw, I., & Brown, G.A. (2012) Paintball Is A Blast, But Is It Exercise? Heart Rate and Accelerometry In Boys Playing Paintball. Med Sci Sports Exerc 44 (5). S3503. 59th Annual Meeting of the American College of Sports Medicine. May 29 - June 2, 2012; San Francisco, California
25. Shaw, I., Shaw, B.S., and Brown G.A. Effort-dependent Pulmonary Variable Improvements Following A Novel Breathing Retraining Technique In Asthmatics. Med Sci Sports Exerc

43 (5). S617, 2011. 58th Annual Meeting of the American College of Sports Medicine. May 31-June 4, 2011 Denver, Colorado

26. Brown G.A. Shaw, B.S., and Shaw, I. Exercise and a Low Carbohydrate Diet Reduce Body Fat but Not PYY and Leptin Concentrations. Med Sci Sports Exerc 43 (5). S4627, 2011. 58th Annual Meeting of the American College of Sports Medicine. May 31-June 4, 2011 Denver, Colorado
27. Shaw, B.S., Shaw, I, and Brown G.A. Pulmonary Function Changes In Response To Combined Aerobic And Resistance Training In Sedentary Male Smokers. Med Sci Sports Exerc 43 (5). S492, 2011. 58th Annual Meeting of the American College of Sports Medicine. May 31-June 4, 2011 Denver, Colorado
28. Heiserman, K., Brown G.A., Shaw, I., and Shaw, B.S. Seated Weighted Abdominal Exercise Activates the Hip Flexors, But Not Abdominals, More Than Unweighted Crunches. A Med Sci Sports Exerc 43 (5). S277, 2011 58th Annual Meeting of the American College of Sports Medicine. May 31-June 4, 2011 Denver, Colorado
29. Brown, G.A., Nienhueser, J., Shaw, I., and Shaw, B.S. Energy Drinks Alter Metabolism at Rest but not During Submaximal Exercise in College Age Males. Med Sci Sports Exerc. 42 (5): S1930. 57th Annual Meeting American College of Sports Medicine, June 1-5, 2010. Baltimore, MD
30. Shaw, I, Shaw, B.S., and Brown G.A. Abdominal and Chest Wall Compliance in Asthmatics: Effects of Different Training Modes. Med Sci Sports Exerc. 42 (5): S1588. 57th Annual Meeting American College of Sports Medicine, June 1-5, 2010. Baltimore, MD.
31. Shaw, B.S., Shaw, I, and Brown G.A. Exercise Effects on Lipoprotein Lipids in the Prevention of Cardiovascular Disease in Sedentary Males Smokers. Med Sci Sports Exerc. 42 (5): S1586. 57th Annual Meeting American College of Sports Medicine, June 1-5, 2010. Baltimore, MD.
32. Brown, G.A. Collaborative Research at a Primarily Undergraduate University. Med Sci Sports Exerc. 42 (5): S424. 57th Annual Meeting American College of Sports Medicine, June 1-5, 2010. Baltimore, MD.
33. Nienhueser, J., Brown, G.A., Effects of Energy Drinks on Resting and Submaximal Metabolism in College Age Males. NCUR 24 (24th National Conference on Undergraduate Research). Missoula, MT. April 15-17, 2010
34. Brown, G.A., N. Dickmeyer, A. Glidden, C. Smith, M. Beckman, B. Malicky, B.S. Shaw and I. Shaw. Relationship of Regional Adipose Tissue Distribution to Fasting Plasma PYY Concentrations in College Aged Females. 56th Annual Meeting American College of Sports Medicine, May 27-30, 2009. Seattle, WA. Med Sci Sports Exerc. 41 (5): S1333
35. Shaw, B.S., I. Shaw, and G.A. Brown. Contrasting Effects Of Exercise On Total And Intra-abdominal Visceral Fat. 56th Annual Meeting American College of Sports Medicine, May 27-30, 2009. Seattle, WA. Med Sci Sports Exerc. 41 (5): S1718
36. Shaw, I., B.S. Shaw, and G.A. Brown. Role of Endurance and Inspiratory Resistive Diaphragmatic Breathing Training In Improving Asthmatic Symptomology. 56th Annual

Meeting American College of Sports Medicine, May 27-30, 2009. Seattle, WA. Med Sci Sports Exerc. 41 (5): S2713

37. McWha, J., S. Horst, G.A. Brown, B.S. Shaw, and I. Shaw. Energy Cost of Physically Active Video Gaming Against a Human or Computer Opponent. 56th Annual Meeting American College of Sports Medicine, May 27-30, 2009. Seattle, WA. Med Sci Sports Exerc. 41 (5): S3069
38. Horst, S., J. McWha, G.A. Brown, B.S. Shaw, and I. Shaw. Salivary Cortisol and Blood Lactate Responses to Physically Active Video Gaming in Young Adults. 56th Annual Meeting American College of Sports Medicine, May 27-30, 2009. Seattle, WA. Med Sci Sports Exerc. 41 (5): S3070
39. Glidden A., M. Beckman, B. Malciky, C. Smith, and G.A. Brown. Peptide YY Levels in Young Women: Correlations with Dietary Macronutrient Intake and Blood Glucose Levels. 55th Annual Meeting American College of Sports Medicine, May 28-31, 2008. Indianapolis, IN. Med Sci Sports Exerc. 40 (5): S741
40. Smith C., Glidden A. M. Beckman, B. Malciky, and G.A. Brown. Peptide YY Levels in Young Women: Correlations with Aerobic Fitness & Resting Metabolic Rate. 55th Annual Meeting American College of Sports Medicine, May 28-31, 2008. Indianapolis, IN. Med Sci Sports Exerc. 40 (5): S742
41. Brown, G.A. M. Holoubeck, B. Nylander, N. Watanabe, P. Janulewicz, M. Costello, K.A. Heelan, and B. Abbey. Energy Costs of Physically Active Video Gaming in Children: Wii Boxing, Wii tennis, and Dance Dance Revolution. 55th Annual Meeting American College of Sports Medicine, May 28-31, 2008. Indianapolis, IN. Med Sci Sports Exerc. 40 (5): S2243
42. McFarland, S.P. and G.A. Brown. One Session of Brisk Walking Does Not Alter Blood Glucose Homeostasis In Overweight Young Men. 53rd annual meeting of the American College of Sports Medicine, Denver, CO. Med Sci Sports Exerc 38: S205, 2006
43. Stahlnecker IV, A.C. and G.A. Brown Acute Effects of a Weight Loss Supplement on Resting Metabolic Rate and Anaerobic Exercise Performance. 53rd annual meeting of the American College of Sports Medicine, Denver, CO. Med Sci Sports Exerc 38: S403, 2006
44. Brown, G.A. and A. Swendener. Effects of Exercise and a Low Carbohydrate Diet on Serum PYY Concentrations 53rd annual meeting of the American College of Sports Medicine, Denver, CO.. Med Sci Sports Exerc 38: s461, 2006
45. Swendener, A.M. and G.A. Brown. Effects of Exercise Combined with a Low Carbohydrate Diet on Health. 53rd annual meeting of the American College of Sports Medicine, Denver, CO. Med Sci Sports Exerc 38: s460, 2006
46. Swendener, A.M. and G.A. Brown. Effects Of Exercise Combined With A Low Carbohydrate Diet On Health. NCUR® 20, 2006
47. Stahlnecker IV, A.C. and G.A. Brown. Acute Effects Of A Weight Loss Supplement On Resting Metabolic Rate And Anaerobic Exercise. NCUR® 20, 2006

48. Eck, L. M. and G.A. Brown. Preliminary Analysis of Physical Fitness Levels in Kinesiology Students. Southern Regional Undergraduate Honors Conference. March 31, 2005.
49. Brown, G.A., J.N. Drouin, and D. MacKenzie. Resistance Exercise Does Not Change The Hormonal Response To Sublingual Androstenediol. 52nd Annual Meeting of the American College of Sports Medicine, June 1-4, 2005, Nashville, TN. Med Sci Sports Exerc 37(5): S40, 2005
50. Brown, G.A., M.P Rebok, M.L. Scott, M.K. Colaluca, and J Harris III. Economy of Jogging Stroller Use During Running. 51st Annual Meeting of the American College of Sports Medicine, June 2-5, 2004, Indianapolis, IN. Med Sci Sports Exerc 36(5): S1714, 2004
51. M.P. Rebok, M.L. Scott, J. Harris III, M.K. Colaluca, and G.A. Brown. Economy of Jogging Stroller use During Running. Georgia Southern University Legislative Wild Game Supper, 2004.
52. M.P. Rebok, M.L. Scott, J. Harris III, M.K. Colaluca, and G.A. Brown. Energy cost of jogging stroller use during running. Annual Meeting of the Southeastern Chapter of the American College of Sports Medicine, 2004.
53. Brown, G.A., Effect of 8 weeks androstenedione supplementation and weight training on glucose tolerance and isokinetic strength. Annual Meeting of the Southeastern Chapter of the American College of Sports Medicine, 2004.
54. Brown, G.A., Vukovich, M.D., Kohut, M.L., Franke, W.D., Jackson, D.A., King, D.S., and Bowers, L.D. Urinary excretion of steroid metabolites following chronic androstenedione ingestion. 50th Annual Meeting of the American College of Sports Medicine, May 27-31 2003, San Francisco, CA. Med Sci Sports Exerc 35(5): S1835
55. Brown, G.A., E.R. Martini, B.S. Roberts, M.D. Vukovich, and D.S. King. Effects of Sublingual androstenediol-cyclodextrin on serum sex hormones in young men. 48th Annual Meeting American College of Sports Medicine, May 30 – June 2, 2001. Baltimore, MD. Med Sci Sports Exerc. 33(5): S1650
56. Kohut, M.L., J.R. Thompson, J. Campbell, G.A. Brown, and D.S. King. Ingestion of a dietary supplement containing androstenedione and dehydroepiandrosterone (DHEA) has a minimal effect on immune response. International Society of Exercise and Immunology, 3rd Annual Convention May 29-30, 2001. Baltimore, MD. Med. Sci. Sports Exerc. 33(5): SISEI12
57. Brown, G.A., E.R. Martini, B.S. Roberts, and D.S. King. Effects of Sublingual androstenediol-cyclodextrin on serum sex hormones in young men. Iowa State University Educational Research Exchange, March 24, 2001. Ames, IA.
58. Martini, E.R., G.A. Brown, M.D. Vukovich, M.L. Kohut, W.D. Franke, D.A. Jackson, and D.S. King. Effects of androstenedione-herbal supplementation on serum sex hormone concentrations in 30-59 year old men. Iowa State University Educational Research Exchange, March 24, 2001. Ames, IA.

59. King, D.S., G.A. Brown, M.D. Vukovich, M.L. Kohut, W.D. Franke, and D.A. Jackson. Effects of Chronic Oral Androstenedione Intake in 30-58 year Old Men. 11th International Conference on the Biochemistry of Exercise. June 4-7, 2000. Little Rock, Arkansas

60. Brown, G.A., M.L. Kohut, W.D. Franke, D. Jackson, M.D. Vukovich, and D.S. King. Serum Hormonal and Lipid Responses to Androgenic supplementation in 30 –59 year old men. 47TH Annual Meeting American College of Sports Medicine, May 31-June 3, 2000. Indianapolis, IN. Med Sci Sports Exerc. 32(5): S486

61. Brown, G.A., T.A. Reifenrath, N.L. Uhl, R.L. Sharp, and D.S. King. Oral anabolic-androgenic supplements during resistance training: Effects on glucose tolerance, insulin action, and blood lipids. 1999 Annual Meeting American College of Sports Medicine, Seattle, WA. Med Sci Sports Exerc. 31(5): S1293

62. Reifenrath, T.A., R.L. Sharp, G.A. Brown, N.L. Uhl, and D.S. King. Oral anabolic-androgenic supplements during resistance training: Effects on body composition and muscle strength. 1999 Annual Meeting American College of Sports Medicine, Seattle, WA. Med Sci Sports Exerc. 31(5): S1292

63. King, D.S., R.L. Sharp, G.A. Brown, T.A. Reifenrath, and N.L. Uhl. Oral anabolic-androgenic supplements during resistance training: Effects on serum testosterone and estrogen concentrations. 1999 Annual Meeting American College of Sports Medicine, Seattle, WA. Med Sci Sports Exerc. 31(5): S1291

64. Parsons, K.A., R.L. Sharp, G.A. Brown, T.A. Reifenrath, N.L. Uhl, and D.S. King. Acute effects of oral anabolic-androgenic supplements on blood androgen and estrogen levels in man. 1999 Annual Meeting American College of Sports Medicine, Seattle, WA. Med Sci Sports Exerc. 31(5): S1290

Book Chapters

Brown, G.A. Chapters on Androstenedione and DHEA. In: Nutritional Supplements in Sport, Exercise and Health an A-Z Guide. edited by Linda M. Castell, Samantha J. Stear, Louise M. Burke. Routledge 2015.

Brown, G.A. Evaluating a Nutritional Supplement with SOAP Notes to Develop Critical Thinking Skills. In: Teaching Critical Thinking and Clinical Reasoning in the Health Sciences, edited by Facione NC and Facione PA. Millbrae, CA: California Academic Press 2008

Non Refereed Publications

Brown, G.A. and King, D.S. Sport Dietary Supplement Update on DHEA supplementation. Human Kinetics Publishers, Inc. October, 2000.

Brown, G.A. Getting in Shape for Paintball in the Winter. Paintball Sports International, January, 1999

Invited Presentations

Brown G.A. Collaborative experiences with researchers in South Africa. Africa Summit 2019 (March 28, 2019). Presented by the University of Nebraska and the University of Nebraska Medical Center.

Peer Reviewer for the Following Journals

Advances in Physiology Education. http://www.the-aps.org/publications/advan/

African Journal For Physical, Health Education, Recreation and Dance (AJPHERD). ISSN: 1117-4315 http://www.ajol.info/journal_index.php?jid=153

Anatomical Sciences Education. http://www.asejournal.com

Asian Journal of Sports Medicine. http://asjsm.tums.ac.ir/index.php/asjsm

CardioVascular Journal of Africa. http://www.cvjsa.co.za/

Complementary Therapies in Medicine. http://ees.elsevier.com/ctim/

European Journal of Sport Science. http://www.tandf.co.uk/journals/titles/17461391.asp

Games for Health Journal. http://www.liebertpub.com/overview/games-for-health-journal/588/

Global Journal of Health and Physical Education Pedagogy. http://js.sagamorepub.com/gjhpep

Interactive Learning Environments. https://www.tandfonline.com/toc/nile20/current

International Journal of Exercise Science. http://digitalcommons.wku.edu/ijes/

Journal of Sports Sciences. http://www.tandf.co.uk/journals/titles/02640414.html

Journal of Strength and Conditioning Research. http://journals.lww.com/nsca-jscr/pages/default.aspx

Lung. http://www.springer.com/medicine/internal/journal/408

Pediatrics. http://pediatrics.aappublications.org/

Scandinavian Journal of Medicine and Science in Sports. http://www.blackwellpublishing.com/journal.asp?ref=0905-7188

South African Journal of Diabetes and Vascular Disease http://www.diabetesjournal.co.za/

The American Journal of Physiology - Endocrinology and Metabolism. http://ajpendo.physiology.org/

The American Journal of Physiology - Heart and Circulatory Physiology. http://ajpheart.physiology.org/

The American Journal of Physiology - Regulatory, Integrative and Comparative Physiology. http://ajpregu.physiology.org/

The International Journal of Sport Nutrition & Exercise Metabolism. http://www.humankinetics.com/IJSNEM/journalAbout.cfm

The Journal of Sports Science and Medicine (JSSM) http://www.jssm.org/

The International Journal of Nutrition and Metabolism ww.academicjournals.org/IJNAM

The Open Sports Sciences Journal. http://benthamscience.com/open/tossj/index.htm

The Journal of Applied Physiology. http://jap.physiology.org/

African Health Sciences. http://www.ajol.info/index.php/ahs

Menopause. http://journals.lww.com/menopausejournal/pages/default.aspx

Membership in Professional Organizations

American College of Sports Medicine

American Physiological Society

National Strength and Conditioning Association

Graduate Student Advisement/Mentoring

Kourtney Woracek. MAEd Thesis Committee. in progress

Marissa Bongers. MAEd Thesis Committee Director. Dietary Habits and Nutrition Knowledge in Female Collegiate Distance Runners. Degree Awarded Spring 2016.

Justin Thiel. MAEd Advisor. Degree Awarded Spring 2016.

Mitchell Sasek. MAEd Advisor. Degree Awarded Summer 2015

Chad Keller. MAEd Advisor. Degree Awarded Summer 2014

Faron Klingehoffer. MAEd Advisor. Degree Awarded Summer 2014

Joe Scharfenkamp. MAEd Internship Advisor. Degree Awarded Summer 2014

Andrew Hudson. MAEd Thesis Committee. Thesis Title. valuation of Weight Loss in Parents Participating in a Pediatric Obesity Treatment Intervention Degree Awarded Fall 2012

Megan Adkins. Doctoral Dissertation Committee. An Examination of Changes in Sedentary Time with the Integration of Technology for Children Participating in a Morning Fitness Program. Degree Awarded Summer 2011

Christopher Campbell. MAEd Advisor. Degree Awarded Spring 2011

Logan Brodine. MAEd Advisor. Degree Awarded Spring 2010

Megan Costello. MAEd Thesis Committee. Changes in the Prevalence of at risk of overweight or overweight in children. Degree Awarded Spring 2009

Pamela Janulewciz, MAEd Thesis Committee. Effects of Exercise Balls as Chair Replacements in a Fourth Grade Classroom. Degree Awarded Spring 2008

Melissa Shelden. MAEd Advisor.

Michael Bell. MAEd Advisor.

Karen DeDonder. MAEd Thesis Committee. Confidence Levels of Certified Athletic Trainers Regarding Female Athlete Triad Syndrome. Degree Awarded Spring 2008

Benjamin Nylander. MAEd Comprehensive Project Director. Degree Awarded Summer 2007

Eme Ferro. MAEd advisor. Degree Awarded Summer 2007

Julie McAlpin. MAEd Thesis Committee. Children Escorted to School; effect on Parental Physical Activity Degree awarded fall 2006

Michael Ray. MAEd Comprehensive Project Director. Degree Awarded Summer 2006

Seth McFarland. MAEd Thesis Committee Director. The Effects of Exercise Duration on Glucose Tolerance and Insulin Sensitivity in Mildly Overweight Men. Degree Awarded Summer 2005

Drew McKenzie. MS Academic Advisor. Degree Awarded Spring 2005

Matthew Luckie. MS Academic Advisor. Degree Awarded Spring 2005

Todd Lane. MS Academic Advisor

Leilani Lowery. MS Internship committee, Degree Awarded Spring 2003

Johnna Ware. MS Internship committee, Degree Awarded Spring 2003

David Bass. MS Internship committee, Degree Awarded Spring 2003

Crystal Smith. MS Internship committee, Degree Awarded Summer 2003

Undergraduate Student Research Mentoring

Cassidy Johnson. Project to be determined. Undergraduate Research Fellowship (Fall 2019 -)

Taylor Wilson. A comparison of High Intensity Interval Exercise on a bicycle ergometer to a treadmill on Resting Metabolic Rate the next day. Undergraduate Research Fellowship (Fall 2018 -)

Dakota Waddell. The effect of yoga versus mindful meditation on stress in physically active and non-physically active female college-aged students Undergraduate Research Fellowship (Fall 2018 -)

Dakota Waddell. A case study of the effects of the *osteostrong* program on bone mineral density and lean body mass in a paraplegic male. Undergraduate Research Fellowship (Fall 2017 – Spring 2018)

Andrew Fields. The effects of retraining running cadence on oxygen consumption in experienced runners. Undergraduate Research Fellowship. (Fall 2017 – Spring 2019)

Logan Engel. The effects of Tart Cherry Juice on Delayed Onset Muscle Soreness following Eccentric Exercise. Undergraduate Research Fellowship. Fall 2017 -

Stephanie Paulsen. Comparing the effects of coffee to a pre-workout drink on cardiovascular drift. Summer Student Research Program. University of Nebraska Kearney. Summer 2017.

Stephanie Paulsen. Comparing the effects of coffee to a pre-workout drink on resting and exercise metabolic rate. Undergraduate Research Fellowship. Spring 2017 - .

Rachael Ernest. Comparing the effects of coffee to a pre-workout drink on resting and exercise metabolic rate. Undergraduate Research Fellowship. Fall 2016 - Spring 2017.

Aleesha Olena. Evaluating the role of body composition on abdominal muscle definition. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2016 - Spring 2017.

Marco Escalera. Evaluating the role of body composition on abdominal muscle definition. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2015 - Spring 2017.

Trevor Schramm. Effects of "pre-workout' drinks on 400 m sprint performance and salivary cortisol concentrations. Undergraduate Research Fellowship. University of Nebraska Kearney. Spring 2016.

Taylor Turek. Evaluating the role of body composition on abdominal muscle definition. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2015 - Spring 2016.

Brian Szekely. Effects of "pre-workout" drinks on Wingate test performance and blood lactate concentrations. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2014 - Spring 2016.

Brianna Jackson. Effects of "pre-workout' drinks on 400 m sprint performance and salivary cortisol concentrations. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2014 – Fall 2015.

Ashley Pearson. Changes in resting metabolic rate over a semester in undergraduate students. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2013 - Spring 2015.

Tricia Young. Changes in resting metabolic rate over a semester in undergraduate students. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2013 - Spring 2014.

Gavin Schneider. Effects of "pre-workout" drinks on resistance training performance. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2013 - Spring 2014.

Bridgette Schneekloth. Physical Activity while engaging in a Zumba dance class or Microsoft Kinect Zumba. Summer Student Research Program. University of Nebraska Kearney. Summer 2013.

Bridgette Schneekloth. Physical Activity while engaging in Microsoft Kinect Track & Field running vs. free running on an indoor track. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2012 - Spring 2014.

Adam Kahle. Evaluating changes in running mechanics with "barefoot" footwear. Summer Student Research Program. University of Nebraska Kearney. Summer 2012

Michelle Jarvi. Quantifying paintball as a form of physical activity in Boys. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2011 - Spring 2012.

Benjamin Lentz, Krista Scheer, & Sarah Siebrandt. Wii, Kinect, and Move for Physical Activity: Analysis of Energy Expenditure, Heart Rate, and Ventilation. Undergraduate Research Fellowship. University of Nebraska Kearney. Fall 2010 - Spring 2012.

Katlyn Heiserman. Comparison of EMG activity in the rectus abdominis and rectus femoris during supine un-weighted abdominal crunch exercise and a seated abdominal crunch exercise weight machine. Summer Student Research Program. University of Nebraska Kearney. Summer 2010

Janae Nienhueser. Effects of Energy drink on resting and submaximal exercise metabolism in college age men. Summer Student Research Program. University of Nebraska Kearney. Summer 2009

Jessica McWha. Metabolic changes while playing active video gaming against a human and computer opponent. Summer Student Research Program and Undergraduate Research Fellowship. University of Nebraska Kearney. Summer 2008 – Spring 2009

Sarah Horst. Changes in blood lactate and salivary cortisol concentrations while "exergaming" against a human or computer opponent. Summer Student Research Program. University of Nebraska Kearney. Summer 2008

Craig Carstensen. Differences in the Physiological Response to Treadmill versus Freely Paced Walking. Summer Student Research Program. University of Nebraska Kearney. Summer 2006

Alvah Stahlnecker Acute effects of a weight loss supplement on resting metabolic rate and anaerobic exercise performance. Summer Student Research Program. University of Nebraska Kearney. Summer 2005

Allison Swendener. Effects of exercise combined with a low carbohydrate diet on health. Summer Student Research Program. University of Nebraska Kearney. Summer 2005

Kamilah Whipple. A measurement of the physical activity and fitness of undergraduate Georgia Southern University students. Ronald E. McNair Post-Baccalaureate Achievement Program. Georgia Southern University. Summer 2004.

Lindsey Eck. Preliminary Analysis of Physical Fitness Levels in Kinesiology Students. Independent undergraduate research project. Georgia Southern University. Summer 2004.

Description of Graduate Courses Taught

PE 870: Advanced Exercise Physiology Course presumes a student has had a basic course in exercise physiology. The content of cardiorespiratory fitness, body composition, muscular strength/flexibility, body fluids and metabolism is presented beyond the introductory level. (University of Nebraska at Kearney)

PE 866P: Nutrition for Health and Sport. (Dual listed/taught with PE 469) Metabolism and metabolic regulation, the influence of dietary practices on health and human performance, and mechanisms and consequences of weight loss and gain.. (University of Nebraska Kearney)

PE 861P: Physiology of Exercise. (Dual listed/taught with PE 461) Physiological processes of body as pertain to physical activity. How trained and untrained individuals differ, and importance of training. (University of Nebraska at Kearney)

TE 800: Education Research. This introductory web-based course in educational research focuses on evaluating and interpreting educational research and applying its findings to educational practice. (University of Nebraska at Kearney)

KINS 7230: Exercise Physiology. Focuses on the study of the effects of exercise on the physiological functions of the human organism with emphasis on theoretical orientations. (Georgia Southern University)

KINS 7231: Laboratory Techniques in Exercise Physiology. Acquaints the student with the use of typical laboratory equipment used in exercise physiology. (Georgia Southern University)

KINS 7238: Human Performance and Nutrition. Examines the interaction between nutrition and physical activity, including exercise and athletic performance. (Georgia Southern University)

KINS 7431: Applied Sport Physiology. Focuses on the study of exercise physiology principles applied to developing training and conditioning programs for enhancing health related fitness and performance (Georgia Southern University)

KINS 7899: Directed Independent Study. Provides the student with an opportunity to investigate an area of interest under the direction of faculty mentor (Georgia Southern University)

EXSP 551: Advanced Exercise Physiology 2. Analysis of factors affecting work capacity and performance. Human energy metabolism concepts and measurement. (Iowa State University)

Description of Undergraduate Courses Taught

PE 498: Special Topics. (University of Nebraska at Kearney)

PE 475: Research Methods in Exercise Science. This course is designed to introduce advanced undergraduate students to the processes of research in the field of Exercise Science including the processes of finding, reading and understanding Exercise Science research; data collection; data analysis; and data interpretation. (University of Nebraska at Kearney)

PE 469: Sports Nutrition. Metabolism and metabolic regulation, the influence of dietary practices on human performance. (University of Nebraska at Kearney)

PE 461: Physiology of Exercise. Physiological processes of body as pertain to physical activity. How trained and untrained individuals differ, and importance of training. (University of Nebraska at Kearney)

PE 388: General Studies Capstone - The Living Dead in Fact & Fiction. The Living Dead, such as Zombies and Vampires, are pervasive in fictional literature, television, and movies. During this course, novels, television episodes, and movies will be used to identify disease symptoms displayed by the living dead, and these symptoms will then be evaluated regarding what type of medical condition might cause the symptoms.

PE 310: Introduction to Exercise Physiology. Provides a foundation of scientific basis for understanding the body's anatomical structures and physiologic responses to acute exercise, as well as its adaptations to chronic exercise. (University of Nebraska at Kearney)

PE 107. This course is designed to introduce students to the field of Exercise Science as an area of academic study and as a professional career. Students majoring in Exercise Science should take this course in their first year. (University of Nebraska at Kearney)

KINS 4231: Fitness Evaluation and Exercise Prescription. Provides the student with an in-depth study of fitness appraisal and exercise prescription and the development, interpretation, implementation and management of fitness programs (with laboratory). (Georgia Southern University)

KINS 3133: Physiological Aspects of Exercise. Provides an in-depth perspective of physiological and biochemical responses of the human body when subjected to exercise (with laboratory). (Georgia Southern University)

GSU 1210: University Orientation 1. Designed to help first year students understand the purpose of a college education, learn about college requirements, explore values and interests, learn to make decisions and realistic choices, explore career objectives and programs of study, and establish supportive relationships with faculty and staff. Required of all new students during their first semester. (Georgia Southern University)

EX SP 462: Medical Aspect of Exercise. The role of exercise in preventive medicine. Impact of exercise on various diseases, and the effect of various medical conditions on the ability to participate in vigorous exercise and competitive sports. Principles of exercise testing and prescription for individuals with these conditions. Environmental and nutritional aspects of exercise. (Iowa State University)

EX SP 458: Principles of Exercise Testing and Prescription. Physiological principles of physical fitness; design and administration of fitness programs; testing, evaluation, and prescription; cardiac risk factor modification. (Iowa State University)

EX SP 455 (Renumbered as EX SP 358 for Fall 2001). Physiology of Exercise. Physiological basis of human performance; effects of physical activity on body functions (with laboratory). (Iowa State University)

EX SP 355: Biomechanics (Laboratory). Mechanical basis of human performance; application of mechanical principles to exercise, sport and other physical activities. (Iowa State University)

EX SP 258: Physical Fitness and Conditioning. Development of personal fitness using a variety of conditioning and exercise techniques such as aerobics, weight training, and aquatic fitness. Introduction to acute and chronic responses to exercise, and the role of exercise in health promotion and weight management. (Iowa State University)

EX SP 236: Fundamentals of Archery, Badminton, Bowling (Archery Segment). (Iowa State University)

EX SP 119: Archery 1. (Iowa State University)

EX SP 220: Physical Fitness and Conditioning. Development of personal fitness using a variety of conditioning and exercise techniques such as aerobics, weight training, and aquatic fitness. Introduction to acute and chronic responses to exercise, and the role of exercise in health promotion and weight management. (Des Moines Area Community College)

PE 157: Introduction to Athletic training. Introduction to methods of prevention and immediate care of athletic injuries. Basic information concerning health supervision of athletes, and some basic wrapping and strapping techniques for common injuries. (Des Moines Area Community College)

PE 144: Introduction to Physical Education. History and development of physical education as an academic discipline. Principles and current practices of teaching physical education. (Des Moines Area Community College)

PHYSL 130: Human Physiology. Principles of the regulation and maintenance of human physiology. (Utah State University; Volunteer Undergraduate TA)

PHYSL 103 Human Anatomy. Introduction to the structure and location of bones, muscles, and organs in the human body. (Utah State University; Volunteer Undergraduate TA)

Service

Service to the Profession

Associate Editor, Asian Journal of Sports Medicine (2019-).

Director, North American Chapter, International Physical Activity Projects (IPAP) (2009-)

Fellow, American College of Sports Medicine (2008-_)

National Research Foundation (South Africa) peer evaluator for grant applicants

National Research Foundation (South Africa) evaluator of applications for funding in Thuthuka Programme

External Evaluator for Master's Theses and Doctoral Dissertations, University of Johannesburg, Johannesburg South Africa.

Grant proposal reviewer for NASPE/ING Run for Something Better School Awards Program.

Session Chair. Special Event. Undergraduate Research Experiences in Exercise Science. ACSM Annual Meeting, 2010

Session Chair. 2nd Annual Education Research Exchange. Iowa State University Education Research Exchange, 2001

Current Service at the University of Nebraska at Kearney

University Wide

Faculty Senate Parliamentarian (April 2019 – April 2022)

Faculty Senate Oversight Committee Chair (April 2019 – April 2022)

Faculty Senate Executive Committee (April 2019 – April 2022)

Faculty Senate, At Large representative (Fall 2018-)

University Student Conduct Appeals Board (Fall 2019 - May 2020)

General Studies Council (fall 2013-)

University Safety Committee (Fall 2018 -)

University Student Travel Policy Committee (Fall 2019-)

University Retention Council (Fall 2019 -)

External Evaluator, Promotion Committee, Department of Social Work & Criminal Justice (Fall 2019-)

College of Education Dean Search Committee Member (Fall 2019 -)

College of Education

College of Education Promotion and Tenure Committee, Chair (Fall 2012 – present) Member (fall 2008 – spring 2012)

Department of Kinesiology and Sport Sciences

Kinesiology Lecturer Search Committee Member (Fall 2019 -)

Nebraska Kids Fitness and Nutrition Day, volunteer educator and student coordinator. (fall 2005-present)

Academic Advisor for Undergraduate exercise Science Students (Fall 2005 - present)

Previous Service at the University of Nebraska at Kearney

Recreation Faculty Search Committee Member (Spring 2019)

University Student Conduct Board (Fall 2016- May 2017, Fall 2018 – May 2019)

Faculty Senate Athletic Committee (Fall 2018-May 2019)

External Evaluator, Promotion & Tenure, Department of Social Work & Criminal Justice (Fall 2018)

External Evaluator, Faculty Annual Performance Reviews, Department of Social Work & Criminal Justice (Spring 2018)

University Graduate Council. (Fall 2014 – spring 2017)

University Graduate Council Standing Committee I: Policy & Planning Committee (fall 2014 – spring 2017)

Faculty Senate (April 2012- April 2016)

Faculty Senate Executive Council, (April 2014 – April 2016)

Faculty Senate representative to the Oversight Committee (September 2014 – April 2016)

Faculty Senate representative to the Grievance Committee (September 2014 – April 2016)

Faculty Senate representative to the Professional Conduct committee (September 2013 - April 2016)

Youth Agility Speed & Quickness program director (2011-2015)

Faculty Senate ad-hoc committee on best practices in peer evaluation (2013-2014)

Director of General Studies search committee, committee member (2013-2014)

Director of the Office of Sponsored Programs search committee member (2012-2013; 2013-2014)

College peer mentor for implementing Critical Thinking in the classroom (2013-2014)

Chair, Ad-hoc committee for the evaluation of a new Student Evaluation of Instruction survey (2012-2014 academic years)

Ad-hoc committee to enhance communication effectiveness within department faculty and staff (2013-2014)

Exercise Science faculty search (2012-2013)

Undergraduate Research and Creative Activity program review team (2011-2012)

Institutional Review Board for the protection of Human Research Subjects. (Service period 2006 - 2011)

Undergraduate Research Committee (Service fall 2008 – spring 2011)

University Graduate Council. (Service period 2006 - 2010)

Homecoming Hustle (HPERLS Fun Run) Race Director and Coordinator (Service period beginning Fall 2007 – fall 2009)

Ad-hoc Committee on Enhancing Enrollment and Course Offerings in PE 110 Dept. of HPERLS (Service period beginning fall 2006)

Graduate Council Standing Committee 1: Policy and Planning Committee. (Service period beginning fall 2006; Chair in 2007 – 2008 and 2009-2010)

General Studies Roundtable 2 (spring 2006-spring 2007)

Academic Affairs Committee on Teaching Continuity (Service period beginning fall 2006)

Health Science Program Assistant Director Search Committee, University of Nebraska at Kearney. (Service period summer 2006)

Graduate Program Chair, HPERLS Department, University of Nebraska at Kearney (Service period beginning summer 2006 - 2010)

Graduate Dean Search Committee. University of Nebraska at Kearney (Service period 2005 – 2006 academic year)

Assistant HPERLS Department Graduate Coordinator. (Service period 2005 – 2006 academic year)

University of Nebraska at Kearney Centennial Run committee. (Service period fall 2005)

Senior College of Central Nebraska, Fit after 50 course coordinator. (Service period 2005 – 2006 academic year)

Health Science Program Assistant Advisor Search Committee. (Service period summer 2005)

HPERLS Furniture Committee (Service period spring 2005)

Academic Advisor for Undergraduate exercise Science Students (Service period Beginning Fall 2005 academic year; ongoing)

Other Prior University Service

Institutional Review Board, Georgia Southern University (2003- 2004)

GSU Exercise Science undergraduate student advisor (2002 – 2004)

GSU Jiann-Ping Hsu School of Public Health extramural funding task force (2003-2004)

GSU Jiann-Ping Hsu School of Public Health Curriculum Committee (2003-2004)

GSU Jiann-Ping Hsu School of Public Health Assistant Graduate program director (2003-2004)

GSU Jiann-Ping Hsu School of Public Health Laboratory Director's Committee (2002-2004)

GSU Jiann-Ping Hsu School of Public Health Exercise Science Graduate program coordinator (2003-2004)

GSU Recreation and Athletic Center advisor to the personal training program (2003-2004)

Institutional Biosafety Committee, Georgia Southern University (2003-2004)

Kinesiology Cluster Area, Georgia Southern University, Jiann-Ping Hsu School of Public Health (2002-2004)

Biostatistics Faculty Search Committee. Georgia Southern University, Jiann-Ping Hsu School of Public Health (2002-2003, 2003-2004)

Computer Advisory Committee, Iowa State University, University-Wide, College of Education, and Dept. of Health and Human Performance (2000-2002)

Computer Fee Allocation Committee, Iowa State University (2000-2001)

Dept. of Health and Human Performance Graduate Student Association (Founding Officer and 1st President; 2001-2002)

Sport Management Faculty Search Committee, Iowa State University Dept. of Health and Human Performance (2001-2002)

Previous Community Involvement

Race Director, Central Nebraska Susan G. Komen Race for the Cure (2011, 2012, 2013 events)

Webelos Den Leader, Boy Scouts of America Pack 132, Kearney, NE. Chartered to the Church of Jesus Christ of Latter Day Saints

Scoutmaster, Boy Scouts of America Troop 132, Kearney, NE. Chartered to the Church of Jesus Christ of Latter Day Saints

Tiger Den Coach, Boy Scouts of America Pack 135, Kearney, NE. Chartered to Faith United Methodist Church.

Personal Fitness Merit Badge Counselor. Boy Scouts of America, Overland Trails Council Covered wagon District.

Certifications

American College of Sports Medicine: ACSM Certified Exercise Physiologist (05/21/1998 - 12/31/2021)

USA Track and Field: Level One Coach

American Red Cross: Community First Aid and CPR

Funding

Research Funding

Brown GA, Bice MR, Abbey BM. Shaw I, Shaw BS. Effects of aerobic exercise, resistance exercise, and combined aerobic & resistance exercise on food choices and endocrine signals of satiety in middle aged adults. Submitted 6/26/2017 to National Institutes of Health [PA16-200] - Academic Research Enhancement Award (Parent R15) (Application #1R15DK117436-01). Total Amount Requested: $367,708. (Resubmission of revised proposal; Pending Review.)

Brown GA, Bice MR, Abbey BM. Shaw I, Shaw BS. Effects of aerobic exercise, resistance exercise, and combined aerobic & resistance exercise on food choices and endocrine signals of satiety in middle aged adults. Submitted 6/26/2017 to National Institutes of Health [PA16-200] - Academic Research Enhancement Award (Parent R15) (Application #1R15DK117436-01). Total Amount Requested: $351,708. Pending Review.

Brown GA, Bice MR, Adkins MM, Hollman A, Bickford S, Bickford N, Ranglack D. HEAT it up (Health, Exercise, Aquaponics, Technology) summer camps to grow future health professionals in Rural Nebraska. Submitted 5/25/2017 to National Institutes of Health [PAR17-183] - NICHD Research Education Programs (R25) (Application # 1R25 HD094673-01) Total Amount Requested: $777,006. Pending Review.

Brown GA, Bice MR, Adkins MM, Hollman A, Bickford S, Bickford N, Ranglack D. Teaching Health, Exercise, Technology, & Aquaponics (THETA) Day Camps to Grow Future Health Professionals. University of Nebraska Rural Futures Institutes (RFI) $20,000 – Funded (July 1, 2017 – June 30, 2019)

Brown GA, Bice MR, Adkins MM, Hollman A, Bickford S, Bickford N, Ranglack D. Teaching Health, Exercise, Technology, & Aquaponics (THETA) Day Camps to Grow Future Health Professionals. University of Nebraska Rural Futures Institutes (RFI) and McCook Economic Development Council $11,400 – Funded (May 1, 2017 – August 30, 2017)

Brown GA, Abbey BM, Bice MR. **"**Is milk an effective rehydration beverage during repeated days of dehydrating exercise?" to the Dairy Research Institute® (DRI) $125,560 – Not funded.

Brown GA & Steele J. "Biochemistry Laboratory Experiences for Exercise Science Students" to the Kelly Fund, University of Nebraska. $23,947. Funded. August 2014- June 2016

Brown GA. "Horizon After School Quickness Program" to Blue Cross & Blue Shield of Nebraska for a Community Wellness grant. $14,106. Not funded

Brown GA. "Effects of chocolate milk taken immediately post exercise on the adaptations to strength training in men" to the Dairy Research Institute® (DRI) $123,192 – not funded.

Brown GA., Heelan KA, Bartee RT, & Maughan S. "Active Video Games as an Alternative to Traditional Group Exercise Classes" to the Robert Wood Johnson Health Games Research program. $297,201 – not funded

Brown GA., Nylander B, Heelan KA. Energy Expenditure for Active Video Game Systems: Dance Dance Revolution and Nintendo Wii. University of Nebraska at Kearney Research Services Council. $3,432. Funded

Brown G.A. Effects of green tea extract on fasting plasma insulin, glucose, leptin, and PYY concentrations in humans. University of Nebraska at Kearney Research Services Council. $3,822. Funded

Brown G.A. Dose response relationship between resistance exercise and changes in the hormonal regulation of blood glucose homeostasis. American Diabetes Association Junior faculty Award. $443,293. Not Funded.

Brown G.A., and K. Heelan. Health benefits of green tea extract in women. NIH NCCAM Exploratory/Developmental Grant for Clinical Studies (R21), PAR-03-153. $485,163. Not Funded.

Brown, G.A. Changes In Biomarkers Of Satiety, Aerobic Fitness, And Body Composition While On A Low Fat Or Low Carbohydrate Diet. University of Nebraska at Kearney Research Services Council. $3,750. Funded

Lynott, F., **Brown, G.A**., and K. Heelan. Health and Fitness of HPERLS Students. University of Nebraska at Kearney Research Services Council. $4,000. Funded

Brown G.A., K. Heelan and D.S. King. Pharmacokinetics & Efficacy of Sublingual Androstenediol for Treating Andropause. NIH NCCAM Exploratory/Developmental Grant for Clinical Studies (R21), PAR-03-153. $477,000. Not Funded.

Maughan S.L., D.P.Snider, and **G.A. Brown,** Physical Health and Social Factors Influencing Educational Success Among Hispanic Immigrant Children, University of Nebraska at Kearney Research Services Council. $4,214.60. Funded

McFarland S.P. and **G.A. Brown,** Effects of Exercise Duration on Glucose Tolerance In Mildly Overweight Men, University of Nebraska at Kearney Research Services Council. $750. Funded

Brown, G.A. Effects of Exercise Duration on Insulin Sensitivity In Mildly Overweight Men, University of Nebraska at Kearney Research Services Council. $2,000. Funded

McFarland S.P. and **G.A.Brown,** Effects of Exercise Duration on Glucose Tolerance In Mildly Overweight Men, Gatorade Sports Sciences Institute. $1,500. Not Funded

Brown, G.A. Effects of Exercise Duration on Glucose Tolerance and Insulin Sensitivity in Mildly Overweight Men. Life fitness Academy. $5,000. not funded

Brown, G.A. American College of Sports Medicine Foundation Grant. Endocrinology of weight lifting & androgen supplementation, $10,000. Not Funded.

Brown, G.A. and J.L. McMillan. Experimental and Applied Sciences. Effects of Green Tea Extract on Insulin Sensitivity and Adaptations to Exercise. $71,075. Not Funded.

Brown, G.A. American College of Sports Medicine Foundation Grant. Endocrinology of weight training & androgen supplementation, $10,000. Not Funded.

Brown, G.A. and J. Drouin. Georgia Southern University Faculty Research Grant. Effects of Resistance Training on the Hormonal response to Sublingual Androstenediol Intake. $5,000. Funded

King D.S. and **G.A. Brown.** *World Anti Doping Agency.* Effects of Testosterone Precursors on the Muscular and Hormonal Response to Resistance Training in Men. $464,634. Not Funded.

Brown, G.A. *American College of Sports Medicin*e Foundation Grant. Effect of Raisin Ingestion on Substrate Use During Exercise. $5,000. Not Funded.

King D.S. and **G.A. Brown.** *California Raisin Marketing Board.* The Glycemic Index Of Raisins Fed To Normal People And Non-Insulin Dependent Diabetics. $110,869. Not Funded.

King D.S. and **G.A. Brown.** *California Raisin Marketing Board.* The Effects Of Raisin Ingestion On Substrate Utilization and Endurance Exercise Performance In Trained Cyclists. $ 84,258. Not Funded.

Brown, G.A., E.R. Martini, and B.S. Roberts. Effect of Androstenediol on Serum Sex Hormone Concentrations. Iowa State University Professional Advancement Grant. Graduate Student Senate and Iowa State University Dept. of Health and Human Performance. $700. Funded

Instructional Development Funding

Brown G.A. and K.A. Heelan. University of Nebraska at Kearney. Proposal for the purchase of upgraded resistance exercise equipment in the Human Performance Laboratory. $21,100. Funded.

Brown G.A. and K.A. Heelan. University of Nebraska at Kearney. Proposal for the purchase of a new metabolic cart for the Human Performance Laboratory. $24,560. Funded

Brown, G.A. Georgia Southern University, Center for Excellence in Teaching Instructional Development Grant. Proposal for purchase of heart rate monitors, manual sphygmomanometers, and automated sphygmomanometers. $2,820. Funded.

Brown, G.A. Georgia Southern University, Center for Excellence in Teaching Innovative Teaching Strategies Retreat. Provides $2,000 in instructional technology funds to the participant. Funded.

Brown, G.A. Georgia Southern University, Center for Excellence in Teaching Travel Grant. $750. Funded.

Brown, G.A. Georgia Southern University student technology fee proposal. Proposal for purchase of Molecular Devices SpectraMax 250 plate reader. $17,000. Funded

Brown, G.A. Georgia Southern University student technology fee proposal. Proposal for purchase of Lode Excalibur Sport Bicycle Ergometer and Physiodyne Max 2 Metabolic Cart. $29,577. Funded

Brown, G.A. Georgia Southern University student technology fee proposal. Proposal for purchase of Packard Cobra 2 Automated Gamma Counter. $14,000. Not funded

References

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EXHIBIT C

UNITED STATES DISTRICT COURT
DISTRICT OF IDAHO

LINDSAY HECOX, and JANE DOE with her next friends JEAN DOE and JOHN DOE,

Plaintiffs,

v.

BRADLEY LITTLE, in his official capacity as Governor of the State of Idaho; SHERRI YBARRA, in her official capacity as the Superintendent of Public Instruction of the State of Idaho and as a member of the Idaho State Board of Education; THE INDIVIDUAL MEMBERS OF THE STATE BOARD OF EDUCATION, in their official capacities; BOISE STATE UNIVERSITY; MARLENE TROMP, in her official capacity as President of Boise State University; INDEPENDENT SCHOOL DISTRICT OF BOISE CITY #1; COBY DENNIS, in his official capacity as superintendent of the Independent School District of Boise City #1; THE INDIVIDUAL MEMBERS OF THE BOARD OF TRUSTEES OF THE INDEPENDENT SCHOOL DISTRICT OF BOISE CITY #1, in their official capacities; THE INDIVIDUAL MEMBERS OF THE IDAHO CODE COMMISSION, in their official capacities,

Defendants.

Case No. 1:20-cv-00184-DCN

DECLARATION OF CHELSEA MITCHELL IN OPPOSITION TO PRELIMINARY INJUNCTION

DECLARATION OF CHELSEA MITCHELL

I, Chelsea Mitchell, declare as follows:

1. I am a seventeen-year-old graduate of Canton High School in Canton, Connecticut.

2. I am an elite female athlete and competed in Connecticut Interscholastic Athletic Conference (CIAC) track and field events throughout all four years of high school.

3. A CIAC policy allows biological males who identify as girls to compete in the girls' category and on girls' athletic teams.

4. From the Spring 2017 outdoor track season through the Winter 2020 indoor track season[1]—six track seasons—I competed against biological males in my track and field athletic events due to the CIAC policy.

5. I understand that some individuals in this case state that they are not aware of any biological girls being harmed by the presence of transgender athletes competing in their league.

6. I personally have been harmed by competing against male athletes in my league. In total, I have lost four state championship titles, two All New England awards, medals, points, and publicity due to the CIAC policy that permits males to compete in girls' athletic events in Connecticut.

2016-2017 Freshman Year

7. I first competed against a male in girls' track and field as a fourteen-year-old freshman at the Spring 2017 outdoor CIAC State Open Championship.

8. On the way to this meet, I was instructed by my coach to respond "no comment" if asked about the issue of males competing in the female category.

9. In the 100m final at the 2017 outdoor State Open, I placed 7th overall. The top six receive a medal and qualify to advance to the New England Regional Championship: one of those top six spots was taken by male athlete Andraya Yearwood:

[1] The Spring 2020 outdoor season was cancelled due to the global COVID-19 pandemic.

Table 1: 2017 CIAC State Open Women's Outdoor Track 100m Results (June 5, 2017)[2]

Place	Grade	Sex	Name	Time	High School
1*	12	F	Caroline O'Neil	12.14s	Daniel Hand
2*	12	F	Kathryn Kelly	12.36s	Lauralton Hall
3*	9	M	Andraya Yearwood	12.41s	Cromwell
4*	11	F	Tia Marie Brown	12.44s	Windsor
5*	12	F	Kiara Smith	12.59s	Jonathan Law
6*	11	F	Kate Hall	12.62s	Stonington
7	9	F	Chelsea Mitchell	12.69s	Canton
8	12	F	Tiandra Robinson	FS	Weaver

* Qualified for the New England Championship.

2017-2018 Sophomore Year

10. During my sophomore year, I learned that Andraya Yearwood's school was reclassified to the Class S division for indoor track events (the school remained a Class M for outdoor track events)—which was the same class as my school.

11. This news was upsetting for me because I would now be racing against a male competitor at both the Class S championship and the State Open championship.

12. At the February 10, 2018, indoor Class S Championship in the 300m, I was knocked out of advancing to the State Open by just one spot—a spot was taken by Andraya.

13. On April 27, 2018, at the first invitational race of the Spring 2018 outdoor season, I was seeded in the 100m in a lane beside not just one, but two male athletes: Terry Miller and Andraya Yearwood.

14. I distinctly remember seeing Terry look over to Andraya and say: "You and me, one and two." At fifteen years old, I felt extremely intimidated to run against bigger, faster, and stronger male competitors.

[2] AthleticNet, https://www.athletic.net/TrackAndField/meet/306453/results/f/1/100m, last visited June 2, 2020.

15. But Terry was right. I should have won that 100m race; but instead, Terry and Andraya took first and second place, while I placed third.

16. Similarly, at the Spring 2018 outdoor State Open Championship, Terry won the women's 100m event by a wide margin, while Andraya finished second.

17. But for CIAC's policy, I would have won second place statewide:

Table 2: 2018 CIAC State Open Championship Women's Outdoor Track 100m Results (June 4, 2018)[3]

Place	Grade	Sex	Name	Time	High School
1*	10	M	Terry Miller	11.72s	Bulkeley
2*	10	M	Andraya Yearwood	12.29s	Cromwell
3*	11	F	Bridget Lalonde	12.36s	RHAM
4*	10	F	Chelsea Mitchell	12.39s	Canton
5*	11	F	Maya Mocarski	12.47s	Fairfield Ludlowe
6*	10	F	Selina Soule	12.67s	Glastonbury
7	12	F	Tia Marie Brown	12.71s	Windsor
8	11	F	Ayesha Nelson	12.80s	Hillhouse

* Qualified for the New England Championship.

18. Bridget Lalonde beat me by just three-hundredths of a second, but I was so relieved that she did. Emotionally, it was less of a loss to be denied runner-up status than to be denied a first place State Open Championship—a feat almost unheard of for a high school sophomore.

19. At the 2018 outdoor New England Regional Championship, I placed seventh in the 100m. Only the top six medal and receive the All New England award—one of those top six spots was taken by Terry.

20. Had I earned the title of All New England, I would have made Canton High School history as the first Canton female athlete to win this prestigious award.

[3] AthleticNet, https://www.athletic.net/TrackAndField/meet/334210/results/f/1/100m, last visited June 2, 2020.

2018-2019 Junior Year

21. In the fall of my junior year, I learned that male athlete Terry Miller transferred to Bloomfield, another Class S school.

22. I was devastated, fearing that with two males competing in my division, my chances of ever winning a state championship in sprints were now over.

23. I trained harder than ever, spending countless hours to shave mere fractions of seconds off of my times. I never missed a practice, squeezed in extra workouts where I could, and saw my race times consistently drop.

24. But it was not enough. And my fears of losing championship after championship were realized in the Winter and Spring 2019 seasons.

25. At the February 7, 2019, indoor Class S State Championship, Terry finished first in the 55m. I placed second. But for the CIAC's policy, I would have been named the Class S State Champion in the 55m.

26. The February 16, 2019, indoor State Open Championship saw similar results and a similar impact. Terry and Andraya finished first and second respectively in both the preliminary and final Women's 55m races, each time defeating the fastest girl by a wide margin. I placed third in the final.

27. But for CIAC's policy, I would have won the 2019 State Open Championship in the 55m dash:

Table 3: 2019 CIAC State Open Championship Women's Indoor Track 55m Preliminary Results (February 16, 2019)[4]

Place	Grade	Sex	Name	Time	High School
1*	11	M	Terry Miller	7.00s	Bloomfield
2*	11	M	Andraya Yearwood	7.07s	Cromwell
3*	12	F	Cori Richardson	7.24s	Windsor
4*	11	F	Chelsea Mitchell	7.27s	Canton
5*	12	F	Kate Shaffer	7.27s	Conard
6*	12	F	Ayesha Nelson	7.29s	Hillhouse
7*	12	F	Maya Mocarski	7.34s	Fairfield Ludlowe
8	11	F	Selina Soule	7.37s	Glastonbury
9	10	F	Kisha Francois	7.41s	East Haven

* Qualified for the women's 55m final.

Table 4: 2019 CIAC State Open Championship Women's Indoor Track 55m Final Results (February 16, 2019)[5]

Place	Grade	Sex	Name	Time	High School
1*	11	M	Terry Miller	6.95s	Bloomfield
2*	11	M	Andraya Yearwood	7.01s	Cromwell
3*	11	F	Chelsea Mitchell	7.23s	Canton
4*	12	F	Kate Shaffer	7.24s	Conard
5*	12	F	Ayesha Nelson	7.26s	Hillhouse
6*	12	F	Maya Mocarski	7.33s	Fairfield Ludlowe
7	12	F	Cori Richardson	7.39s	Windsor

* Qualified for the New England Championship.

28. Instead, I was not named State Open Champion in the 55m, I received a bronze medal instead of a gold medal, and I did not make Canton High School history as the first ever Canton female athlete to be named a State Open Champion.

29. However, after the 55m race, I returned to the finals of the long jump, which had no males competing. While listening to them announce Terry as the winner and new meet record holder in the 55m, I won the long jump event to solidify my place in the Canton record books as the first Canton indoor track athlete—male or female—to be named a State Open Champion.

[4] AthleticNet, https://www.athletic.net/TrackAndField/meet/352707/results/f/1/55m, last visited June 2, 2020.
[5] *Id.*

30. State Champions are recognized as All-State Athletes, an award listed on college applications, scholarship applications, and college recruiting profiles. State Champions are invited to the All-State Banquet, and get their name celebrated on a banner in their high school gym. I did not receive any of these awards for the 55m. But I was able to receive these awards for my long jump championship.

31. After the State Open Championship, I was repeatedly referred to in the press as the "third-place competitor, who is not transgender." I was the fastest biological girl in the 55m race at the State Open Championship, but the press did not mention my name—I felt invisible.

32. At the March 2, 2019, indoor New England Regional Championship, Terry took first and Andraya took third place in the 55m dash. I missed medaling and being named All New England Champion by just two spots—two spots that were taken by male competitors.

33. Following Terry Miller's sweep of the CIAC's Indoor Class S, State Open, and New England titles in the 55m dash and 300m, Terry was named "All-Courant girls indoor track and field athlete of the year" by the Hartford Courant newspaper. This felt like an injustice to my fellow female athletes.

34. In the Spring 2019 outdoor season, I competed against both Terry and Andraya in the Class S Championship. At this event, I ran the fastest biological female times in the 100m and 200m across all state class meets.

35. But because of the CIAC's policy, being the fastest biological girl just was not good enough to experience the thrill of victory. Instead, at the 2019 Class S Championship, Terry placed first in the 100m and 200m, while I placed second in both events. I won the long jump and received a state title. But because of the CIAC's policy, I took home only one state title instead of three.

36. The trend continued at the 2019 outdoor State Open Championship as Terry easily won the women's 200m race. But for CIAC's policy, Cori Richardson would have won the state championship, Alanna Smith would have finished runner-up, and Olivia D'Haiti would have advanced to the New England Championship:

Table 5: 2019 CIAC State Open Championship Women's Outdoor Track 200m Final Results (June 3, 2019)[6]

Place	Grade	Sex	Name	Time	High School
1*	11	M	Terry Miller	24.33s	Bloomfield
2*	12	F	Cori Richardson	24.75s	Windsor
3*	9	F	Alanna Smith	25.01s	Danbury
4*	11	F	Chelsea Mitchell	25.24s	Canton
5*	12	F	Nichele Smith	25.38s	East Hartford
6*	12	F	Bridget Lalonde	25.55s	RHAM
7	12	F	Olivia D'Haiti	25.63s	Kolbe-Cathedral

* Qualified for the New England Championship.

37. But I did receive one opportunity to compete on a more level playing field. At the Spring 2019 State Open Championship in the 100m, Terry, the top-seed in the race, false-started and was disqualified. This opened the door for me: I was able to relax, focus on my race, and win. I set a personal record of 11.67 seconds, made Canton High School history as the first sprinter to be a state open champion in any sprint event, medaled, received significant media publicity, and advanced to the New England Regional Championships.

38. I went on to win the New England Regional Championships in the 100m dash and was named All New-England. Here, too, I made Canton High School history as the first female to win a New England Championship.

[6] AthleticNet, https://www.athletic.net/TrackAndField/MeetResults.aspx?Meet=364088&show=all, last visited June 2, 2020.

39. Thereafter, I was awarded Track Athlete of the Year by the Connecticut High School Coaches Association, and the Hartford Courant named me 2019 All-Courant Girls Outdoor Track and Field Athlete of the Year and the Bo Kolinsky Female Athlete of the Year (across all sports).

40. My new personal record, State Open Champion and All New-England awards put me in a much better recruiting position for college scholarships—all because a false start that prevented a male from competing against me in the women's division leveled the playing field.

2019-2020 Senior Year

41. A similar scenario played out in the Winter 2020 season. At the indoor Class S Championship 55m race, Andraya Yearwood—the top seed in the race and the individual ranked number one in the state for the women's 55m dash—false-started and was disqualified. That false start opened the door for me to not only win the CIAC Class S Championship in the 55m dash, but also to advance to the 2020 Connecticut State Open Championship in the 55m event and win.

42. To my disappointment, the 2020 Spring outdoor season was cancelled in light of the global COVID-19 pandemic.

43. I just completed my senior year of high school and the final track season of my high school athletic career.

44. It feels defeating to know that records at my high school, CIAC, AthleticNet, MySportsResults, CT.Milesplit.com, and others do not reflect the four state titles and two All New England awards I should have earned. It is upsetting to know that the meet records of many great female athletes before me have also been wiped from the books.

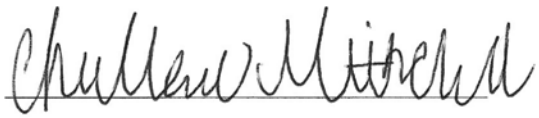
45. Competing against males makes me feel anxious and stressed. And stress has a direct, negative impact on my athletic performance.

46. I try to stay positive, to take support from family and friends, but it is hard when I know that I must compete against those who have a biological advantage because they were born male.

47. I hope that future female athletes will not have to endure the anxiety, stress, and performance losses that I have while competing under a policy that allows males to compete in the female category.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 2 day of June, 2020



Chelsea Mitchell

EXHIBIT D

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August 31, 2020

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Re: Case No. 01-19-4025
Connecticut Interscholastic Athletic Conference

Case No. 01-19-1252
Glastonbury Public Schools

Case No. 01-20-1003
Bloomfield Public Schools

Case No. 01-20-1004
Canton Public Schools

Case No. 01-20-1005
Cromwell Public Schools

Case No. 01-20-1006
Danbury Public Schools

Case No. 01-20-1007
Hartford Public Schools

Dear Attorneys Mizerak, Monastersky, Murphy, Yoder, and Zelman:

The U.S. Department of Education, Office for Civil Rights (OCR) issues this Revised Letter of Impending Enforcement Action[1] in the above-referenced cases. The earlier Letter of Impending Enforcement Action, dated May 15, 2020, has been updated in light of the Supreme Court's holding in *Bostock v. Clayton Cnty., Georgia*, 140 S. Ct. 1731 (2020).

The Complainant filed complaints against the Connecticut Interscholastic Athletic Conference (CIAC) and the Glastonbury Board of Education (Glastonbury) on behalf of three high school student-athletes and their parents. The Complainant alleged that the CIAC's policy permitting certain biologically male student-athletes to participate in interscholastic athletics (Article IX, Section B of the CIAC By-Laws, adopted May 9, 2013, and titled, "Transgender Participation" (hereinafter referred to as the Revised Transgender Participation Policy)) discriminated against female student-athletes competing in interscholastic girls' track in the state of Connecticut on the basis of their sex.[2] Specifically, the Complainant alleged that the Revised Transgender Participation Policy denied girls opportunities to compete, including in state and regional meets, and to receive public recognition critical to college recruiting and scholarship opportunities. The

[1] Section 305 of OCR's *Case Processing Manual* states as follows: "When following the expiration of the 10 calendar day period referenced in CPM subsection 303(g) . . . the recipient does not enter into a resolution agreement to resolve the identified areas of non-compliance, OCR will prepare a Letter of Impending Enforcement Action."

[2] For the purposes of this letter, the terms "male" and "female" are defined by biological sex. *See Mem. from U.S. Attorney General to U.S. Attorneys Heads of Department Components* (Oct. 4, 2017), available at https://www.justice.gov/ag/page/file/1006981/download; *see also Bostock v. Clayton Cnty., Georgia*, 140 S. Ct. 1731, 1739 (2020) (leaving undisturbed the government's position, and noting that the Court proceeded "on the assumption that 'sex' signified what the employers suggest, referring only to biological distinctions between male and female.").

Complainant further alleged that implementation of the Revised Transgender Participation Policy by Glastonbury, the school attended by one of the complainant student-athletes (Student 1), denied opportunities to girls competing in interscholastic girls' track on the basis of their sex. In addition, the Complainant alleged that the CIAC retaliated against one of the complainant parents (Parent 1), after Parent 1 complained about the Revised Transgender Participation Policy; and that a Glastonbury track coach retaliated against Student 1 for her and her parent's (Parent 2's) advocacy against the Revised Transgender Participation Policy.

Pursuant to OCR's *Case Processing Manual* (the *Manual*),[3] Section 103, OCR also opened an investigation of Bloomfield Public Schools (Bloomfield) and Hartford Public Schools (Hartford), based on allegations that these school districts allowed a biologically male student-athlete (Student A) to participate on their girls' track teams. OCR also opened an investigation of Cromwell Public Schools (Cromwell), based on allegations that this school district allowed a biologically male student-athlete (Student B) to participate on its girls' track team. Additionally, OCR opened an investigation of Canton Public Schools (Canton) and Danbury Public Schools (Danbury), the school districts attended by the other two complainant student-athletes (Students 2 and 3, respectively), following a determination that these school districts may have been involved in alleged acts of discrimination related to the complaints filed against the CIAC and Glastonbury. OCR investigated whether these school districts denied athletic benefits and opportunities to female student-athletes competing in interscholastic girls' track through implementation of the Revised Transgender Participation Policy, or limited the eligibility or participation of any female student-athletes competing in interscholastic girls' track through implementation of the Revised Transgender Participation Policy.

Summary of Findings

As detailed below, the actions of the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury resulted in the loss of athletic benefits and opportunities for female student-athletes. One complainant student-athlete explained to OCR that no matter how hard she trained, she felt that she could never be good enough to defeat Students A and B. She also stated that female student-athletes were missing out on great opportunities to succeed and felt that female student-athletes could be "completely eradicated from their own sports." Another complainant student-athlete explained to OCR that she felt that she could not fairly compete against Students A and B, because they had a physical advantage over her. In this sense, they were denied the opportunities that Connecticut male student-athletes had of being able to compete, on a level playing field, for the benefits that flow from success in competitive athletics. OCR determined that the participation of Students A and B in girls' track events resulted in lost benefits and opportunities for female student-athletes.

OCR determined that the CIAC, by permitting the participation of certain male student-athletes in girls' interscholastic track in the state of Connecticut, pursuant to the Revised Transgender Participation Policy, denied female student-athletes athletic benefits and opportunities, including advancing to the finals in events, higher level competitions, awards, medals, recognition, and the possibility of greater visibility to colleges and other benefits. Accordingly, OCR determined that

[3] https://www2.ed.gov/about/offices/list/ocr/docs/ocrcpm.pdf.

the CIAC denied athletic benefits and opportunities to female student-athletes competing in interscholastic girls' track in the state of Connecticut through the Revised Transgender Participation Policy, in violation of the regulation implementing Title IX of the Education Amendments of 1972 (Title IX), at 34 C.F.R. § 106.41(a).

OCR determined that the participation of Glastonbury, Canton, and Danbury in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Students 1, 2, and 3, and other female student-athletes competing against Students A and B, denied athletic benefits and opportunities to Students 1, 2, and 3, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. § 106.41(a). Even though Glastonbury, Canton, and Danbury purported to operate separate teams for members of each sex, Glastonbury, Canton, and Danbury placed female student-athletes in athletic events against male student-athletes, resulting in competitive disadvantages for female student-athletes. The athletic events in which the female student-athletes competed were coeducational; female student-athletes were denied the opportunity to compete in events that were exclusively female, whereas male student-athletes were able to compete in events that were exclusively male. Accordingly, the districts' participation in the athletic events sponsored by the CIAC denied female student-athletes athletic opportunities that were provided to male student-athletes. Glastonbury's, Canton's, and Danbury's obligations to comply with the regulation implementing Title IX are not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R § 106.6(c).

Student A participated in girls' outdoor track during school year 2017-2018 on the Bulkeley (Hartford) team; and participated in girls' indoor and outdoor track during school year 2018-2019 on Bloomfield's team. OCR determined that the participation of Hartford and Bloomfield in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student A's participating in events against Students 1, 2, and 3, and against other female student-athletes, denied athletic benefits and opportunities to Students 1, 2, and 3, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. § 106.41(a). Student B participated in girls' indoor and outdoor track during school years 2017-2018 and 2018-2019 on Cromwell's team. OCR determined that the participation of Cromwell in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student B's participating in events against Students 1, 2, and 3, and against other female student-athletes, denied athletic benefits and opportunities to Students 1, 2, and 3, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. § 106.41(a). Hartford's, Bloomfield's, and Cromwell's obligations to comply with the regulation implementing Title IX are not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R. § 106.6(c).

For the aforementioned reasons, OCR also determined that the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury treated student-athletes differently based on sex, by denying benefits and opportunities to female students that were available to male students.

With respect to the retaliation allegation filed against the CIAC, there was insufficient evidence to substantiate the Complainant's allegation that the CIAC retaliated against Parent 1 after Parent 1 complained about the Revised Transgender Participation Policy. With respect to the retaliation

allegation filed against Glastonbury, there was insufficient evidence to substantiate the Complainant's allegation that Glastonbury retaliated against Student 1.

Nothing in this letter should be interpreted to impute misconduct on the part of any biologically male students who participated in these competitions.

Investigation and Issuance of Letter of Impending Enforcement Action

During the course of the investigation, OCR interviewed the Executive Director of the CIAC; administrators and staff from Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury; and the students and parents on whose behalf the complaint was filed. In addition, OCR reviewed documentation that the Complainant, the CIAC, the school districts, and some of the students and parents submitted. OCR also reviewed publicly available information regarding the CIAC and its member school student-athletes.

At the conclusion of the investigations, OCR informed the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury of its findings and determinations that the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury had discriminated against female student-athletes. OCR requested that the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury enter into resolution agreements to remedy the violations. Because the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury did not enter into resolution agreements, OCR issued letters of impasse to the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury on March 17, 2020, in which it advised the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury that it would issue this letter if each did not reach an agreement with OCR within 10 calendar days of the date of its impasse letter.[4] OCR issues this Letter of Impending Enforcement Action because the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury have to date failed to voluntarily enter into resolution agreements to remedy the identified violations.

Jurisdiction

OCR is responsible for enforcing Title IX, as amended, 20 U.S.C. § 1681 et seq., and its implementing regulations at 34 C.F.R. Part 106, which prohibit discrimination on the basis of sex in education programs and activities receiving financial assistance from the U.S. Department of Education (the Department).

OCR has jurisdiction over the CIAC as follows:

a) The CIAC is a direct recipient of Federal funding from the Department through a grant awarded by the Department's Office of Special Education Programs (OSEP) to support the Special Olympics Unified Champion Schools program administered by the CIAC.

[4] In emails dated March 27, 2020, OCR informed the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury that in view of their COVID-19-related duties and responsibilities, OCR was extending the 10-calendar-day deadline to respond to OCR's proposed resolution agreement for a period of 30 days, to April 27, 2020.

b) The CIAC is also an indirect recipient of Federal funding. The CIAC is governed by member school representatives who devote official time and district resources to the CIAC (e.g., determine athletic eligibility, make rules for athletic competitions, run state boys' and girls' tournaments, and control state championships). In addition, the CIAC receives revenue through the sale of tickets to tournament contests—revenue that would otherwise go to the schools—and by the assessment of entry fees on schools for participation in various tournaments. The CIAC is also an indirect recipient of Departmental financial assistance through Special Olympics of Connecticut (which receives grant money from OSEP) because several employees of Special Olympics of Connecticut provide to the CIAC technical assistance in the administration of the Special Olympics Unified Champion Schools program.

c) The CIAC's member schools also have ceded controlling authority over Connecticut's high school athletic program to the CIAC, whose purpose is to supervise, direct, and control interscholastic athletics in Connecticut. In addition to the CIAC's governance by local school representatives (noted above), the Connecticut General Assembly's Office of Legislative Research stated that school districts have the power to organize athletic programs and decide in what sports to compete, adding, "Boards have delegated authority over the organization of interscholastic high school athletics to [the CIAC]. CIAC regulates high school sports, promulgates eligibility and safety and health rules for teams, and organizes and controls games and championships."

OCR has jurisdictional authority under Title IX to investigate Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury, because each is a recipient of financial assistance from the Department.

I. ATHLETIC BENEFITS AND OPPORTUNITIES

Findings of Fact

The CIAC's Organizational Structure

The CIAC is the only association governing interscholastic athletic programs for secondary schools in Connecticut.[5] The CIAC is a division of the Connecticut Association of Schools (CAS). Any public or parochial school accredited by the Connecticut State Department of Education, as well as any private school or academy, and any private school holding associate institutional membership in the CAS can become a member of the CIAC. The CIAC currently has 188 member schools. Member schools sign an annual Membership Agreement, pay annual dues, and agree to abide by the CAS Constitution and the CIAC By-Laws and Eligibility Rules. During school year 2018-2019, the CIAC authorized its member schools to participate in 14 boys' sports and 13 girls' sports. The CIAC By-Laws allow female athletes to participate on boys' teams, but do not permit

[5] *See* CIAC Handbook 2019-2020, Section 2.2 ("The CIAC is the only Association which governs interscholastic athletic programs for secondary schools in Connecticut.").

male athletes to participate on girls' teams. The CIAC administers its athletics programs by way of the CAS Constitution, by-laws, and tournament regulations.[6]

The CIAC has 27 committees corresponding to each of the CIAC-sanctioned sports. Each committee includes representatives from member schools, including principals, coaches, and athletic directors, as well as former coaches. These committees coordinate the activities of the sports, including game rules, playing conditions, tournament policies, and sportsmanship initiatives. The by-laws, along with the CAS constitution, are published every year as part of the CIAC Handbook, which is available on the CIAC website.[7] The Handbook includes detailed rules and regulations governing athletic administration, scheduling, and eligibility, among other topics. The CAS Legislative Body is authorized to make changes to the CAS Constitution and the by-laws. The principals of the CIAC member schools are the voting delegates to the Legislative Body. The CAS Constitution states that any voting member school may submit a proposed change to the by-laws/regulations through its representative. The CIAC Board of Control is the governing body for high school interscholastic sports in Connecticut and has 14 voting and 3 non-voting members; the Board of Control has representatives from large, medium, and small schools, urban and rural schools, as well as public, parochial, and technical schools.[8] The by-laws require that the Board of Control consider any proposed change to a by-law/regulation, act upon it, and submit any proposed by-law/regulation change to member schools for a vote at the annual meeting of the Legislative Body. The by-laws, including the rules, regulations, and policies contained therein, as well as the tournament regulations are binding on its member schools,[9] and the CIAC has the authority to penalize schools for violation of the by-laws.[10]

During interviews, district staff members confirmed that the districts regarded the by-laws, rules, and regulations, including the Revised Transgender Participation Policy, as binding. The witnesses further stated that they regarded the CIAC as the only athletic association in Connecticut

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[6] The by-laws constitute the general rules and policies for athletic administration and participation in the CIAC. Specific policies, such as the Revised Transgender Participation Policy, are contained within the by-laws. Further policies regarding sport-specific tournament participation ("tournament regulations") are published each season in a sports information packet.

[7] http://www.casciac.org/pdfs/ciachandbook_1920.pdf (site last visited on April 24, 2020).

[8] The CIAC Board of Control is elected each year by the Legislative Body at the Annual Meeting of the CAS. The CIAC Board of Control meets monthly during the school year.

[9] *See* the CIAC Handbook 2019-2020, Section 2.4 ("Each member school has the responsibility of knowing and adhering to all CIAC rules and regulations and administering its athletic programs according to those rules.").

[10] *See* the CIAC Handbook 2019-2020, Section 3.0, CIAC By-Laws, Article III, Section C ("The Board of Control shall have the power to assess and to enforce such penalties, including fines, against member schools, principals, athletic directors, coaches and/or members of the coaching staff, as it deems suitable for violations of its Bylaws, Regulations, Rules, Standards of Courtesy, Fair Play and Sportsmanship, Code of Ethics, or any other standard of conduct or any other provision of this Handbook."). Witnesses OCR interviewed, including the CIAC Executive Director and administrators of member schools, stated that, in general, member schools are responsible for ensuring their own compliance with the CIAC's rules and for self-reporting any violations of those rules. Member schools can also report other schools for potential violations. The CIAC Executive Director informed OCR that, to date, no member school has self-reported or reported another member school for a violation of the Revised Transgender Participation Policy.

that could provide sufficient competitive opportunities for their students.[11] Witnesses told OCR that if their schools were to withdraw from the CIAC, they likely would encounter difficulties scheduling games against other schools and would be unable to participate in statewide competitions. An Athletic Director for one of the Districts advised OCR that a CIAC member school would not benefit from playing against a nonmember school because it would not add to the school's record for purposes of qualifying for the state championship. The same Athletic Director also stated that having a state-wide association makes all of the athletics programs stronger and more consistent with set rules for play and eligibility.

The CIAC's Adoption of its Revised Transgender Participation Policy

The CIAC stated that its Board of Control began discussions regarding transgender participation in athletics during school year 2007-2008. During its 56th Annual Meeting, held on May 8, 2008, the CIAC membership adopted a by-law change concerning the eligibility of transgender athletes, adding new language to Article IX of the CIAC by-laws (the 2008 policy). Specifically, the 2008 policy allowed transgender student-athlete participation only in accordance with the gender stated on the student's birth certificate unless the student had undergone "sex reassignment."[12] The 2008 policy set forth specific requirements for post-pubescent sex reassignment, including surgery; legal recognition of the reassignment by proper governmental authorities; hormonal therapy; and a two-year waiting period post-surgical and anatomical changes.[13] The 2008 policy also provided that a student-athlete seeking participation as a result of a sex reassignment would be able to appeal eligibility determinations through the CIAC's eligibility appeal process. The stated rationale for the 2008 policy was that "[w]hile the eligibility of transgendered students has not yet been a 'live' issue in Connecticut, the CIAC Board felt that it should be pro-active and have a policy in place for any future eventualities."[14] The 2008 policy remained in effect until 2013. The CIAC advised OCR that, during that time period, the CIAC did not receive any requests for a student-athlete to participate on a team that was different from the student's "assigned gender at birth."

The CIAC stated that in 2012, after the Connecticut Legislature passed Public Act 11-55, expanding the scope of Connecticut's anti-discrimination laws to prohibit discrimination on the basis of "gender identity or expression,"[15] the CIAC decided to review and revise the 2008 policy.

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[11] The CIAC Executive Director stated that there are private schools within Connecticut, such as Taft, Choate, and Kent, that do not belong to the CIAC. These schools belong to the Founders League, whose website describes the league as comprising "highly selective college preparatory schools." The Founders League includes ten schools from Connecticut and one school from New York. The Founders League holds its Championship in 13 boys' sports and 12 girls' sports separately, and the CIAC precludes any Founders League schools from competing in any post-season events hosted by the CIAC. Witnesses opined that they did not know if the Founders League was a feasible alternative for a public school in lieu of becoming a member of the CIAC.

[12] https://www.casciac.org/pdfs/ciachandbook_1213.pdf (site last visited on April 24, 2020)

[13] Under the 2008 policy, a student-athlete who had undergone sex reassignment before puberty was not subject to the requirements detailed above.

[14] The CIAC Annual Meeting minutes. https://www.casciac.org/pdfs/adopted_bylaw_changes_CIAC.pdf (site last visited on April 24, 2020).

[15] P.A. 11-55, which became effective on October 1, 2011, defines "gender identity or expression" as follows:

The CIAC did so at its Annual Meeting, held on May 9, 2013, when the current Revised Transgender Participation Policy was enacted. This Policy states, in relevant part:

> [T]his policy addresses eligibility determinations for students who have a gender identity that is different from the gender listed on their official birth certificates. . . . Therefore, for purposes of sports participation, the CIAC shall defer to the determination of the student and his or her local school regarding gender identification. In this regard, the school district shall determine a student's eligibility to participate in a CIAC gender specific sports team based on the gender identification of that student in current school records and daily life activities in the school and community at the time that sports eligibility is determined for a particular season. Accordingly, when a school district submits a roster to the CIAC it is verifying that it has determined that the students listed on a gender specific sports team are entitled to participate on that team due to their gender identity and that the school district has determined that the expression of the student's gender identity is bona fide and not for the purpose of gaining an unfair advantage in competitive athletics. . . . The CIAC has concluded that [these] criteria [are] sufficient to preclude the likelihood that a student will claim a particular gender identity for the purpose of gaining a perceived advantage in athletic competition.[16]

> "Gender identity or expression" means a person's gender-related identity, appearance or behavior, whether or not that gender-related identity, appearance or behavior is different from that traditionally associated with the person's physiology or assigned sex at birth, which gender-related identity can be shown by providing evidence including, but not limited to, medical history, care or treatment of the gender-related identity, consistent and uniform assertion of the gender-related identity or any other evidence that the gender-related identity is sincerely held, part of a person's core identity or not being asserted for an improper purpose.

See Conn. Gen. Stat. § 46a-51. Specifically, with respect to the public schools, P.A. 11-55 amended § 10-15c of the Connecticut General Statutes to prohibit discrimination on the basis of gender identity or expression, among other bases. The legislative history of P.A. 11-55 indicates that the topic of athletics was briefly raised during the Connecticut House proceedings on May 19, 2011, in a discussion between Rep. Fox (the bill's proponent) and Rep. Shaban. In response to Rep. Shaban's question concerning whether, under the bill, a high school boy who wanted to play on the school's girls' basketball team could not be prohibited from doing so, Rep. Fox indicated that he believed, but was not certain, that in that context the intent of the bill was to apply only to a male athlete who had undertaken what Rep. Shaban had described as "affirmative physical changes." Conn. Gen. Assembly House Proceedings 2011, Vol. 54, Part 12 (May 19, 2011) at 4017-4022.

[16] The CIAC informed OCR that the Revised Transgender Participation Policy has been in effect since its adoption on May 9, 2013. The CIAC stated to OCR that the policy contained in the revised by-law no longer required student-athletes to undergo medical treatment or sex reassignment surgery in order to participate in athletics consistent with their gender identity, nor would a student-athlete be required to seek permission from the CIAC in order to participate under the policy in accordance with the student's gender identity; rather, the policy required member schools to submit rosters that reflected the gender identities of their students. The CIAC further stated that this decision was based on "a determination that a member school is in the best position to identify and confirm that a student-athlete's gender is consistent with the student's gender identity at school and to place the student on the correct team roster." Accordingly, the Board of Control determined that students would not be required to disclose their transgender status to the CIAC.

Thus, the Revised Transgender Participation Policy eliminated any requirement that transgender student-athletes provide any medical information or documentation to the CIAC or its member schools.

The Connecticut State Department of Education (CSDE) issued a document entitled, "Guidance on Civil Rights Protections and Supports for Transgender Students – Frequently Asked Questions," dated September 2017 (the 2017 FAQs).[17] The 2017 FAQs state, in relevant part:

> For issues concerning participation in interscholastic competitive sports, schools and districts should consult their counsel and the Connecticut Interscholastic Athletic Association ("CIAC").[18]

On October 11, 2018, the CAS Board of Directors requested that an ad hoc committee examine all the CIAC rules and regulations that relate to gender. The meeting minutes of the CIAC stated that the purpose of the review was to ensure that the regulations were in alignment with state law.[19] The CIAC established a Gender By-Law Subcommittee in December 2018 to review all of the by-laws relating to gender in order to confirm the current policies and practices or make recommendations for improvements. In its report to the CIAC Board of Control, dated April 4, 2019, the Subcommittee concluded that the by-laws reviewed were "in alignment with Connecticut law and the CAS-CIAC mission."[20]

The CIAC's and School Districts' Implementation of the Revised Transgender Participation Policy

School district witnesses interviewed stated that none of the districts had a specific written procedure or practice in place to implement the Revised Transgender Participation Policy, but that they followed or would follow the plain language of the policy. Districts that had not had a transgender student request to participate in athletics stated that should they receive a request from a transgender student to participate in athletics, they would look at the gender identity listed in the student's current school records and then whether the gender identity the student is expressing during the day is consistent with the gender identity listed in the student's school records; e.g., whether the student has requested to use a name and pronouns consistent with that sex. Witnesses stated that often this process would involve the student's parents, particularly if the student were

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[17] https://portal.ct.gov/-/media/SDE/Title-IX/transgender_guidance_faq.pdf?la=en (site last visited on April 24, 2020). This guidance indicates that the CIAC is responsible for establishing statewide policies for transgender participation in interscholastic competitive sports.

[18] 2017 FAQs, p. 7. *See* https://portal.ct.gov/-/media/SDE/Title-IX/transgender_guidance_faq.pdf?la=en (site last visited on April 24, 2020).

[19] https://portal.ct.gov/-/media/SDE/Title-IX/transgender_guidance.pdf?la=en (site last visited on April 24, 2020).

[20] The CAS mission statement is as follows: "The Connecticut Association of Schools provides exemplary programs and services that promote excellence in the education of all children." The CIAC mission statement is as follows: "The CIAC believes that interscholastic athletic programs and competition are an integral part of a student's academic, social, emotional and physical development. The CIAC promotes the academic mission of schools and honorable competition. As such, the CIAC serves as the regulatory agency for high school interscholastic athletic programs and exists to assure quality experiences that reflect high ethical standards and expectations for fairness, equity and sportsmanship for all student-athletes and coaches. The CIAC provides leadership and support for member schools through the voluntary services of dedicated school administrators, athletic directors, coaches and consultants."

a minor and school records needed to be changed; but that once the student had established his or her gender identity, the school would place the student on the roster of the team associated with that gender. Witnesses from districts that have had transgender students request to participate in athletics detailed a similar internal process; namely, that upon a request from a transgender student, they would review the student's records, speak with the student's teachers/counselors, meet with the student's parents, and if all was consistent, thereafter, place the student on the team roster associated with the student's gender identity.

Every district confirmed to OCR that it believed that no specific documentation, medical or otherwise, was required in order for the district to comply with the policy. District administrators reported that they had not received specific training regarding implementation of the Revised Transgender Participation Policy, although some stated that they had attended workshops or presentations on the topic of transgender athletes generally. Principals and athletics directors interviewed by OCR indicated that transgender student-athlete participation had been discussed either formally or informally at annual professional development conferences, as well as during professional association meetings, and through their respective regional conferences. Witnesses from the districts stated, and the CIAC confirmed to OCR, that the CIAC has not questioned any decisions made by a member school under the policy, nor has it investigated any rosters submitted by member schools with respect to the policy. Glastonbury noted that, in the past, when it had a transgender student wish to participate in athletics, the student's parent offered to provide medical documentation to support their request under the Revised Transgender Policy; however, the CIAC advised Glastonbury that the information was not required.

Additionally, multiple district witnesses stated to OCR that, according to their understanding of the Revised Transgender Participation Policy, it is not the school's or district's role to determine a student's gender. Witnesses from Bloomfield, Danbury, Glastonbury, and Hartford stated that the student initiates the process and informs the district of the student's gender identity; and the district's role is to review the current school records, speak with school staff regarding the student's current gender expression during the school day, and then place the student on the appropriate roster. Witnesses from Bloomfield and Cromwell also stated that if a student were to initially register with the school under a gender identity that differed from the student's biological sex, the school would place the student on the roster of the gender identified in the school registration records; i.e., the district and student would not need to have a discussion or review the student's participation under the Revised Transgender Participation Policy. Both Cromwell and Bloomfield have used this process in their districts.

Concerns Raised by Parents and Others to the CIAC Regarding the Policy and the Participation of Biologically Male Students in Track Events

In 2019, the CIAC received several emails from parents of Connecticut high school students, in which the parents expressed concerns about the policy and specifically about the participation in female track events of biologically male students.

From January 2019 to March 2019, the CIAC received four emails from the father of a female student-athlete at Glastonbury High School (Parent 3). On January 29, 2019, Parent 3 sent an email to the CIAC stating that he and many parents of other female track athletes, as well many of

the athletes themselves, believed that the policy was unfair to female track athletes[21] and that the policy raised safety concerns as well, particularly with respect to sports involving physical contact.[22] With respect to track, he suggested that a compromise could be reached whereby a boy identifying as a girl would be able to compete but would not have the results used for purposes of conference or state records or for all-conference or all-state selection. Parent 3 requested a meeting with the CIAC officials to discuss the topic.[23]

On February 17, 2019, Parent 3 sent an email to the CIAC stating that the transgender policy affected the outcome of the CIAC State Open Girls Indoor Track Championship held on February 16, 2019. Specifically, he stated that the performance of a transgender athlete "with all the physiological and anatomical attributes of a male athlete" in the Championship had enabled Bloomfield High School to win the team championship over Glastonbury. Parent 3 again urged the CIAC to change the policy. On February 25, 2019, the Executive Director of the CIAC responded to Parent 3, stating that Parent 3's correspondence would be provided to a CIAC subcommittee reviewing the policy.

On March 3, 2019, Parent 3 sent an email to the CIAC again urging the CIAC to change the policy. He further stated that at the New England Regional Indoor Track Championship, held on March 2, 2019, a biologically male athlete finished first in the 55-meter and 300-meter sprints and had helped Bloomfield win first place over Glastonbury in the girls' 4 x 400 meter relay. On March 10, 2019, Parent 3 sent an email to the CIAC stating that the National Scholastic Athletic Foundation, an organization that hosts the New Balance National high school track and field competition, had established a policy whereby female transgender athletes are required to meet applicable rules established by the National Scholastic Athletics Foundation, USA Track & Field, and International Olympic Committee, which required such athletes to demonstrate that they had undergone hormone treatment. Parent 3 stated that when Bloomfield's girls' 4 x 400 team recently competed in the New Balance Nationals, it did so without the participation of its biologically male athlete, and that this resulted in a slower time than Bloomfield's team had achieved at the New England championships, when the biologically male athlete had competed.

From February 2019 to March 2019, the CIAC received three emails from a parent (Parent 4). On February 25, 2019, Parent 4 sent an email to the CIAC expressing concerns about the fairness of the policy.[24] He stated "the current unfair competitive balance at the State Open has cost 7

[21] In part, Parent 3 stated as follows: "Should a boy who identifies as a girl with all of the physiological and anatomical advantages of a boy be able to compete in Connecticut Girls Indoor Track, obtain medals over other girls who have trained hard and care deeply about the results, eradicate existing girls event and state track records and push what would have been the final girl qualifier out of selection for All-Conference and All-State honors?"

[22] In part, Parent 3 stated as follows: "Should safety be compromised in girls high school track or other girls sports such as basketball, soccer or lacrosse to accommodate a boy who identifies as a girl with all of the physiological and anatomical advantages of a boy?"

[23] In addition, Parent 3 attached a copy of an email dated January 27, 2019, that he had sent to officials from the Glastonbury District. In this email, Parent 3 expressed his concerns about the policy's fairness and safety, and he described several recent track meets in which a transgender athlete had finished ahead of other athletes. Parent 3 asked the Glastonbury officials to make efforts to have the policy changed.

[24] Specifically, he stated that "there are many, myself included, who cannot begin to fathom the policy of the CIAC that has allowed the competitive record of Connecticut Girls High School Track and Field Competitions to be altered

Connecticut student/athletes the opportunity to compete at the New England Championship" and "[t]his results in a significant negative impact to these cisgender girls through no fault of their own." He also stated the policy unfairly denied these elite athletes an opportunity to gain additional exposure with college coaches and recruiters. In addition, he stated that "[a]t the heart of the competitive fairness issue regarding competition between transgender girls and cisgender girls is the abundance of testosterone present in young biological males."

Further, Parent 4 stated that the CIAC maintains different qualifying standards for girls' and boys' track, which he contended was an acknowledgment that there was a measurable difference in the performance capabilities between genders. He requested that the CIAC adjust the results of the 2019 State Girls Open Competition so as not to include the results of the transgender athletes, and he requested that the policy be changed going forward. He offered several suggestions for a new policy (e.g., establishing a new competitive category for transgender athletes).

The Executive Director of the CIAC responded the same day, stating that Parent 4's correspondence would be shared with the subcommittee reviewing the Revised Transgender Participation Policy. On March 1, 2019, Parent 4 sent an email to the CIAC, stating that he would like to arrange a meeting with the members of the subcommittee reviewing the policy. On March 5, 2019, Parent 4 sent an email to the CIAC stating that, during the New England Indoor Regional Championships on March 2, 2019, spectators from other states had expressed "surprise and concern" that Connecticut permitted transgender athletes to participate.

On June 20, 2019, the CIAC received an email from the mother of a rising female high school student in Connecticut (Parent 5). Parent 5 expressed her concern that the policy was unfair to female athletes because it would allow "genetic males (no matter how they identify themselves) to usurp genetically female athletes in competition."

In a letter to the CIAC, dated April 11, 2017, a head track coach at a Connecticut high school stated that Student B was at a great advantage unless or until the student began taking hormone blockers. He also referred to average high school testosterone levels according to the Mayo Clinic. He then argued that Student B had gender characteristics that females cannot compete with, and that Student B was taking advantage of the CIAC's policies and rules. He requested that the CIAC find a solution that allowed Students A and B to compete but also protected female athletes.

The CIAC's Rules for Girls' Indoor and Outdoor Track Competition

The CIAC is organized into various boards and committees, including one committee for each CIAC-sanctioned sport. Each year, the CIAC committee for the respective sport publishes a "Sports Packet/Information Sheet" for the season. The Sports Packet/Information Sheets for girls' indoor and outdoor track set forth, among other things, the procedures for entering student-athletes

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by the tabulation and classification of results that include transgender athletes that has now spread its impact to not only athletes that have competed directly in these events, but now also their teammates, especially 75 members of the Glastonbury Girls Indoor Track Team, when team records and scoring are impacted."

in events; how many events a student-athlete may participate in;[25] submitting qualifying performances; entrance fees; rules regarding electronic devices; protest procedures; scrimmages; and, regular season score reporting.

The CIAC sets the rules for athletic eligibility and competition across the state. Each sport is divided into divisions/classes, based on the size of the school. The CIAC sports committees determine the tournament or championship class divisions for each sport based on the grade 9-12 enrollments of each school as of October 1 of the past school year. A school can have different classes for each of its sports, and a school's class/division can change depending on the year. The Sports Packet/Information Sheet for each sport sets forth the class/divisions for the current year. For example, during school year 2018-2019, for girls' indoor track, the CIAC had the following classes, from smallest school enrollment to largest: Class S, Class M, Class L, and Class LL. For girls' outdoor track, the CIAC had the following classes: Class S, Class M, Class MM, Class L, and Class LL.

There are eleven conferences/leagues[26] that are based mostly on geographic location, which can include schools from the different CIAC classes. The CIAC does not set regular season competitive schedules; these are set by the individual member schools, individually or through conferences/leagues.[27] However, the CIAC does mandate certain "season limitations," including when the opening day of practice occurs, the minimum number of required practice days prior to the first contest, the maximum number of games or meets played per week, and the maximum number of contests scheduled per season.[28]

For post-season competition, if they met qualifying standards,[29] participants in girls' indoor and outdoor track can participate in a conference/league championship; a class statewide championship; the State Open Championship; and the New England Regional Championship. Each of the eleven conferences/leagues holds a conference/league championship at the end of the indoor and outdoor seasons; and each class holds a class statewide championship at the end of the indoor and outdoor seasons. A student-athlete's eligibility to compete at the indoor and outdoor track State Open Championships is determined by the finish order at the respective class statewide

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[25] For both girls' indoor and outdoor track, the sport packets state that a competitor shall not compete in more than three events including relays, and any athlete on the tournament roster shall not be entered in more than three events excluding relays; e.g., an athlete may be entered in the 4 x 800, 1600, 3200, and 4 x 400 events, but can only run or be a competitor in three events. A contestant becomes a competitor when the contestant reports to the clerk of course. The rules also state that a competitor who competes in three events at any of the class meets cannot enter any other event at the State Open Championship. The stated rationale is that class championship meets and the State Open are really one meet because advancing to the State Open Championship is predicated on class meet performance. Athletes listed as alternates for relay events may only run if they ran two events or fewer at the class meet; i.e., they are still limited to three events.

[26] http://ciacsports.com/site/?page_id=131 (site last visited on April 24, 2020).

[27] *See* CIAC Handbook, Section 5.0 ("The CIAC has no jurisdiction over regular season interscholastic scheduling problems except as these relate to violation of CIAC policies. Schedul[ing] of interscholastic contests within CIAC season limitations is the responsibility of individual schools and/or leagues.")

[28] *See id.* at page 47.

[29] Schools may only enter athletes who meet the minimum requirements for the event as established by the sports committee for that year, as set forth in the sports information packet.

championships as set forth in the Sports Packet/Information Sheet.[30] For example, for indoor track for school year 2018-2019, the top 14 finishers in all events in class statewide championships for Classes LL, L, M, and S were eligible to compete in the indoor State Open Championship. For outdoor track for school year 2018-2019, the top 5 finishers in each of the class statewide championships automatically qualified for the outdoor State Open Championship, as well as all athletes who obtained the special (automatic) standard for their event at the class statewide championship.[31]

The CIAC awards medals to the top 6 competitors based on the order of finish in events at the State Open Championships (both indoor and outdoor), and the top 6 competitors also qualify for the New England Regional Championships.[32] Thereafter, a student may go on to compete at the national championships, held by the National Scholastic Athletics Foundation (the New Balance Indoor and Outdoor Championships), based on the student's qualifying time.[33]

The CIAC uses a point system to award points by school to determine a school state champion for indoor and outdoor track. For indoor track, the CIAC uses team scoring based on six places (from first to sixth place, the CIAC awards 10, 8, 6, 4, 2 and 1 points, respectively) for all events. For outdoor track, the CIAC uses team scoring based on eight places (from first to eighth; 10, 8, 6, 5, 4, 3, 2 and 1 points) only when an eight lane track is used; otherwise the CIAC uses team scoring based on six places (from first to sixth; 10, 8, 6, 4, 2 and 1 points) for the event. The points earned by each school are then tallied, and the CIAC ranks schools in the order of points from highest to lowest to determine the state champion.[34]

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[30] The Sports Packet/Information Sheet provides information about the Class/Division Championships and the State Open Championship; including qualifying distances and times for entry into the class championships, as well as eligibility to compete in the State Open Championship.

[31] From at least school years 2012-2013 through 2016-2017, the outdoor sports packet set a CIAC State Open Championship qualifying standard for each event. For the 100-meter dash, the qualifying standard was 12.60 for all years and for the 200-meter dash, the qualifying standard was 26.70 for all years except 2016-2017, when it was lowered to 26.14. The sports packets during those years stated that the automatic standard approximated the 8th place finish established in the prior year State Open. Starting in school year 2017-2018, and continuing in school year 2018-2019, per the Sports Packet, "The special standard will be set each year after the class meets have ended. The special standard will be determined by looking at the performance rankings for each event that includes the top five (5) qualifying performances from each of the class meets. The 12th place performance from the qualifiers will become the automatic standard for that year. All athletes who meet that standard during the current year's class championship will advance to the open."

[32] For outdoor track, the 7th and 8th place finishers in the final for any event will be considered as alternates.

[33] The National Scholastic Athletics Foundation's Transgender Participation Policy & Procedure, updated December 2019, allows for a transgender student-athlete to submit a qualified entry into a National Scholastic Athletics Foundation competition or make a written request for participation, which the National Scholastic Athletics Foundation then evaluates on a case-by-case basis, including evaluation by an Eligibility Committee comprising at least one medical professional, event director, active age-appropriate coach, and lawyer. The Eligibility Committee can request any information it believes relevant to the application, including but not limited to interviews with the athlete and/or parents/guardians and coaches, and a review of relevant medical and legal records. The policy states that a male-to-female athlete who is not taking hormone treatments related to gender transition may not compete in female competitions, but that a female-to-male athlete not taking testosterone related to gender transition may compete in male competitions.

[34] In the outdoor State Open Championship, seeding is done electronically based on an athlete's performance at the Class meets. An athlete's seed determines the athlete's lane assignment; the athlete with the fastest projected time based on performance at the Class meets is assigned to a middle lane (usually lane 4) and athletes are then placed in lanes in order of seed, working towards the outside lanes.

Complainant Students and Competition Against Students A and B

The complaint was filed on behalf of three high school female students competing in girls' track in the state of Connecticut: Student 1, attending Glastonbury High School (School 1); Student 2, attending Canton High School (School 2); and Student 3, attending Danbury High School (School 3). The Complainant specifically complained about two students who participated in girls' track in the state of Connecticut: Student A, who competed for Bulkeley High School in the Hartford School District (School A1) in the spring of school year 2017-2018, and Bloomfield High School (School A2) during school year 2018-2019 to the present; and Student B attending Cromwell High School (School B). The CIAC's list of sanctioned sports includes boys' track. Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury each maintained boys' track teams.

In order to determine the impact of the Revised Transgender Participation Policy on Students 1, 2, and 3, OCR reviewed the participation of Students 1, 2, 3, A, and B in post-season conference/league championships, class championships, State Open Championships, and the New England Regional Championships. OCR reviewed information for school years 2017-2018 and 2018-2019.

Student 1

OCR determined that Student 1 was enrolled at School 1 as a 10th grade student during school year 2017-2018, and as an 11th grade student during school year 2018-2019. Student 1 was a student-athlete on School 1's girls' varsity indoor and outdoor track teams. Regionally, School 1 participated in the Central Connecticut Conference (CCC). Statewide, School 1 participated in Class LL for indoor and outdoor track.

The Complainant asserted that pursuant to the Revised Transgender Participation Policy, and the resulting participation of Students A and B, the CIAC denied Student 1 opportunities to advance to the finals in an event, to advance to higher levels of competition, and/or win titles at events such as the CIAC Outdoor State Open Championship, held on June 4, 2018; the CIAC Indoor State Open Championship, held on February 16, 2019; and the Indoor New England Regional Championship, held on June 8, 2019.

During an interview with OCR, Student 1 stated that she and other female student-athletes with whom she had spoken found it very difficult to go into a race knowing that no matter what they do, they would never be good enough to win. In a video provided by the Complainant, Student 1 asserted that by permitting transgender athletes to participate in girls' track competitions, she and other athletes had lost opportunities to compete at track meets, to win titles, and to gain attention from college coaches. She further stated that women have fought hard for many years to have opportunities and a voice in sports; and that it is upsetting to realize that no matter how hard she and other female student-athletes train, they will never be good enough to compete against transgender athletes. Student 1 also stated: "I respect these transgender athletes, and I understand that they are just following CIAC policy. But at the same time, it is demoralizing and frustrating for me and for other girls."

The Athletic Director for School 1 acknowledged that some parents had complained that their children did not place at certain meets, but she stated that she was unaware of whether any female students had lost out on competitive opportunities, awards, or wins. School 1's Athletic Director denied that any of the female student-athletes on the girls' indoor or outdoor track teams were denied participation opportunities as a result of having transgender athletes participate in track events. She stated that student-athletes were eligible to participate in all meets that the District participated in if they met the requirements. School 1's Assistant Athletic Director stated that she is aware of Student 1's complaint that she was deprived of an opportunity to advance to the New England Regional Championship due to the participation of transgender athletes.

Student 2

Student 2 was enrolled at School 2 as a 10th grade student during school year 2017-2018, and as an 11th grade student during school year 2018-2019. During school years 2017-2018 and 2018-2019, Student 2 was a student-athlete on School 2's varsity girls' indoor and outdoor track teams. Regionally, School 2 participated in the North Central Connecticut Conference (NCCC). Statewide, School 2 participated in Class S for indoor and outdoor track.

The Complainant asserted that, pursuant to the Revised Transgender Participation Policy and the resulting participation of Students A and B, the CIAC denied Student 2 opportunities to advance to higher levels of competition and/or win titles at events such as the 2017 Outdoor State Open Championship, held on June 6, 2017; the New England Regional Championship, held on June 10, 2017; the Class S Indoor Championship held on February 10, 2018; the Outdoor State Open Championship, held on June 4, 2018; the Class S Indoor Championship, held on February 7, 2019; the Indoor State Open Championship, held on February 16, 2019; the Class S Outdoor Championship, held on May 30, 2019; and the Outdoor State Open Championship, held on June 3, 2019.

During an interview with OCR, Student 2 stated that, in addition to the impact the participation of Students A and B had on her and other female student-athletes' ability to win titles and awards, their participation also has had an impact on her and other female student-athletes' ability to obtain recognition from media and college coaches. Student 2's mother (Parent 1) noted that some biologically female track student-athletes had lost out on media recognition because the winner of an event at the state championships gets the opportunity to be interviewed by reporters, while the second and third place finishers do not. Specifically, Parent 1 stated that at the state championships there is a bank of reporters waiting to interview the winners and the winners' names are put in the local papers, and that student-athletes typically do not receive any media recognition when they come in second. Further, Student 2 stated that the participation of Student A, in particular, had an impact on her ability to set class records for the CIAC Class S 100-meter and 200-meter races.

School 2's principal stated that no student-athletes were prohibited from participating; student-athletes went to every meet that the school participated in, and all student-athletes who qualified for state tournaments had the opportunity to compete. However, the principal acknowledged that, at the state level, some people might argue that a transgender athlete defeated a District student (i.e., Student 2); therefore, that student lost out on an award.

Student 3

OCR determined that Student 3 was enrolled at School 3 as a 9th grade student during school year 2018-2019. Regionally, School 3 participated in the Fairfield County Interscholastic Athletic Conference (FCIAC). Statewide, School 3 participated in Class LL for indoor and outdoor track. During school year 2018-2019, Student 3 was a student-athlete on School 3's girls' varsity outdoor track team.

The Complainant asserted that, pursuant to the Revised Transgender Participation Policy and the resulting participation of Students A and B, the CIAC denied Student 3 opportunities to advance to higher levels of competition and/or win titles at events, such as the Outdoor State Open Championship, held on June 3, 2019. During an interview with OCR, Student 3 stated that when competing against transgender athletes, it was frustrating for her to know that she would not be able to do as well as she otherwise could do. In a video the Complainant provided, Student 3 asserted that even before she gets to the track, she already knows that she is not going to win first or second place if she races against transgender athletes; and that no matter how hard she works, she will not be able to win the top spot.

Competition Against Students A and B

Descriptions of some of the girls' track indoor and outdoor post-season events in which Students 1, 2, and/or 3 participated with Students A and/or B during school years 2017-2018 and 2018-2019 are set forth below.

1. During school year 2017-2018, in the Indoor State Open Championships, Student B participated in the 55-meter dash. In the preliminary for the 55-meter dash, Student B placed 2nd and Student 2 placed 16th. The top 8 finishers advanced to the finals; however, even though Student 2 would not have advanced to the finals even absent Student B's participation, Student B's finish in the top 8 in the preliminary denied an opportunity for the 9th place finisher to advance to the finals. See chart summarizing the results:

2017-2018 Indoor State Open Championships Girls 55-Meter Dash Preliminaries (Top 7 Advance to Finals)					
Place	**Student**	**Time**	**School**	**Seed**	**Heat**
1	*	7.26q	*	7.31	1
2	**Student B**	7.30q	School B	7.31	1
3	*	7.34q	*	7.39	3
4	*	7.35q	*	7.28	2
5	*	7.40q	*	7.39	3
6	*	7.42q	*	7.48	3
7	*	7.43q	*	7.38	2
8	*	7.44	*	7.44	1
9T	*	7.53	*	7.47	3
9T	*	7.53	*	7.40	2

2017-2018 Indoor State Open Championships **Girls 55-Meter Dash Preliminaries (Top 7 Advance to Finals)**					
Place	**Student**	**Time**	**School**	**Seed**	**Heat**
…	…	…	…	…	
16	Student 2	7.78	School 2	7.46	2

2. During school year 2017-2018, in the Outdoor State Open Championships, Student A and Student B participated in the 100-meter dash. In the preliminary for the 100-meter dash, Student A placed 1st and Student B placed 4th. The top 8 finishers advanced to the finals, including Student 2 (who placed 2nd) and Student 1 (who placed 8th); however, Student A's and Student B's finishes in the top 8 in the preliminary denied an opportunity for two female student-athletes to advance to the finals. In the finals of the 100-meter dash, Student A placed 1st, Student B placed 2nd; Student 2 placed 4th; and Student 1 placed 6th. The top six finishers were awarded medals and advanced to the New England Regional Championships, including Student 1 and Student 2; however, Student A's and Student B's finishes in 1st and 2nd place, respectively, denied an opportunity for two female student-athletes to advance to the New England Regional Championships, along with the benefit of receiving a medal for the Outdoor State Open Championships.[35] Student A placed 1st at the preliminaries of the 100-meter dash at New England Regional Championships. The top 8 finishers advanced to the finals, including Student 2 (who placed 7th);[36] however, Student A's finish in the top 8 in the preliminary denied an opportunity for a female student-athlete to advance to the finals.[37] See charts summarizing the results below:

2017-2018 Outdoor State Open Championships **Girls 100-Meter Dash Preliminaries (Top 8 Advance to Finals)**					
Place	**Student**	**Time**	**School**	**Seed**	**Heat**
1	**Student A**	11.75q	School A1	11.77	3
2	Student 2	12.26q	School 2	12.61	2
3	*	12.38q	*	12.33	1
4	**Student B**	12.39q	School B	12.22	2
5	*	12.46q	*	12.57	3
6	*	12.52q	*	12.74	2
7	*	12.54q	*	12.34	1
8	Student 1	12.58q	School 1	12.91	3
9	*	12.63	*	12.73	3
10	*	12.64	*	12.68	2
…	…	…	…	…	…
25	*	13.17	*	12.98	

[35] Student A, Student B, and Student 2 also participated in the 200-meter dash, and finished 1st, 7th and 10th, respectively, in the final. Student A's 1st place finish denied an opportunity for one female student-athlete to advance to the New England Regional Championships in the 200-meter dash, along with the benefit of receiving a medal for the Outdoor State Open Championships.

[36] Student 1 placed 25th.

[37] In the finals of the 100-meter dash, Student A placed 1st, while Student 2 placed 7th.

2017-2018 Outdoor State Open Championships **Girls 100-Meter Dash Finals**				
Place	**Student**	**Time**	**School**	**Points**
1	**Student A**	11.72#	School A1	10
2	**Student B**	12.29	School B	8
3	*	12.36	*	6
4	Student 2	12.39	School 2	5
5	*	12.47	*	4
6	Student 1	12.67	School 1	3
7	*	12.71	*	2
8	*	12.80	*	1

2017-2018 Outdoor New England Regional Championships **Girls 100-Meter Dash Preliminaries (Top 8 Advance to Finals)**						
Place	**Student**	**Time**	**School**	**Heat**	**Tie-breaker**	**State**
1	**Student A**	12.46q	School A1	5		CT
2	*	12.59q	*	4		MA
3	*	12.64q	*	3		MA
4	*	12.65q	*	1		MA
5	*	12.81q	*	1	12.805	CT
6	*	12.81q	*	2	2.809	CT
7	Student 2	12.82q	School 2	2		CT
8	*	12.92q	*	5		RI
9	*	12.94	*	3		MA
10	*	12.95	*	5		MA
…	…	…	…	…	…	…
25	Student 1	13.5010	School 1	3	13.497	CT
33	*	13.84	*	1		RI

2017-2018 Outdoor New England Regional Championships **100-Meter Dash Finals**					
Place	**Student**	**Time**	**School**	**Tie breaker**	**State**
1	**Student A**	11.97	School A1		CT
2	*	12.26	*		MA
3	*	12.31	*		MA
4	*	12.50	*		MA
5	*	12.56	*	12.554	CT
6	*	12.56	*	12.559	CT
7	Student 2	12.58	School 2		CT
8	*	12.69	*		RI

3. During school year 2018-2019, in the Indoor Class S Statewide Championships, Student A and Student B participated in the 55-meter dash. In the preliminary for the 55-meter dash, Student A placed 1st and Student B placed 2nd. The top 7 finishers advanced to the finals, including Student 2 (who placed 3rd); however, Student A's and Student B's finishes in the top 7 in the preliminary denied an opportunity for two female student-athletes to advance to the finals. In the finals of the 55-meter dash, Student A placed 1st, Student 2 placed 2nd, and Student B placed 3rd. The top 14 finishers advanced to the State Open Championship. While all three student-athletes advanced to the State Open Championship, Student A's and Student B's participation denied an opportunity to two female student-athletes to participate in the State Open Championship for the 55-meter dash.[38] See charts summarizing results below:

2018-2019 Indoor Class S Statewide Championships **Girls 55-Meter Dash Preliminaries (Top 7 Advance to Finals)**				
Place	**Athlete**	**Time**	**High School**	**Heat**
1	**Student A**	7.16q	School A2	8
2	**Student B**	7.30q	School B	6
3	Student 2	7.38q	School 2	7
4	*	7.61q	*	1
5	*	7.63q	School A2	1
6	*	7.63q	*	5
7	*	7.68q	*	3
8	*	7.70	*	5
9	*	7.71	*	2
10	*	7.74	*	4
. . . .	. . . .	. . . .	. . . .	. . . .
48	*	8.37	*	3

2018-2019 Indoor Class S Statewide Championships **Girls 55-Meter Dash Finals**				
Place	**Athlete**	**Time**	**High School**	**Points**
1	**Student A**	7.03	School A2	10
2	Student 2	7.27	School 2	8
3	**Student B**	7.33	School B	6
4	*	7.48	*	4
5	*	7.51	School A2	2
6	*	7.53	*	1
7	*	7.54	*	-

4. During school year 2018-2019, in the Indoor State Open Championship, Student A and Student B participated in the 55-meter dash. In the preliminary for the 55-meter dash, Student A placed 1st and Student B placed 2nd. The top 7 finishers advanced to the

[38] Student A also placed 1st in the finals of the 300-meter dash, which denied an opportunity to one girl to participate in the State Open Championship for the 300-meter dash.

finals, including Student 2 (who placed 4th); however, Student A's and Student B's finishes in the top 7 in the preliminary would have denied an opportunity for two female student-athletes to advance to the finals, including Student 1 (who placed 8th). In the finals of the 55-meter dash, Student A placed 1st, Student B placed 2nd, and Student 2 placed 3rd. The top six finishers are awarded medals and advance to the New England Regional Championships; however, Student A's and Student B's finishes in 1st and 2nd place, respectively, denied an opportunity for two female student-athletes to advance to the New England Regional Championships, along with the benefit of receiving a medal for the Outdoor State Open Championships.[39] Further, since Student 2 placed 3rd, Student A's and Student B's participation denied an opportunity to Student 2 to place 1st in the 55-meter dash and receive the benefit of a 1st place medal. In the Indoor New England Regional Championship, in the preliminaries for the 55-meter dash, Student A placed 2nd, Student B placed 3rd, and Student 2 placed 8th. The top 8 finishers advanced to the finals. Although all three advanced to the finals, Student A's and Student B's 2nd and 3rd place finishes, respectively, denied an opportunity to two female student-athletes to advance to the finals. In the finals of the 55-meter dash, Student A placed 1st, Student B placed 3rd, and Student 2 placed 8th. See charts summarizing results below:

2018-2019 Indoor State Open Championships Girls 55-Meter Dash Preliminaries (Top 7 Advance to Finals)				
Place	**Athlete**	**Time**	**High School**	**Heat**
1	**Student A**	7.00q	School A2	3
2	**Student B**	7.07q	School B	3
3	*	7.24q	*	2
4	Student 2	7.27q	School 2	1
5	*	7.27q	*	1
6	*	7.29q	*	2
7	*	7.34q	*	3
8	Student 1	7.37	School 1	2
9	*	7.41	*	3
10	*	7.45	*	2
. . . .	. . . .	. . . .	. . . .	. . . .
16	*	7.85	School A2	2

2018-2019 Indoor State Open Championships Girls 55-Meter Dash Final				
Place	**Athlete**	**Time**	**High School**	**Points**
1	**Student A**	6.95	School A2	10
2	**Student B**	7.01	School B	8
3	Student 2	7.23	School 2	6

[39] Student A also placed 1st in the finals of the 300 meter dash in the Indoor State Open Championships, which denied an opportunity to a female student-athlete to advance to the New England Regional Championships, along with the benefit of receiving a medal for the Indoor State Open Championships.

2018-2019 Indoor State Open Championships **Girls 55-Meter Dash Final**				
Place	**Athlete**	**Time**	**High School**	**Points**
4	*	7.24	*	4
5	*	7.26	*	2
6	*	7.33	*	1
7	*	7.39	*	-

2018-2019 Indoor New England Regional Championships **Girls 55-Meter Dash Preliminaries (Top 8 Advance to Finals)**				
Place	**Athlete**	**Time**	**High School**	**Heat**
1	*	7.08q	* MA	2
2	**Student A**	7.09q	School A2- CT	4
3	**Student B**	7.24q	School B- CT	3
4	*	7.28q	*- MA	3
5	*	7.29q	*- MA	4
6	*	7.30q	* -CT	1
7	*	7.30q	*- MA	1
8	Student 2	7.30q	School 2 - CT	1
9	*	7.39	*- MA	1
10	*	7.40	* - RI	4
. . . .	. . . .	. . . .	. . . .	. . . .
30	*	7.92	* - VT	3

2018-2019 Indoor New England Regional Championships **Girls 55-Meter Dash Finals**			
Place	**Athlete**	**Time**	**High School**
1	**Student A**	6.94	School A2- CT
2	*	7.04	* - MA
3	**Student B**	7.17	School B- CT
4	*	7.23	* - MA
5	*	7.27	* - MA
6	*	7.27	* - CT
7	*	7.31	* - MA
8	Student 2	7.32	School 2 - CT

5. During school year 2018-2019, in the Outdoor Class S Statewide Championships, Student A participated in the 100-meter dash and the 200-meter dash; and Student B participated in the 100-meter dash. In the preliminary for the 100-meter dash, Student A placed 2nd and Student B placed 3rd. The top 8 finishers advanced to the finals, including Student 2 (who placed 1st); however, Student A's and Student B's finishes in the top 8 in the preliminary denied an opportunity for two female student-athletes to advance to the finals. In the finals of the 100-meter dash, Student A placed 1st, Student 2 placed 2nd, and Student B placed 3rd. While all three student-athletes advanced to the

State Open Championship, Student A's participation denied Student 2 the benefit of a 1st place finish in the Class S Statewide Championship for the 100-meter dash. Similarly, in the finals of the 200-meter dash, Student A placed 1st and Student 2 placed 2nd.[40] While both students advanced to the State Open Championship, Student A's participation denied Student 2 the benefit of a 1st place finish in the Class S Statewide Championship for the 200-meter dash. See charts summarizing results below:

2018-2019 Outdoor Class S Statewide Championships
Girls 100-Meter Dash Preliminaries (Top 8 Advance to Finals)

Place	Student	Time	School	Heat
1	Student 2	12.14	School 2	4
2	**Student A**	12.18	School A2	5
3	**Student B**	12.50	School B	3
4	*	12.73	*	1
5	*	13.05	*	1
6	*	13.08	*	2
7	*	13.16	School A2	4
8	*	13.22	*	5
9	*	13.27	*	3
10	*	13.30	*	4
…	…	…	…	…
35	*	14.28	*	5

2018-2019 Outdoor Class S Statewide Championships
Girls 100-Meter Dash Finals

Place	Student	Time	School	Points
1	**Student A**	11.93#	School A2	10
2	Student 2	12.02	School 2	8
3	**Student B**	12.28	School B	6
4	*	12.82	*	5
5	*	12.86	*	4
6	*	13.13	*	3
7	*	13.14	*	2
8	*	13.31	School A2	1

2018-2019 Class S Statewide Championships
Girls 200-Meter Dash Finals

Place	Student	Time	School	Heat	Points
1	**Student A**	24.47#	School A2	6	10
2	Student 2	24.79	School 2	6	8
3	*	25.92	School A2	6	6
4	*	26.17	*	6	5

[40] Student B scratched.

2018-2019 Class S Statewide Championships **Girls 200-Meter Dash Finals**					
Place	**Student**	**Time**	**School**	**Heat**	**Points**
5	*	26.30	*	3	4
6	*	26.41	*	6	3
7	*	26.76	School A2	6	2
8	*	26.85	*	3	1
9	*	26.93	*	5	
10	*	27.02	*	6	
…	…	…	…	…	…
32	*	28.95	*	2	
…	…	…	…	…	…
--	**Student B**	SCR	School B		

6. During school year 2018-2019, in the Outdoor State Open Championship, Student A and Student B participated in the 100-meter dash. In the preliminary for the 100-meter dash, Student A placed 1st and Student B placed 5th. The top 8 finishers advanced to the finals, including Student 2 (who placed 3rd) and Student 3 (who placed 4th)[41]; however, Student A's and Student B's finishes in the top 8 in the preliminary denied an opportunity for two female student-athletes to advance to the finals. In the finals of the 100-meter dash, Student 2 placed 1st, Student 3 placed 3rd, and Student B placed 4th.[42] The top 6 finishers were awarded medals and advanced to the New England Regional Championships; however, Student B's finish in 4th place denied an opportunity for a female student-athlete to advance to the New England Regional Championships, along with the benefit of receiving a medal for the Outdoor State Open Championships. Student A, Student 2 and Student 3 also participated in the 200-meter dash and finished 1st, 4th, and 3rd, respectively, in the final. Student A's 1st place finish denied an opportunity for one female student-athlete to advance to the New England Regional Championships, along with the benefit of receiving a medal for the Outdoor State Open Championships. Student A placed 1st in the finals of the 200-meter dash at the Outdoor New England Regional Championships; Student 3 placed 3rd and Student 2 placed 5th. See charts summarizing results below:

2018-2019 Outdoor State Open Championships **Girls 100-Meter Dash Preliminaries (Top 8 Advance to Finals)**					
Place	**Student**	**Time**	**School**	**Heat**	**Tie**
1	**Student A**	11.64q	School A2	3	
2	*	11.98q	*	1	
3	Student 2	12.07q	School 2	2	
4	Student 3	12.11q	School 3	3	
5	**Student B**	12.20q	School B	1	
6	*	12.44q	*	2	12.433

[41] Student 1 placed 14th.
[42] Student A had a false start and was disqualified.

2018-2019 Outdoor State Open Championships **Girls 100-Meter Dash Preliminaries (Top 8 Advance to Finals)**					
Place	**Student**	**Time**	**School**	**Heat**	**Tie**
7	*	12.44q	*	1	12.436
8	*	12.45q	*	3	
9	*	12.50	*	3	
10	*	12.56	*	1	
***					
14	Student 1	12.79	School 1	3	
***					
24	*	13.25	*	3	

2018-2019 Outdoor State Open Championships **Girls 100-Meter Dash Finals**					
Place	**Student**	**Time**	**School**	**Points**	**Tie**
1	Student 2	11.67	School 2	10	
2	*	11.92	*	8	
3	Student 3	12.04	School 3	6	
4	**Student B**	12.22	School B	5	
5	*	12.36	*	4	
6	*	12.38	*	3	12.375
7	*	12.38	*	2	12.378
--	**Student A**	FS	School A2		

2018-2019 Outdoor State Open Championships Girls 200 Meter Dash Finals					
Place	Student	Time	School	Heat	Points
1	**Student A**	24.33	School A2	3	10
2	*	24.75	*	3	8
3	Student 3	25.01	School 3	3	6
4	Student 2	25.24	School 2	3	5
5	*	25.38	*	3	4
6	*	25.55	*	3	3
7	*	25.63	*	2	2
8	*	25.79	*	2	1
9	*	26.28	*	2	
10	*	26.44	*	2	
…	…	…	…	…	…
--	Student 1	DNS	School 1	2	

Team School Championships Involving Students A and B

OCR reviewed the race results for the 2018-2019 Indoor State Open Championship and confirmed the following order of finish of schools for the state championship:

- School A2 – 54 points
- School 1 – 39 points
- School 3 – 34 points
- Hillhouse – 34 points
- Norwich Free Academy – 21 points

OCR further confirmed that School A2 earned 10 points for each of Student A's 1st place finishes. OCR determined that other School A2 student-athletes at the meet earned the team the following points:

- 2nd place in the 300-meter dash, earning School A2 8 points,
- 1st place in the 600-meter run, earning School A2 10 points;
- 5th place in the 4 x 200 relay, earning School A2 2 points; and
- 3rd place in the shot put, earning School A2 6 points

OCR also reviewed the results for the 2018-2019 Outdoor State Open Championships, held on June 3, 2019. OCR determined that School A2 placed 3rd (38 points) in the team championship, a full 20 points behind School 2, which placed first (58 points) and Windsor, which placed 2nd (43 points). The top 5 finishers were as follows:

- School 3 – 58 points
- Windsor – 43 points
- School A2 – 38 points
- Norwich Free Academy – 32 points
- Immaculate – 30 points

Student A participated in the 100-meter dash, the 200-meter dash, and the 4 x 400 relay in the 2018-2019 Indoor State Open Championship, and earned 10 points for School A2 for Student A's first place finish in the 200-meter dash; and was also on School A2's 4 x 400 relay team, which placed 1st and also earned 10 points for School A2.

School Districts Investigated by OCR

Glastonbury:

Glastonbury advised OCR that as a CIAC member school, it must comply with all of the CIAC's by-laws, policies, rules, and regulations, including the Revised Transgender Participation Policy. Glastonbury reported that it does not currently have any transgender students of which it is aware participating in its athletics program. Glastonbury stated that it must allow students to participate on the athletics team consistent with their gender identity because of state law and the Revised Transgender Participation Policy. Glastonbury stated that it has not challenged the CIAC's Revised Transgender Participation Policy because it is consistent with the requirements of state law, with which Glastonbury already must comply.

Glastonbury's Athletic Director stated that no female athletes were denied participation on any of their athletic teams as a result of having transgender athletes participate, and that student-athletes were eligible to participate in all meets that the District participated in if they met the requirements (i.e., qualifying marks, selection for relay team which is a determination made at the coaching level). The Athletic Director stated that the complaint filed with OCR addresses what is perceived as an inability to win.

Glastonbury's Principal stated that some district parents complained that a female student was affected by having a transgender student from another team participate in track events. The principal advised OCR that she never verified the times or records brought to her attention, nor did she make a determination regarding the allegations.

In emails dated May 2-10, 2018, Parent 2 requested guidance from the Athletic Director regarding the participation of Student A in girls' track events and whether it was consistent with the CIAC's Revised Transgender Participation Policy. The Athletic Director stated that she had spoken with someone at the CIAC who indicated that Student A would have had to declare her gender identity prior to the start of the school year in August. Parent 2 stated that she informed the CIAC that Student A participated as a male during the indoor season and then as a female during the outdoor season in 2017-2018; and stated that the CIAC advised her that it would be following up with School A1. On May 10, 2018, the Athletic Director advised Parent 2 that she was following up and had placed a call to the CIAC. In an email dated May 11, 2018, the Athletic Director responded to Parent 2, advising her that based on her reading of the CIAC rule, as well as confirmation she received from the CIAC, Student A's participation was in compliance with the Revised Transgender Participation Policy. She noted that if Parent 2 had been told Student A had to declare prior to the start of the school year, that was misinformation, as that requirement is nowhere in the language of the policy. The Athletic Director advised Parent 2 that she also shared this information with the track coach.

On May 23, 2018, Parent 2 advised the Athletic Director via email that she had been discussing transgender eligibility with her legislative office and wanted to make the Athletic Director aware. In an email dated May 29, 2018, Parent 2 asked the Athletic Director if students declaring a gender identity are required to produce any supporting documentation, or if there is a waiting period. In an email dated June 6, 2018, Parent 2 advised the Athletic Director that she intended to request a meeting with the CIAC regarding the transgender policy; the Athletic Director acknowledged the email and stated that there had been articles and some troubling behavior around the issue, and advised that a letter to the CIAC was probably the best route for the parent to take.

In an email dated July 2, 2018, to the Athletic Director, Parent 2 stated that the CIAC had refused to entertain any policy changes in response to her correspondence with them; it was her understanding that member schools set policy; and she wanted to meet with the Athletic Director to share her research. The Athletic Director responded attempting to schedule a time to meet. Thereafter, in an email dated July 18, 2018, Parent 2 forwarded to the Athletic Director copies of responses she had received from the CIAC Executive Director. In the email, she stated that, although the CIAC stated that the state legislature needed to make a change, her state representatives informed her that athletics policies fall under the CIAC's jurisdiction.

In an email dated January 27, 2019, to School 1 administrators, Parent 3 alleged that Student A, whom Parent 3 identified as a boy who identifies as a girl, was participating in track and creating an unfair and unsafe environment in girls track. He provided, as an example, that during the 4 x 400 relay event on January 26, 2019, in the second leg, Student A "had physicality" with a runner from Windsor, resulting in a significant lead for Bloomfield. The student-athlete running the last leg of the relay for Windsor was unable to close the gap that Student A had created. He also provided an example that at the Yale Invitational held on January 12, 2019, a student-athlete came in second to Student A, despite having run a faster time than 182 other girls in the 300-meter sprint. He asked that the unsafe and unfair situation be addressed now before it affected other sports.

In response, on January 29, 2019, the District's school board chair emailed Parent 3 and thanked him for sharing his experiences and concerns, but noted that the CIAC handbook indicated that it would be contrary to state and federal law to preclude transgender students from participating. She stated that, accordingly, she did not believe that exclusion was an option, but advised that this was just her opinion.

In an email dated February 17, 2019, to School 1 administrators and the CIAC Executive Director, among others, Parent 3 asserted that the Revised Transgender Participation Policy directly affected the outcome of School 1's winning the 2018-2019 Indoor State Open Championship held on February 16, 2019. Specifically, Parent 3 stated that School A2 earned the highest number of points due to the participation of Student A, who earned 20 points for the team by herself. Parent 3 alleged that, but for Student A's participation, School 1 would have won the state title. Specifically, Parent 3 asserted that School A2 was only able to win because Student A placed first in two separate events, earning School A2's team 20 of its total 54 points. Parent 3 also noted that Student A participated on the 4 x 400 relay, which earned the school 8 points for second place. Parent 3 acknowledged in his email that it was possible that School A2 still would have placed 2nd in the 4 x 400 relay, even if another athlete had run in Student A's place.[43]

In an email dated February 25, 2019, to School 1 administrators and the CIAC Executive Director, among others, Parent 4 questioned the inclusion of transgender athletes' competitive times in results, which he argued affected all of the other athletes competing. Parent 4 further stated that recognizing the transgender athletes' results insulted the "current cisgender record holder who has worked hard and competed fairly." Parent 4 also asserted that the potential to compete for a college scholarship was at stake because the participation of transgender athletes resulted in other athletes not being able to compete at the New England Regionals, expand their résumés, and gain additional exposure to college recruiters and coaches. Parent 4 alleged that the CIAC was violating its own rules by allowing transgender athletes to compete; and asked that the results of the State Open Championship be recalculated, and points redistributed, and that the Revised Transgender Participation Policy be changed for the outdoor 2019 season. Parent 4 also suggested potential solutions to continue to allow transgender athletes to compete but change the competitive categories or "which scores count."

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[43] Parent 3 further asked that the CIAC adopt the NCAA and IOC policy, whereby a transgender athlete must undergo hormone treatment for one year before being able to compete; allow transgender athletes to run in events as exhibition participants where their results do not count; or "another fair and safe solution."

In an email dated March 3, 2019, to School 1 administrators and the CIAC Executive Director, among others, Parent 3 followed up on his original request that the Revised Transgender Participation Policy be revised. Parent 3 alleged that the policy prevented deserving girls from qualifying for the New England Regionals. For example, Parent 3 stated that at the New England Regionals on March 2, 2019, a Bloomfield transgender athlete (Student A) placed first in the 55-meter and 300-meter dash events. He also stated that by participating in the 4 x 400-meter relay event, Student A provided Bloomfield with a .06 second lead over Glastonbury in the final results.

In an email dated March 5, 2019, to School 1 administrators and the CIAC Executive Director, among others, Parent 4 stated that no other states at the New England Regionals had transgender student-athletes participating, and many people "expressed surprise and concern that their cisgender girls were forced to compete against transgender girls." In another email dated March 5, 2019, to School 1 administrators, Parent 4 requested a meeting to review the current policy regarding transgender athletes and its impact on competitive fairness; and alleged that "cisgender girls are being deprived of fair and equal opportunity."

In an email dated March 7, 2019, to the District Superintendent, a parent (Parent 5) stated her opinion that the CIAC should adopt NCAA standards regarding transgender participation. In an email dated March 10, 2019, to School 1 administrators and the CIAC Executive Director, Parent 3 advised that the National Scholastic Athletic Foundation (NSAF), which hosts the national championships, had released statements regarding its transgender policy, which required athletes to take gender affirming hormones. Parent 3 then stated that at the New England Regionals on March 2, 2019, Bloomfield beat Glastonbury in the 4 x 400 relay with Student A participating on Bloomfield's team. He then noted that at the New Balance National championships held over March 8-10, 2019, Glastonbury's 4 x 400 relay team came in 14th in the nation, while Bloomfield's came in 34th, running without Student A.

On March 15, 2019, Parent 2 and the Parent 4 met with the Athletic Director and the Principal. The Principal stated that Parent 2 wanted School 1 to put forth a request for the CIAC to change its policy, and she communicated to them that the school was comfortable with the CIAC's following the state law and was not willing to ask the CIAC to change their policy. The Athletic Director did not recall that Parent 2 and Parent 4 raised any specific concerns about the policy, other than that the policy set up an uneven playing field. The Athletic Director stated that it was difficult to keep Parent 2 focused on what was Parent 2's real issue, as Parent 2 had started talking about separate math classes. The Athletic Director stated that she did not leave the meeting with any clear understanding of what Parent 2 was saying. She noted that Parent 2 and Parent 4 also wanted to show them photos of other non-district students, which they refused to discuss due to Family and Educational Rights and Privacy Act of 1974 (FERPA). In an email dated March 18, 2019, following their meeting, Parent 2 summarized her continued concerns that the transgender policy may violate Title IX; included information from her state legislative office that there is no law to be changed and that any changes would be the responsibility of the CIAC and member schools; and provided examples of contradictions within the CIAC policies, relative to co-ed teams.

On March 18, 2019, Parent 3 requested a meeting with administrators at School 1 to discuss the transgender policy. In an email dated March 25, 2019, to School 1 administrators, Parent 3 stated

that he learned that the CIAC had sent out a survey to member schools regarding the transgender policy. He included links to resources in his email and urged School 1 not to just "rubber stamp" the policy. In response to his request, on April 2, 2019, the principal and School 1's Athletic Director met with Parent 3. Both the principal and Athletic Director described the meeting as lasting thirty minutes, per Parent 3's request. The Athletic Director stated that, during the meeting, Parent 3 discussed biological differences and the challenges female athletes face, and what could happen when transgender athletes participate in other sports. The principal stated that Parent 3 was focused on the safety of his child with allowing a transgender student to participate in track. The principal stated that she communicated to Parent 3 that the district was not looking at asking the CIAC to change the transgender policy. On April 2, 2019, Parent 3 emailed the principal and Athletic Director thanking them for meeting with him; he emphasized two points relative to the fairness of the policy and the implications if an elite transgender athlete were ever to participate. He also included resources related to Oregon's policy, as well an NSAF's press release regarding transgender participation.

In an email dated April 12, 2019, to the District Director of Health and Physical Education, K-12 (the Director), Parent 2 acknowledged their recent conversation regarding Title IX; asked the Director for clarification regarding why the principal, as a voting CIAC member, could set different athletic expectations for girls and boys teams and questioned why that did not violate Title IX. Parent 2 also questioned why the CIAC had separate competitions for boys and girls if the CIAC's purpose was just participation, and whether the concept of gender fluidity would satisfy Title IX when there was no distinction between the sexes.

Canton:

Canton advised OCR that it was required to comply with the CIAC's Revised Transgender Participation Policy because the CIAC is the governing body for interscholastic athletics. Canton also noted that the Revised Transgender Participation Policy follows state law. Canton reported that it does not currently have any transgender students of which it is aware participating in its athletics program, nor has it challenged the CIAC's Revised Transgender Participation Policy.

Danbury:

Danbury stated that it was required to follow the Revised Transgender Participation Policy because the CIAC is the governing body of athletics for the state and it is required to follow all of the CIAC rules, regulations, and policies. Danbury reported that it does not currently have any transgender students of which it is aware participating in its athletics program. Danbury stated that it has not expressed concerns about the policy to the CIAC.

Hartford (School A1):

Student A was a 10th grade student who participated on School A1's athletics program during school year 2017-2018.[44] During the indoor track season of school year 2017-2018, Student A

[44] During school year 2017-2018, Student A attended another school in Hartford that does not have a sports program; as a result, Student A participated in athletics through School A1's program.

was a student-athlete on School A1's boys' indoor track team. During the outdoor track season of school year 2017-2018, Student A was a student-athlete on School A1's girls' outdoor track team. School A1 staff stated that as a CIAC member, School A1 is required to follow the CIAC policy and is also required to follow state law.

Bloomfield:

Student A was enrolled in School A2 in Bloomfield as an 11th grade student during school year 2018-2019. Bloomfield stated that as a member of the CIAC, it is required to follow the CIAC rules regarding participation, eligibility, and other matters, including the Revised Transgender Participation Policy.[45] Bloomfield denied that Student A's participation has had a negative impact on other female students in the district, as Bloomfield does not cut any students from the girls' indoor or outdoor track teams; therefore, anyone who wishes to participate can. Bloomfield staff opined that while a student may have lost to a transgender student, overall, everyone's performance has benefited from the participation of Student A; and that participation in athletics is not about winning.

Cromwell:

Student B was enrolled in School B in Cromwell as a 10th grade student during school year 2017-2018, and as an 11th grade student during school year 2018-2019. During school years 2017-2018 and 2018-2019, Student B was a student-athlete on School B's varsity girls' indoor and outdoor track teams.

Cromwell stated that it has one transgender student (Student B) participating in its interscholastic athletics program, and noted that Student B's records since her enrollment at School B in school year 2016-2017 have indicated that she was female; accordingly, Student B was placed on female rosters. Cromwell staff stated that they are required to follow the Revised Transgender Participation Policy as it is set by the CIAC, which is their governing body. Cromwell staff stated that none of their district students have been affected negatively by Student B's participation.

Legal Standards

Subpart D of the regulation implementing Title IX prohibits discrimination on the basis of sex in education programs and activities. 34 C.F.R. § 106.31(b)(7) of Subpart D states that in providing any aid, benefit, or service to a student, a recipient shall not, on the basis of sex, limit any person in the enjoyment of any right, privilege, advantage, or opportunity. 34 C.F.R. § 106.41 of Subpart D specifically applies to athletics. The regulation implementing Title IX, at 34 C.F.R. § 106.41(a), states that no person shall, on the basis of sex, be excluded from participation in, be denied the benefits of, be treated differently from another person, or otherwise be discriminated against, in

[45] Bloomfield denied that it has received any requests from students to participate in its interscholastic athletics program pursuant to the Revised Transgender Participation Policy. Bloomfield stated that it currently has a transgender student participating on its girls track team (Student A), but noted that the student registered and enrolled at School A2 as a female, i.e., the student's school records indicated that she was female; therefore, Bloomfield was not required to make any determinations pursuant to the policy.

any interscholastic athletics offered by a recipient, and no recipient shall provide any such athletics separately on such basis. The regulation implementing Title IX, at 34 C.F.R. § 106.41(b), states that, notwithstanding the requirements of 34 C.F.R. § 106.41(a), a recipient may operate or sponsor separate teams for members of each sex where selection for such teams is based upon competitive skill or the activity involved is a contact sport.[46] The regulation implementing Title IX, at 34 C.F.R. § 106.6(c), states that the obligation to comply with the regulation is not obviated or alleviated by any rule or regulation of any athletic or other league, which would render any student ineligible to participate or limit the eligibility or participation of any student, on the basis of sex, in any education program or activity operated by a recipient.[47]

The Supreme Court's holding in *Bostock v. Clayton Cnty., Georgia*, 140 S. Ct. 1731 (2020), does not alter the relevant legal standard under 34 C.F.R. § 106.41, or how that provision interacts with 34 C.F.R. § 106.31 or 34 C.F.R. § 106.6. In *Bostock*, the U.S. Supreme Court held that an employer violated Title VII of the Civil Rights Act of 1964 by terminating a transgender employee on the basis of their transgender status. *See Bostock*, 140 S. Ct. at 1743 ("For an employer to discriminate against employees for being homosexual or transgender, the employer must intentionally discriminate against individual men and women in part because of sex."). However, the Court expressly declined to decide questions about how its interpretation of Title VII would affect other statutes:

> The employers worry that our decision will sweep beyond Title VII to other federal or state laws that prohibit sex discrimination. And, under Title VII itself, they say sex-segregated bathrooms, locker rooms, and dress codes will prove unsustainable after our decision today. But none of these other laws are before us; we have not had the benefit of adversarial testing about the meaning of their terms, and we do not prejudge any such question today.

Id. at 1753. Indeed, the Court clearly stated that the "only question before [it] is whether an employer who fires someone simply for being homosexual or transgender has discharged or otherwise discriminated against that individual 'because of such individual's sex.'" *Id.*

The Court's holding was consistent with the position of the transgender employee who filed suit in a companion case to *Bostock—R.G. & G.R. Harris Funeral Homes, Inc. v. EEOC*, 140 S. Ct. 1731 (2020). During oral argument before the U.S. Supreme Court, the employee's counsel conceded that the outcome of the case was not relevant, one way or another, to the question of whether a recipient's willingness to allow a biological male who identified as a transgender female to compete against biological females constituted a violation under Title IX:

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[46] Where a recipient operates or sponsors a team in a particular sport for members of one sex but operates or sponsors no such team for members of the other sex, and athletic opportunities for members of that sex have previously been limited, members of the excluded sex must be allowed to try out for the team offered unless the sport involved is a contact sport. 34 C.F.R. § 106.41(b).

[47] OCR understands that the CIAC and the individual school districts maintain that the Revised Transgender Participation Policy is consistent with, and required by, Connecticut state law. OCR takes no view on the requirements of Connecticut law except to note that the duty to comply with Title IX and its implementing regulation is independent of any such requirements.

> JUSTICE GINSBURG: [T]his is a question of someone who has transitioned from male to female … and wants to play on the female team. She is not questioning separate female/male teams. But she was born a man. *She has transitioned. She wants to play on the female team. Does it violate Title IX which prohibits gender-based discrimination*?
>
> MR. COLE: Right. And I think *the question again would not be affected even by the way that the Court decides this case*, because the question would be, is it permissible to have sex-segregated teams, yes, where they involve competitive skill or – or contact sports, and then the question would be, how do you apply that permissible sex segregation to a transgender individual?

Oral Arg. Tr., *R.G. & G.R. Harris Funeral Homes, Inc. v. EEOC*, No. 18-107, at 17-18, *available at* https://www.supremecourt.gov/oral_arguments/argument_transcripts/2019/18-107_c18e.pdf. (emphasis added). After reviewing *Bostock*, the Office for Civil Rights concurs with counsel for the employee's concession in *R.G. & G.R. Harris Funeral Homes, Inc. v. EEOC*, that the *Bostock* holding does not alter the legal authority for sex-segregated teams under Title IX. Even if *Bostock* applied to Title IX—a question the Supreme Court expressly declined to address—its reasoning would only confirm that Title IX does not permit a biologically male student to compete against females on a sex-segregated team or in a sex-segregated league.

As an initial matter, despite some similarities, Title IX differs from Title VII in important respects. Title IX has different operative text, is subject to different statutory exceptions, and is rooted in a different Congressional power. *See Gebser v. Lago Vista Indep. Sch. Dist.*, 524 U.S. 274, 275, 286-87 (1998). Significantly, unlike Title VII, one of Title IX's crucial purposes is protecting women's and girls' athletic opportunities. Indeed, Title IX was passed, and implemented by regulations, to prohibit discrimination on the basis of sex in education programs and activities and to protect equal athletic opportunity for students who are biological females, including providing for sex-segregated athletics. Congress specifically mandated that the Department of Education consider promulgating regulations to address sports. After first enacting Title IX, Congress subsequently passed another statute, entitled the Javits Amendment, which instructed the Secretary of Education to publish regulations "implementing the provisions of Title IX . . . which shall include with respect to intercollegiate activities reasonable provisions considering the nature of the particular sports." Public Law 93–380 (HR 69), Section 844, 88 Stat 484 (August 21, 1974). Congress indicated in the same bill that following the publication of those regulations, Congress itself would review the regulations and determine whether they were "inconsistent with the Act from which [they] derive[] [their] authority." *Id*.

Pursuant to the Javits Amendment, the Secretary of Health, Education, and Welfare subsequently published Title IX regulations, including regulatory text identical to the current text of the athletics regulations. After Congressional review over six days of hearings, Congress ultimately allowed the regulations to go into effect, consistent with its prior statement that Congress itself would review the regulations to ensure consistency with Title IX. *See McCormick ex rel. McCormick v. Sch. Dist. of Mamaroneck*, 370 F.3d 275, 287 (2d Cir. 2004) (laying out the history of the Javits Amendment, and the response from Congress to the regulations promulgated thereunder). In doing so, Congress deemed the Department's athletics regulations to be consistent with Title IX.

The Department's regulations validly clarify the scope of a recipient's non-discrimination duties under Title IX in the case of sex-specific athletic teams. *See Cohen v. Brown Univ.*, 991 F.2d 888, 895 (1st Cir. 1993) ("The degree of deference [to the Department of Education] is particularly high in Title IX cases because Congress explicitly delegated to the agency the task of prescribing standards for athletic programs under Title IX."). Specifically, although the Department's regulations have long generally prohibited schools from "provid[ing] any athletics separately" on the basis of sex, they permit schools to "operate or sponsor separate teams for members of each sex where selection for such teams is based upon competitive skill or the activity involved is a contact sport." 34 C.F.R. § 106.41(a), (b). In those circumstances, men and women are not similarly situated because of their physiological differences, and separating them based on sex is accordingly not prohibited by Title IX. *See Bostock*, 140 S. Ct. at 1740 ("To 'discriminate against' a person, then, would seem to mean treating that individual worse than others who are similarly situated."). Thus, schools may offer separate-sex teams. Indeed, such separate-sex teams have long ensured that female student athletes are afforded an equal opportunity to participate. 34 C.F.R. § 106.41(c)(1). Those regulations authorize single-sex teams because physiological differences are relevant.

Even assuming that the Court's reasoning in *Bostock* applies to Title IX—a question the Court expressly did not decide—the Court's opinion in *Bostock* would not affect the Department's position that its regulations authorize single-sex teams under the terms of 34 C.F.R. § 106.41(b). The *Bostock* decision states, "An individual's homosexuality or transgender status is not relevant to employment decisions" because an employee's sex is not relevant to employment decisions, and "[se]x plays a necessary and undisguisable role in the decision" to fire an employee because of the employee's homosexual or transgender status. *Bostock*, 140 S. Ct. at 1741, 1737. Conversely, however, there are circumstances in which a person's sex *is* relevant, and distinctions based on the two sexes in such circumstances are permissible because the sexes are not similarly situated. Congress recognized as much in Title IX itself when it provided that nothing in the statute should be construed to prohibit "separate living facilities for the different sexes." *See, e.g.*, 20 U.S.C. §1686; *see also* 34 C.F.R. § 106.32(b) (permitting schools to provide "separate housing on the basis of sex" as long as housing is "[p]roportionate" and "comparable"); 34 C.F.R. § 106.33 (permitting "separate toilet, locker room, and shower facilities on the basis of sex," so long as the facilities "provided for students of one sex shall be comparable to such facilities provided for students of the other sex").

The Court's opinion in *Bostock* also does not affect the Department's position that its regulations authorize single-sex teams based only on biological sex at birth—male or female—as opposed to a person's gender identity. The Court states that its ruling is based on the "assumption" that sex is defined by reference to biological sex, and its ruling in fact rests on that assumption. *See Bostock*, 140 S. Ct. at 1741 ("[T]ake an employer who fires a transgender person who was identified as a male at birth but who now identifies as a female. If the employer retains an otherwise identical employee who was identified as female at birth, the employer intentionally penalizes a person identified as male at birth for traits or actions that it tolerates in an employee identified as female at birth."). The logic that an employer must treat males and females as similarly situated comparators for Title VII purposes necessarily relies on the premise that there are two sexes, and that the biological sex of the individual employee is necessary to determine whether discrimination because of sex occurred. Where separating students based on sex is

permissible—for example, with respect to sex-specific sports teams—such separation must be based on biological sex.

Additionally, if *Bostock*'s reasoning under Title VII were applied to policies regarding single-sex sports teams under Title IX, it would confirm that the Department's regulations authorize single-sex teams only based on biological sex. In *Bostock*, the Court took the position that "homosexuality and transgender status are inextricably bound up with sex," such that "when an employer fires an employee for being homosexual or transgender, it necessarily and intentionally discriminates against that individual in part because of sex." *See id.* at 1742, 1744. Under that logic, special exceptions from single-sex sports teams based on homosexuality or transgender status would themselves generally constitute unlawful sex discrimination, because homosexuality and transgender status are not physiological differences relevant to the separation of sports teams based on sex. In other words, if *Bostock* applies, it would require that a male student-athlete who identifies as female not be treated better or worse than other male student-athletes. If the school offers separate-sex teams, the male student-athlete who identifies as female must play on the male team, just like any other male student-athlete. For all of these reasons, the Department continues to interpret 34 C.F.R. § 106.41(b), regarding operation of athletic teams "for members of *each sex*" (emphasis added), to mean operation of teams for biological males, and for biological females, and does not interpret Title IX to authorize separate teams based on each person's transgender status, or for members of each gender identity. When a recipient provides "separate teams for members of each sex" under 34 C.F.R. § 106.41(b), the recipient must separate those teams on the basis of biological sex, and not on the basis of homosexual or transgender status.

The holding in *Bostock* addressed the context of an employment situation in which a distinction based on sex was prohibited and not permitted under Title VII. The *Bostock* holding does not alter the legal authority for single-sex athletic teams under Title IX because Title IX and its implementing regulations permit certain distinctions based on sex under 34 C.F.R. 106.41(b). The Office for Civil Rights therefore issues this Revised Letter of Impending Enforcement Action to clarify that it will continue to proceed with bringing the recipients in this matter into compliance with Title IX.

Analysis and Conclusions

The Complainant alleged that the CIAC's Revised Transgender Participation Policy discriminated against female student-athletes competing in interscholastic girls' track in the state of Connecticut on the basis of their sex. Specifically, the Complainant alleged that as a result of the CIAC's Revised Transgender Participation Policy, Students A and B were permitted to compete in girls' track athletic competitions, which resulted in female student-athletes being denied the benefits of an education program or activity and the opportunities to participate in higher level and/or post-season competitions.

The CIAC:

OCR determined that the CIAC, by purporting to provide sex-segregated teams under 34 C.F.R. § 106.41(b) yet permitting the participation of biologically male students in girls' interscholastic track in the state of Connecticut, pursuant to the Revised Transgender Participation Policy, denied

female student-athletes benefits and opportunities, including to advance to the finals in events; to advance to higher level competitions, such as the State Open Championship or the New England Regional Championship; to win individual and team state championships, along with the benefit of receiving medals for these events; to place higher in any of the above events; to receive awards and other recognition; and possibly to obtain greater visibility to colleges and other benefits. For these same reasons, OCR also determined that the CIAC treated students differently based on sex, by denying opportunities and benefits to female student-athletes that were available to male student-athletes, including the opportunity to compete on and against teams comprised of members of one sex. Indeed, CIAC also treated male student-athletes whose gender identity does not align with their sex more favorably than other male student-athletes, by affording them the opportunity to compete on and against teams comprised of members of the opposite sex.

With respect to the three student-athletes on whose behalf the complaint was filed (Student 1, Student 2, and Student 3), Student A's and Student B's 1st and 2nd place finishes, respectively, in the preliminaries of the 2018-2019 Indoor State Open Championship for the 55-meter dash, denied Student 1, who placed 8th, the opportunity of advancing to the finals in this event, since only the top 7 finishers advanced to the finals. Student A's and Student B's participation in girls' interscholastic track in the state of Connecticut, pursuant to the Revised Transgender Participation Policy had the most significant impact on Student 2. Specifically, Student A's 1st place finish, in the finals of the 2018-2019 Outdoor Class S Statewide Championship for the 100-meter dash and the 200-meter dash, denied Student 2, who placed 2nd in both events, the benefit of a 1st place finish; and Student A's and Student B's 1st and 2nd place finishes, in the 2018-2019 Indoor State Open Championship for the 55-meter dash, denied an opportunity for Student 2, who placed 3rd, to place 1st in the event and receive the benefit of a 1st place medal. Denying a female student a chance to win a championship due to the lack of opportunity to compete on and against teams comprised solely of members of one sex, is inconsistent with Title IX's mandate of equal opportunity for both sexes.[48] Accordingly, OCR determined that the CIAC denied athletic benefits and opportunities to female student-athletes competing in interscholastic girls' track in the state of Connecticut through the Revised Transgender Participation Policy, in violation of the regulation implementing Title IX, at 34 C.F.R. § 106.41(a). OCR also has concerns that additional violations may have resulted from the Policy and from Student A's and B's participation in girls' track, including but not limited to losses or lowered placement in regular season meets; losses or lowered placement in conference championships; and an inability for some female student-athletes to participate generally in a race at any level (not just championship level).

With respect to the Team Championships for the 2018-2019 Indoor State Open Championship, absent Student A's participation, School A2 earned 26 points in 4 different events. Adding the 8 points for the 4 x 200 relay, in which School A2 may have placed and earned points even without Student A, School A2 would have earned 34 points, behind School 1, which had 39 points. Subtracting the 8 relay points would have also placed School A behind School 3. Thus, Student A's participation may have denied School 1 and its female student-athletes the benefit of a team

[48] See *McCormick v. School District of Mamaroneck*, 370 F.3d 275, 294-95 (2d Cir. 2004) ("A primary purpose of competitive athletics is to strive to be the best. . . . Treating girls differently regarding a matter so fundamental to the experience of sports—the chance to be champions—is inconsistent with Title IX's mandate of equal opportunity for both sexes.").

championship, and may have denied School 3, and other schools, the benefit of a higher placement.[49]

Glastonbury:

OCR determined that the participation of Glastonbury in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student 1, and other female student-athletes competing against Students A and B, denied athletic benefits and opportunities to Student 1 and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. § 106.41(a). Further, Glastonbury is not providing separate teams for each sex as permitted under 34 C.F.R. § 106.41(b). Glastonbury placed female student-athletes in athletic events against male student-athletes, resulting in competitive disadvantages for female student-athletes. The athletic events in which the female student-athletes competed were coeducational; female student athletes were denied the opportunity to compete in events that were exclusively female, whereas male students were able to compete in events that were exclusively male. Accordingly, the districts' participation in the athletic events sponsored by the CIAC denied female student-athletes athletic opportunities that were provided to male student-athletes. Glastonbury's obligation to comply with the regulation implementing Title IX is not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R § 106.6(c).

The participation of Glastonbury in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student 1, and other female student-athletes competing against Students A and B, denied Student 1 the opportunity to place higher in events, such as the 100-meter dash at the 2017-2018 Outdoor State Championship and New England Regional Championship; the 55-meter dash at the 2018-2019 Indoor CCC Regional Championship; and the 200-meter dash at the 2018-2019 Outdoor State Championship. Student A's and Student B's 1st and 2nd place finishes, respectively, in the preliminaries of the 2018-2019 Indoor State Open Championship for the 55-meter dash, denied Student 1, who placed 8th, the opportunity of advancing to the final in this event, since only the top 7 finishers advanced to the finals.

Canton:

OCR determined that the participation of Canton in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student 2, and other female student-athletes, competing against Students A and B, denied athletic benefits and opportunities to Student 2, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. Section 106.41(a). Further, Canton is not providing separate teams for each sex as permitted under 34 C.F.R. § 106.41(b). Canton placed female student-athletes in athletic events against male student-athletes, resulting in competitive disadvantages for female student-athletes. The athletic events in which the female student-athletes competed were

[49] With respect to the 2018-2019 Outdoor State Open Championships, held on June 3, 2019. The top five finishers were as follows: School 3: 58 points; Windsor: 43 points; School A2: 38 points; Norwich Free Academy: 32 points; Immaculate: 30 points. Student A's participation earned school A2 an additional 10 to 20 points and a third-place finish when School A2 might otherwise have finished no better than 5th.

coeducational; female student athletes were denied the opportunity to compete in events that were exclusively female, whereas male students were able to compete in events that were exclusively male. Accordingly, the districts' participation in the athletic events sponsored by the CIAC denied female student-athletes athletic opportunities that were provided to male student-athletes. Canton's obligation to comply with the regulation implementing Title IX is not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R § 106.6(c).

The participation of Canton in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student 2, and other female student-athletes competing against Students A and B, denied Student 2 the opportunity to place higher in events, such as the Class S Outdoor Championships; the Indoor and Outdoor State Open Championships; and the New England Regional Championships. Specifically, Student A's and Student B's 1st and 2nd place finishes respectively, in the 2018-2019 Indoor State Open Championship for the 55-meter dash, denied an opportunity for Student 2, who placed 3rd, to place 1st in the event and receive the benefit of a 1st place medal. Student A's 1st place finish, in the finals of the 2018-2019 Outdoor Class S Statewide Championship for the 100-meter dash and the 200-meter dash, denied Student 2, who placed 2nd in both events, the benefit of a 1st place finish. Student A's 1st place finish in the finals of the State Open Championship in the 200-meter dash denied Student 2, who finished 4th, the benefit of a top-three finish.

Danbury:

OCR determined that the participation of Danbury in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student 3, and other female student-athletes, competing against Students A and B, denied athletic benefits and opportunities to Student 3, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. Section 106.41(a). Further, Danbury is not providing separate teams for each sex as permitted under 34 C.F.R. § 106.41(b). Danbury placed female student-athletes in athletic events against male student-athletes, resulting in competitive disadvantages for female student-athletes. The athletic events in which the female student-athletes competed were coeducational; female student athletes were denied the opportunity to compete in events that were exclusively female, whereas male students were able to compete in events that were exclusively male. Accordingly, the districts' participation in the athletic events sponsored by the CIAC denied female student-athletes athletic opportunities that were provided to male student-athletes. Danbury's obligation to comply with the regulation implementing Title IX is not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R § 106.6(c).

The participation of Danbury in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student 3, and other female student-athletes competing against Students A and B, denied Student 3 the opportunity to place higher in events, such as at the Outdoor State Open Championships and the New England Regional Championships. Specifically, Student A's 1st place finish in the finals of the State Open Championship in the 200-meter dash denied Student 3, who finished 3rd, the benefit of placing 2nd in the event; and Student A's 1st place finish in the finals of the 200-meter dash at the Outdoor New England Regional Championships denied Student 3, who finished 3rd the benefit of placing 2nd in the event.

Hartford (School A1):

Student A participated in girls' outdoor track on School A1's team in Hartford during school year 2017-2018. OCR determined that the participation of School A1 in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student A's participating in events against Students 1, 2, and 3, and against other female student-athletes, denied athletic benefits and opportunities to Students 1, 2, and 3, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. § 106.41(a). Further, Hartford is not providing separate teams for each sex as permitted under 34 C.F.R. § 106.41(b). Hartford's obligation to comply with the regulation implementing Title IX is not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R. § 106.6(c).

Bloomfield:

Student A participated in girls' indoor and outdoor track for Bloomfield during school year 2018-2019. OCR determined that the participation of Bloomfield in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student A's participating in events against Students 1, 2, and 3, and against other female student-athletes, denied athletic benefits and opportunities to Students 1, 2, and 3, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. Section 106.41(a). Further, Bloomfield is not providing separate teams for each sex as permitted under 34 C.F.R. § 106.41(b). Bloomfield's obligation to comply with the regulation implementing Title IX is not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R. § 106.6(c).

Cromwell:

Student B participated in girls' indoor and outdoor track for Cromwell during school years 2017-2018 and 2018-2019. OCR determined that the participation of Cromwell in athletic events sponsored by the CIAC, consistent with the CIAC's Revised Transgender Participation Policy, which resulted in Student B's participating in events against Students 1, 2, and 3, and against other female student-athletes, denied athletic benefits and opportunities to Students 1, 2, and 3, and other female student-athletes, in violation of the regulation implementing Title IX, at 34 C.F.R. § 106.41(a). Further, Cromwell is not providing separate teams for each sex as permitted under 34 C.F.R. § 106.41(b). Cromwell's obligation to comply with the regulation implementing Title IX is not obviated or alleviated by any rule or regulation of the CIAC. 34 C.F.R. § 106.6(c).

For the aforementioned reasons, OCR also determined that the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury treated student-athletes differently based on sex, by denying opportunities and benefits to female student-athletes that were available to male student-athletes.

II. RETALIATION

The Complainant also alleged that (1) the CIAC retaliated against Parent 1, after Parent 1 complained about the Revised Transgender Participation Policy, by informing Parent 1, in March

2019, that the CIAC's Executive Director would no longer accept communications from her; and (2) that Glastonbury's track coach retaliated against Student 1, for her and Parent 2's advocacy against the Revised Transgender Participation Policy, by (a) replacing Student 1 on the sprint medley relay team in February 2019; (b) telling Student 1 and her parents that he could not give a good report to college coaches about her in March and May 2019; (c) denying Student 1 a position as a team captain in March 2019; and (d) suggesting that Student 1 should leave the outdoor track team due to her schedule, in March and May 2019.

Findings of Fact

1. Allegation Regarding the CIAC's Retaliation

OCR determined that the CIAC Handbook in effect during school year 2018-2019 sets forth the CIAC's "Communication Protocol Rules, Regulations and Interpretations" (Communication Protocol). According to the Communication Protocol, the CIAC Board of Control is the official body charged with the responsibility of interpreting the CIAC's rules and regulations. The Communication Protocol provides, in pertinent part, that "[i]nquiries to the CIAC office from parents, student-athletes, coaches and the public requesting an interpretation of the rules and regulations will be referred back to the member school principal or his/her designee." In addition, Section 4.21 of the CIAC Handbook, "Regulation Interpretation/CIAC Protocol in Providing Decisions to School Personnel and Public (Effective July 1, 2006)," provides, in pertinent part, "The CIAC staff will not discuss CIAC rules and regulations with anyone other than school administrators and athletic directors. Telephone inquiries from parents and coaches will not be honored. **All calls from anyone other than the athletic director or school administrator will be referred back to the school.**" (Emphasis in original.)

OCR determined that Parent 1 initially contacted the CIAC about the policy when she sent a letter dated February 21, 2018, to the CIAC's former Executive Director, in which she requested that the CIAC establish a rule to address transgender athletes' participating in the girls' state championship track competitions. In an email dated March 10, 2018, the former Executive Director responded by acknowledging that issues surrounding transgender student-athlete participation are complicated; advising Parent 1 that the CIAC's policy is directly aligned with state anti-discrimination law, including the state's definition of gender to include gender identity; and reminding Parent 1 that most high school athletes are minors and are therefore afforded a unique level of legal protection regarding their right to privacy.

On January 24, 2019, Parent 1 sent an email to the CIAC's current Executive Director, attaching a letter in which she again requested that the CIAC establish a rule for transgender athletes' participating in state championship track competitions and setting forth her own proposal for the placement and scoring of transgender female athletes participating in state championships.[50] The

[50] Specifically, Parent 1 proposed the following: "Male-to-female transgender athletes who have not yet undergone hormone therapy should compete as exhibition athletes, with results not included for scoring and placing. This would ensure that the needs of both of these protected classes are met. The transgender athletes would still be able to **participate** on the team in which they identify and the female-born athletes would be afforded the opportunity to **compete** in a race that is not clouded by questions of unfair advantage." (Emphasis in original.)

Executive Director responded by email the same day, advising Parent 1 that the appropriate process for addressing her proposal would be to speak with the athletic director or principal at her child's school, as policy or rule proposals "may be submitted through member leagues, sport committees, member principals, [the Connecticut Association of Athletic Directors], or the Connecticut High School Coaches Association." Parent 1 replied to the director's email that same day, January 24, 2019, stating that she would follow up with the principal and athletic director at her child's school to see if they would be willing to submit her proposal.

OCR determined that on February 1, 2019, the principal and the Executive Director spoke by telephone, regarding Parent 1's letter and proposal. The Executive Director memorialized the call in an email to the principal that same day, in which he stated that the CIAC would be convening a gender subcommittee meeting on February 7, 2019, with the task of reviewing all the CIAC bylaws, processes, procedures in which gender plays a role, including the Revised Transgender Participation Policy; and that he would share a redacted copy of Parent 1's letter with the subcommittee members, in order "to provide all points of view to ensure a rich discussion among committee members."

OCR determined that in response to Parent 1's request, made through her building principal, for an in-person meeting with a CIAC representative, the Executive Director attended a meeting at the school with Parent 1 and the principal on February 28, 2019. The Executive Director stated that, at the meeting, he explained to Parent 1 why the CIAC believed that the Revised Transgender Participation Policy was in alignment with Title IX and Connecticut state law, and advised Parent 1 that he believed that Title IX did not apply to the parent's concerns because Title IX does not address winning. Following the meeting, that same day, Parent 1 sent an email to the Executive Director, in which she thanked him for visiting the school and wrote that "[i]t was helpful to hear from you directly regarding the transgender policy and to understand what the CIAC process will be for reviewing this issue."

OCR determined that on March 28, 2019, Parent 1 sent an email to the Executive Director, in which she attached a letter and included links to several websites concerning issues related to the Revised Transgender Participation Policy. The Executive Director responded by email that same day, stating that he had read her email, and cordially reminded her that any further correspondence to the CIAC should come through her principal. The Complainant did not provide, nor did OCR find, evidence of any further communications between Parent 1 and the Executive Director.

The Executive Director denied that he banned Parent 1 from sending communications to him. Rather, the Executive Director stated that he treated Parent 1 in a manner consistent with how he treated other individuals in similar situations, by reminding her of the CIAC's policy that communications must go through the member school's representative. OCR determined that the Executive Director has responded in a similar manner to other parents who sought to communicate directly with him in a similar fashion. OCR determined that none of the similarly situated parents had engaged in protected activities.

2. Allegations Regarding Glastonbury Track Coach Retaliation

The Complainant also alleged that a Glastonbury track coach retaliated against Student 1, for her and Parent 2's advocacy against the Revised Transgender Participation Policy, by (a) replacing Student 1 on the sprint medley relay team in February 2019; (b) telling Student 1 and her parents that he could not give a good report to college coaches about her in March and May 2019; (c) denying Student 1 a position as a team captain in March 2019; and (d) suggesting that Student 1 should leave the outdoor track team due to her schedule, in March and May 2019.

Allegation (a):

OCR determined that a team made up of students from Glastonbury's girls' indoor track team competed at the 2019 New Balance Nationals Track and Field championships ("Nationals"). The track coach stated that the meet is not a CIAC or school-sanctioned meet; therefore, any student who participates does so on an individual basis, not on behalf of Glastonbury. The track coach stated that, accordingly, the Glastonbury coaches do not choose who may attend the meet or choose which athletes will participate in which events. Rather, the individual students choose, on their own, whether to compete in the meet, and who will compete in the events, including relays. The track coach further stated that it was his understanding that Student 1 was not selected to run in a relay at the meet, but he denied that he played a role in this decision. He further stated that his understanding was that the other athletes decided that Student 1 would not compete in the relay, but he did not know why they had made that decision.

Student 1 confirmed that it is each individual student-athlete's decision whether to attend Nationals, if she qualifies; however, she stated that for relay events, a track coach was responsible for signing up the various teams. Parent 2 indicated that this is to prevent students from different schools entering themselves as a single "power team." Student 1 stated that although she had a qualifying time for the sprint medley relay in December 2018,[51] she was not asked to join the sprint medley relay team for Nationals in March 2019. Student 1 stated that, during the regular season, coaches pick the best athletes that are capable of running times that they would like to see for an overall split in the event, but that she was not fully aware of how the coaches make those determinations. Student 1 acknowledged that she was not sure which coach picked the sprint medley relay team for Nationals, but she assumed that a coach picked the team because that was what was done for all other meets during the season.

Allegation (b):

The Complainant stated that at the first practice of the outdoor season on March 16, 2019, the track coach told Parent 4 that he had nothing good to say about Student 1 to a college coach; and on or about May 1, 2019, the track coach told Student 1 that he could not give a good report of her to college coaches.

The track coach denied that he told either Student 1 or her parents that he could not give a good report to college coaches about Student 1. The track coach stated that it is his practice to be completely honest with college coaches, to ensure that college coaches continue to trust and rely

[51] The records Glastonbury provided indicate that Student 1 participated on a sprint medley relay team during a meet held on December 22, 2018.

on his recommendations of athletes. The track coach stated that because of this, on or about March 16, 2019, in the course of a discussion with Parent 4 about the Student 1's workouts and her college future, he told Parent 4 that he is "100% honest with a college coach when asked any questions about any of the athletes."[52] The track coach stated that he had also told Student 1 that he would be 100% honest with college coaches, although he did not recall the date of this conversation or the specific context in which the subject was raised. The track coach also advised OCR that Student 1 has not requested that he give a recommendation or report to any college coach on her behalf, nor has any college coach requested information about Student 1.

Student 1 denied that the track coach told her that he would be honest with any college coaches, and instead maintained that the track coach told her, and Parent 4, that he did not have anything good to say about her and could not give a good report about her. Student 1 stated that the track coach made this statement to her one day when she was letting him know that she was leaving practice for work. Student 1 confirmed that she has not asked the track coach to speak with any coaches on her behalf.

Allegation (c):

The Complainant stated that the track coach told Student 1 that he did not select her as team captain because she departed early from practice on Fridays for work, despite her having served as team captain during the indoor season and not receiving any complaints about her as a captain. The track coach stated that students who wish to be considered for a team captain position are required to submit a written statement concerning their interest at the beginning of each season, indoor and outdoor. All of the coaches then select the team captains as a group. If there are any disagreements among the coaches, the track coach makes the final decision regarding the selection. The track coach stated that the qualifications for team captain are hard work, dedication, leadership, sportsmanship, and appropriately representing the high school. The track coach stated that the number of captains for the team typically ranges from three to seven for each season, depending on the size of the team and the number of qualified athletes who apply.

The track coach stated that in December 2018, Student 1 was selected as a captain for the indoor season 2018-2019; but that the decision was not unanimous because at least two coaches questioned Student 1's qualifications for a captain position, stating that they believed that she had not shown enough leadership, dedication and maturity.[53] The track coach stated that despite the concerns raised by other coaches, he chose Student 1 to be a captain for that season because he had observed her helping new athletes on the team and he believed that she would step up to the challenge.

The track coach stated that in March 2019, Student 1 applied to be a captain for the outdoor season 2018-2019. He stated that after speaking with all of the coaches, it was unanimous that they would not select Student 1 to be a captain for a number of reasons. He stated that the main reason was that during the indoor season (December 2018 – January 2019), Student 1 had, on several

[52] The track coach stated that in reply to his remark, Parent 4 stated that he understood.
[53] Specifically, an assistant track coach stated that he had concerns about Student 1's being selected as captain because he did not believe that Student 1 had the maturity to be a captain.

occasions, displayed poor sportsmanship at meets by ripping off her headband and storming away at the conclusion of her race. In addition, the track coach stated, and another coach confirmed, that during the indoor season, Student 1 often skipped her sprint workouts in favor of spending more time doing her long jump workouts; or claimed that she had an injury and could not do her sprint workouts, despite being able to do her long jump workouts and being cleared by the trainer. An assistant coach confirmed that during the indoor season, Student 1 failed to follow his instructions during practice, often did not complete her workouts, and exhibited poor sportsmanship at meets. Both the assistant coach and another coach agreed that Student 1 should not be selected as a captain for the outdoor season. The track coach stated that during a prior school year, he declined to select a student as team captain because she similarly failed to demonstrate leadership qualities/maturity. Glastonbury stated that this student had not engaged in protected activities.

Allegation (d):

The Complainant alleged that on or about March 25, 2019, the track coach told Student 1 that she should consider leaving the team if she did not attend full practice every day. The Complainant alleged that the track coach had not asked other student-athletes to leave the team due to missing practices for work commitments. The Complainant also alleged that on or about May 1, 2019, the track coach complained to Student 1 about her missing Friday practices.

The track coach denied that he had an issue with Student 1's leaving practice early on Fridays and denied that he specifically told her that she should leave the team. The track coach stated that he and the other coaches emphasized the importance of practice during meetings held at the beginning of the season with the student-athletes and their parents; but he denied having told any students recently, including Student 1, that they should consider leaving the team if they did not attend full practice every day. The track coach further stated that he was aware that Student 1 left practice early on Fridays for work; and stated that he did not object to this, particularly because the team often ends practice early on Fridays during the winter when the gym is used for high school basketball games and because Friday practices are typically lighter prior to the track team competitions on the weekends.

Legal Standards

The regulation implementing Title IX, at 34 C.F.R. § 106.71, incorporates by reference 34 C.F.R. § 100.7(e) of the regulation implementing Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d et seq., which provides that no recipient or other person shall intimidate, threaten, coerce or discriminate against any individual for the purpose of interfering with any right or privilege secured by regulations enforced by OCR or because one has made a complaint, testified, assisted or participated in any manner in an investigation, proceeding, or hearing held in connection with a complaint. The following three elements must be satisfied to establish a prima facie case of retaliation: (1) an individual engaged in a protected activity; (2) an individual experienced an adverse action caused by the recipient; and (3) there is some evidence of a causal connection between the adverse action and the protected activity. When a prima facie case of retaliation has been established, OCR then determines whether there is a facially legitimate, non-retaliatory

reason for the adverse action; and if so, whether the facially legitimate, non-retaliatory reason is a pretext for retaliation.

Analysis and Conclusions

1. Allegation Regarding the CIAC's Retaliation

The Complainant alleged that the CIAC retaliated against Parent 1, after Parent 1 complained about the Revised Transgender Participation Policy, by informing Parent 1, in March 2019, that the CIAC's Executive Director would no longer accept communications from her. OCR determined that Parent 1 engaged in protected activity on February 22, 2018, January 24, 2019, and March 28, 2019, when she sent emails expressing concern regarding the Revised Transgender Participation Policy to the CIAC's Executive Director;[54] and on February 28, 2019, when Parent 1 met with the Executive Director in person to discuss her concerns about the policy. OCR determined that the CIAC was aware of Parent 1's protected activity.

OCR determined, however, that the CIAC proffered a legitimate, non-retaliatory reason for the Executive Director's statement to Parent 1 that "further correspondence to CIAC has to come through your principal"; namely, that the CIAC staff typically did not communicate directly with parents and Parent 1 should have communicated her concerns with the athletic director or school administrator. OCR determined that the proffered reason was not a pretext for retaliation, as the Executive Director's instruction was consistent with the CIAC policy and the Executive Director's directives to other parents who had not engaged in protected activities. Therefore, OCR determined that there was insufficient evidence to substantiate the Complainant's allegation that the CIAC retaliated against Parent 1, after Parent 1 complained about the Revised Transgender Participation Policy, by informing Parent 1, in March 2019, that the Executive Director would no longer accept communications from her. Accordingly, OCR will take no further action with respect to this allegation.

2. Allegations Regarding Glastonbury Track Coach Retaliation

OCR determined that Parent 2 engaged in protected activity by sending emails to the Athletic Director in May, June, and July 2018, expressing her concerns that as a result of the Revised Transgender Participation Policy "[c]isgender girls are no longer provided opportunities in scholastic athletics that are equal and proportionate to the opportunities that boys are provided"; meeting with the Athletic Director, the principal, and the superintendent, on or about August 1, 2018, to discuss these concerns; meeting with the Athletic Director and Parent 4, on or about March 15, 2019, to again discuss these concerns; and telephoning and sending an email to the School's Title IX Coordinator in March and April 2019. OCR determined that Parent 2 also engaged in protected activity in May and June 2018, and in March 2019, when she sent emails to the track coach regarding her objections to the policy and a petition that she had initiated in opposition to

[54] As discussed previously, Parent 1 communicated with the former the Executive Director in her email on February 22, 2018; and with the current Executive Director from January 24, 2019, onward.

the policy. OCR determined that the Glastonbury track coach was aware of the Parent 2's protected activity.

With respect to Allegation (a), OCR determined that neither the track coach nor any other Glastonbury employee denied Student 1 an opportunity to participate on a sprint medley relay team at the New Balance Nationals. Rather, the students themselves chose who would participate. Accordingly, OCR could not substantiate that the track coach or other Glastonbury employee subjected Student 1 to an adverse action. Absent an adverse action, OCR does not proceed further with retaliation analysis. Accordingly, OCR will take no further action regarding Allegation (a).

With respect to Allegation (b), OCR must often weigh conflicting evidence in light of the facts and circumstances of each case and determine whether the preponderance of evidence supports the allegation. Here, OCR did not find that the preponderance of the evidence supported the Complainant's assertion that the track coach told Parent 2 or Student 1 that he would not give a good report about Student 1 to college coaches. Based on the foregoing, OCR determined that there was insufficient evidence to substantiate that the track coach subjected Student 1 to the alleged adverse action. Absent an adverse action, OCR does not proceed further with a retaliation analysis. Accordingly, OCR will take no further action regarding Allegation (b).

With respect to Allegation (c), OCR determined that the Glastonbury proffered a legitimate, non-retaliatory reason for not selecting Student 1 as a captain for the spring 2019 outdoor season; namely, that track coaches had concerns about Student 1's maturity and dedication after the winter 2018 indoor season. Even assuming that the track coach also told Student 1 that the decision had to do with her leaving practice early on Fridays, OCR determined that would still be a legitimate, non-retaliatory reason for not selecting her. OCR determined that the proffered reasons were not a pretext for retaliation, as other coaches corroborated the reasons for the decision and the track coach gave an example of another student who had not been re-selected as captain based on similar behaviors, who had not engaged in protected activities. Additionally, OCR determined that there was no causal connection between the protected activity and the alleged adverse action, as the track coach selected Student 1 as a captain for the indoor season after she and Parent 2 had engaged in protected activities in 2018 and prior to their again engaging in protected activities in 2019. Therefore, OCR determined that there was insufficient evidence to substantiate the Complainant's allegation that the Glastonbury track coach retaliated against Student 1, for her and Parent 2's advocacy against the Revised Transgender Participation Policy, by denying Student 1 a position as a team captain in March 2019. Accordingly, OCR will take no further action regarding Allegation (c).

With respect to Allegation (d), OCR must often weigh conflicting evidence in light of the facts and circumstances of each case and determine whether the preponderance of evidence supports the allegation. Here, OCR did not find that the preponderance of the evidence supported the Complainant's assertion that the track coach told Student 1 in March 2019 and May 2019, that she should consider leaving the team if she had to leave practice early. Based on the foregoing, OCR determined that there was insufficient evidence to substantiate that the track coach subjected Student 1 to the alleged adverse action. Absent an adverse action, OCR does not proceed further with a retaliation analysis. Accordingly, OCR will take no further action regarding Allegation (d).

Attempts to Resolve the Complaint

Via e-mail on February 12, 2020, OCR notified the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury that it had determined that the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury violated Title IX, and provided a proposed resolution agreement (the Agreement) to each that would resolve OCR's compliance concerns. During subsequent telephone calls with counsel for the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury, held during the period of February 13, 2020, through March 13, 2020, OCR informed counsel for the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury of the specific violation, and explained the nature of the violations and the basis of its findings. On multiple occasions during these communications, OCR informed counsel for the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury of the 90-calendar day timeframe for negotiations as set forth in Section 303(f) of the *Manual*. OCR also informed counsel for the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury that the *Manual* states that OCR may end the negotiation period at any time prior to the expiration of the 90-calendar day period when it is clear that agreement will not be reached. On March 12, 2020, counsel for Bloomfield, Hartford, and Cromwell, and on March 13, 2020, counsel for the CIAC, Glastonbury, Canton and Danbury, informed OCR that their clients would not sign the Agreements.

On March 17, 2020, OCR issued impasse letters to the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury notifying the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury that the negotiations had reached an impasse and a final agreement had not been reached. Further, the letter informed the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury that in accordance with the *Manual*, Section 303(g), if an agreement was not reached within 10 calendar days of the date of the letter, i.e., by March 30, 2020, OCR would issue a Letter of Impending Enforcement Action indicating that the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury are in violation of Title IX. OCR also referred the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury to the *Manual*, at https://www2.ed.gov/about/offices/list/ocr/docs/ocrcpm.pdf, in particular, Sections 303-305 and 601-602, for more information.

In emails dated March 27, 2020, OCR informed the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury that in view of their COVID-19-related duties and responsibilities, OCR was extending the ten-calendar day-deadline to respond to OCR's proposed resolution agreements for a period of 30 days, to April 27, 2020; and that if agreement was not reached by that date, OCR would issue a Letter of Impending Enforcement Action pursuant to Section 305 of the *Manual*. None of the entities in this matter—the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury entered into a resolution agreement with OCR to remedy the violations, and a Letter of Impending Enforcement Action was sent on May 15, 2020. No response to that Letter was received, either before or after the Court's decision in *Bostock v. Clayton Cnty., Georgia*, 140 S. Ct. 1731 (2020), on June 15, 2020.

Based on the failure of the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury to resolve the identified areas of noncompliance, OCR will either initiate administrative proceedings to suspend, terminate, or refuse to grant or continue and defer financial assistance to

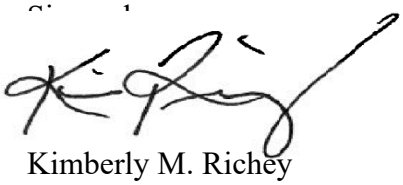
the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury, or refer the cases to the U.S. Department of Justice for judicial proceedings to enforce any rights of the United States under its laws. OCR will take further enforcement action after no fewer than 10 calendar days from the date of this letter if resolution of these complaints has not yet been reached. This letter constitutes a formal statement of OCR's interpretation of Title IX and its implementing regulations and should be relied upon, cited, and construed as such. Congress explicitly delegated to the OCR the task of prescribing standards for athletic programs under Title IX. As a result, the degree of deference to the Department is particularly high in Title IX cases.

This Letter of Impending Enforcement Action is not intended and should not be interpreted to address the compliance of the CIAC, Glastonbury, Bloomfield, Hartford, Cromwell, Canton, and Danbury with any other regulatory provision or to address any issues other than those addressed in this letter. The complainant may file a private suit in federal court whether or not OCR finds a violation.

Under the Freedom of Information Act, it may be necessary to release this document and related correspondence and records upon request. In the event that OCR receives such a request, it will seek to protect, to the extent provided by law, personally identifiable information that, if released, could reasonably be expected to constitute an unwarranted invasion of personal privacy.

If you have any questions, please contact Nadja Allen Gill, Compliance Team Leader, at (646) 428-3801, or nadja.r.allen.gill@ed.gov.

Sincerely,



Kimberly M. Richey
Acting Assistant Secretary for Civil Rights

cc: Glenn Lungarini, CIAC Executive Director, via email only
Alan B. Bookman, Glastonbury Superintendent, via email only
Kevin D. Case, Canton Superintendent, via email only
Dr. Enza Macri, Cromwell Superintendent, via email only
Dr. Sal V. Pascarella, Danbury Superintendent, via email only
Dr. James Thompson, Jr., Bloomfield Superintendent, via email only
Dr. Leslie Torres-Rodriguez, Hartford Superintendent, via email only
Roger G. Brooks, Alliance Defending Freedom, Complainant, via email only

EXHIBIT E

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
AT CHARLESTON

B.P.J., by her next friend and mother,
HEATHER JACKSON,

Plaintiff,

vs.

Civil Action No. 2:21-cv-00316
Hon. Joseph R. Goodwin

WEST VIRGINIA STATE BOARD OF EDUCATION; HARRISON COUNTY BOARD OF EDUCATION; WEST VIRGINIA SECONDARY SCHOOL ACTIVITIES COMMISSION; W. CLAYTON BURCH in his official capacity as State Superintendent; and, DORA STUTLER in her official capacity as Harrison County Superintendent,

Defendants.

DECLARATION OF JAMES M. CANTOR, PhD

I, Dr. James M. Cantor, PhD, pursuant to 28 U.S. Code § 1746, declare under penalty of perjury under the laws of the United States of America that my Expert Report of James M. Cantor, PhD attached hereto is true and correct to the best of my knowledge and belief.

Executed on 22 June, 2021.

JAMES M. CANTOR, PhD

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF KENTUCKY
LOUISVILLE DIVISION

ALLAN M. JOSEPHSON, *Plaintiff*, *v.* **NEELI BENDAPUDI**, *et al.*, *Defendants.*	Case No: 3:19-cv-00230-RGJ-CHL **THE HONORABLE** **REBECCA GRADY JENNINGS**

EXPERT REPORT OF JAMES M. CANTOR, PHD

TABLE OF CONTENTS

I. Background & Credentials

1. I am a clinical psychologist and Director of the Toronto Sexuality Centre in Canada. For my education and training, received my Bachelor of Science degree from Rensselaer Polytechnic Institute, where I studied mathematics, physics, and computer science. I received my Master of Arts degree in Psychology from Boston University, where I studied neuropsychology. I earned my Doctoral degree in psychology from McGill University, which included successfully defending my doctoral dissertation studying the effects of psychiatric medication and neurochemical changes on sexual behavior, and included a clinical internship assessing and treating people with a wide range of sexual and gender identity issues.

2. Over my academic career, my posts have included Psychologist and Senior Scientist at the Centre for Addiction and Mental Health (CAMH) and Head of Research for CAMH's Sexual Behaviour Clinic, Associate Professor of Psychiatry on the University of Toronto Faculty of Medicine, and Editor-in-Chief of the peer reviewed journal, Sexual Abuse. That journal is one of the top-impact, peer-reviewed journals in sexual behavior science and is the official journal of the Association for the Treatment of Sexual Abusers. In that appointment, I was charged to be the final arbiter for impartially deciding which contributions from other scientists in my field merited publication. I believe that appointment indicates not only my extensive experience evaluating scientific claims and methods, but also the faith put in me by the other scientists in my field. I have also served on the Editorial Boards of the *Journal of Sex Research*, the *Archives of Sexual Behavior*, and *Journal of Sexual Aggression*. Thus, although I cannot speak for other scientists, I regularly interact with and am routinely exposed to the views and opinions of most of the scientists active in our field today, within the United States and throughout the world.

3. My scientific expertise spans the biological and non-biological development of human sexuality, the classification of sexual interest patterns, the assessment and

treatment of atypical sexualities, and the application of statistics and research methodology in sex research. I am the author of over 50 peer-reviewed articles in my field, spanning the development of sexual orientation, gender identity, hypersexuality, and atypical sexualities collectively referred to as *paraphilias*. I am the author of the past three editions of the gender identity and atypical sexualities chapter of the *Oxford Textbook of Psychopathology*. These works are now routinely cited in the field and are included in numerous other textbooks of sex research.

4. I began providing clinical services to people with gender dysphoria in 1998. I trained under Dr. Ray Blanchard of CAMH and have participated in the assessment of treatment of over one hundred individuals at various stages of considering and enacting both transition and detransition. My clinical experience includes the assessment and treatment of several thousand individuals experiencing other atypical sexuality issues. I am regularly called upon to provide objective assessment of the science of human sexuality by the courts (prosecution and defense), professional media, and mental health care providers.

5. I have served as an expert witness in a total of 10 cases, which are listed in my CV, attached here as Appendix 1.

6. A substantial proportion of the existing research on gender dysphoria comes from two clinics, one in Canada and one in the Netherlands. The CAMH gender clinic (previously, Clarke Institute of Psychiatry) was in operation for several decades, and its research was directed by Dr. Kenneth Zucker. I was employed by CAMH between 1998 and 2018. I was a member of the hospital's adult forensic program. However, I was in regular contact with members of the CAMH child psychiatry program (of which Dr. Zucker was a member), and we collaborated on multiple projects.

7. For my work in this case, I am being compensated at the hourly rate of $400 per hour. My compensation does not change based on the conclusions and opinions that I provide here or later in this case or on the outcome of this lawsuit.

II. Introduction

8. I have been asked to provide my expert opinion as to whether certain statements made by Dr. Allan Josephson concerning gender dysphoria and the treatment of gender dysphoria in children and adolescents were consistent with current science. As I explain in detail in this report, it is my opinion that they were.

9. To prepare the present report, I reviewed the video recording and a verbatim transcript of the complete panel discussion at the Heritage Foundation on 11 October 2021 including its question and answer session with Dr. Josephson and two other presenters, and I have compared his claims with the content the peer-reviewed research literature and professional statements on gender dysphoria and transsexualism. The points asserted were:

- A very high proportion ("almost all") adolescents expressing gender issues are struggling with other mental health difficulties, to which the gender issues may be secondary.
- The stigma of transgenderism does not explain all the mental health difficulties reported among children and adolescents presenting with gender issues.
- After explicating the use of the term "affirmation," affirming a new gender identity for a child should occur after rather than before ascertaining whether resolution of the child's other mental health issues would alleviate distress over gender.

10. As shown in the following, Dr. Josephson's claims are, without exception, entirely consistent with the contents of the peer-reviewed research literature, the empirically-based and internationally employed "Dutch Approach" to clinical practice with gender dysphoric children, and the clinical recommendations as set by the professional associations issuing them—including the World Professional Association of Transgender Health (WPATH) and the American Academy of Child & Adolescent Psychiatry (AACAP)—but with the single exception of the American Association of Pediatrics (AAP), which itself contradicts all the other professional associations. Dr. Josephson's remarks reflected not only the published science available when he made his comments in 2017, but also reflect the subsequent research published since that

time through this writing.

11. It is not possible to assess Dr. Josephson's comments relative to a consensus of my field, however. No such consensus is discernable. The current situation remains today as described by Dr. Rosalia Costa of the widely cited gender clinic at the Tavistock Centre in the United Kingdom (UK).

> Since the release of the Dutch model [detailed below], there has been disagreement about the appropriateness of treatment in minors. Some practitioners have questioned the ethics and safety of this intervention. Conversely, other healthcare professionals have argued that they have an obligation to alleviate suffering and it would be unethical to allow a patient to suffer through the distress of pubertal development when there was a way of preventing it.[1]

III. The Science of Transgenderism

A. Clarifying Terms

12. Most scientific discussions begin with the relevant vocabulary and definitions of terms. In the highly polarized and politicized debates surrounding transgender issues, that is less feasible: Different authors have used terms in differing, overlapping ways. Activists and the public (especially on social media) will use the same terms, but to mean different things, and some have actively misapplied terms so that original documents appear to assert something they do not.

13. For example, the word "child" is used in some contexts to refer specifically to children before puberty; in some contexts, to refer to children before adolescence (thus including ages of puberty); in still some contexts, to refer to people under the legal age of consent, which is age sixteen in the Netherlands (where much of the research was conducted) or age eighteen in much of North America. Thus, care should be taken in both using and interpreting the word "child" in this field.

14. Because the present document is meant to compare the claims made by others, it is the definitions used by those specific authors in those specific contexts which are relevant. Thus, definitions to my own uses of terms are provided where appropri-

[1] Costa, *et al.*, 2015, p. 2207.

ate, but primarily explicate how terms were defined and used in their original contexts.

B. Types of Gender Dysphoria

15. One of the most widespread public misunderstandings about transsexualism and people with gender dysphoria is that all cases of gender dysphoria represent the same phenomenon; however, the clinical science has long and consistently demonstrated that gender dysphoric children do not represent the same phenomenon as adult gender dysphoria, but coming to clinics at younger ages. That is, gender dysphoric children are not simply younger versions of gender dysphoric adults. They differ in every known regard, from brain structure, to sexual interest patterns, to responses to treatments. Very many misunderstandings in the media and public mind arise from the misapprehension that, because they both express the desire to be treated as the other gender, they are best served by the same treatment.

16. The research literature has long and consistently demonstrated there exist two well-characterized forms of gender dysphoria: childhood- (prepubertal) onset gender dysphoria and adult-onset, typically midlife.[2] These have also been called "early-onset" and "late-onset." A third presentation has recently become increasingly observed among people presenting to gender clinics: These cases appear to have an onset in adolescence in the absence of any childhood history of gender dysphoria. Such cases have been called adolescent-onset or "rapid-onset."

1. Adult-Onset Gender Dysphoria

17. People with adult-onset gender dysphoria typically attend clinics requesting transition services in mid-adulthood, usually in their 30s or 40s. Such individuals are nearly exclusively male.[3] They typically report being sexually attracted to women and sometimes to both men and women. Some cases profess asexuality, but very few indicate any sexual interest in or behavior involving men.[4] Cases of adult-onset gen-

[2] Blanchard, 1985.
[3] Blanchard, 1990, 1991.
[4] Blanchard, 1988.

der dysphoria are typically associated with a sexual interest pattern (medically, a *paraphilia*) involving themselves in female form.[5]

18. Clinical research facilities studying gender dysphoria have repeatedly reported low rates of regret (less than 3%) among adult-onset patients who underwent complete transition (*i.e.*, social, plus hormonal, plus surgical transition). This has been widely reported by clinics in Canada,[6] Sweden,[7] and the Netherlands.[8]

19. Importantly, each of the Canadian, Swedish, and Dutch clinics for adults with gender dysphoria all performed "gate-keeping" procedures, disqualifying from medical services people with mental health or other contraindications. One would not expect the same results to emerge in the absence of such gate-keeping or when gate-keepers apply only minimal standards.

2. Childhood Onset (Pre-Puberty) Gender Dysphoria

20. The large majority of childhood onset cases of gender dysphoria occur in biological males, with clinics reporting 3–6 biological male children to each female.[9]

a. Prospective Studies of "Natural Course": Desistance by Puberty in Majority

21. Prepubescent children (and their parents) have been approaching mental health professionals for help with their unhappiness with their sex and belief they would be happier living as the other for many decades. Projects following-up and reporting on such cases began being published in the 1970s, with subsequent generations of research employing increasingly sophisticated methods studying the outcomes of increasingly large samples. In total, there have now been a total of 11 such outcomes studies. *See* Appendix 2 (listing these studies).

22. In sum, despite coming from a variety of countries, conducted by a variety of labs, using a variety of methods, all spanning four decades, every study without

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5 Blanchard 1989a, 1989b, 1991.
6 Blanchard, *et al.*, 1989.
7 Dhejneberg, *et al.*, 2014.
8 Wiepjes, *et al.*, 2018.
9 Cohen-Kettenis, *et al.*, 2003.

exception has come to the identical conclusion: Among prepubescent children who feel gender dysphoric, the majority cease to want to be the other gender by puberty—ranging 61–88% desistance across the large, prospective studies. Such cases are often referred to as "desisters," whereas children who continue to feel gender dysphoria are often called "persisters."

23. Notably, in most cases, these children were receiving professional psychosocial support across the study period aimed, not at affirming cross-gender identification, but at resolving stressors and issues potentially interfering with desistance. While beneficial to these children and their families, its inclusion represents a complication for the interpretation of the results: That is, it is not possible to know to what extent the observed outcomes (predominant desistance, with a small but consistent occurrence of persistence) were influenced by the psychosocial support or would have emerged regardless. It can be concluded only that prepubescent children who suffer gender dysphoria and receive psychosocial support focused on issues other than "affirmation" of cross-gender identification do in fact desist in suffering from gender dysphoria, at high rates, over the course of puberty.

24. While the absolute number of those who present as prepubescent children with gender dysphoria and "persist" through adolescence is very small in relation to the total population, persistence in some subjects was observed in each of these studies. Thus, the clinician cannot take either outcome for granted.

25. It is because of this long-established and invariably consistent research finding that desistance is probable, but not inevitable, that the "watchful waiting" method became the standard approach for assisting gender dysphoric children. *See infra* Part III.A.2.b. The balance of potential risks to potential benefits is very different for groups likely to desist versus groups unlikely to desist: If a child is very likely to persist, then taking on the risks of medical transition might be more worthwhile than if that child is very likely to desist in transgender feelings.

26. The consistent observation of high rates of desistance among pre-pubertal children who present with gender dysphoria demonstrates a pivotally important—yet often overlooked—feature: because gender dysphoria so often desists on its own, clinical researchers cannot assume that therapeutic intervention cannot facilitate or speed desistance for at least some patients. Such is an empirical question, and there has not yet been any such study.

27. It is also important to note that research has not yet identified any reliable way to discern which children who present with gender dysphoria will persist, as against the majority who will desist, absent transition and "affirmation."

28. The more accurately that potential persisters can be distinguished from desisters, the better the risks and benefits of options can be weighted. Such "risk prediction" and behavioral "test construction" are standard components of applied statistics in the behavioral sciences. Multiple research teams have reported that, on average, groups of persisters are somewhat more gender non-conforming than desisters, but not so different as to assist in decision-making.[10]

29. A research team led by Dr. Kristina Olson attempted to develop a method of distinguishing persisters from desisters to develop a method of predicting outcomes in future groups.[11] That team created a single composite score representing a combination of children's "peer preference, toy preference, clothing preference, gender similarity, and gender identity."[12] They reported a statistical association (mathematically equivalent to a correlation) between that composite score and the probability of persistence. As they described their result, "Our model predicted that a child with a gender-nonconformity score of .50 would have roughly a .30 probability . . . of socially transitioning. By contrast, a child with gender-nonconformity score of .75 would have

[10] Singh *et al.*, in press; Steensma *et al.*, 2013; Wallien *et al.*, 2009
[11] Rae, *et al.*, 2019.
[12] Rae, *et al.*, p. 671.

roughly a .48 probability."[13] Although the authors declared that "social transitions may be predictable from gender identification and preferences,"[14] their actual results suggest the opposite: The gender-nonconforming group who went on to transition (socially) had a mean composite score of .73 (which is less than .75), and the gender-nonconforming group who did not transition had a mean composite score of .61, also less than .75.[15] Both of those are lower than the value of .75, so both of those would be less than 48% probable to transition. Thus, Olson's model does not distinguish likely from unlikely to transition; rather, it distinguishes unlikely from even less likely to transition.

30. Although it remains entirely possible for some future finding to yield a method to identity with sufficient accuracy which gender dysphoric children will persist, there does not exist such a method at the present time.

b. "Watchful Waiting" and "The Dutch Approach"

31. It was this state of the science—that the majority of prepubescent children will desist in their feelings of gender dysphoria and that we lack an accurate method of identifying which children will persist—that led to the development of a clinical approach, often called "The Dutch Approach" (referring to The Netherlands clinic where it was developed) including "Watchful Waiting" periods. Internationally, the Dutch Approach is currently the most widely respected and utilized method for treatment of children who present with gender dysphoria.

32. The purpose of these methods was to compromise the conflicting needs among: clients' desires upon assessment, the long-established and repeated observation that those preferences will change in the majority of (but not all) childhood cases, and that cosmetic aspects of medical transition are perceived to be better when they occur earlier rather than later.

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[13] Rae, *et al.*, p. 673.
[14] Rae, *et al.*, pp. 673, 679.
[15] Rae, *et al.*, 2019, p. 6, Table S1, bottom line.

33. The Dutch Approach (also called the "Dutch Protocol") was developed over many years by the Netherlands' child gender identity clinic, incorporating the accumulating findings from their own research as well as those reported by other clinics working with gender dysphoric children. They summarized and explicated the approach in their peer-reviewed report, *Clinical management of gender dysphoria in children and adolescents: The Dutch Approach* (de Vries & Cohen-Kettenis, 2012). The components of the Dutch Approach are:

- no social transition at all considered before age 12 (watchful waiting period),
- no puberty blockers considered before age 12,
- cross-sex hormones considered only after age 16, and
- resolution of mental health issues before any transition.

34. The Dutch Approach authors are explicit in indicating that these age cut-off's were not based on any research demonstrating their superiority over other potential age cut-off's. Rather, they were chosen to correspond to ages of consent to medical procedures under Dutch law. The authors were moreover explicit in indicating it is "conceivable that when more information about the safety of early hormone treatment becomes available, the age limit may be further adjusted."[16]

35. For youth under age 12, "the general recommendation is watchful waiting and carefully observing how gender dysphoria develops in the first stages of puberty."[17]

36. The authors of the Dutch Approach repeatedly and consistently emphasize the need for extensive mental health assessment, including clinical interviews, formal psychological testing with validated psychometric instruments, and multiple sessions with the child and the child's parents. Indeed, those researchers' description of the appropriate response to other potentially relevant mental health issues is nearly identical to Dr. Josephson's panel remarks regarding unresolved issues of abuse as a potential confound:

[16] de Vries & Cohen-Kettenis, 2012, p. 311.
[17] de Vries & Cohen-Kettenis, 2012, p. 301.

> If any [mental illness] is found, the possible relationship between the gender dysphoria and other diagnoses is investigated. In this way, for example, one can investigate whether an autistic boy's fascination for fancy dresses and long hair is more part of his autism or whether his autism reinforces certain aspects of his gender dysphoria. . . . If concomitant problems are observed (e.g., substantial problems with peers, psychiatric problems, or conflicts with parents or siblings), the child may be referred to a local mental health agency. The primary aim is for the child and, if necessary, the family to function better. If these problems have contributed to causing or keeping up some gender dysphoria, the dysphoria will likely disappear by tackling these other problems. Although there is little evidence that psychotherapeutic interventions can eliminate gender dysphoria in general, it is conceivable that in some cases gender variant behavior can change as a result of therapy. In our own practice, a reduction or disappearance of gender variant behavior seems to take place particularly when this behavior appeared to be a clear reaction to certain events or situations which in themselves are amenable to therapy (e.g., a boy suddenly dressing up and saying he wants to be a girl as an expression of extreme jealousy after the birth of a younger sister).[18]

37. Within the Dutch approach, there is no social transition before age twelve. That is, social affirmation of the new gender may begin at age 12—as desistance is less likely to occur past that age. "Watchful Waiting" refers to a child's developmental period up to that age. Watchful waiting does not mean do nothing but passively observe the child. Such children and families typically present with substantial distress involving both gender and non-gender issues. It is during the watchful waiting period that a child (and other family members as appropriate) would undergo therapy, resolving other issues which may be exacerbating psychological stress or dysphoria. As noted by the Dutch clinic, "[T]he adolescents in this study received extensive family or other social support . . . [and they] were all regularly seen by one of the clinic's psychologists or psychiatrists."[19] One is actively treating the person, while carefully "watching" the dysphoria.

38. In sum, Dr. Josephson's comments regarding the prevalence of comorbid mental health issues and the need to resolve them before making decisions about any type of transition are fully in line with the recommendations of the widely respected Dutch Model.

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[18] de Vries & Cohen-Kettenis, 2012, pp. 307, 309.
[19] de Vries, *et al.*, 2011, p. 2281.

39. The inclusion of psychotherapy and support during the watchful waiting period is, clinically, a great benefit to the gender dysphoric children and their parents. The inclusion of psychotherapy and support poses a scientific complication, however: It becomes difficult to know to what extent the outcomes of these cases might be related to receiving psychotherapy received versus being "spontaneous" desistance, which would have occurred on its own anyway. This situation is referred to in science as a "confound."

c. Prospective Studies of Social Transition and Puberty Blockers in Adolescence

i. The Dutch Approach (studies from before 2017): Mix of positive, negative, and neutral outcomes

40. The research confirms that some, but not all, adolescents improve on some, but not all, indicators of mental health and that those indicators are inconsistent across studies. Thus, the balance of potential benefits to potential risks differs across cases, and thus suggest different courses of actions across cases.

41. The Dutch clinical research team followed-up 70 youth undergoing puberty suppression at their clinic.[20] The youth were improved better on several variables upon follow-up than at the beginning, including depressive symptoms and general functioning. No changes were detected in feelings of anxiety or anger or in gender dysphoria; however, natal females suffered *increased* body dissatisfaction both with their secondary sex characteristics and with nonsexual characteristics.[21]

42. As the report authors noted, it is possible that the improvement was due to the puberty-blockers, it is possible that the improvement was due to the mental health support, and it is possible that the improvement occurred only on its own with natural maturation. Because this study did not include a control group (another group of adolescents matching the first group, but *not* receiving medical or social support), these possibilities cannot be distinguished from each other, representing a

[20] de Vries, *et al*. 2011.
[21] Biggs, 2020.

confound. The authors of the study were explicit in noting this themselves: "All these factors may have contributed to the psychological well-being of these gender dysphoric adolescents."[22]

43. The authors were careful not to overstate the implications of their results, "We *cautiously* conclude that puberty suppression may be a valuable *element* in clinical management of adolescent gender dysphoria."[23]

44. Of those 70 cases, 55 were re-examined in that clinic's report of surgical outcomes.[24] This updated report indicated the cases' level of functioning at baseline, after having undergone puberty blocking, and now after having undergone surgical sex reassignment. Changes were again positive in some variables, but without significant changes in depression, anger, or anxiety.

45. Costa, *et al.* (2015) reported on preliminary outcomes from the Tavistock and Portman NHS Foundation Trust clinic in the UK. They compared the psychological functioning of one group of youth receiving psychological support with a second group receiving both psychological support as well as puberty blocking medication. Both groups improved in psychological functioning over the course of the study, but no statistically significant differences between the groups was detected at any point.[25] As those authors concluded, "Psychological support and puberty suppression were both associated with an improved global psychosocial functioning in GD adolescence. Both these interventions may be considered effective in the clinical management of psychosocial functioning difficulties in GD adolescence."[26]

ii. Clinicians and advocates have invoked the Dutch Approach while departing from its protocols in important ways.

46. The reports of partial success contained in de Vries, *et al.* 2011 called for additional research, both to confirm those results and to search for ways to maximize

[22] de Vries, *et al.* 2011, p. 2281.
[23] de Vries, *et al.* 2011, p. 2282, italics added.
[24] de Vries, *et al.*, 2014.
[25] Costa, *et al.*, Table 2, p. 2212.
[26] Costa, *et al.*, p. 2206.

beneficial results and minimize negative outcomes. Instead, many other clinics and clinicians proceeded on the basis of the positives only, broadened the range of people beyond those represented in the research findings, and removed the protections applied in the procedures that led to those outcomes. Many clinics and individual clinicians have reduced the minimum age for transition to 10 instead of 12. While the Dutch Protocol involves interdisciplinary teams of clinicians, many clinics now rely on a single assessor, in some cases one without adequate professional training in childhood and adolescent psychiatric health. Comprehensive, longitudinal assessments (*e.g.*, one and a half *years*[27]) became approvals after a single assessment session. Validated, objective measures of youths psychological functioning were replaced with clinicians' subjective (and first) opinion, often reflecting only the clients' own self-report. Systematic recordings of outcomes, so as to allow for detection and correction of clinical deficiencies, were eliminated.

47. Most relevantly to Dr. Josephson's panel comments, instead of feelings of distress being explored and resolved as emphasized throughout the clinical recommendations, they are too often ignored entirely, dismissed at the outset as effects of stigma, but without empirical basis. *See infra* Part III.C.4 (discussing minority stress).

48. Notably, Dr. Thomas Steensma, central researcher of the Dutch clinic, has decried other clinics for "blindly adopting our research" despite the indications that those results may not actually apply: "We don't know whether studies we have done in the past can still be applied to this time. Many more children are applying, and also a different type."[28] Steensma opined that "every doctor or psychologist who engages in transgender care should feel the obligation to do a good before and after measurement." But few if any are doing so.

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[27] de Vries, *et al.*, 2011.
[28] Tetelepta, 2021.

iii. Studies by other clinicians in other countries have failed to reliably replicate the positive components of the results reported by the Dutch clinicians in de Vries et al. 2011.

49. The indications of potential benefit from puberty suppression in at least some cases has led some clinicians to attempt to replicate the positive aspects of those findings. These efforts have not succeeded.

50. The Tavistock and Portman clinic in the U.K. recently released its findings, attempting to replicate the outcomes reported by the Dutch clinic.[29] Study participants were ages 12–15 (Tanner stages 3 for natal males, Tanner 2 for natal females) and were repeatedly tested before beginning puberty-blocking medications and then every six months thereafter. Cases exhibiting serious psychiatric conditions (*e.g.*, psychosis, bipolar disorder, anorexia nervosa, severe body-dysmorphic disorder unrelated to gender dysphoria) were excluded. Relative to the time point before beginning puberty suppression, there were *no* significant changes in any psychological measure, from either the patients' or their parents' perspective.

51. A multidisciplinary team from Dallas published a prospective follow-up study which included 25 youths as they began puberty suppression.[30] (The other 123 study participants were undergoing cross-sex hormone treatment.) Interventions were administered according to "Endocrine Society Clinical Practice Guidelines."[31] Their analyses found *no statistically significant changes* in the group undergoing puberty suppression on any of the nine measures of wellbeing measured, spanning tests of body satisfaction, depressive symptoms, or anxiety symptoms.[32] (Although the authors reported detecting some improvements, these were only found when the large group undergoing cross-sex hormone treatment were added in.) Although the Dutch Approach includes age 12 as a minimum for puberty suppression treatment, this team

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29 Carmichael, *et al.*, 2021.
30 Kuper, *et al.*, 2020.
31 Kuper, *et al.*, p. 3, referring to Hembree, *et al.*, 2017.
32 Kuper, *et al.*, 2020, Table 2.

provided such treatment beginning at age 9.8 years (full range: 9.8–14.9 years).[33]

52. Achille, *et al.* (2020) at Stony Brook Children's Hospital in New York treated a sample of 95 youth with gender dysphoria, providing follow-up data on 50 of them. (The report did not indicate how these 50 were selected from the 95.) As well as receiving puberty blocking medications, "Most subjects were followed by mental health professionals. Those that were not were encouraged to see a mental health professional."[34] The puberty blockers themselves "were introduced in accordance with the Endocrine Society and the WPATH guidelines."[35] Upon follow-up, some incremental improvements were noted; however, after statistically adjusting for psychiatric medication and engagement in counselling, "*most predictors did not reach statistical significance*."[36] Moreover, "the numbers are too small to parse out the effects of pubertal suppression versus cross sex hormone therapy in the different genders."[37]

53. In a recent update, the Dutch clinic reported continuing to find improvement in transgender adolescents' psychological functioning, reaching age-typical levels, "after the start of specialized transgender care involving puberty suppression."[38] Unfortunately, because the transgender care method of that clinic involves both psychosocial support and puberty suppression, it cannot be known which of those (or their combination) is driving the improvement. Also, the authors indicate that the changing demographic and other features among gender dysphoric youth might have caused the treated group to differ from the control group in unknown ways. As the study authors themselves noted, "The present study can, therefore, not provide evidence about the direct benefits of puberty suppression over time and long-term mental health outcomes."[39]

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33 Kuper, *et al.*, 2020, p. 4.
34 Achille, *et al.*, 2020, p. 2.
35 Achille, *et al.*, 2020, p. 2.
36 Achille, *et al.*, 2020, p. 3, italics added.
37 Achille, *et al.*, 2020, p. 4.
38 van der Miesen, *et al.*, 2020, p. 699.
39 van der Miesen, *et al.*, 2020, p. 703.

54. It has not yet been determined why the successful outcomes reported by the Dutch child gender clinic failed to emerge when applied by others. It is possible that:

(1) The Dutch Approach itself does *not* work and that their originally successful results were a fluke;

(2) The Dutch Approach *does* work, but only in the Netherlands, with local cultural, genetic, or other unrecognized factors that do not generalize to other countries;

(3) The Dutch Approach itself *does* work, but that other clinics and individual clinicians are removing safeguards and adding short-cuts to the approach, and those changes are hampering success.

(4) The Dutch Approach *does* work, but that the cause of the improvement is the psychosocial support, rather than any medical intervention, which other clinics are *not* providing.

55. The failure of other clinics to repeat the already very qualified success of the Dutch clinic demonstrates the need for still greater caution before endorsing transition and the greater need to resolve potential mental health obstacles before doing so. Although there do exist authors citing only the positive from among these research findings, Dr. Josephson's explicit cautions in his presentation are consistent with the complete content of the scientific literature.

d. Affirmation vs. Affirmation-Only and Affirmation-on-Demand: Social Transition in Childhood (pre-puberty)

56. Colloquially, affirmation refers broadly to any actions that treat the person as belonging to a new gender. In different contexts, that could apply to social actions (use of a new name and pronouns), legal actions (changes to birth certificates), or medical actions (hormonal and surgical interventions). That is, social transition, legal transition, and medical transition (and subparts thereof) need not, and rarely do, occur at the same time. In practice, there are cases in which a child has socially only partially transitioned, such as presenting as one gender at home and another at school or presenting as one gender with one custodial parent and another gender with the other parent.

57. Referring to "affirmation" as a treatment approach is ambiguous: Although often used in public discourse to take advantage of the positive connotations of the

term, it obfuscates what exactly is being affirmed. This often leads to confusion, such as quoting a study of the benefits and risks of social affirmation in a discussion of medical affirmation, where the appearance of the isolated word "affirmation" refers to entirely different actions.

58. It is also an error to divide treatment approaches into affirmative versus non-affirmative. As noted already, the widely adopted Dutch Approach (and the guidelines of the multiple professional associations based on it) cannot be said to be either: It is a staged set of interventions, wherein social affirmation (and puberty blocking) may begin at age 12 and cross-sex hormonal and other medical interventions, later.

59. The false dichotomy categorizing interventions into affirmative versus non-affirmative typically occurs within polarized debates, where one side espouses affirmation-on-demand for all (or nearly all) cases and mischaracterizes any delay, including the watchful waiting period of the Dutch Approach—to constitute non-affirmation and a denial of "rights." Legitimate debate can (and should) be had regarding what ages or other developmental indicators would best guide clinical decision-making. Because almost all approaches discussed include affirmation, the most extreme is not accurately called the affirmation approach, but rather affirmation-*on-demand*.

60. There do not exist any prospective outcomes research on the Affirmation-on-Demand approach. All existing studies pertain to the step-wise use of affirmation, within a gate-keeper model, and with professionals diverting cases with other mental health issues or counter indicators as necessary. There have been attempts to use non-prospective research designs to demonstrate effects of prepubertal social transition. Although these studies are often cited as evidence of the benefits of early social transition, how the studies were conducted make them entirely unable to show what they are claimed to support. That is, non-prospective studies are being cited as if they

were prospective.

61. Olsen and colleagues used a novel research design, studying children recruited from the TransYouth Project—a convenience sample of socially transitioned youth and families, recruited by word of mouth and interested in participating in research. There were three groups of children for comparison: (i) children who had already socially transitioned, (ii) their siblings, and (iii) children in a university database of families interested in participating in child development research. As noted by the study authors, "For the first time, this article reports on socially transitioned gender children's mental health as reported by the children."[40] Reports from parents were also recorded.[41] In contrast, no reports or ratings were provided by any mental health care professional or researcher at all. That is, although adding self-assessments to the professional assessments might indeed provide novel insights, this project did not add self-assessment to professional assessment. Rather, it replaced professional assessment with self-assessment.

62. It is well established in the field of psychology that participant self-assessment can be severely unreliable for multiple reasons. For example, one well-known phenomenon in psychological research is known as "socially desirable responding"—the tendency of subjects to give answers that they believe will make themselves look good, rather than accurate answers. Specifically, subjects' reports that they are enjoying good mental health and functioning well could reflect the subjects' desire to be *perceived* as healthy and to have made good choices, rather than reflecting their actual mental health.

63. In their analyses, the study reported finding no significant differences between the transgender children, their non-transgender siblings, or the community controls. As the authors noted, "[t]hese findings are in striking contrast to previous

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40 Durwood, *et al*., 2016, p. 121, italics added.
41 *See* Olson, *et al*. (2016).

work with gender-nonconforming children who had not socially transitioned, which found very high rates of depression and anxiety."[42] The authors are correct to note that their result contrasts with the previous research, but they do not discuss that this could reflect a problem with the novel research design they used: The subjective self-reports of the children and their parents' reports may not be reflecting reality objectively, as professional researchers would. Because the study did not employ any method to detect and control for participants indulging in "socially desirable responding" or acting under other biasing motivations, this possibility cannot be assessed or ruled out.

64. Because this was a single-time study relying on self-reporting, rather than a before-and-after transition study relying on professional evaluation, it is not possible to know if the children reported as well-functioning are in fact well-functioning, nor if so whether they are well-functioning because they were permitted to transition, or whether instead the fact is that they were already well-functioning and therefore permitted to transition. Finally, because the TransYouth project lacks a prospective design, it cannot be known how many cases attempted transition, reacted poorly, and then detransitioned, thus never having entered into the study in the first place.

e. "Conversion Therapy"

65. There exist writers who have denounced all attempts to address mental health concerns *before* undergoing transition as "conversion therapy." The term makes no sense in this context. The purpose of the mental health support provided during the "watchful waiting" period before puberty is to address all the other mental health issues—anxiety, depression, drug use, etc. Clinical improvement in mental health is itself the purpose and would be deemed a success regardless of whether it resulted in a transgender child better prepared for the stresses of transition to come or a cis-gender child now ready to take on new challenges.

[42] Durwood, *et al.*, 2017, p. 116.

66. Indeed, in the context of gender dysphoric children, "conversion therapy" is an oxymoron. It simply makes no sense to refer to externally induced conversion among gender dysphoric children, as this appears to be the usual outcome *regardless* of any attempt to change them.

3. Adolescent-Onset Gender Dysphoria

67. A third profile has begun to present to clinicians or socially, characteristically distinct from the previously identified ones.[43] Unlike adult-onset gender dysphoria (and also unlike childhood-onset, *see supra* Part III.B.2), this group is predominately biologically female. This group first presents in adolescence, but lacks the history of cross-gender behavior in childhood like the childhood-onset cases have. It is this feature which led to the term Rapid Onset Gender Dysphoria (ROGD).[44] The majority of cases appear to occur within clusters of peers and in association with increased social media use[45] and especially among people with autism or other neurodevelopmental or psychiatric disorders.[46]

68. It cannot be easily determined whether the self-reported gender dysphoria is a result of other underlying issues or if those mental health issues are the result of the stresses of being a stigmatized minority.[47] *See infra* Part III.C (discussing mental health). Importantly, and unlike other presentations of gender dysphoria, "coming out" in this group was often (47.2%) associated with *declines* rather than improvements in mental health.[48] Although long-term outcomes have not yet been reported, these distinctions argue against generalizing findings from the other types of gender dysphoria to this one.

69. There do not yet exist prospective outcomes studies for medical interventions for people with this presentation. At least, no study has yet been organized in

[43] Kaltiala-Heino, *et al.*, 2015; Littman, 2018.
[44] Littman, 2018.
[45] Littman, 2018.
[46] Kaltiala-Heino, *et al.*, 2015; Littman, 2018; Warrier et al., 2020.
[47] Boivin, *et al.*, 2020.
[48] Biggs, 2020; Littman, 2018.

such a way as to allow for an analysis of this group, as distinct from childhood-onset or adult-onset cases. Many of the newer clinics (not the original clinics systematically tracking and reporting on their case results) fail to distinguish between people who had childhood-onset gender dysphoria and have aged into adolescence and people whose onset was not until adolescence. Similarly, there are clinics failing to distinguish people who had adolescent-onset gender dysphoria and aged into adulthood from adult-onset gender dysphoria. Studies selecting groups according to their current age instead of their ages of onset can produce only confounded results, representing unclear mixes according to how many of each type of case wound up in the final sample.

C. Dr. Josephson's views regarding the importance of addressing mental health co-morbidities before deciding questions of transition are well supported by science and professional standards.

70. The role of mental illness in gender dysphoria is central to providing appropriate and effective care. Dr. Josephson's comments included noting the very high rates of mental health concerns among gender dysphoric youth. His statements in this regard were accurate. As demonstrated by the research summarized below, psychiatric issues are repeatedly observed to be present in the majority of samples seeking transition services, not only among gender dysphoric youth, but also for people with gender dysphoria of all age groups.

71. The need to address mental health concerns—and to do so *before* embarking on a gender transition—was also emphasized in Dr. Josephson's comments. That very protocol appears ubiquitously across medical associations providing such standards. *See infra* Part V (reviewing comprehensively medical associations' statements).

72. Many claims published about mental health among people with gender dysphoria pertain to suicidality—variously referring to suicidal ideation, threats, attempts, or actual completed suicides. The role of suicide in mental health is not itself

straight-forward, sometimes reflecting severe depression and hopelessness and sometimes reflecting emotionally manipulative gestures in persons with substantial histories of self-harm. *See infra* Part IV.B (reviewing suicidality).

73. The research evidence on mental illness in gender dysphoria indicates it to be different between adult-onset versus adolescent-onset versus prepubescent-onset types. Although childhood-onset cases are the most directly relevant to the present proceedings, those findings are best understood in the context of what is known about the other age groups. Therefore, those findings are also summarized briefly.

1. Mental Illness in Adult-Onset Gender Dysphoria

74. The co-occurrence of psychiatric illness with gender dysphoria in adults is widely recognized and widely documented.[49] A research team in 2016 published a comprehensive and systematic review of all studies examining rates of mental illness in transgender adults.[50] There were 38 studies in total. The review indicated that many studies were methodologically weak, but nonetheless concluded that (1) rates of mental illness among people are highly elevated, and (2) rates of psychopathology decreased on average among those who completed transition. Analyses were not conducted in a way so as to compare the elevation in mental illness observed among people newly attending clinics to improvement after transition. Also, several studies showed more than 40% of patients becoming "lost to follow-up." With attrition rates that high, it is unclear to what extent the information from the available participants genuinely reflects the whole sample.

75. In a survey of the board-certified psychiatrists in the Netherlands, 186 respondents answered questions about their experiences with a total of 584 cross-gender identified patients. The survey indicated: "In 270 (75%) of these 359 patients, cross-gender identification was interpreted as *an epiphenomenon of other psychiatric*

[49] *See, e.g.*, Hepp, *et al.*, 2005.
[50] Dhejne, *et al.*, 2016.

illnesses, notably personality, mood, dissociative, and psychotic disorders."[51] The survey also asked about the age at which individuals should be permitted to transition. Acknowledging on the one hand that the Netherlands may have social attitudes differing from the United States and on the other hand that such attitudes may have shifted since this 2003 survey, the results nonetheless indicated: "[T]here is little consensus, at least among Dutch psychiatrists, about diagnostic features of gender identity disorder or about the minimum age at which sex reassignment therapy is a safe option."[52]

76. More recently, an international consortium of gender clinics formed the European Network for the Investigation of Gender Incongruence, spanning the Netherlands, Belgium, Germany, and Norway.[53] They recorded systematically on all adult patients evaluated at any of the clinics, totaling 305 participants over a three-and-a-half year period. Rather than rely on self-descriptor narratives, degree of gender dysphoria experience was measured with the Utrecht Gender Dysphoria Scale (UGDS).[54] The presence of psychiatric disorders was assessed with two standard instruments, the Mini International Neuropsychiatric Interview—Plus and the Structured Clinical Interview for DSM-IV Axis II Personality Disorders. When tabulated, "Almost 70% of the final sample of 305 participants show one or more Axis I disorders current and lifetime,"[55] which were primarily affective disorders (such as depression) and anxiety disorders.

77. An important caution applies to interpreting these results: These very high proportions of mental illness come from people who are attending a clinic for the first time and are undergoing assessment. Clinics serving a "gate-keeper" role diverted candidates with mental health issues away from medical intervention. The side-effect

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51 Campo, *et al.*, 2003, p. 1332, italics added.
52 Campo, *et al.*, 2003, p. 1332.
53 Heylens, *et al.*, 2014, p. 152.
54 Cohen-Kettenis & van Goozen, 1997.
55 Cohen-Kettenis & van Goozen, 1997, page 152.

of gate-keeping is that if a researcher compared the average mental health of individuals coming into the clinic with the average mental health of individuals after medical transition, then there would seem to have been a substantial improvement, even though transition had no effect at all: The removal of people with poorer mental health can create the statistical illusion of improvement among the remaining people.

2. Mental Illness in Adolescent-Onset Gender Dysphoria

78. In 2019, a Special Section of the *Archives of Sexual Behavior* was published: "Clinical Approaches to Adolescents with Gender Dysphoria." It included this brief yet thorough summary of rates of mental illnesses among adolescents expressing gender dysphoria by Dr. Aron Janssen, of the Department of Child and Adolescent Psychiatry of New York University:[56] The literature varies in the range of percentages of adolescents with co-occurring disorders. The range for depressive symptoms ranges was 6–42%,[57] with suicide attempts ranging 10 to 45%.[58] Self-injurious thoughts and behaviors range 14–39%.[59] Anxiety disorders and disruptive behavior difficulties including Attention Deficit/Hyperactivity Disorder are also prevalent.[60] Gender dysphoria also overlaps with Autism Spectrum Disorder.[61]

79. There is one mental illness of specific concern in the context of adolescent onset gender dysphoria, *Borderline Personality Disorder* (BPD). The DSM criteria for BPD are:

> A pervasive pattern of instability of interpersonal relationships, self-image, and affects, and marked impulsivity beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:
>
> 1. Frantic efforts to avoid real or imagined abandonment. (Note: Do not include suicidal or self-mutilating behaviour covered in Criterion 5.)
> 2. A pattern of unstable and intense interpersonal relationship characterized by alternating between extremes of idealization and devalu-

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56 Janssen, *et al.*, 2019.
57 Holt, *et al.*, 2016; Skagerberg, *et al.*, 2013; Wallien, *et al.*, 2007.
58 Mustanski et al., 2015.
59 Holt, *et al.*, 2016; Skagerberg, *et al.*, 2013.
60 de Vries, *et al.*, 2011; Mustanski, *et al.*, 2010; Wallien, *et al.*, 2007.
61 de Vries, *et al.*, 2010; Jacobs, *et al.*, 2014; Janssen, *et al.*, 2016; May, *et al.*, 2016; Strang, *et al.*, 2014, 2016.

ation.

3. *Identity disturbance: markedly and persistently unstable self-image or sense of self.*
4. Impulsivity in at least two areas that are potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating). (Note: Do not include suicidal or self-mutilating behavior covered in Criterion 5.)
5. *Recurrent suicidal behaviour, gestures, or threats, or self-mutilating behavior.*
6. Affective instability due to a marked reactivity of mood (e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days).
7. Chronic feelings of emptiness.
8. Inappropriate, intense anger or difficulty controlling anger (e.g., frequent displays of temper, constant anger, recurrent physical fights).
9. Transient, stress-related paranoid ideation or severe dissociative symptoms.

(Italics added.)

80. It is increasingly hypothesized that very many cases appearing to be adolescent-onset gender dysphoria are actually cases of BPD. That is, some people may be misinterpreting their experiences to represent a gender identity issue, when it instead represents the "identity disturbance" noted in symptom Criterion 3. Like adolescent-onset gender dysphoria, BPD begins to manifest in adolescence, is substantially more common among biological females than males, and occurs in 2–3% of the population, rather than 1-in-5,000 people. Thus, if even only a portion of people with BPD had an 'identity disturbance' that focused on gender identity and were mistaken for transgender, they could easily overwhelm the number of genuine cases of gender dysphoria.

81. A primary cause for concern is symptom Criterion 5: recurrent suicidality. Regarding the provision of mental health care, this is a crucial distinction: A person with BPD going undiagnosed will not receive the appropriate treatments (the currently most effective of which is Dialectical Behavior Therapy). A person with a cross-gender identity would be expected to feel relief from medical transition, but someone

with BPD would not: The problem was not about *gender* identity, but about having an *unstable* identity. Moreover, after a failure of medical transition to provide relief, one would predict for these people increased levels of hopelessness and increased risk of suicidality. One would predict also that misdiagnoses would occur more often if one reflexively dismissed or discounted symptoms of BPD as responses to "minority stress." *See infra* Part III.C.4 (discussing minority stress).

82. Regarding research, there have now been several attempts to document rates of suicidality among gender dysphoric adolescents. *See infra* Part IV.B. The scientific concern presented by BPD is that it poses a potential confound: samples of gender dysphoric adolescents could appear to have elevated rates of suicidality, not because of the gender dysphoria (or transphobia in society), but because of the number of people with BPD in the sample.

3. Mental Illness in Childhood-Onset Gender Dysphoria

83. Elevated rates of multiple mental illnesses among gender dysphoric children are reported throughout the research literature. A formal analysis of children (ages 4–11) undergoing assessment at the Dutch child gender clinic showed 52% fulfilled criteria for a DSM axis-I disorder.[62] A comparison of the children attending the Canadian versus Dutch child gender dysphoria clinic showed only few differences between them, but a large proportion in both groups were diagnosable with clinically significant mental health issues. Results of standard assessment instruments (Child Behavior Check List, or CBCL) demonstrated that the average score was in the clinical rather than healthy range, among children in both clinics.[63] When expressed as percentages, among 6–11-year-olds, 61.7% of the Canadian and 62.1% of the Dutch sample were in the clinical range.

84. A systematic, comprehensive review of all studies of Autism Spectrum Dis-

[62] Wallien, *et al.*, 2007.
[63] Cohen-Kettenis, *et al.*, 2003.

orders (ASDs) and Attention-Deficit Hyperactivity Disorder (ADHD) among children was recently conducted. It was able to identify a total of 22 studies examining the prevalence of ASD or ADHD I youth with gender dysphoria. Studies reviewing medical records of children and adolescents referred to gender clinics showed 5–26% to have been diagnosed with ASD.[64] Moreover, those authors gave specific caution on the "considerable overlap between symptoms of ASD and symptoms of gender variance, exemplified by the subthreshold group which may display symptoms which could be interpreted as either ASD or gender variance. Overlap between symptoms of ASD and symptoms of GD may well confound results."[65] The rate of ADHD among children with GD was 8.3–11%. Conversely, in data from children (ages 6–18) with Autism Spectrum Disorders (ASDs) show they are more than seven times more likely to have parent-reported "gender variance."[66]

4. Dr. Josephson's observations that the negative mental health of children with gender dysphoria cannot be sufficiently explained by social stigma is well supported by the available science.

85. Dr. Josephson's panel comments included that stigma was not a sufficient explanation for the all the mental health issues observed among children with gender dysphoria. The research evidence supports him in this assertion.

86. The elevated levels of mental health problems among lesbian, gay, and bisexual populations is a well-documented phenomenon, and the idea that it is caused by living within a socially hostile environment is called the *Minority Stress Hypothesis*.[67] The association is not entirely straight-forward, however. For example, although lesbian, gay, and bisexual populations are more vulnerable to suicide ideation overall, the evidence specifically on adult lesbian and bisexual women is unclear. Meyer did not include transgender populations in originating the hypothesis, and it remains a legitimate question to what extent and in what ways it might apply to

64 Thrower, *et al.*, 2020.
65 Thrower, *et al.*, 2020, p. 703.
66 Janssen, *et al.*, 2016.
67 Meyer, 2003.

gender identity.

87. Minority stress is associated, in large part, with being a visible minority. There is little evidence that transgender populations show the patterns suggested by the hypothesis. For example, the minority stress hypothesis would predict differences according to how visibly a person is discernable as a member of the minority, which often changes greatly upon transition. Biological males who are very effeminate stand out throughout childhood, but can successfully blend in as adult females; whereas the adult onset transitioners blend in very much as heterosexual cis-gendered males during their youth and begin visibly to stand out in adulthood, only for the first time.

88. Also suggesting minority stress cannot be the full story is that the mental health symptoms associated with minority stress do not entirely correspond with those associated with gender dysphoria. The primary symptoms associated with minority stress are depressive symptoms, substance use, and suicidal ideation.[68] The symptoms associated with gender dysphoria indeed include depressive symptoms and suicidal ideation, but also includes anxiety symptoms, Autism Spectrum Disorders, and personality disorders.

IV. Scientific Claims Assessed

A. Assessment of Claims that All Childhood Outcome Studies Are Wrong

89. There exist authors asserting and re-asserting that the entire set of prospective outcomes studies on prepubescent children is wrong; that desistance is not, in fact, the usual outcome for gender dysphoric children; and that results from various retrospective studies are the more accurate picture.[69] As indicated in the responses published from authors of several prospective outcomes studies (and as summarized below), the arguments are not at all valid.[70]

90. There have been accusations that some of the prospective outcome studies

[68] Meyer, 2003.
[69] Temple Newhook, *et al*., 2018; Winters, *et al*., 2018.
[70] Steensma, *et al*., 2018; Zucker, *et al*. 2018.

(see Appendix 2 for a full list) are old. This criticism would be valid only if newer studies showed different results from the older studies; however, the findings of desistance are the same, indicating that age of the studies is not, in fact, a factor.

91. There have been accusations that some studies failed to use a DSM diagnosis, and should therefore be rejected. That would be a valid criticism only if studies using the DSM showed different results from studies not using the DSM. Because both kinds of studies showed the same results, one may conclude that DSM status was not a factor, even if using a DSM diagnosis would have been a preferred method.

92. There have been criticisms that some studies are too small to provide a reliable result. It is indeed true that if larger studies showed different results from the smaller studies, we would tend to favor the results of the larger studies. Because the smaller studies came to the same conclusion as the larger studies, however, the criticism is, once again, entirely moot.

93. There have been accusations that studies did not use the current DSM-5 as their method of diagnosing gender dysphoric children. This criticism would be valid only if there existed any studies using the DSM-5 against which to compare the existing studies. The DSM-5 is still too recent for there yet to have been long-term follow-up studies. It can be seen, however, that the outcome studies are the same across the DSM-III, DSM-III-R, DSM-IV, and DSM-IV-TR.

94. In science, there cannot be any such thing as a perfect study. Especially in medical research, where we cannot manipulate people in ways that would clear up difficult questions, all studies will have a fault. In science, we do not, however, reject every study with any identifiable short-coming—rather, we gather a diversity of observations, made with their diversity of compromises to safety and ethics (and time and cost, etc.), and tentatively accept the most parsimonious (simplest) explanation of the full set, weighting each study according to their individual strengths and weaknesses.

B. Assessment of Claims of Suicidality

95. The polarized context of gender dysphoria has led to the use of increasingly hyperbolic claims and terms. Typically, as part of an emotion-based effort to effect behavior change, reports of suicidality have been rhetorically weaponized, scarcely representing the content of the research literature.

96. Despite the frequency with which writers refer to "suicidality," few explicate what they mean by the term. The research literature distinguishes importantly among suicidal ideation (which may range from fleeting to chronic), suicide gestures and attempts (which may range from expressions of cries for help range to actual intents to die), threats (which may or may not be sincere or involve lethal means), and actual deaths by suicide.

97. The scientific study of suicide is inextricably link to that of mental illness. For example, as noted in the preceding, suicidality is a well-documented symptom of Borderline Personality Disorder (as are chronic identity issues), and personality disorders are highly elevated among transgender populations, especially adolescent-onset. Thus, the elevations of suicidality among gender dysphoric adolescents may not be a result of anything related to transition (or lack of transition), but to the overlap with mental illnesses of which suicidality is a substantial part. Conversely, improvements in suicidality reported in some studies may not be the result of anything related to transition, but rather to the concurrent general mental health support which is reported by the clinical reported prospective outcomes. Studies that include more than one factor at the same time without accounting for each other represent a "confound," and it cannot be known which factor (or both) is the one causing the effects observed. That is, when a study provides both mental health services and medical transition services at the same time, it cannot be known which (or both) is what caused any changes.

98. Overall, rates of suicidal ideation and suicidal attempts appear to be re-

lated—not to transition status—but to the social support received: The research evidence shows that support decreases suicidality, but that transition itself does not. Indeed, in some situations, social support was associated with increased suicide attempts, suggesting the reported suicidality may represent attempts to evoke more support.[71]

V. Statements from Professional Associations

99. The value of position statements from professional associations should be neither over- nor underestimated. In the ideal, an organization of licensed health care professionals would convene a panel of experts who would systematically collect all the available evidence about an issue, synthesizing it into recommendations or enforceable standards for clinical care, according to the quality of the evidence for each alternative. For politically neutral issues, with relevant expertise contained among association members, this ideal can be readily achievable. For controversial issues with no clear consensus, the optimal statement will summarize each perspective and explicate the strengths and weaknesses of each, providing relatively reserved recommendations and suggestions for future research that might resolve the continuing questions. Several obstacles can hinder that goal, however. Committees within professional organizations are typically volunteer activities, subject to the same internal politics of all human social structures. That is, committee members are not necessarily committees of experts of a topic—they are often committees of generalists handling a wide variety of issues or members of an interest group who feel strongly about political implications of an issue, instead of scientists engaged in the objective study of the topic.

100. Thus, documents from professional associations may represent required standards, the violation of which may merit sanctions, or may represent only recommendations or guidelines. A document may represent the views of an association's

[71] Bauer, *et al*. (2015).

full membership or only of the committee's members (or majorities thereof). Documents may be based on systematic, comprehensive reviews of the available research or selected portions of the research. In sum, the weight best placed on any association's statement is the amount by which that association employed evidence versus other considerations in its process.

101. In the presently highly politicized context, official statements of professional associations have been widely misrepresented. At the end of the Heritage panel discussion in which Dr. Josephson participated, audience member Zack Ford made a claim I have seen frequently on social and in mainstream media: "You all have beliefs that stand in stark contradiction to almost all of the major medical organizations." That claim is demonstrably untrue.

102. In preparing the present report, I searched the professional research literature for documentation of statements from these bodies and from my own files, for which I have been collecting such information for many years. I was able to identify statements from six such organizations (below). Although not strictly a medical association, the World Professional Association for Transgender Health (WPATH) also distributed a set of guidelines in wide use and on which other organizations' guidelines are based.

Association	**Acronym**	**Statement Publication Date**
American Academy of Pediatrics	AAP	2018
Endocrine Society (and Pediatric Endocrine Society)	ES/PES	2017 (2020)
American College of Obstetricians & Gynecologists	ACOG	2017
American College of Physicians	ACP	2015
American Academy of Child and Adolescent Psychiatry	AACAP	2012

Association	Acronym	Statement Publication Date
European Society for Pediatric Endocrinology & Lawson Wilkins Pediatric Endocrine Society	ESPE-LWPES	2009
World Professional Association for Transgender Health	WPATH	2011/2012

103. The professional associations statements addressed different subsets of the various aspects of transition. Nonetheless, with the broad exception of the American Academy of Pediatrics (AAP),[72] the statements repeatedly noted:

- Desistance of gender dysphoria occurs in the majority of prepubescent children.
- Mental health issues need to be assessed as potentially contributing factors and need to be addressed before transition.
- Puberty-blocking medication is an experimental, not a routine, treatment.
- Social transition is not generally recommended until after puberty.

Although some other medical associations have published broad statements of moral support for sexual minorities and against discrimination, they did not include any specific standards or guidelines regarding medical- or transition-related care.

104. Notably, despite that all these medical associations reiterate the need for mental health issues to be resolved before engaging in medical transition, only the AACAP members have medical training in mental health. The other medical specialties include clinical participation with this population, but their assistance in transition generally assumes the mental health aspects have already been assessed and treated beforehand.

105. I was unable to identify any statement from Dr. Josephson that contradicted the major medical associations, with the exception of the AAP, which itself contradicted all the other major medical associations. That is, AAP appears to be the only major medical association advocating an affirmation-only approach, despite the

[72] Rafferty, *et al.*, 2018.

lack of any objective evidence justifying their departure. I review each of these statements by professional organizations below.

A. World Professional Association for Transgender Health (WPATH)—2011

106. The WPATH standards as they relate to prepubescent children begin with the acknowledgement of the known rates of desistance among gender dysphoric children:

> [I]n follow-up studies of prepubertal children (mainly boys) who were referred to clinics for assessment of gender dysphoria, the dysphoria persisted into adulthood for only 6–23% of children (Cohen-Kettenis, 2001; Zucker & Bradley, 1995). Boys in these studies were more likely to identify as gay in adulthood than as transgender (Green, 1987; Money & Russo, 1979; Zucker & Bradley, 1995; Zuger, 1984). Newer studies, also including girls, showed a 12–27% persistence rate of gender dysphoria into adulthood (Drummond, Bradley, Peterson-Badali, & Zucker, 2008; Wallien & Cohen-Kettenis, 2008).[73]

107. That is, "In most children, gender dysphoria will disappear before or early in puberty."[74]

108. Dr. Josephson's comments about the mental health of gender dysphoric children were entirely consistent with the WPATH standards, including the need to "[a]ssess and treat any co-existing mental health concerns of children or adolescents (or refer to another mental health professional for treatment)."[75] Indeed, the WPATH standards agree explicitly with Dr. Josephson's expressed purpose: "The role of mental health professionals includes making reasonably sure that the gender dysphoria is not secondary to or better accounted for by other diagnoses."[76]

109. Although WPATH does not refer to puberty blocking medications as "experimental," the document indicates the non-routine, or at least inconsistent availability of the treatment:

> Among adolescents who are referred to gender identity clinics, the number considered eligible for early medical treatment—starting with GnRH analogues to suppress puberty in the first Tanner stages—differs

[73] Coleman, *et al.*, 2012, p. 172.
[74] Coleman, *et al.*, 2012, p. 173.
[75] Coleman, *et al.*, 2012, p. 174.
[76] Coleman, *et al.*, 2012, p. 180.

> among countries and centers. Not all clinics offer puberty suppression. If such treatment is offered, the pubertal stage at which adolescents are allowed to start varies from Tanner stage 2 to stage 4 (Delemarre, van de Waal & Cohen-Kettenis, 2006; Zucker et al., in press).[77]

110. WPATH neither endorses nor proscribes social transitions before puberty, instead recognizing the diversity among families' decisions:

> Social transitions in early childhood do occur within some families with early success. This is a controversial issue, and divergent views are held by health professionals. The current evidence base is insufficient to predict the long-term outcomes of completing a gender role transition during early childhood.[78]

111. It does caution, however, "Relevant in this respect are the previously described relatively low persistence rates of childhood gender dysphoria."[79]

B. Endocrine Society (ES)—2017

112. The 150,000-member Endocrine Society appointed a nine-member task force, plus a methodologist and a medical writer, who commissioned two systematic reviews of the research literature and, in 2017, published an update of their 2009 recommendations, based on the best available evidence identified. The guideline was co-sponsored by the American Association of Clinical Endocrinologists, American Society of Andrology, European Society for Paediatric Endocrinology, European Society of Endocrinology, Pediatric Endocrine Society (PES), and the World Professional Association for Transgender Health (WPATH).

113. The document acknowledged the frequency of desistance among gender dysphoric children:

> Prospective follow-up studies show that childhood GD/gender incongruence does not invariably persist into adolescence and adulthood (so-called "desisters"). Combining all outcome studies to date, the GD/gender incongruence of a minority of prepubertal children appears to persist in adolescence. . . . In adolescence, a significant number of these desisters identify as homosexual or bisexual.[80]

114. The statement similarly acknowledges inability to predict desistance or persistence, "With current knowledge, we cannot predict the psychosexual outcome

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77 Coleman, *et al.*, 2012, p. 173.
78 Coleman, *et al.*, 2012, p. 173.
79 Coleman, *et al.*, 2012, p. 176 (quoting Drummond, *et al.*, 2008; Wallien & Cohen-Kettenis, 2008).
80 Hembree, *et al.*, 2017, p. 3876.

for any specific child."[81]

115. Although outside their area of professional expertise, mental health issues were also addressed by the Endocrine Society, repeating the need to handle such issues before engaging in transition, "In cases in which severe psychopathology, circumstances, or both seriously interfere with the diagnostic work or make satisfactory treatment unlikely, clinicians should assist the adolescent in managing these other issues."[82] This ordering—to address mental health issues before embarking on transition—avoids relying on the unproven belief that transition will solve such issues.

116. The Endocrine Society did not endorse any affirmation-only approach. The guidelines were neutral with regard to social transitions before puberty, instead advising that such decisions be made only under clinical supervision: "We advise that decisions regarding the social transition of prepubertal youth are made with the assistance of a mental health professional or similarly experienced professional."[83]

117. Among his contributions to the panel, Dr. Josephson related a disagreement he had with a colleague regarding clinical judgments about clients' thoughts about transition. The Endocrine Society guidelines side with Dr. Josephson, making explicit that, after gathering information from adolescent clients seeking medical interventions and their parents, the clinician "provides correct information to prevent unrealistically high expectations [and] assesses whether medical interventions may result in unfavorable psychological and social outcomes."[84]

C. Pediatric Endocrine Society and Endocrine Society (ES/PES)—2020

118. In 2020, the 1500-member Pediatric Endocrine Society partnered with the Endocrine Society to create and endorse a brief, two-page position statement.[85] Although strongly worded, the document provided no specific guidelines, instead

[81] Hembree, *et al.*, 2017, p. 3876.
[82] Hembree, *et al.*, 2017, 3877.
[83] Hembree, *et al.*, 2017, p. 3872.
[84] Hembree, *et al.*, 2017, p. 3877.
[85] PES, online; Pediatric Endocrine Society & Endocrine Society, 2020, December 15.

deferring to the Endocrine Society guidelines.[86]

119. It is not clear to what extent this endorsement is meaningful, however. According to the PES, the Endocrine Society "recommendations include evidence that treatment of gender dysphoria/gender incongruence is medically necessary and should be covered by insurance."[87] However, the Endocrine Society makes neither statement. Although the two-page PES document mentioned insurance coverage four times, the only mention of health insurance by the Endocrine Society was: "If GnRH analog treatment is not available (insurance denial, prohibitive cost, or other reasons), postpubertal, transgender female adolescents may be treated with an antiandrogen that directly suppresses androgen synthesis or action."[88] Despite the PES asserting it as 'medically necessary', the Endocrine Society stopped short of that. Its only use of that phrase was instead limiting: "We recommend that a patient pursue genital gender-affirming surgery only after the MHP and the clinician responsible for endocrine transition therapy both agree that surgery is medically necessary and would benefit the patient's overall health and/or well-being."[89]

120. Thus, Dr. Josephson's comments, including those about evaluating child clients' thinking and the need to resolve mental health issues before transition, are entirely consistent also with the guidelines of the Pediatric Endocrine Society.

D. American Academy of Child & Adolescent Psychiatry (AACAP)—2012

121. The 2012 statement of the American Academy of Child & Adolescent Psychiatry (AACAP) is not an affirmation-only policy. It notes:

> Just as family rejection is associated with problems such as depression, suicidality, and substance abuse in gay youth, the proposed benefits of treatment to eliminate gender discordance in youth must be carefully weighed against such possible deleterious effects. . . . In general, it is desirable to help adolescents who may be experiencing gender distress and dysphoria to defer sex reassignment until adulthood, or at least

[86] Hembree, *et al.*, 2017.
[87] PES, online, p. 1.
[88] Hembree, *et al.*, p. 3883.
[89] Hembree, *et al.*, p. 3872, repeated on p. 3894.

> until the wish to change sex is unequivocal, consistent, and made with appropriate consent.[90]

122. The AACAP's language repeats the description of the use of puberty blockers only as an exception "For situations in which deferral of sex reassignment decisions until adulthood is *not clinically feasible*, one approach that has been described in case series is sex hormone suppression under endocrinological management with psychiatric consultation using gonadotropin-releasing hormone analogues."[91]

123. The AACAP statement acknowledges the long-term outcomes literature for gender dysphoric children: "In follow-up studies of prepubertal boys with gender discordance—including many without any mental health treatment—the cross gender wishes usually fade over time and do not persist into adulthood,"[92] adding that "[c]linicians should be aware of current evidence on the natural course of gender discordance and associated psychopathology in children and adolescents in choosing the treatment goals and modality."[93]

124. The policy similarly includes a provision for resolving mental health issues: "Gender reassignment services are available in conjunction with mental health services focusing on exploration of gender identity, cross-sex treatment wishes, counseling during such treatment if any, and *treatment of associated mental health problems*."[94] The document also includes minority stress issues and the need to deal with mental health aspects of minority status (*e.g.*, bullying).[95]

125. Rather than endorse social transition for prepubertal children, the AACAP indicates: "There is similarly no data at present from controlled studies to guide clinical decisions regarding the risks and benefits of sending gender discordant children to school in their desired gender. Such decisions must be made based on clinical judg-

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90 Adelson & AACAP, 2012, p. 969.
91 Adelson & AACAP, 2012, p. 969, italics added.
92 Adelson & AACAP, 2012, p. 963.
93 Adelson & AACAP, 2012, p. 968.
94 Adelson & AACAP, 2012, p. 970, italics added.
95 Adelson & AACAP, 2012, p. 969.

ment, bearing in mind the potential risks and benefits of doing so."

E. American College of Obstetricians & Gynecologists (ACOG)—2017

126. The American College of Obstetricians & Gynecologists (ACOG) published a "Committee Opinion" expressing recommendations in 2017. The statement indicates it was developed by the ACOG's Committee on Adolescent Health Care, but does not indicate participation based on professional expertise or a systematic method of objectively assessing the existing research. It includes the disclaimer: "This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed."[96]

127. Prepubertal children do not typically have clinical contact with gynecologists, and the ACOG recommendations include that the client additionally have a primary health care provider.

128. The ACOG statement cites the statements made by other medical associations—ESPE, PES, and the Endocrine Society—and by WPATH. It does not cite any professional association of *mental* health care providers, however. The ACOG recommendations repeat the previously mentioned eligibility/readiness criteria of having no psychiatric illness that would hamper diagnosis and no psychiatric (or other medical) contraindications to treatment. It notes that "*before* any treatment is undertaken, the patient must display eligibility and readiness (Table 1), meaning that the adolescent has been evaluated by a mental health professional, has no contraindications to therapy, and displays an understanding of the risks involved."[97] Dr. Josephson's comments are entirely in line with this recommendation.

129. The "Eligibility and Readiness Criteria" also include, "Diagnosis established for gender dysphoria, transgender, transsexualism."[98] This standard, requir-

[96] ACOG, 2017, p. 1.
[97] ACOG, 2017, p. 3 (citing the Endocrine Society guidelines, italics added).
[98] ACOG, 2017, Table 1, p. 3.

ing a formal diagnosis, forestall affirmation-on-demand because self-declared self-identification is not sufficient for DSM diagnosis.

130. ACOG's remaining recommendations pertain only to post-transition, medically oriented concerns. Pre-pubertal social transition is not mentioned in the document, and the outcomes studies of gender dysphoric (prepubescent) children are not cited.

F. American College of Physicians (ACP)—2015

131. The American College of Physicians published a position paper broadly expressing support for the treatment of LGBT patients and their families, including nondiscrimination, antiharassment, and defining "family" by emotional rather than biological or legal relationships in visitation policies, and the inclusion of transgender health care services of public and private health benefit plans.[99]

132. ACP did not provide guidelines or standards for child or adult gender transitions. The policy paper opposed attempting "reparative therapy;" however, the paper confabulated sexual orientation with gender identity in doing so. That is, on the one hand, ACP explicitly recognized that "[s]exual orientation and gender identity are inherently different."[100] It based this statement on the fact that "the American Psychological Association conducted a literature review of 83 studies on the efficacy of efforts to change *sexual orientation*."[101] The APA's document, entitled "Report of the American Psychological Task Force on appropriate therapeutic responses to *sexual orientation*" (italics added) does not include or reference research on gender identity. Despite citing no research about transgenderism, the ACP nonetheless included in its statement: "Available research does not support the use of reparative therapy as an effective method in the treatment of LGB*T* persons."[102] That is, the inclusion of "T" with "LGB" is based on something other than the existing evidence.

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99 Daniel & Butkus, 2015a, 2015b.
100 Daniel & Butkus, 2015b, p. 2.
101 Daniel & Butkus, 2015b, p. 8, italics added.
102 Daniel & Butkus, 2015b, p. 8, italics added.

133. There is another statement,[103] which was funded by ACP and published in the Annals of Internal Medicine under its "*In the Clinic*" feature, noting that "'In the Clinic' does not necessarily represent official ACP clinical policy."[104] The document discusses medical transition procedures for adults rather than for children, except to note that "no medical intervention is indicated for prepubescent youth,"[105] "a mental health provider can assist the child and family with identifying an appropriate time for a social transition,"[106] and that "the child should be assessed and managed for coexisting mood disorders during this period because risk for suicide is high than in their cisgender peers."[107]

134. I could find no contradictions between Dr. Josephson's comments and the content of these documents.

G. American Academy of Pediatrics (AAP)—2018

135. The policy of the American Academy of Pediatrics (AAP) is unique among the major medical associations in being the only one to endorse an affirmation-on-demand policy, including social transition before puberty without any watchful waiting period. Although changes in recommendations can obviously be appropriate in response to new research evidence, the AAP provided none. Rather, the research studies AAP cited in support of its policy simply did not say what AAP claimed they did. In fact, the references that AAP cited as the basis of their policy instead outright contradicted that policy, repeatedly endorsing watchful waiting.[108] Moreover, of all the outcomes research published, the AAP policy cited *none*.

136. I conducted a point-by-point fact-check of the claims asserted in the AAP policy and the references it cited in support of them. I submitted it to the *Journal of Sex & Marital Therapy*, a well-known research journal of my field, where it under-

[103] Safer & Tangpricha, 2019.
[104] Safer & Tangpricha, 2019, p. ITC1.
[105] Safer & Tangpricha, 2019, p. ITC9.
[106] Safer & Tangpricha, 2019, p. ITC9.
[107] Safer & Tangpricha, 2019, p. ITC9.
[108] Cantor, 2020.

went blind peer review and was published. I append that article as part of this report. See Appendix 3.

137. A great deal of published attention ensued; however, the AAP has yet to respond to the errors I demonstrated in its policy. Writing for *The Economist* about the use of puberty blockers, Helen Joyce asked AAP directly, "Has the AAP responded to Dr Cantor? If not, have you any response now?" The AAP Media Relations Manager, Lisa Black, emailed: "We do not have anyone available for comment."

H. The ESPE-LWPES GnRH Analogs Consensus Conference Group—2009

138. Included in the interest of completeness, there was also a collaborative report in 2009, between the European Society for Pediatric Endocrinology (ESPE) and the Lawson Wilkins Pediatric Endocrine Society (LWPES). Thirty experts were convened, evenly divided between North American and European labs and evenly divided male/female, who comprehensively rated the research literature on gonadotropin-release hormone analogs in children.

139. The effort concluded that "[u]se of gonadotropin-releasing hormone analogs for conditions other than central precocious puberty requires additional investigation and cannot be suggested routinely." However, gender dysphoria was not explicitly mentioned as one of those other conditions.

VI. Conclusions

140. In sum, the research literature consists of a relatively small number of studies on a diverse phenomenon, which show mixed results from potential treatments (and non-treatment). Many debates, both public and professional ones, repeatedly provided only selected portions of these findings, thus misrepresenting the state of the science to appear one-sided rather than mixed.

141. Given the only tentative and incomplete nature of the science, the continuing and active misrepresentation of the science by extremists, and the large risks potentially posed to the long-term well-being of children, my field requires not only

additional research, but also vigorous debate among all potential interpretations.

142. The negative effect of shutting down a single side of an issue can be seen best with a specific example. A recent study "estimated homicide rates for transgender residents and transfeminine, Black, Latin@, and young (aged 15–34 years) subpopulations during the period 2010 to 2014 using Transgender Day of Remembrance and National Coalition of Anti-Violence Programs transgender homicide data."[109] The analyses demonstrated that homicide rates were highly elevated among Black, trans, drug-involved sex workers, but otherwise were lower than among the remainder of the transgender population as compared to the general mainstream population.

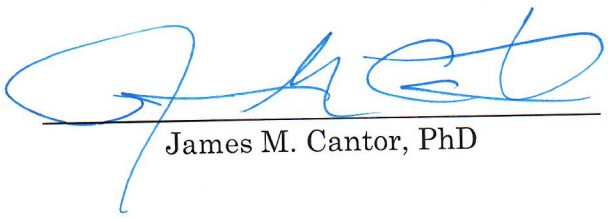
143. If an observer were provided only with the first of these findings, then it would appear that transphobia is adding to the victimization of those in already victimized groups. A policy-maker would want to respond by allocating resources into combatting transphobic violence; however, such efforts would be mostly misapplied, going to portions of the community who don't need it. Conversely, if the observer were provided only with the second of these findings, then one would conclude that there is no transphobia problem at all—the trans community would already be doing better than average. That, however, would lead to a failure to allocate protections where they are indeed needed to save people who are indeed suffering high rates of homicide. It is only when an observer has access to both of these findings that one can identify the best means to benefit the public: to help drug-involved sex workers, for which the Black transpeople would disproportionately benefit exactly as they are disproportionately victimized.

144. Acknowledging the contested nature of many claims in public and professional discussions of this topic, Dr. Josephson's claims are uniformly consistent with medical association guidelines and with the contents of the scientific literature. If

[109] Dinno, 2017, p. 1441.

experts and care providers are unable to share the information they have, then clients and their families will be unable to become informed enough to provide informed consent, and policy makers will be led away from applying resources to where they may do their intended good.

Date: 31 March 2021



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Zuger, B. (1984). Early effeminate behavior in boys: Outcome and significance for homosexuality. *Journal of Nervous and Mental Disease, 172*, 90–97.

Appendix 1

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EDUCATION

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Psychology • McGill University • Montréal, Canada

Master of Arts Sep., 1990–Jan., 1992
Psychology • Boston University • Boston, MA

Bachelor of Science Sep. 1984–Aug., 1988
Interdisciplinary Science • Rensselaer Polytechnic Institute • Troy, NY
Concentrations: Computer science, mathematics, physics

EMPLOYMENT HISTORY

Director Feb., 2017–Present
Toronto Sexuality Centre • Toronto, Canada

Senior Scientist (Inaugural Member) Aug., 2012–May, 2018
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Senior Scientist Jan., 2012–May, 2018
Complex Mental Illness Program
Centre for Addiction and Mental Health • Toronto, Canada

Head of Research Nov., 2010–Apr. 2014
Sexual Behaviours Clinic
Centre for Addiction and Mental Health • Toronto, Canada

Research Section Head Dec., 2009–Sep. 2012
Law & Mental Health Program
Centre for Addiction and Mental Health • Toronto, Canada

Psychologist May, 2004–Dec., 2011
Law & Mental Health Program
Centre for Addiction and Mental Health • Toronto, Canada

Clinical Psychology Intern Sep., 1998–Aug., 1999
Centre for Addiction and Mental Health • Toronto, Canada

Teaching Assistant Sep., 1993–May, 1998
Department of Psychology
McGill University • Montréal, Canada

Pre-Doctoral Practicum Sep., 1993–Jun., 1997
Sex and Couples Therapy Unit
Royal Victoria Hospital • Montréal, Canada

Pre-Doctoral Practicum May, 1994–Dec., 1994
Department of Psychiatry
Queen Elizabeth Hospital • Montréal, Canada

ACADEMIC APPOINTMENTS

Associate Professor Jul., 2010–May, 2019
Department of Psychiatry
University of Toronto Faculty of Medicine • Toronto, Canada

Adjunct Faculty Aug. 2013–Jun., 2018
Graduate Program in Psychology
York University • Toronto, Canada

Associate Faculty (Hon) Oct., 2017–Dec., 2017
School of Behavioural, Cognitive & Social Science
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Assistant Professor Jun., 2005–Jun., 2010
Department of Psychiatry
University of Toronto Faculty of Medicine • Toronto, Canada

Adjunct Faculty Sep., 2004–Jun., 2010
Clinical Psychology Residency Program
St. Joseph's Healthcare • Hamilton, Canada

PUBLICATIONS

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6. Cantor, J. M., & Fedoroff, J. P. (2018). Can pedophiles change? Response to opening arguments and conclusions. *Current Sexual Health Reports, 10,* 213–220. doi: 10.1007/s11930-018-0167-0z
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54. Cantor, J. M., Blanchard, R., Robichaud, L. K., & Christensen, B. K. (2005). Quantitative reanalysis of aggregate data on IQ in sexual offenders. *Psychological Bulletin, 131,* 555–568. doi: 10.1037/0033-2909.131.4.555
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56. Cantor, J. M., Blanchard, R., Christensen, B. K., Dickey, R., Klassen, P. E., Beckstead, A. L., Blak, T., & Kuban, M. E. (2004). Intelligence, memory, and handedness in pedophilia. *Neuropsychology, 18,* 3–14. doi: 10.1037/0894-4105.18.1.3
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64. Pilkington, N. W., & Cantor, J. M. (1996). Perceptions of heterosexual bias in professional psychology programs: A survey of graduate students. *Professional Psychology: Research and Practice*, *27*, 604–612.

PUBLICATIONS

LETTERS AND COMMENTARIES

1. Cantor, J. M. (2015). Research methods, statistical analysis, and the phallometric test for hebephilia: Response to Fedoroff [Editorial Commentary]. *Journal of Sexual Medicine, 12,* 2499–2500. doi: 10.1111/jsm.13040
2. Cantor, J. M. (2015). In his own words: Response to Moser [Editorial Commentary]. *Journal of Sexual Medicine, 12,* 2502–2503. doi: 10.1111/jsm.13075
3. Cantor, J. M. (2015). Purported changes in pedophilia as statistical artefacts: Comment on Müller et al. (2014). *Archives of Sexual Behavior, 44,* 253–254. doi: 10.1007/s10508-014-0343-x
4. McPhail, I. V., & Cantor, J. M. (2015). Pedophilia, height, and the magnitude of the association: A research note. *Deviant Behavior, 36,* 288–292. doi: 10.1080/01639625.2014.935644
5. Soh, D. W., & Cantor, J. M. (2015). A peek inside a furry convention [Letter to the Editor]. *Archives of Sexual Behavior, 44,* 1–2. doi: 10.1007/s10508-014-0423-y
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8. Cantor, J. M., & Blanchard, R. (2012). White matter volumes in pedophiles, hebephiles, and teleiophiles [Letter to the Editor]. *Archives of Sexual Behavior, 41, 749–752.* doi: 10.1007/s10508-012-9954-2
9. Cantor, J. M. (2011). New MRI studies support the Blanchard typology of male-to-female transsexualism [Letter to the Editor]. *Archives of Sexual Behavior, 40*, 863–864. doi: 10.1007/s10508-011-9805-6
10. Zucker, K. J., Bradley, S. J., Own-Anderson, A., Kibblewhite, S. J., & Cantor, J. M. (2008). Is gender identity disorder in adolescents coming out of the closet? *Journal of Sex and Marital Therapy, 34,* 287–290.
11. Cantor, J. M. (2003, Summer). Review of the book *The Man Who Would Be Queen* by J. Michael Bailey. *Newsletter of Division 44 of the American Psychological Association, 19*(2), 6.
12. Cantor, J. M. (2003, Spring). What are the hot topics in LGBT research in psychology? *Newsletter of Division 44 of the American Psychological Association, 19*(1), 21–24.
13. Cantor, J. M. (2002, Fall). Male homosexuality, science, and pedophilia. *Newsletter of Division 44 of the American Psychological Association, 18*(3), 5–8.
14. Cantor, J. M. (2000). Review of the book *Sexual Addiction: An Integrated Approach. Journal of Sex and Marital Therapy, 26*, 107–109.

EDITORIALS

1. Cantor, J. M. (2012). Editorial. *Sexual Abuse: A Journal of Research and Treatment, 24*.

2. Cantor, J. M. (2011). Editorial note. *Sexual Abuse: A Journal of Research and Treatment, 23,* 414.
3. Barbaree, H. E., & Cantor, J. M. (2010). Performance indicates for *Sexual Abuse: A Journal of Research and Treatment* (SAJRT) [Editorial]. *Sexual Abuse: A Journal of Research and Treatment, 22,* 371–373.
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5. Zucker, K. J., & Cantor, J. M. (2009). Cruising: Impact factor data [Editorial]. *Archives of Sexual Research, 38,* 878–882.
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7. Zucker, K. J., & Cantor, J. M. (2008). The *Archives* in the era of online first ahead of print[Editorial]. *Archives of Sexual Behavior, 37,* 512–516.
8. Zucker, K. J., & Cantor, J. M. (2006). The impact factor: The *Archives* breaks from the pack [Editorial]. *Archives of Sexual Behavior, 35,* 7–9.
9. Zucker, K. J., & Cantor, J. M. (2005). The impact factor: “Goin’ up” [Editorial]. *Archives of Sexual Behavior, 34,* 7–9.
10. Zucker, K., & Cantor, J. M. (2003). The numbers game: The impact factor and all that jazz [Editorial]. *Archives of Sexual Behavior, 32,* 3–5.

FUNDING HISTORY

Principal Investigators:	Doug VanderLaan, Meng-Chuan Lai
Co-Investigators:	James M. Cantor, Megha Mallar Chakravarty, Nancy Lobaugh, M. Palmert, M. Skorska
Title:	*Brain function and connectomics following sex hormone treatment in adolescents experience gender dysphoria*
Agency:	Canadian Institutes of Health Research (CIHR), Behavioural Sciences-B-2
Funds:	$650,250 / 5 years (July, 2018)

Principal Investigator:	Michael C. Seto
Co-Investigators:	Martin Lalumière , James M. Cantor
Title:	*Are connectivity differences unique to pedophilia?*
Agency:	University Medical Research Fund, Royal Ottawa Hospital
Funds:	$50,000 / 1 year (January, 2018)

Principal Investigator:	Lori Brotto
Co-Investigators:	Anthony Bogaert, James M. Cantor, Gerulf Rieger
Title:	*Investigations into the neural underpinnings and biological correlates of asexuality*
Agency:	Natural Sciences and Engineering Research Council (NSERC), Discovery Grants Program
Funds:	$195,000 / 5 years (April, 2017)

Principal Investigator:	Doug VanderLaan
Co-Investigators:	Jerald Bain, James M. Cantor, Megha Mallar Chakravarty, Sofia Chavez, Nancy Lobaugh, and Kenneth J. Zucker
Title:	*Effects of sex hormone treatment on brain development: A magnetic resonance imaging study of adolescents with gender dysphoria*
Agency:	Canadian Institutes of Health Research (CIHR), Transitional Open Grant Program
Funds:	$952,955 / 5 years (September, 2015)

Principal Investigator:	James M. Cantor
Co-Investigators:	Howard E. Barbaree, Ray Blanchard, Robert Dickey, Todd A. Girard, Phillip E. Klassen, and David J. Mikulis
Title:	*Neuroanatomic features specific to pedophilia*
Agency:	Canadian Institutes of Health Research (CIHR)
Funds:	$1,071,920 / 5 years (October, 2008)

Principal Investigator:	James M. Cantor
Title:	*A preliminary study of fMRI as a diagnostic test of pedophilia*
Agency:	Dean of Medicine New Faculty Grant Competition, Univ. of Toronto
Funds:	$10,000 (July, 2008)

Principal Investigator:	James M. Cantor
Co-Investigator:	Ray Blanchard
Title:	*Morphological and neuropsychological correlates of pedophilia*
Agency:	Canadian Institutes of Health Research (CIHR)
Funds:	$196,902 / 3 years (April, 2006)

KEYNOTE AND INVITED ADDRESSES

1. Cantor, J. M. (2019, May 1). *Introduction and Q&A for 'I, Pedophile.'* StopSO 2nd Annual Conference, London, UK.
2. Cantor, J. M. (2018, August 29). *Neurobiology of pedophilia or paraphilia? Towards a 'Grand Unified Theory' of sexual interests.* Keynote address to the International Association for the Treatment of Sexual Offenders, Vilnius, Lithuania.
3. Cantor, J. M. (2018, August 29). *Pedophilia and the brain: Three questions asked and answered.* Preconference training presented to the International Association for the Treatment of Sexual Offenders, Vilnius, Lithuania.
4. Cantor, J. M. (2018, April 13). *The responses to* I, Pedophile *from We, the people.* Keynote address to the Minnesota Association for the Treatment of Sexual Abusers, Minneapolis, Minnesota.
5. Cantor, J. M. (2018, April 11). *Studying atypical sexualities: From vanilla to* I, Pedophile. Full day workshop at the Minnesota Association for the Treatment of Sexual Abusers, Minneapolis, Minnesota.
6. Cantor, J. M. (2018, January 20). *How much sex is enough for a happy life?* Invited lecture to the University of Toronto Division of Urology Men's Health Summit, Toronto, Canada.
7. Cantor, J. M. (2017, November 2). Pedophilia as a phenomenon of the brain: Update of evidence and the public response. Invited presentation to the 7th annual SBC education event, Centre for Addiction and Mental Health, Toronto, Canada.
8. Cantor, J. M. (2017, June 9). Pedophilia being in the brain: The evidence and the public's reaction. Invited presentation to *SEXposium at the ROM: The science of love and sex,* Toronto, Canada.
9. Cantor, J. M., & Campea, M. (2017, April 20). *"I, Pedophile" showing and discussion.* Invited presentation to the 42nd annual meeting of the Society for Sex Therapy and Research, Montréal, Canada.
10. Cantor, J. M. (2017, March 1). *Functional and structural neuroimaging of pedophilia: Consistencies across methods and modalities.* Invited lecture to the Brain Imaging Centre, Royal Ottawa Hospital, Ottawa, Canada.
11. Cantor, J. M. (2017, January 26). *Pedophilia being in the brain: The evidence and the public reaction.* Inaugural keynote address to the University of Toronto Sexuality Interest Network, Toronto, Ontario, Canada.
12. Cantor, J. M. (2016, October 14). *Discussion of CBC's "I, Pedophile."* Office of the Children's Lawyer Educational Session, Toronto, Ontario, Canada.
13. Cantor, J. M. (2016, September 15). *Evaluating the risk to reoffend: What we know and what we don't.* Invited lecture to the Association of Ontario Judges, Ontario Court of Justice Annual Family Law Program, Blue Mountains, Ontario, Canada. [Private link only: https://vimeo.com/239131108/3387c80652]
14. Cantor, J. M. (2016, April 8). *Pedophilia and the brain: Conclusions from the second generation of research.* Invited lecture at the 10th annual Risk and Recovery Forensic Conference, Hamilton, Ontario.
15. Cantor, J. M. (2016, April 7). *Hypersexuality without the hyperbole.* Keynote address to the 10th annual Risk and Recovery Forensic Conference, Hamilton, Ontario.
16. Cantor, J. M. (2015, November). *No one asks to be sexually attracted to children: Living in*

Daniel's World. Grand Rounds, Centre for Addiction and Mental Health. Toronto, Canada.

17. Cantor, J. M. (2015, August). *Hypersexuality: Getting past whether "it" is or "it" isn't.* Invited address at the 41st annual meeting of the International Academy of Sex Research. Toronto, Canada.
18. Cantor, J. M. (2015, July). *A unified theory of typical and atypical sexual interest in men: Paraphilia, hypersexuality, asexuality, and vanilla as outcomes of a single, dual opponent process.* Invited presentation to the 2015 Puzzles of Sexual Orientation conference, Lethbridge, AL, Canada.
19. Cantor, J. M. (2015, June). *Hypersexuality.* Keynote Address to the Ontario Problem Gambling Provincial Forum. Toronto, Canada.
20. Cantor, J. M. (2015, May). *Assessment of pedophilia: Past, present, future.* Keynote Address to the International Symposium on Neural Mechanisms Underlying Pedophilia and Child Sexual Abuse (NeMUP). Berlin, Germany.
21. Cantor, J. M. (2015, March). *Prevention of sexual abuse by tackling the biggest stigma of them all: Making sex therapy available to pedophiles.* Keynote address to the 40th annual meeting of the Society for Sex Therapy and Research, Boston, MA.
22. Cantor, J. M. (2015, March. *Pedophilia: Predisposition or perversion?* Panel discussion at Columbia University School of Journalism. New York, NY.
23. Cantor, J. M. (2015, February). *Hypersexuality.* Research Day Grand Rounds presentation to Ontario Shores Centre for Mental Health Sciences, Whitby, Ontario, Canada.
24. Cantor, J. M. (2015, January). *Brain research and pedophilia: What it means for assessment, research, and policy.* Keynote address to the inaugural meeting of the Netherlands Association for the Treatment of Sexual Abusers, Utrecht, Netherlands.
25. Cantor, J. M. (2014, December). *Understanding pedophilia and the brain: Implications for safety and society.* Keynote address for The Jewish Community Confronts Violence and Abuse: Crisis Centre for Religious Women, Jerusalem, Israel.
26. Cantor, J. M. (2014, October). *Understanding pedophilia & the brain.* Invited full-day workshop for the Sex Offender Assessment Board of Pennsylvania, Harrisburg, PA.
27. Cantor, J. M. (2014, September). *Understanding neuroimaging of pedophilia: Current status and implications.* Invited lecture presented to the Mental Health and Addition Rounds, St. Joseph's Healthcare, Hamilton, Ontario, Canada.
28. Cantor, J. M. (2014, June). *An evening with Dr. James Cantor.* Invited lecture presented to the Ontario Medical Association, District 11 Doctors' Lounge Program, Toronto, Ontario, Canada.
29. Cantor, J. M. (2014, April). *Pedophilia and the brain.* Invited lecture presented to the University of Toronto Medical Students lunchtime lecture. Toronto, Ontario, Canada.
30. Cantor, J. M. (2014, February). *Pedophilia and the brain: Recap and update.* Workshop presented at the 2014 annual meeting of the Washington State Association for the Treatment of Sexual Abusers, Cle Elum, WA.
31. Cantor, J. M., Lafaille, S., Hannah, J., Kucyi, A., Soh, D., Girard, T. A., & Mikulis, D. M. (2014, February). *Functional connectivity in pedophilia.* Neuropsychiatry Rounds, Toronto Western Hospital, Toronto, Ontario, Canada.
32. Cantor, J. M. (2013, November). *Understanding pedophilia and the brain: The basics, the current status, and their implications.* Invited lecture to the Forensic Psychology Research Centre, Carleton University, Ottawa, Canada.

33. Cantor, J. M. (2013, November). *Mistaking puberty, mistaking hebephilia.* Keynote address presented to the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago, IL.
34. Cantor, J. M. (2013, October). *Understanding pedophilia and the brain: A recap and update.* Invited workshop presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago, IL.
35. Cantor, J. M. (2013, October). *Compulsive-hyper-sex-addiction: I don't care what we all it, what can we* do*?* Invited address presented to the Board of Examiners of Sex Therapists and Counselors of Ontario, Toronto, Ontario, Canada.
36. Cantor, J. M. (2013, September). *Neuroimaging of pedophilia: Current status and implications.* McGill University Health Centre, Department of Psychiatry Grand Rounds presentation, Montréal, Québec, Canada.
37. Cantor, J. M. (2013, April). *Understanding pedophilia and the brain.* Invited workshop presented at the 2013 meeting of the Minnesota Association for the Treatment of Sexual Abusers, Minneapolis, MN.
38. Cantor, J. M. (2013, April). *The neurobiology of pedophilia and its implications for assessment, treatment, and public policy.* Invited lecture at the 38th annual meeting of the Society for Sex Therapy and Research, Baltimore, MD.
39. Cantor, J. M. (2013, April). *Sex offenders: Relating research to policy.* Invited roundtable presentation at the annual meeting of the Academy of Criminal Justice Sciences, Dallas, TX.
40. Cantor, J. M. (2013, March). *Pedophilia and brain research: From the basics to the state-of-the-art.* Invited workshop presented to the annual meeting of the Forensic Mental Health Association of California, Monterey, CA.
41. Cantor, J. M. (2013, January). *Pedophilia and child molestation.* Invited lecture presented to the Canadian Border Services Agency, Toronto, Ontario, Canada.
42. Cantor, J. M. (2012, November). *Understanding pedophilia and sexual offenders against children: Neuroimaging and its implications for public safety.* Invited guest lecture to University of New Mexico School of Medicine Health Sciences Center, Albuquerque, NM.
43. Cantor, J. M. (2012, November). *Pedophilia and brain research.* Invited guest lecture to the annual meeting of the Circles of Support and Accountability, Toronto, Ontario, Canada.
44. Cantor, J. M. (2012, January). *Current findings on pedophilia brain research.* Invited workshop at the San Diego International Conference on Child and Family Maltreatment, San Diego, CA.
45. Cantor, J. M. (2012, January). *Pedophilia and the risk to re-offend.* Invited lecture to the Ontario Court of Justice Judicial Development Institute, Toronto, Ontario, Canada.
46. Cantor, J. M. (2011, November). *Pedophilia and the brain: What it means for assessment, treatment, and policy.* Plenary Lecture presented at the Association for the Treatment of Sexual Abusers, Toronto, Ontario, Canada.
47. Cantor, J. M. (2011, July). *Towards understanding contradictory findings in the neuroimaging of pedophilic men.* Keynote address to 7th annual conference on Research in Forensic Psychiatry, Regensberg, Germany.
48. Cantor, J. M. (2011, March). *Understanding sexual offending and the brain: Brain basics to the state of the art.* Workshop presented at the winter conference of the Oregon Association for the Treatment of Sexual Abusers, Oregon City, OR.

49. Cantor, J. M. (2010, October). *Manuscript publishing for students.* Workshop presented at the 29th annual meeting of the Association for the Treatment of Sexual Abusers, Phoenix, AZ.
50. Cantor, J. M. (2010, August). *Is sexual orientation a paraphilia?* Invited lecture at the International Behavioral Development Symposium, Lethbridge, Alberta, Canada.
51. Cantor, J. M. (2010, March). *Understanding sexual offending and the brain: From the basics to the state of the art.* Workshop presented at the annual meeting of the Washington State Association for the Treatment of Sexual Abusers, Blaine, WA.
52. Cantor, J. M. (2009, January). *Brain structure and function of pedophilia men.* Neuropsychiatry Rounds, Toronto Western Hospital, Toronto, Ontario.
53. Cantor, J. M. (2008, April). *Is pedophilia caused by brain dysfunction?* Invited address to the University-wide Science Day Lecture Series, SUNY Oswego, Oswego, NY.
54. Cantor, J. M., Kabani, N., Christensen, B. K., Zipursky, R. B., Barbaree, H. E., Dickey, R., Klassen, P. E., Mikulis, D. J., Kuban, M. E., Blak, T., Richards, B. A., Hanratty, M. K., & Blanchard, R. (2006, September). *MRIs of pedophilic men.* Invited presentation at the 25th annual meeting of the Association for the Treatment of Sexual Abusers, Chicago.
55. Cantor, J. M., Blanchard, R., & Christensen, B. K. (2003, March). *Findings in and implications of neuropsychology and epidemiology of pedophilia.* Invited lecture at the 28th annual meeting of the Society for Sex Therapy and Research, Miami.
56. Cantor, J. M., Christensen, B. K., Klassen, P. E., Dickey, R., & Blanchard, R. (2001, July). *Neuropsychological functioning in pedophiles.* Invited lecture presented at the 27th annual meeting of the International Academy of Sex Research, Bromont, Canada.
57. Cantor, J. M., Blanchard, R., Christensen, B., Klassen, P., & Dickey, R. (2001, February). *First glance at IQ, memory functioning and handedness in sex offenders.* Lecture presented at the Forensic Lecture Series, Centre for Addiction and Mental Health, Toronto, Ontario, Canada.
58. Cantor, J. M. (1999, November). *Reversal of SSRI-induced male sexual dysfunction: Suggestions from an animal model.* Grand Rounds presentation at the Allan Memorial Institute, Royal Victoria Hospital, Montréal, Canada.

PAPER PRESENTATIONS AND SYMPOSIA

1. Cantor, J. M. (2020, April). "I'd rather have a trans kid than a dead kid": Critical assessment of reported rates of suicidality in trans kids. *Paper presented at the annual meeting of the Society for the Sex Therapy and Research.* Online in lieu of in person meeting.
2. Stephens, S., Lalumière, M., Seto, M. C., & Cantor, J. M. (2017, October). *The relationship between sexual responsiveness and sexual exclusivity in phallometric profiles.* Paper presented at the annual meeting of the Canadian Sex Research Forum, Fredericton, New Brunswick, Canada.
3. Stephens, S., Cantor, J. M., & Seto, M. C. (2017, March). *Can the SSPI-2 detect hebephilic sexual interest?* Paper presented at the annual meeting of the American-Psychology Law Society Annual Meeting, Seattle, WA.
4. Stephens, S., Seto, M. C., Goodwill, A. M., & Cantor, J. M. (2015, October). *Victim choice polymorphism and recidivism.* Symposium Presentation. Paper presented at the 34th annual meeting of the Association for the Treatment of Sexual Abusers, Montréal, Canada.
5. McPhail, I. V., Hermann, C. A., Fernane, S. Fernandez, Y., Cantor, J. M., & Nunes, K. L. (2014, October). *Sexual deviance in sexual offenders against children: A meta-analytic review of phallometric research.* Paper presented at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
6. Stephens, S., Seto, M. C., Cantor, J. M., & Goodwill, A. M. (2014, October). *Is hebephilic sexual interest a criminogenic need?: A large scale recidivism study.* Paper presented at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
7. Stephens, S., Seto, M. C., Cantor, J. M., & Lalumière, M. (2014, October). *Development and validation of the Revised Screening Scale for Pedophilic Interests (SSPI–2).* Paper presented at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
8. Cantor, J. M., Lafaille, S., Hannah, J., Kucyi, A., Soh, D., Girard, T. A., & Mikulis, D. M. (2014, September). *Pedophilia and the brain: White matter differences detected with DTI.* Paper presented at the 13th annual meeting of the International Association for the Treatment of Sexual Abusers, Porto, Portugal.
9. Stephens, S., Seto, M., Cantor, J. M., Goodwill, A. M., & Kuban, M. (2014, March). *The role of hebephilic sexual interests in sexual victim choice.* Paper presented at the annual meeting of the American Psychology and Law Society, New Orleans, LA.
10. McPhail, I. V., Fernane, S. A., Hermann, C. A., Fernandez, Y. M., Nunes, K. L., & Cantor, J. M. (2013, November). *Sexual deviance and sexual recidivism in sexual offenders against children: A meta-analysis.* Paper presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago, IL.
11. Cantor, J. M. (2013, September). *Pedophilia and the brain: Current MRI research and its implications.* Paper presented at the 21st annual World Congress for Sexual Health, Porto Alegre, Brazil. [Featured among Best Abstracts, top 10 of 500.]
12. Cantor, J. M. (Chair). (2012, March). *Innovations in sex research.* Symposium conducted at the 37th annual meeting of the Society for Sex Therapy and Research, Chicago.
13. Cantor, J. M., & Blanchard, R. (2011, August). fMRI versus phallometry in the diagnosis of pedophilia and hebephilia. In J. M. Cantor (Chair), *Neuroimaging of men's object*

preferences. Symposium presented at the 37th annual meeting of the International Academy of Sex Research, Los Angeles, USA.

14. Cantor, J. M. (Chair). (2011, August). *Neuroimaging of men's object preferences.* Symposium conducted at the 37th annual meeting of the International Academy of Sex Research, Los Angeles.
15. Cantor, J. M. (2010, October). A meta-analysis of neuroimaging studies of male sexual arousal. In S. Stolerú (Chair), *Brain processing of sexual stimuli in pedophilia: An application of functional neuroimaging.* Symposium presented at the 29th annual meeting of the Association for the Treatment of Sexual Abusers, Phoenix, AZ.
16. Chivers, M. L., Seto, M. C., Cantor, J. C., Grimbos, T., & Roy, C. (April, 2010). *Psychophysiological assessment of sexual activity preferences in women.* Paper presented at the 35th annual meeting of the Society for Sex Therapy and Research, Boston, USA.
17. Cantor, J. M., Girard, T. A., & Lovett-Barron, M. (2008, November). *The brain regions that respond to erotica: Sexual neuroscience for dummies.* Paper presented at the 51st annual meeting of the Society for the Scientific Study of Sexuality, San Juan, Puerto Rico.
18. Barbaree, H., Langton, C., Blanchard, R., & Cantor, J. M. (2007, October). *The role of age-at-release in the evaluation of recidivism risk of sexual offenders.* Paper presented at the 26th annual meetingof the Association for the Treatment of Sexual Abusers, San Diego.
19. Cantor, J. M., Kabani, N., Christensen, B. K., Zipursky, R. B., Barbaree, H. E., Dickey, R., Klassen, P. E., Mikulis, D. J., Kuban, M. E., Blak, T., Richards, B. A., Hanratty, M. K., & Blanchard, R. (2006, July). *Pedophilia and brain morphology.* Abstract and paper presented at the 32nd annual meeting of the International Academy of Sex Research, Amsterdam, Netherlands.
20. Seto, M. C., Cantor, J. M., & Blanchard, R. (2006, March). *Child pornography offending is a diagnostic indicator of pedophilia*. Paper presented at the 2006 annual meeting of the American Psychology-Law Society Conference, St. Petersburg, Florida.
21. Blanchard, R., Cantor, J. M., Bogaert, A. F., Breedlove, S. M., & Ellis, L. (2005, August). *Interaction of fraternal birth order and handedness in the development of male homosexuality.* Abstract and paper presented at the International Behavioral Development Symposium, Minot, North Dakota.
22. Cantor, J. M., & Blanchard, R. (2005, July). *Quantitative reanalysis of aggregate data on IQ in sexual offenders.* Abstract and poster presented at the 31st annual meeting of the International Academy of Sex Research, Ottawa, Canada.
23. Cantor, J. M. (2003, August). *Sex reassignment on demand: The clinician's dilemma.* Paper presented at the 111th annual meeting of the American Psychological Association, Toronto, Canada.
24. Cantor, J. M. (2003, June). *Meta-analysis of VIQ–PIQ differences in male sex offenders.* Paper presented at the Harvey Stancer Research Day, Toronto, Ontario, Canada.
25. Cantor, J. M. (2002, August). *Gender role in autogynephilic transsexuals: The more things change…* Paper presented at the 110th annual meeting of the American Psychological Association, Chicago.

26. Cantor, J. M., Christensen, B. K., Klassen, P. E., Dickey, R., & Blanchard, R. (2001, June). *IQ, memory functioning, and handedness in male sex offenders.* Paper presented at the Harvey Stancer Research Day, Toronto, Ontario, Canada.
27. Cantor, J. M. (1998, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 106th annual meeting of the American Psychological Association.
28. Cantor, J. M. (1997, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 105th annual meeting of the American Psychological Association.
29. Cantor, J. M. (1997, August). *Convention orientation for lesbian, gay, and bisexual students*. Paper presented at the 105th annual meeting of the American Psychological Association.
30. Cantor, J. M. (1996, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 104th annual meeting of the American Psychological Association.
31. Cantor, J. M. (1996, August). *Symposium: Question of inclusion: Lesbian and gay psychologists and accreditation*. Paper presented at the 104th annual meeting of the American Psychological Association, Toronto.
32. Cantor, J. M. (1996, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 104th annual meeting of the American Psychological Association.
33. Cantor, J. M. (1995, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 103rd annual meeting of the American Psychological Association.
34. Cantor, J. M. (1995, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 103rd annual meeting of the American Psychological Association.
35. Cantor, J. M. (1994, August). *Discussion hour for lesbian, gay, and bisexual students*. Presented at the 102nd annual meeting of the American Psychological Association.
36. Cantor, J. M. (1994, August). *Convention orientation for lesbian, gay, and bisexual students*. Papers presented at the 102nd annual meeting of the American Psychological Association.
37. Cantor, J. M., & Pilkington, N. W. (1992, August). *Homophobia in psychology programs: A survey of graduate students.* Paper presented at the Centennial Convention of the American Psychological Association, Washington, DC. (ERIC Document Reproduction Service No. ED 351 618)
38. Cantor, J. M. (1991, August). *Being gay and being a graduate student: Double the memberships, four times the problems*. Paper presented at the 99th annual meeting of the American Psychological Association, San Francisco.

POSTER PRESENTATIONS

1. Klein, L., Stephens, S., Goodwill, A. M., Cantor, J. M., & Seto, M. C. (2015, October). *The psychological propensities of risk in undetected sexual offenders.* Poster presented at the 34th annual meeting of the Association for the Treatment of Sexual Abusers, Montréal, Canada.
2. Pullman, L. E., Stephens, S., Seto, M. C., Goodwill, A. M., & Cantor, J. M. (2015, October). *Why are incest offenders less likely to recidivate?* Poster presented at the 34th annual meeting of the Association for the Treatment of Sexual Abusers, Montréal, Canada.
3. Seto, M. C., Stephens, S. M., Cantor, J. M., Lalumiere, M. L., Sandler, J. C., & Freeman, N. A. (2015, August). *The development and validation of the Revised Screening Scale for Pedophilic Interests (SSPI-2).* Poster presentation at the 41st annual meeting of the International Academy of Sex Research. Toronto, Canada.
4. Soh, D. W., & Cantor, J. M. (2015, August). *A peek inside a furry convention.* Poster presentation at the 41st annual meeting of the International Academy of Sex Research. Toronto, Canada.
5. VanderLaan, D. P., Lobaugh, N. J., Chakravarty, M. M., Patel, R., Chavez, S. Stojanovski, S. O., Takagi, A., Hughes, S. K., Wasserman, L., Bain, J., Cantor, J. M., & Zucker, K. J. (2015, August). *The neurohormonal hypothesis of gender dysphoria: Preliminary evidence of cortical surface area differences in adolescent natal females.* Poster presentation at the 31st annual meeting of the International Academy of Sex Research. Toronto, Canada.
6. Cantor, J. M., Lafaille, S. J., Moayedi, M., Mikulis, D. M., & Girard, T. A. (2015, June). *Diffusion tensor imaging (DTI) of the brain in pedohebephilic men: Preliminary analyses.* Harvey Stancer Research Day, Toronto, Ontario Canada.
7. Newman, J. E., Stephens, S., Seto, M. C., & Cantor, J. M. (2014, October). *The validity of the Static-99 in sexual offenders with low intellectual abilities.* Poster presentation at the 33rd annual meeting of the Association for the Treatment of Sexual Abusers, San Diego, CA.
8. Lykins, A. D., Walton, M. T., & Cantor, J. M. (2014, June). *An online assessment of personality, psychological, and sexuality trait variables associated with self-reported hypersexual behavior.* Poster presentation at the 30th annual meeting of the International Academy of Sex Research, Dubrovnik, Croatia.
9. Stephens, S., Seto, M. C., Cantor, J. M., Goodwill, A. M., & Kuban, M. (2013, November). *The utility of phallometry in the assessment of hebephilia.* Poster presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago.
10. Stephens, S., Seto, M. C., Cantor, J. M., Goodwill, A. M., & Kuban, M. (2013, October). *The role of hebephilic sexual interests in sexual victim choice.* Poster presented at the 32nd annual meeting of the Association for the Treatment of Sexual Abusers, Chicago.
11. Fazio, R. L., & Cantor, J. M. (2013, October). *Analysis of the Fazio Laterality Inventory (FLI) in a population with established atypical handedness.* Poster presented at the 33rd annual meeting of the National Academy of Neuropsychology, San Diego.
12. Lafaille, S., Hannah, J., Soh, D., Kucyi, A., Girard, T. A., Mikulis, D. M., & Cantor, J. M. (2013, August). *Investigating resting state networks in pedohebephiles.* Poster presented at the 29th annual meeting of the International Academy of Sex Research, Chicago.

13. McPhail, I. V., Lykins, A. D., Robinson, J. J., LeBlanc, S., & Cantor, J. M. (2013, August). *Effects of prescription medication on volumetric phallometry output.* Poster presented at the 29th annual meeting of the International Academy of Sex Research, Chicago.
14. Murray, M. E., Dyshniku, F., Fazio, R. L., & Cantor, J. M. (2013, August). *Minor physical anomalies as a window into the prenatal origins of pedophilia.* Poster presented at the 29th annual meeting of the International Academy of Sex Research, Chicago.
15. Sutton, K. S., Stephens, S., Dyshniku, F., Tulloch, T., & Cantor, J. M. (2013, August). *Pilot group treatment for "procrasturbation."* Poster presented at 39th annual meeting of the International Academy of Sex Research, Chicago.
16. Sutton, K. S., Pytyck, J., Stratton, N., Sylva, D., Kolla, N., & Cantor, J. M. (2013, August). *Client characteristics by type of hypersexuality referral: A quantitative chart review.* Poster presented at the 39th annual meeting of the International Academy of Sex Research, Chicago.
17. Fazio, R. L., & Cantor, J. M. (2013, June). *A replication and extension of the psychometric properties of the Digit Vigilance Test.* Poster presented at the 11th annual meeting of the American Academy of Clinical Neuropsychology, Chicago.
18. Lafaille, S., Moayedi, M., Mikulis, D. M., Girard, T. A., Kuban, M., Blak, T., & Cantor, J. M. (2012, July). *Diffusion Tensor Imaging (DTI) of the brain in pedohebephilic men: Preliminary analyses.* Poster presented at the 38th annual meeting of the International Academy of Sex Research, Lisbon, Portugal.
19. Lykins, A. D., Cantor, J. M., Kuban, M. E., Blak, T., Dickey, R., Klassen, P. E., & Blanchard, R. (2010, July). *Sexual arousal to female children in gynephilic men.* Poster presented at the 38th annual meeting of the International Academy of Sex Research, Prague, Czech Republic.
20. Cantor, J. M., Girard, T. A., Lovett-Barron, M., & Blak, T. (2008, July). *Brain regions responding to visual sexual stimuli: Meta-analysis of PET and fMRI studies.* Abstract and poster presented at the 34th annual meeting of the International Academy of Sex Research, Leuven, Belgium.
21. Lykins, A. D., Blanchard, R., Cantor, J. M., Blak, T., & Kuban, M. E. (2008, July). *Diagnosing sexual attraction to children: Considerations for DSM-V.* Poster presented at the 34th annual meeting of the International Academy of Sex Research, Leuven, Belgium.
22. Cantor, J. M., Blak, T., Kuban, M. E., Klassen, P. E., Dickey, R. and Blanchard, R. (2007, October). *Physical height in pedophilia and hebephilia.* Poster presented at the 26th annual meeting of the Association for the Treatment of Sexual Abusers, San Diego.
23. Cantor, J. M., Blak, T., Kuban, M. E., Klassen, P. E., Dickey, R. and Blanchard, R. (2007, August). *Physical height in pedophilia and hebephilia.* Abstract and poster presented at the 33rd annual meeting of the International Academy of Sex Research, Vancouver, Canada.
24. Puts, D. A., Blanchard, R., Cardenas, R., Cantor, J., Jordan, C. L., & Breedlove, S. M. (2007, August). *Earlier puberty predicts superior performance on male-biased visuospatial tasks in men but not women.* Abstract and poster presented at the 33rd annual meeting of the International Academy of Sex Research, Vancouver, Canada.
25. Seto, M. C., Cantor, J. M., & Blanchard, R. (2005, November). *Possession of child pornography is a diagnostic indicator of pedophilia.* Poster presented at the 24th annual meeting of the Association for the Treatment of Sexual Abusers, New Orleans.

26. Blanchard, R., Cantor, J. M., Bogaert, A. F., Breedlove. S. M., & Ellis, L. (2005, July). *Interaction of fraternal birth order and handedness in the development of male homosexuality.* Abstract and poster presented at the 31st annual meeting of the International Academy of Sex Research, Ottawa, Canada.
27. Cantor, J. M., & Blanchard, R. (2003, July). *The reported VIQ–PIQ differences in male sex offenders are artifactual?* Abstract and poster presented at the 29th annual meeting of the International Academy of Sex Research, Bloomington, Indiana.
28. Christensen, B. K., Cantor, J. M., Millikin, C., & Blanchard, R. (2002, February). *Factor analysis of two brief memory tests: Preliminary evidence for modality-specific measurement.* Poster presented at the 30th annual meeting of the International Neuropsychological Society, Toronto, Ontario, Canada.
29. Cantor, J. M., Blanchard, R., Paterson, A., Bogaert, A. (2000, June). *How many gay men owe their sexual orientation to fraternal birth order?* Abstract and poster presented at the International Behavioral Development Symposium, Minot, North Dakota.
30. Cantor, J. M., Binik, Y., & Pfaus, J. G. (1996, November). *Fluoxetine inhibition of male rat sexual behavior: Reversal by oxytocin*. Poster presented at the 26th annual meeting of the Society for Neurosciences, Washington, DC.
31. Cantor, J. M., Binik, Y., & Pfaus, J. G. (1996, June). *An animal model of fluoxetine-induced sexual dysfunction: Dose dependence and time course*. Poster presented at the 28th annual Conference on Reproductive Behavior, Montréal, Canada.
32. Cantor, J. M., O'Connor, M. G., Kaplan, B., & Cermak, L. S. (1993, June). *Transient events test of retrograde memory: Performance of amnestic and unimpaired populations*. Poster presented at the 2nd annual science symposium of the Massachusetts Neuropsychological Society, Cambridge, MA.

EDITORIAL AND PEER-REVIEWING ACTIVITIES

Editor-in-Chief

Sexual Abuse: A Journal of Research and Treatment Jan., 2010–Dec., 2014

Editorial Board Memberships

Journal of Sexual Aggression Jan., 2010–Present
Journal of Sex Research, The Jan., 2008–Present
Sexual Abuse: A Journal of Research and Treatment Jan., 2006–Dec., 2019
Archives of Sexual Behavior Jan., 2004–Present
The Clinical Psychologist Jan., 2004–Dec., 2005

Ad hoc Journal Reviewer Activity

American Journal of Psychiatry
Annual Review of Sex Research
Archives of General Psychiatry
Assessment
Biological Psychiatry
BMC Psychiatry
Brain Structure and Function
British Journal of Psychiatry
British Medical Journal
Canadian Journal of Behavioural Science
Canadian Journal of Psychiatry
Cerebral Cortex
Clinical Case Studies
Comprehensive Psychiatry
Developmental Psychology
European Psychologist
Frontiers in Human Neuroscience
Human Brain Mapping
International Journal of Epidemiology
International Journal of Impotence Research
International Journal of Sexual Health
International Journal of Transgenderism
Journal of Abnormal Psychology
Journal of Clinical Psychology
Journal of Consulting and Clinical Psychology
Journal of Forensic Psychology Practice
Journal for the Scientific Study of Religion
Journal of Sexual Aggression
Journal of Sexual Medicine
Journal of Psychiatric Research
Nature Neuroscience
Neurobiology Reviews
Neuroscience & Biobehavioral Reviews
Neuroscience Letters
Proceedings of the Royal Society B (Biological Sciences)
Psychological Assessment
Psychological Medicine
Psychological Science
Psychology of Men & Masculinity
Sex Roles
Sexual and Marital Therapy
Sexual and Relationship Therapy
Sexuality & Culture
Sexuality Research and Social Policy
The Clinical Psychologist
Traumatology
World Journal of Biological Psychiatry

GRANT REVIEW PANELS

2017– Member, College of Reviewers, *Canadian Institutes of Health Research,* Canada.

2017 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2017 Member, International Review Board, Research collaborations on behavioural disorders related to violence, neglect, maltreatment and abuse in childhood and adolescence. *Bundesministerium für Bildung und Forschung [Ministry of Education and Research],* Germany.

2016 Reviewer. National Science Center [*Narodowe Centrum Nauki*], Poland.

2016 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2015 Assessor (Peer Reviewer). Discovery Grants Program. *Australian Research Council,* Australia.

2015 Reviewer. *Czech Science Foundation,* Czech Republic.

2015 Reviewer, "Off the beaten track" grant scheme. *Volkswagen Foundation,* Germany.

2015 External Reviewer, Discovery Grants program—Biological Systems and Functions. *National Sciences and Engineering Research Council of Canada*, Canada

2015 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2014 Assessor (Peer Reviewer). Discovery Grants Program. *Australian Research Council,* Australia.

2014 External Reviewer, Discovery Grants program—Biological Systems and Functions. *National Sciences and Engineering Research Council of Canada*, Canada.

2014 Panel Member, Dean's Fund—Clinical Science Panel. *University of Toronto Faculty of Medicine*, Canada.

2014 Committee Member, Peer Review Committee—Doctoral Research Awards A. *Canadian Institutes of Health Research*, Canada.

2013 Panel Member, Grant Miller Cancer Research Grant Panel. *University of Toronto Faculty of Medicine*, Canada.

2013 Panel Member, Dean of Medicine Fund New Faculty Grant Clinical Science Panel. *University of Toronto Faculty of Medicine,* Canada.

2012 Board Member, International Review Board, Research collaborations on behavioural disorders related to violence, neglect, maltreatment and abuse in childhood and adolescence (2nd round). *Bundesministerium für Bildung und Forschung [Ministry of Education and Research],* Germany.

2012 External Reviewer, University of Ottawa Medical Research Fund. *University of Ottawa Department of Psychiatry*, Canada.

2012 External Reviewer, Behavioural Sciences—B. *Canadian Institutes of Health Research*, Canada.

2011 Board Member, International Review Board, Research collaborations on behavioural disorders related to violence, neglect, maltreatment and abuse in childhood and adolescence. *Bundesministerium für Bildung und Forschung [Ministry of Education and Research],* Germany.

TEACHING AND TRAINING

PostDoctoral Research Supervision
Law & Mental Health Program, Centre for Addiction and Mental Health, Toronto, Canada

Dr. Katherine S. Sutton	Sept., 2012–Dec., 2013
Dr. Rachel Fazio	Sept., 2012–Aug., 2013
Dr. Amy Lykins	Sept., 2008–Nov., 2009

Doctoral Research Supervision
Centre for Addiction and Mental Health, Toronto, Canada

Michael Walton • University of New England, Australia	Sept., 2017–Aug., 2018
Debra Soh • York University	May, 2013–Aug, 2017
Skye Stephens • Ryerson University	April, 2012–June, 2016

Masters Research Supervision
Centre for Addiction and Mental Health, Toronto, Canada

Nicole Cormier • Ryerson University	June, 2012–present
Debra Soh • Ryerson University	May, 2009–April, 2010

Undergraduate Research Supervision
Centre for Addiction and Mental Health, Toronto, Canada

Kylie Reale • Ryerson University	Spring, 2014
Jarrett Hannah • University of Rochester	Summer, 2013
Michael Humeniuk • University of Toronto	Summer, 2012

Clinical Supervision (Doctoral Internship)
Clinical Internship Program, Centre for Addiction and Mental Health, Toronto, Canada

Katherine S. Sutton • Queen's University	2011–2012
David Sylva • Northwestern University	2011–2012
Jordan Rullo • University of Utah	2010–2011
Lea Thaler • University of Nevada, Las Vegas	2010–2011
Carolin Klein • University of British Columbia	2009–2010
Bobby R. Walling • University of Manitoba	2009–2010

TEACHING AND TRAINING

Clinical Supervision (Doctoral- and Masters- level practica)
Centre for Addiction and Mental Health, Toronto, Canada

Tyler Tulloch • Ryerson University	2013–2014
Natalie Stratton • Ryerson University	Summer, 2013
Fiona Dyshniku • University of Windsor	Summer, 2013
Mackenzie Becker • McMaster University	Summer, 2013
Skye Stephens • Ryerson University	2012–2013
Vivian Nyantakyi • Capella University	2010–2011
Cailey Hartwick • University of Guelph	Fall, 2010
Tricia Teeft • Humber College	Summer, 2010
Allison Reeves • Ontario Institute for Studies in Education/Univ. of Toronto	2009–2010
Helen Bailey • Ryerson University	Summer, 2009
Edna Aryee • Ontario Institute for Studies in Education/Univ. of Toronto	2008–2009
Iryna Ivanova • Ontario Institute for Studies in Education/Univ. of Toronto	2008–2009
Jennifer Robinson • Ontario Institute for Studies in Education/Univ. of Toronto	2008–2009
Zoë Laksman • Adler School of Professional Psychology	2005–2006
Diana Mandelew • Adler School of Professional Psychology	2005–2006
Susan Wnuk • York University	2004–2005
Hiten Lad • Adler School of Professional Psychology	2004–2005
Natasha Williams • Adler School of Professional Psychology	2003–2004
Lisa Couperthwaite • Ontario Institute for Studies in Education/Univ. of Toronto	2003–2004
Lori Gray, née Robichaud • University of Windsor	Summer, 2003
Sandra Belfry • Ontario Institute for Studies in Education/Univ. of Toronto	2002–2003
Althea Monteiro • York University	Summer, 2002
Samantha Dworsky • York University	2001–2002
Kerry Collins • University of Windsor	Summer, 2001
Jennifer Fogarty • Waterloo University	2000–2001
Emily Cripps • Waterloo University	Summer, 2000
Lee Beckstead • University of Utah	2000

PROFESSIONAL SOCIETY ACTIVITIES

OFFICES HELD

2018–2019	Local Host. Society for Sex Therapy and Research.
2015	Member, International Scientific Committee, World Association for Sexual Health.
2015	Member, Program Planning and Conference Committee, Association for the Treatment of Sexual Abusers
2012–2013	Chair, Student Research Awards Committee, Society for Sex Therapy & Research
2012–2013	Member, Program Planning and Conference Committee, Association for the Treatment of Sexual Abusers
2011–2012	Chair, Student Research Awards Committee, Society for Sex Therapy & Research
2010–2011	Scientific Program Committee, International Academy of Sex Research
2002–2004	Membership Committee • APA Division 12 (Clinical Psychology)
2002–2003	Chair, Committee on Science Issues, APA Division 44
2002	Observer, Grant Review Committee • Canadian Institutes of Health Research Behavioural Sciences (B)
2001–2009	Reviewer • APA Division 44 Convention Program Committee
2001, 2002	Reviewer • APA Malyon-Smith Scholarship Committee
2000–2005	Task Force on Transgender Issues, APA Division 44
1998–1999	Consultant, APA Board of Directors Working Group on Psychology Marketplace
1997	Student Representative • APA Board of Professional Affairs' Institute on TeleHealth
1997–1998	Founder and Chair • APA/APAGS Task Force on New Psychologists' Concerns
1997–1999	Student Representative • APA/CAPP Sub-Committee for a National Strategy for Prescription Privileges
1997–1999	Liaison • APA Committee for the Advancement of Professional Practice
1997–1998	Liaison • APA Board of Professional Affairs
1993–1997	Founder and Chair • APA/APAGS Committee on LGB Concerns

PROFESSIONAL SOCIETY ACTIVITIES

MEMBERSHIPS

2017–Present Member • *Canadian Sex Research Forum*

2009–Present Member • *Society for Sex Therapy and Research*

2006–Present Member (elected) • *International Academy of Sex Research*

2006–Present Research and Clinical Member • *Association for the Treatment of Sex Abusers*

2003–2006 Associate Member (elected) • *International Academy of Sex Research*

2002 Founding Member • CPA Section on Sexual Orientation and Gender Identity

2001–2013 Member • *Canadian Psychological Association* (CPA)

2000–2015 Member • *American Association for the Advancement of Science*

2000–2015 Member • *American Psychological Association* (APA)

APA Division 12 (Clinical Psychology)

APA Division 44 (Society for the Psychological Study of LGB Issues)

2000–2020 Member • *Society for the Scientific Study of Sexuality*

1995–2000 Student Member • *Society for the Scientific Study of Sexuality*

1993–2000 Student Affiliate • *American Psychological Association*

1990–1999 Member, American Psychological Association of Graduate Students (APAGS)

CLINICAL LICENSURE/REGISTRATION

Certificate of Registration, Number 3793
College of Psychologists of Ontario, Ontario, Canada

AWARDS AND HONORS

2017 Elected Fellow, Association for the Treatment of Sexual Abusers

2011 Howard E. Barbaree Award for Excellence in Research
Centre for Addiction and Mental Health, Law and Mental Health Program

2004 fMRI Visiting Fellowship Program at Massachusetts General Hospital
American Psychological Association Advanced Training Institute and NIH

1999–2001 CAMH Post-Doctoral Research Fellowship
Centre for Addiction and Mental Health Foundation and Ontario Ministry of Health

1998 Award for Distinguished Contribution by a Student
American Psychological Association, Division 44

1995 Dissertation Research Grant
Society for the Scientific Study of Sexuality

1994–1996 McGill University Doctoral Scholarship

1994 Award for Outstanding Contribution to Undergraduate Teaching
"TA of the Year Award," from the McGill Psychology Undergraduate Student Association

MAJOR MEDIA

(Complete list available upon request.)

Feature-length Documentaries

Vice Canada Reports. *Age of Consent.* 14 Jan 2017.
Canadian Broadcasting Company. *I, Pedophile.* Firsthand documentaries. 10 Mar 2016.

Appearances and Interviews

24 Apr 2017. Sastre, P. Pédophilie: une panique morale jamais n'abolira un crime. *Slate France.*
12 Feb 2017. Payette, G. Child sex doll trial opens Pandora's box of questions. *CBC News.*
26 Nov 2016. Det morke uvettet ["The unknown darkness]". *Fedrelandsvennen.*
13 July 2016. Paedophilia: Shedding light on the dark field. *The Economist.*
1 July 2016. Debusschere, B. Niet iedereen die kinderporno kijkt, is een pedofiel: De mythes rond pedofilie ontkracht. *De Morgen.*
12 Apr 2016. O'Connor, R. Terence Martin: The Tasmanian MP whose medication 'turned him into a paedophile'. *The Independent.*
8 Mar 2016. Bielski, Z. 'The most viscerally hated group on earth': Documentary explores how intervention can stop pedophiles. *The Globe and Mail.*
1 Mar 2016. Elmhirst, S. What should we do about paedophiles? *The Guardian.*
24 Feb 2016. The man whose brain tumour 'turned him into a paedophile'. *The Independent.*
24 Nov 2015. Byron, T. The truth about child sex abuse. *BBC Two.*
20 Aug 2015. The Jared Fogle case: Why we understand so little about abuse. *Washington Post.*
19 Aug 2015. Blackwell, T. Treat sex offenders for impotence—to keep them out of trouble, Canadian psychiatrist says. *National Post.*
2 Aug 2015. Menendez, J. BBC News Hour. *BBC World Service.*
13 July 2015. The nature of pedophilia. *BBC Radio 4.*
9 July 2015. The sex-offender test: How a computerized assessment can help determine the fate of men who've been accused of sexually abusing children. *The Atlantic.*
10 Apr 2015. NWT failed to prevent sex offender from abusing stepdaughter again. *CBC News.*
10 February 2015. Savage, D. "The ethical sadist." In Savage Love. *The Stranger.*
31 January 2015. Begrip voor/van pedofilie [Understanding pedophilia]. *de Volkskrant.*
9 December 2014. Carey, B. When a rapist's weapon is a pill. *New York Times*.
1 December 2014. Singal, J. Can virtual reality help pedophiles? *New York Magazine.*
17 November 2014. Say pedófile, busco aydua. *El Pais.*
4 September 2014. Born that way? *Ideas, with Paul Kennedy.* CBC Radio One.
27 August 2014. Interrogating the statistics for the prevalence of paedophilia. BBC.
25 July 2014. Stephenson, W. The prevalence of paedophilia. *BBC World Service.*
21 July 2014. Hildebrandt, A. Virtuous Pedophiles group gives support therapy cannot. *CBC.*
26 January 2014. Paedophilia a result of faulty wiring, scientists suggest. *Daily Mail.*
22 December 2013. Kane, L. Is pedophilia a sexual orientation? *Toronto Star.*
21 July 2013. Miller, L. The turn-on switch: Fetish theory, post-Freud. *New York Magazine.*
1 July 2013. Morin, H. Pédophilie: la difficile quête d'une origine biologique. *Le Monde.*
2 June 2013. Malcolm, L. The psychology of paedophilia. *Australian National Radio.*
1 March 2013. Kay, J. The mobbing of Tom Flanagan is unwarranted and cruel. *National Post.*
6 February 2013. Boy Scouts board delays vote on lifting ban on gays. *L.A. Times.*
31 August 2012. CNN Newsroom interview with Ashleigh Banfield. *CNN.*
24 June 2012. CNN Newsroom interview with Don Lemon. *CNN.*

LEGAL TESTIMONY, PAST 4 YEARS

2019	US vs Peter Bright	Southern District, New York
2019	Probate and Family Court	Boston, Massachusetts
2019	Re Commitment of Steven Casper (Frye Hearing)	Kendall County, Illinois
2019	Re Commitment of Inger (Frye Hearing)	Poughkeepsie, NY
2018	Re Commitment of Fernando Little (Frye Hearing)	Utica, NY
2018	Canada vs John Fitzpatrick (sentencing hearing)	Toronto, Ontario, Canada
2017	Re Commitment of Nicholas Bauer (Frye Hearing)	Lee County, Illinois
2017	US vs William Leford (presentencing hearing)	Warnock, Georgia

Appendix 2

1. Phil S. Lebovitz, *Feminine Behavior in Boys: Aspects of Its Outcome*, 128 AM. J. PSYCH. 1283 (1972).

2. Bernard Zuger, *Effeminate Behavior Present in Boys from Childhood: Ten Additional Years of Follow-Up*, 19 COMPREHENSIVE PSYCH. 363 (1978).

3. John Money & Anthony J. Russo, *Homosexual Outcome of Discordant Gender Identity/Role in Childhood: Longitudinal Follow-Up*, 4 J. PEDIATRIC PSYCH. 29 (1979).

4. Bernard Zuger, *Early Effeminate Behavior in Boys: Outcome and Significance for Homosexuality*, 172 J. NERVOUS & MENTAL DISEASE 90 (1984).

5. Charles W. Davenport, *A Follow-Up Study of 10 Feminine Boys*, 15 ARCHIVES OF SEXUAL BEHAV. 511 (1986).

6. Richard Green, THE "SISSY BOY SYNDROME" AND THE DEVELOPMENT OF HOMOSEXUALITY (1987).

7. Robert J. Kosky, *Gender-Disordered Children: Does Inpatient Treatment Help?*, 146 MED. J. AUSTL. 565 (1987).

8. Madeleine S. C. Wallien & Peggy T. Cohen-Kettenis, *Psychosexual Outcome of Gender-Dysphoric Children*, 47 J. AM. ACAD. CHILD & ADOL. PSYCH. 1413 (2008).

9. Kelley D. Drummond et al., *A Follow-Up Study of Girls with Gender Identity Disorder*, 44 DEVELOPMENTAL PSYCH. 34 (2008).

10. Thomas D. Steensma et al., *Factors Associated with Desistence and Persistence of Childhood Gender Dysphoria: A Quantitative Follow-Up Study*, 52 J. AM. ACAD. CHILD & ADOL. PSYCH. 582 (2013).

11. Devita Singh et al., *A Follow-Up Study of Boys with Gender Identity Disorder*, 12 FRONTIERS IN PSYCH. 297 (2021).

Appendix 3

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Transgender and Gender Diverse Children and Adolescents: Fact-Checking of AAP Policy

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ABSTRACT

The American Academy of Pediatrics (AAP) recently published a policy statement: *Ensuring comprehensive care and support for transgender and gender-diverse children and adolescents*. Although almost all clinics and professional associations in the world use what's called the *watchful waiting* approach to helping gender diverse (GD) children, the AAP statement instead rejected that consensus, endorsing *gender affirmation* as the only acceptable approach. Remarkably, not only did the AAP statement fail to include any of the actual outcomes literature on such cases, but it also misrepresented the contents of its citations, which repeatedly said the very opposite of what AAP attributed to them.

The American Academy of Pediatrics (AAP) recently published a policy statement entitled, *Ensuring comprehensive care and support for transgender and gender-diverse children and adolescents* (Rafferty, AAP Committee on Psychosocial Aspects of Child and Family Health, AAP Committee on Adolescence, AAP Section on Lesbian, Gay, Bisexual, and Transgender Health and Wellness, 2018). These are children who manifest discontent with the sex they were born as and desire to live as the other sex (or as some alternative gender role). The policy was quite a remarkable document: Although almost all clinics and professional associations in the world use what's called the *watchful waiting* approach to helping transgender and gender diverse (GD) children, the AAP statement rejected that consensus, endorsing only *gender affirmation.* That is, where the consensus is to delay any transitions after the onset of puberty, AAP instead rejected waiting before transition. With AAP taking such a dramatic departure from other professional associations, I was immediately curious about what evidence led them to that conclusion. As I read the works on which they based their policy, however, I was pretty surprised—rather alarmed, actually: These documents simply did not say what AAP claimed they did. In fact, the references that AAP cited as the basis of their policy instead outright contradicted that policy, repeatedly endorsing *watchful waiting*.

The AAP statement was also remarkable in what it left out—namely, the actual outcomes research on GD children. In total, there have been 11 follow-up studies of GD children, of which AAP cited one (Wallien & Cohen-Kettenis, 2008), doing so without actually mentioning the outcome data it contained. The literature on outcomes was neither reviewed, summarized, nor subjected to meta-analysis to be considered in the aggregate—It was merely disappeared. (The list of all existing studies appears in the appendix.) As they make clear, *every* follow-up study of GD children, without exception, found the same thing: Over puberty, the majority of GD children cease to want to transition. AAP is, of course, free to establish whatever policy it likes on

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whatever basis it likes. But any assertion that their policy is based on evidence is demonstrably false, as detailed below.

AAP divided clinical approaches into three types—conversion therapy, watchful waiting, and gender affirmation. It rejected the first two and endorsed *gender affirmation* as the only acceptable alternative. Most readers will likely be familiar already with attempts to use conversion therapy to change sexual orientation. With regard to gender identity, AAP wrote:

> "[C]onversion" or "reparative" treatment models are used to prevent children and adolescents from identifying as transgender or to dissuade them from exhibiting gender-diverse expressions. … Reparative approaches have been proven to be not only unsuccessful[38] but also deleterious and are considered outside the mainstream of traditional medical practice.[29,39–42]

The citations were:

38. Haldeman DC. The practice and ethics of sexual orientation conversion therapy. *J Consult Clin Psychol.* 1994;62(2):221–227.

29. Adelson SL; American Academy of Child and Adolescent Psychiatry (AACAP) Committee on Quality Issues (CQI). Practice parameter on gay, lesbian, or bisexual sexual orientation, gender nonconformity, and gender discordance in children and adolescents. *J Am Acad Child Adolesc Psychiatry.* 2012;51(9):957–974.

39. Byne W. Regulations restrict practice of conversion therapy. *LGBT Health.* 2016;3(2):97–99.

40. Cohen-Kettenis PT, Delemarrevan de Waal HA, Gooren LJ. The treatment of adolescent transsexuals: changing insights. *J Sex Med.* 2008;5(8):1892–1897.

41. Bryant K. Making gender identity disorder of childhood: historical lessons for contemporary debates. *Sex Res Soc Policy.* 2006;3(3):23–39.

42. World Professional Association for Transgender Health. *WPATH De-Psychopathologisation Statement.* Minneapolis, MN: World Professional Association for Transgender Health; 2010.

AAP's claims struck me as odd because *there are no studies of conversion therapy for gender identity.* Studies of conversion therapy have been limited to *sexual orientation,* and, moreover, to the sexual orientation *of adults,* not to gender identity and not of children in any case. The article AAP cited to support their claim (reference number 38) is indeed a classic and well-known review, but it is a review of sexual orientation research *only.* Neither gender identity, nor even children, received a single mention in it. Indeed, the narrower scope of that article should be clear to anyone reading even just its title: "The practice and ethics of *sexual orientation* conversion therapy" [italics added].

AAP continued, saying that conversion approaches for GD children have already been rejected by medical consensus, citing five sources. This claim struck me as just as odd, however—I recalled associations banning conversion therapy for sexual orientation, but not for gender identity, exactly because there is no evidence for generalizing from adult sexual orientation to childhood gender identity. So, I started checking AAP's citations for that, and these sources too pertained only to sexual orientation, not gender identity (specifics below). What AAP's sources *did* repeatedly emphasize was that:

A. Sexual orientation of adults is unaffected by conversion therapy and any other [known] intervention;
B. Gender dysphoria in childhood before puberty desists in the majority of cases, becoming (cis-gendered) homosexuality in adulthood, again regardless of any [known] intervention; and
C. Gender dysphoria in childhood persisting after puberty tends to persist entirely.

That is, in the context of GD children, it simply makes no sense to refer to externally induced "conversion": The majority of children "convert" to cisgender or "desist" from transgender

regardless of any attempt to change them. "Conversion" only makes sense with regard to adult sexual orientation because (unlike childhood gender identity), adult homosexuality never or nearly never spontaneously changes to heterosexuality. Although gender identity and sexual orientation may often be analogous and discussed together with regard to social or political values and to civil rights, they are nonetheless distinct—with distinct origins, needs, and responses to medical and mental health care choices. Although AAP emphasized to the reader that "gender identity is not synonymous with 'sexual orientation'" (Rafferty et al., 2018, p. 3), they went ahead to treat them as such nonetheless.

To return to checking AAP's fidelity to its sources: Reference 29 was a practice guideline from the Committee on Quality Issues of the American Academy of Child and Adolescent Psychiatry (AACAP). Despite AAP applying this source to *gender identity,* AACAP was quite unambiguous regarding their intent to speak to sexual orientation and *only* to sexual orientation: "Principle 6. Clinicians should be aware that there is no evidence that *sexual orientation* can be altered through therapy, and that attempts to do so may be harmful. There is no established evidence that change in a predominant, enduring *homosexual* pattern of development is possible. Although sexual fantasies can, to some degree, be suppressed or repressed by those who are ashamed of or in conflict about them, sexual desire is not a choice. However, behavior, social role, and—to a degree—identity and self-acceptance are. Although operant conditioning modifies sexual fetishes, it does not alter *homosexuality*. Psychiatric efforts to alter *sexual orientation* through 'reparative therapy' *in adults* have found little or no change in *sexual orientation,* while causing significant risk of harm to self-esteem" (AACAP, 2012, p. 967, italics added).

Whereas AAP cites AACAP to support gender affirmation as the only alternative for treating GD children, AACAP's actual view was decidedly neutral, noting the lack of evidence: "Given the lack of empirical evidence from randomized, controlled trials of the efficacy of treatment aimed at eliminating gender discordance, the potential risks of treatment, and longitudinal evidence that gender discordance persists in only a small minority of untreated cases arising in childhood, further research is needed on predictors of persistence and desistence of childhood gender discordance as well as the long-term risks and benefits of intervention before any treatment to eliminate gender discordance can be endorsed" (AACAP, 2012, p. 969). Moreover, whereas AAP rejected watchful waiting, what AACAP recommended was: "In general, it is desirable to help adolescents who may be experiencing gender distress and dysphoria to defer sex reassignment until adulthood" (AACAP, 2012, p. 969). So, not only did AAP attribute to AACAP something AACAP never said, but also AAP withheld from readers AACAP's actual view.

Next, in reference 39, Byne (2016) also addressed only sexual orientation, doing so very clearly: "Reparative therapy is a subset of conversion therapies based on the premise that *same-sex attraction* are reparations for childhood trauma. Thus, practitioners of reparative therapy believe that exploring, isolating, and repairing these childhood emotional wounds will often result in reducing *same-sex attractions*" (Byne, 2016, p. 97). Byne does not say this of gender identity, as the AAP statement misrepresents.

In AAP reference 40, Cohen-Kettenis et al. (2008) did finally pertain to gender identity; however, this article never mentions conversion therapy. (!) Rather, in this study, the authors presented that clinic's lowering of their minimum age for cross-sex hormone treatment from age 18 to 16, which they did on the basis of a series of studies showing the high rates of success with this age group. Although it did strike me as odd that AAP picked as support against conversion therapy an article that did not mention conversion therapy, I could imagine AAP cited the article as an example of what the "mainstream of traditional medical practice" consists of (the logic being that conversion therapy falls outside what an 'ideal' clinic like this one provides). However, what this clinic provides is the very *watchful waiting* approach that AAP rejected. The approach

espoused by Cohen-Kettenis (and the other clinics mentioned in the source—Gent, Boston, Oslo, and now formerly, Toronto) is to make puberty-halting interventions available at age 12 because: "[P]ubertal suppression may give adolescents, together with the attending health professional, more time to explore their gender identity, without the distress of the developing secondary sex characteristics. The precision of the diagnosis may thus be improved" (Cohen-Kettenis et al., 2008, p. 1894).

Reference 41 presented a very interesting history spanning the 1960s–1990s about how feminine boys and tomboyish girls came to be recognized as mostly pre-homosexual, and how that status came to be entered into the DSM at the same time as homosexuality was being *removed* from the DSM. Conversion therapy is never mentioned. Indeed, to the extent that Bryant mentions treatment at all, it is to say that treatment is entirely irrelevant to his analysis: "An important omission from the *DSM* is a discussion of the kinds of treatment that GIDC children should receive. (This omission is a general orientation of the DSM and not unique to GIDC)" (Bryant, 2006, p. 35). How this article supports AAP's claim is a mystery. Moreover, how AAP could cite a 2006 history discussing events of the 1990s and earlier to support a claim about the *current* consensus in this quickly evolving discussion remains all the more unfathomable.

Cited last in this section was a one-paragraph press release from the World Professional Association for Transgender Health. Written during the early stages of the American Psychiatric Association's (APA's) update of the DSM, the statement asserted simply that "The WPATH Board of Directors strongly urges the de-psychopathologisation of gender variance worldwide." Very reasonable debate can (and should) be had regarding whether gender dysphoria should be removed from the DSM as homosexuality was, and WPATH was well within its purview to assert that it should. Now that the DSM revision process is years completed however, history has seen that APA ultimately retained the diagnostic categories, rejecting WPATH's urging. This makes AAP's logic entirely backwards: That WPATH's request to depathologize gender dysphoria was *rejected* suggests that it is *WPATH's* view—and therefore the AAP policy—which fall "outside the mainstream of traditional medical practice." (!)

AAP based this entire line of reasoning on their belief that conversion therapy is being used "to prevent children and adolescents from identifying as transgender" (Rafferty et al., 2018, p. 4). That claim is left without citation or support. In contrast, what is said by AAP's sources is "delaying affirmation should *not* be construed as conversion therapy or an attempt to change gender identity" in the first place (Byne, 2016, p. 2). Nonetheless, AAP seems to be doing exactly that: simply relabeling any alternative approach as equivalent to conversion therapy.

Although AAP (and anyone else) may reject (what they label to be) conversion therapy purely on the basis of political or personal values, there is no evidence to back the AAP's stated claim about the existing science on gender identity at all, never mind gender identity of children.

AAP also dismissed the watchful waiting approach out of hand, not citing any evidence, but repeatedly calling it "outdated." The criticisms AAP provided, however, again defied the existing evidence, with even its own sources repeatedly calling watchful waiting the current standard. According to AAP:

> [G]ender affirmation is in contrast to the outdated approach in which a child's gender-diverse assertions are held as "possibly true" until an arbitrary age (often after pubertal onset) when they can be considered valid, an approach that authors of the literature have termed "watchful waiting." This outdated approach does not serve the child because critical support is withheld. Watchful waiting is based on binary notions of gender in which gender diversity and fluidity is pathologized; in watchful waiting, it is also assumed that notions of gender identity become fixed at a certain age. The approach is also influenced by a group of early studies with validity concerns, methodologic flaws, and limited follow-up on children who identified as TGD and, by adolescence, did not seek further treatment ("desisters").[45,47]

The citations from AAP's reference list are:

45. Ehrensaft D, Giammattei SV, Storck K, Tishelman AC, Keo-Meier C. Prepubertal social gender transitions: what we know; what we can learn—a view from a gender affirmative lens. *Int J Transgend.* 2018;19(2):251–268

47. Olson KR. Prepubescent transgender children: what we do and do not know. *J Am Acad Child Adolesc Psychiatry.* 2016;55(3):155–156.e3

I was surprised first by the AAP's claim that watchful waiting's delay to puberty was somehow "arbitrary." The literature, including AAP's sources, repeatedly indicated the pivotal importance of puberty, noting that outcomes strongly diverge at that point. According to AAP reference 29, in "*prepubertal* boys with gender discordance—including many without any mental health treatment—the cross gender wishes usually fade over time and do not persist into adulthood, with only 2.2% to 11.9% continuing to experience gender discordance" (Adelson & AACAP, 2012, p. 963, italics added), whereas "when gender variance with the desire to be the other sex is present *in adolescence,* this desire usually does persist through adulthood" (Adelson & AACAP, 2012, p. 964, italics added). Similarly, according to AAP reference 40, "Symptoms of GID *at prepubertal ages* decrease or even disappear in a considerable percentage of children (estimates range from 80–95%). Therefore, any intervention in childhood would seem premature and inappropriate. However, GID persisting *into early puberty* appears to be highly persistent" (Cohen-Kettenis et al., 2008, p. 1895, italics added). That follow-up studies of prepubertal transition differ from postpubertal transition is the very meaning of non-arbitrary. AAP gave readers exactly the reverse of what was contained in its own sources. If AAP were correct in saying that puberty is an arbitrarily selected age, then AAP will be able to offer another point to wait for with as much empirical backing as puberty has.

Next, it was not clear on what basis AAP could say that watchful waiting withholds support—AAP cited no support for its claim. The people in such programs often receive substantial support during this period. Also unclear is on what basis AAP could already know exactly which treatments are "critical" and which are not—Answering that question is the very purpose of this entire endeavor. Indeed, the logic of AAP's claim appears entirely circular: It is only if one were already pre-convinced that gender affirmation is the only acceptable alternative that would make watchful waiting seem to withhold critical support—What it delays is gender affirmation, the method one has already decided to be critical.

Although AAP's next claim did not have a citation appearing at the end of its sentence, binary notions of gender were mentioned both in references 45 and 47. Specifically, both pointed out that existing outcome studies have been about people transitioning from one sex to the other, rather than from one sex to an in-between status or a combination of masculine/feminine features. Neither reference presented this as a reason to reject the results from the existing studies of complete transition however (which is how AAP cast it). Although it is indeed true that the outcome data have been about complete transition, some future study showing that partial transition shows a different outcome would not invalidate what is known about complete transition. Indeed, data showing that partial transition gives better outcomes than complete transition would, once again, support the watchful waiting approach which AAP rejected.

Next was a vague reference alleging concerns and criticisms about early studies. Had AAP indicated what those alleged concerns and flaws were (or which studies they were), then it would be possible to evaluate or address them. Nonetheless, the argument is a red herring: Because all of the later studies showed the same result as did the early studies, any such allegation is necessarily moot.

Reference 47 was a one-and-a-half page commentary in which the author off-handedly mentions criticisms previously made of three of the eleven outcome studies of GD children, but does not provide any analysis or discussion. The only specific claim was that studies (whether early or late) had limited follow-up periods—the logic being that had outcome researchers lengthened the follow-up period, then people who seemed to have desisted might have returned to the clinic as

cases of "persistence-after-interruption." Although one could debate the merits of that prediction, AAP instead simply withheld from the reader the result from the original researchers having tested that very prediction directly: Steensma and Cohen-Kettenis (2015) conducted another analysis of their cohort, by then ages 19–28 (mean age 25.9 years), and found that 3.3% (5 people of the sample of 150) later returned. That is, in long-term follow-up, the childhood sample showed 66.7% desistence instead of 70.0% desistance.

Reference 45 did not support the claim that watchful-waiting is "outdated" either. Indeed, that source said the very opposite, explicitly referring to watchful waiting as the *current* approach: "Put another way, if clinicians are straying from SOC 7 guidelines for social transitions, not abiding by the watchful waiting model *favored by the standards,* we will have adolescents who have been consistently living in their affirmed gender since age 3, 4, or 5" (Ehrensaft et al., 2018, p. 255). Moreover, Ehrensaft et al. said there are cases in which they too would still use watchful waiting: "When a child's gender identity is unclear, the watchful waiting approach can give the child and their family time to develop a clearer understanding and is not necessarily in contrast to the needs of the child" (p. 259). Ehrensaft et al. are indeed critical of the watchful waiting model (which they feel is applied too conservatively), but they do not come close to the position the AAP policy espouses. Where Ehrensaft summaries the potential benefits and potential risks both to transitioning and not transitioning, the AAP presents an ironically binary narrative.

In its policy statement, AAP told neither the truth nor the whole truth, committing sins both of commission and of omission, asserting claims easily falsified by anyone caring to do any fact-checking at all. AAP claimed, "This policy statement is focused specifically on children and youth that identify as TGD rather than the larger LGBTQ population"; however, much of that evidence was about sexual orientation, not gender identity. AAP claimed, "Current available research and expert opinion from clinical and research leaders … will serve as the basis for recommendations" (pp. 1–2); however, they provided recommendations entirely unsupported and even in direct opposition to that research and opinion.

AAP is advocating for something far in excess of mainstream practice and medical consensus. In the presence of compelling evidence, that is just what is called for. The problems with Rafferty, however, do not constitute merely a misquote, a misinterpretation of an ambiguous statement, or a missing reference or two. Rather, AAP's statement is a systematic exclusion and misrepresentation of entire literatures. Not only did AAP fail to provide compelling evidence, it failed to provide the evidence at all. Indeed, AAP's recommendations are *despite* the existing evidence.

Disclosure statement

No potential conflict of interest was reported by the author.

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Steensma, T. D., & Cohen-Kettenis, P. T. (2015). More than two developmental pathways in children with gender dysphoria? *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*, 147–148. doi:10.1016/j.jaac.2014.10.016

Wallien, M. S. C., & Cohen-Kettenis, P. T. (2008). Psychosexual outcome of gender-dysphoric children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*, 1413–1423. doi:10.1097/CHI.0b013e31818956b9

Appendix

Count	Group	Study
2/16 4/16 10/16	gay* trans-/crossdress straight*/uncertain	Lebovitz, P. S. (1972). Feminine behavior in boys: Aspects of its outcome. *American Journal of Psychiatry, 128,* 1283–1289.
2/16 2/16 12/16	trans- uncertain gay	Zuger, B. (1978). Effeminate behavior present in boys from childhood: Ten additional years of follow-up. *Comprehensive Psychiatry, 19,* 363–369.
0/9 9/9	trans- gay	Money, J., & Russo, A. J. (1979). Homosexual outcome of discordant gender identity/role: Longitudinal follow-up. *Journal of Pediatric Psychology, 4,* 29–41.
2/45 10/45 33/45	trans-/crossdress uncertain gay	Zuger, B. (1984). Early effeminate behavior in boys: Outcome and significance for homosexuality. *Journal of Nervous and Mental Disease, 172,* 90–97.
1/10 2/10 3/10 4/10	trans- gay uncertain straight	Davenport, C. W. (1986). A follow-up study of 10 feminine boys. *Archives of Sexual Behavior, 15,* 511–517.
1/44 43/44	trans- cis-	Green, R. (1987). *The "sissy boy syndrome" and the development of homosexuality*. New Haven, CT: Yale University Press.
0/8 8/8	trans- cis-	Kosky, R. J. (1987). Gender-disordered children: Does inpatient treatment help? *Medical Journal of Australia, 146,* 565–569.
21/54 33/54	trans- cis-	Wallien, M. S. C., & Cohen-Kettenis, P. T. (2008). Psychosexual outcome of gender-dysphoric children. *Journal of the American Academy of Child and Adolescent Psychiatry, 47,* 1413–1423.
3/25 6/25 16/25	trans- lesbian/bi- straight	Drummond, K. D., Bradley, S. J., Badali-Peterson, M., & Zucker, K. J. (2008). A follow-up study of girls with gender identity disorder. *Developmental Psychology, 44*, 34–45.
17/139 122/139	trans- cis-	Singh, D. (2012). *A follow-up study of boys with gender identity disorder*. Unpublished doctoral dissertation, University of Toronto.
47/127 80/127	trans- cis-	Steensma, T. D., McGuire, J. K., Kreukels, B. P. C., Beekman, A. J., & Cohen-Kettenis, P. T. (2013). Factors associated with desistence and persistence of childhood gender dysphoria: A quantitative follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry, 52,* 582–590.

*For brevity, the list uses "gay" for "gay and cis-", "straight" for "straight and cis-", etc.

EXHIBIT F

Neutral Citation Number: [2020] EWHC 3274 (Admin)

Case No: CO/60/2020

IN THE HIGH COURT OF JUSTICE
ADMINISTRATIVE COURT
DIVISIONAL COURT

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 01/12/2020

Before :

THE PRESIDENT OF THE QUEEN'S BENCH DIVISION
LORD JUSTICE LEWIS
MRS JUSTICE LIEVEN

- -

Between :

(1) QUINCY BELL
(2) MRS A

Claimants

and

THE TAVISTOCK AND PORTMAN NHS FOUNDATION TRUST

Defendant

NATIONAL HEALTH SERVICE COMMISSIONING BOARD (NHS ENGLAND)

Interested Party

(1) UNIVERSITY COLLEGE LONDON HOSPITALS NHS FOUNDATION TRUST
(2) LEEDS TEACHING HOSPITALS NHS TRUST
(3) TRANSGENDER TREND LTD

Interveners

Mr Jeremy Hyam QC and Mr Alasdair Henderson (instructed by **Sinclairslaw**) for the **Claimants**
Ms Fenella Morris QC and Ms Nicola Kohn (instructed by **DAC Beachcroft**) for the **Defendant**
The Interested Party did not appear and was not represented
Mr John McKendrick QC (instructed by **Hempsons**) for the **First and Second Interveners**
Mr Paul Skinner and Mr Aidan Wills (instructed by **Ai Law)** for the **Third Intervener**
Hearing dates: **7 and 8 October 2020**

- -

Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

.....

THE PRESIDENT OF THE QUEEN'S BENCH DIVISION
LORD JUSTICE LEWIS
MRS JUSTICE LIEVEN

Dame Victoria Sharp P., Lord Justice Lewis, Lieven J.

SECTION A: INTRODUCTION AND BACKGROUND

1. This is the judgment of the court.

2. This is a claim for judicial review of the practice of the defendant, the Tavistock and Portman NHS Foundation Trust, through its Gender Identity Development Service (GIDS) and the first and second Interveners (the Trusts) of prescribing puberty-suppressing drugs to persons under the age of 18 who experience gender dysphoria.

3. Gender dysphoria or GD is a condition where persons experience distress because of a mismatch between their perceived identity and their natal sex, that is, their sex at birth. Such persons have a strong desire to live according to their perceived identity rather than their natal sex.

4. Those with gender dysphoria may be referred to GIDS. GIDS may, in turn, refer them to one of two NHS Trusts (the first and second Interveners) whose clinicians may be prepared to undertake medical interventions in relation to those with gender dysphoria. We are concerned in this case with the administration of gonadotropin-releasing hormone agonists (GnRHa) which are hormone or puberty blocking drugs (also called PBs) to suppress the physical developments that would otherwise occur during puberty.

5. Puberty blocking drugs can in theory be, and have in practice been, prescribed for gender dysphoria through the services provided by the defendant to children as young as 10. It is the practice of the defendant, through GIDS, to require the informed consent of those children and young persons to whom such drugs are prescribed.

6. The issue at the heart of this claim is whether informed consent in the legal sense can be given by such children and young persons.

7. The claimants' case is that children and young persons under 18 are not competent to give consent to the administration of puberty blocking drugs. Further, they contend that the information given to those under 18 by the defendant is misleading and insufficient to ensure such children or young persons are able to give informed consent. They further contend that the absence of procedural safeguards, and the inadequacy of the information provided, results in an infringement of the rights of such children and young persons under Article 8 of the European Convention for the Protection of Human Rights and Fundamental Freedoms (the Convention).

8. In our view, it is appropriate to consider first, whether a child under 16, or a young person between 16 and 18, can give the requisite consent; and secondly, if, in principle, they can do so, whether the information provided by the defendant and the Trusts is adequate for achieving informed consent.

9. The court in this case is concerned with the legal requirements of the process of obtaining consent for the carrying out of medical treatment. In considering this issue the court has had to consider evidence on the use of PBs, their impact on the patients, both in the short and long term, and the evidence of the efficacy of their use. The court is not deciding on the benefits or disbenefits of treating children with GD with PBs, whether in the long or short term. The court has been given a great deal of evidence

about the nature of GD and the treatments that may or may not be appropriate. That is not a matter for us. The sole legal issue in the case is the circumstances in which a child or young person may be competent to give valid consent to treatment in law and the process by which consent to the treatment is obtained.

10. We have had placed before us written evidence from a wide variety of those engaged in issues surrounding GD and a number of individuals who have been treated or are still being treated with PBs.

11. On behalf of the defendant and the Trusts there are statements from Dr Polly Carmichael, Director of GIDS, Professor Gary Butler, Consultant in Paediatric Endocrinology at University College Hospital London, and Dr Nurus-Sabah Alvi, Consultant in Paediatric Endocrinology at Leeds General Infirmary and Clinical Lead for Endocrine Liaison Clinics of the GIDS, Leeds. These witnesses describe the process that the children and young people go through at GIDS and at the Trusts. The court has also had a wide range of evidence from a variety of people concerned with the treatment of those under 18 with PBs. We will refer to that evidence and its sources as appropriate below. Our references to a child or children will be to those under the age of 16, and to young person(s) to anyone under the age of 18, save where it is clear from the context that we are referring to anyone under the age of 18.

Gender Dysphoria

12. Gender dysphoria is defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) which provides for one overarching diagnosis of gender dysphoria with separate specific criteria for children and for adolescents and adults:

> "In adolescents and adults gender dysphoria diagnosis involves a difference between one's experienced gender and assigned gender, and significant distress or problems functioning. It lasts at least six months and is shown by at least two of the following:
>
> 1. A marked incongruence between one's experienced / expressed gender and primary and / or secondary sex characteristics
>
> 2. A strong desire to be rid of one's primary and / or secondary sex characteristics
>
> 3. A strong desire for the primary and / or secondary sex characteristics of the other gender
>
> 4. A strong desire to be of the other gender
>
> 5. A strong desire to be treated as the other gender
>
> 6. A strong conviction that one has the typical feelings and reactions of the other gender.
>
> In children, gender dysphoria diagnosis involves at least six of the following and an associated significant distress or impairment in function, lasting at least six months:

1. A strong desire to be of the other gender or an insistence that one is the other gender

2. A strong preference for wearing clothes typical of the other gender

3. A strong preference for cross-gender roles in make-believe play or fantasy play

4. A strong preference for toys, games or activities stereotypically used or engaged in by the other gender

5. A strong preference for playmates of the other gender

6. A strong rejection of toys, games and activities typical of one's assigned gender

7. A strong dislike of one's sexual anatomy

8. A strong desire for the physical sex characteristics that match one's experienced gender."

Gender Identity Development Service (GIDS)

13. The defendant is an NHS Foundation Trust employing specialist staff including child psychologists, psychotherapists, psychiatrists, social workers, family therapists and nurses. Since 1989 it has provided a gender identity development service, a specialised service providing care to patients up to the age of 18 suffering from GD. GIDS is commissioned by the National Health Service Commissioning Board. The statutory mechanism is that under section 3B of the NHS Act 2006, the Secretary of State has the power to require NHS England to arrange services or facilities as may be prescribed by regulations. The Secretary of State has exercised that power (pursuant to Regulation 11 of the National Health Service Commissioning Board and Clinical Commissioning Groups (Responsibilities and Standing Rules) Regulations 2012/2296, which concerns specified services for rare and very rare conditions) that NHS England must arrange for the provision of services including, pursuant to para 56 of Schedule 4, a gender identity development service specifically for children and adolescents in addition to gender dysphoria services more generally (para 57).

14. Schedule 2, Part A of the NHS Standard Contract, pursuant to which GIDS is provided, sets out the Service Specification which establishes the context of the service, its aims and objectives and the manner in which it will be delivered. As set out in the Service Specification, the service is commissioned to provide specialist assessment, consultation and care including psychological support and physical treatments. The purpose of the treatment is *"to help reduce the distressing feelings of a mismatch between their natal (assigned) sex and their gender identity."* The service also provides support to family and carers of children and young persons so affected.

15. GIDS recognises three stages of physical intervention that may be appropriate in cases of GD. Stage 1 is the administration of GnRHa (one form of puberty blocker). This is clinically appropriate for children and young people who have reached Tanner Stage 2

of puberty and above. Tanner Stage 2 marks the beginning of the physical development of puberty. In natal girls this is the start of development of the breasts, and in boys the testicles and scrotum begin to get larger. Stage 2 of the treatment is the administration of cross-sex hormones (CSH) which can only be prescribed from around the age of 16. Stage 3 is gender reassignment surgery which is only available via adult services to people aged over 18.

16. GIDS takes referrals from across England and Wales and from a wide range of professionals in the health, social services and education sectors, and the voluntary sectors. When a referral is made, the case will be discussed with the relevant regional team. If the intake is successful, then the child will then progress to the GIDS waiting list.

17. As at November 2019 the waiting time for a first assessment at GIDS was between 22-26 months. When a young person reaches the top of the waiting list, they will be invited to the first of a number of assessment appointments at GIDS. The assessment process laid out in the Service Specification anticipates that the assessment process will typically span three to six sessions over 6 months or longer. Most young people will have more sessions than this, and the younger the age the more sessions are likely.

18. Dr Carmichael said that during assessments young persons will be asked, for example, about: the onset of their gender dysphoria; the consistency of their feelings about their gender; how they identify (cross-gender, non-binary, etc); their relationships with peers and family members; their social functioning in general, thoughts about or experience of puberty; their relationship to their bodies; their attractions or romantic relationships as appropriate based on their age and maturity; and their hopes and expectations for the future.

19. As this case is brought by way of judicial review of the GIDS policy and practice, rather than a challenge to an individual treatment decision, it is not possible to give a detailed analysis of the facts of an individual case and the degree to which all the matters referred to by Dr Carmichael were explored in the particular case. We refer at paras 78 to 89 below to the evidence of the experience of the first claimant and some of the other patients of the GIDS service.

20. Dr Carmichael sets out the broad range of professionals who work within GIDS, their specialism in working with young people with GD and the care that is taken when discussing the young person's expression of their gender identity.

21. At the end of the assessment period the clinicians will agree a care plan with the young person and their family. Where the young person fulfils the criteria in the Service Specification and has reached at least Tanner Stage 2 of puberty, they will be referred by GIDS to the first and second Interveners for consultation and/or physical assessment with endocrinologists with a view to being prescribed PBs. Dr Carmichael explains that before any referral to the Trusts, GIDS clinicians discuss the treatment with the young person, including explaining side effects.

The Age and Patient Group for Puberty Blockers

22. Until 2011 PBs were only available at GIDS for those aged 16 or older. In 2011 PBs started to be prescribed for those aged 12-15 and in mid-puberty. This was first done between 2011-14 at University College London Hospital (UCLH) under an approved research study known as the Early Intervention Study. The Study took an uncontrolled treatment cohort of 12-15 year olds with established and persistent GD in England. The Study recruited children for 3 years, but there was then a period until February 2019 when the last cohort member began the next stage of therapy (cross-sex hormones).

23. One of the issues raised in these proceedings is the non-existent or poor evidence base, as it is said to be, for the efficacy of such treatment for children and young persons with GD.

24. In that context, we note that though this research study was commenced some 9 years ago, at the time of the hearing before us the results of this research had yet to be published. Dr Carmichael says in her witness statement dated 2 February 2020 that a paper is now being finalised for publication. At the hearing we were told that that this paper had been submitted for peer-review but that Professor Viner, one of the authors of it, had yet to respond to issues raised by the reviewers, as he has been otherwise engaged in working on issues relating to the coronavirus pandemic.

25. The court was however provided with a paper entitled *"The Early Intervention Study. An evaluation of early pubertal suppression in a carefully selected group of adolescents with "Gender Identity Disorder". A statement and update on the Early Intervention Study (dated 2020)".* We refer further to this paper at para 73 below.

26. There are now two types of endocrine clinic: a clinic for under 15s, referred to as the early intervention clinic, and a clinic for over 15s. The Service Specification states that the early intervention clinic will continue to follow the 2011 Protocol, save that PBs will now be considered for any children *under the age of 12* if they are in established puberty.

27. The age distribution of those treated with PBs in each year between 2011 and 2020 was not provided to the court. Although the defendant and the Trusts said that such data was available, in the sense that the ages of the children are known, the data has not been collated for each year. However, Ms Ailsa Swarbrick, the Divisional Director of Gender Services at the Trust, has presented evidence in relation to patients referred to endocrinology services in 2019-20 and those treated in earlier years but who were discharged from GIDS in 2019-2020. This work was done in response to recommendations in the GIDS Review Action Plan 2019 (a Review commissioned by the Trust following a report by Dr David Bell) that data would help to inform clinical and service developments and a process of continuous improvement.

28. We note here that we find it surprising that such data was not collated in previous years given the young age of the patient group, the experimental nature of the treatment and the profound impact that it has.

29. As it is, for the year 2019/2020, 161 children were referred by GIDS for puberty blockers (a further 10 were referred for other reasons). Of those 161, the age profile is as follows:

> 3 were 10 or 11 years old at the time of referral;
>
> 13 were 12 years old;
>
> 10 were 13 years old;
>
> 24 were 14 years old;
>
> 45 were 15 years old;
>
> 51 were 16 years old;
>
> 15 were 17 or 18 years old.

For the year 2019/20, therefore, 26 of the 161 children referred were 13 or younger; and 95 of the 161 (well over 50%) were under the age of 16.

30. It follows from the information that the court does have on age distribution that some young people could be on PBs for a number of years, in the most extreme case for 5 years between the age of 10 and when they start CSH at 16.

31. Apart from the age distribution, there are other aspects of the patient group which are relevant to this case. The number of referrals to GIDS has increased very significantly in recent years. In 2009, 97 children and young people were referred. In 2018 that number was 2519.

32. Further, in 2011 the gender split was roughly 50/50 between natal girls and boys. However, in 2019 the split had changed so that 76 per cent of referrals were natal females. That change in the proportion of natal girls to boys is reflected in the statistics from the Netherlands (Brik et al "*Trajectories of Adolescents Treated with Gonadotropin-Releasing Hormone Analogues for Gender Dysphoria"* 2018). The defendant did not put forward any clinical explanation as to why there had been this significant change in the patient group over a relatively short time.

33. It is recorded in the GIDS Service Specification and the wider literature that a significant proportion of those presenting with GD have a diagnosis of Autistic Spectrum Disorder (ASD). The Service Specification says:

> "There seems to be a higher prevalence of autistic spectrum disorder (ASD) conditions in clinically referred, gender dysphoric adolescents than in the general adolescent population. Holt, Skagerberg & Dunsford (2014) found that 13.3% of referrals to the service in 2012 mentioned comorbid ASD (although this is likely to be an underestimate). This compares with 9.4% in the Dutch service; whereas in the Finnish service, 26% of adolescents were diagnosed to be on the autism spectrum (Kaltiala-Heino et al. 2015)."

34. The court asked for statistics on the number or proportion of young people referred by GIDS for PBs who had a diagnosis of ASD. Ms Morris said that such data was not available, although it would have been recorded on individual patient records. We therefore do not know the proportion of those who were found by GIDS to be *Gillick* competent who had ASD, or indeed a mental health diagnosis.

35. Again, we have found this lack of data analysis – and the apparent lack of investigation of this issue - surprising.

The process of taking consent

36. The position taken by GIDS is that they will only refer a young person for PBs if they determine that person is competent to give consent, i.e. is *Gillick* competent within the meaning of competence identified in the decision of the House of Lords in *Gillick v West Norfolk and Wisbech Health Authority* [1986] AC 112.

37. Dr Carmichael explained that GIDS takes consent from the young person to their case being referred to the Trusts for treatment; however the consent for the actual prescription of the PBs is taken separately by the clinicians working for the Trusts. She set out the careful process by which GIDS gives information to the young persons and to their parents in order to seek to ensure that the young person is in a position to give valid consent. The court was taken through the statements of Dr Carmichael and Professor Butler and various documents to show the level of information and dialogue that was involved in achieving lawful consent to the treatment. The Service Specification includes Section 3.2 on "Informed Consent". This states *"The consequences of treatment decisions can be significant and life-changing"* and states:

> "All efforts will be made to ensure that clients are aware of the longer term consequences of the endocrine treatments, including implications for fertility, and the decision of the competence of the client will be jointly made by the endocrine and psychological members of the Service's integrated team.
>
> The current context of treatment decisions about cross sex hormones in adolescence is that there is limited scientific evidence for the long-term benefits versus the potential harms of the intervention. There are also concerns that it is uncertain whether or not a young person will continue to identify as transgender in the future, given that some subsequently identify in a different way."

38. The defendant has recently adopted a Standard Operating Procedure for the taking of consent in GIDS. This has taken 2 years to develop and is dated 31 January 2020. Dr Carmichael says at para 33 of her first statement:

> "In advance of any referral by the Trust of a young person for consideration by an endocrinologist for GnRHa treatment, GIDS clinicians discuss treatment with the young person. This includes, checking that the young person's hopes for treatment are realistic, explaining what the treatment can and cannot do, discussing any potential

> side-effects, discussing fertility and potential impact on genital development for birth registered males. We have developed visual aids to support this process.
>
> UCLH and LTH have collated extensive written information to help young people and their parents further understand the nature of the drugs, their limitations and the possible side effects. These written documents are given to young people at their first endocrine clinic visit. The written documents act as a reference point for patients with questions whilst they contemplate whether they would like to go ahead with the referral, and subsequently with treatment. In particular, informational slides titled "Have you thought about having children in the future?" explains the impact GnRHa treatment can have on fertility in explicit terms. Young people and their families are encouraged to raise any questions with their GIDS clinicians or at their next endocrine clinic visit."

39. Ms Morris emphasised that the process of ensuring that consent could validly be given was a discursive and iterative one that involved multiple discussions and answering any questions the young people or their parents might raise. Dr Carmichael said at para 35: "*The GIDS clinicians make it very clear to children and young people that there are both known and unknown risks associated with GnRHa treatment."* Further, she said at para 41: "*In my experience, those young people we see who are recommended for GnRHa treatment understand the implications and limitations of treatment with GnRHa treatment and are able to consent to this stage of treatment."*

40. Professor Butler described the approach to consent at the Trusts as follows:

> "For those under 15 years of age all the pre-assessment consultations are individual and occur with a consultant or senior clinical fellow on at least two visits. Parental support (or that of their guardian or social services where appropriate) is a pre-requisite for the under 15 year stream. On occasions, a young person is not deemed, on clinical examination, to be at an appropriate stage of puberty so further follow-up visits are arranged thereafter at 6-12 monthly intervals until a person is deemed at an appropriate physical stage for intervention and taking of consent. This also gives the opportunity to judge the level of emotional cognitive and psychosocial maturity, and capacity.
>
> The decisions at UCLH and Leeds do not automatically follow on from those made at the GIDS Tavistock. They are a reassessment of physical maturity and cognitive capacity in their own right. They may be at odds with the Tavistock formulation (an infrequent event) and thus would be returned to the Tavistock MDT for reconsideration."

41. Professor Butler said that in his clinic they are careful to ensure that the force behind the decision to seek treatment comes from the young person themselves and is not a consequence of pressure upon them from others around them. The Trusts work closely

with parents to reach a solution that is satisfactory to all and meets the best interests of the child. His clinic has never sought to apply to the Court under its inherent jurisdiction "against" parental opinions because he is concerned that would cause familial frictions. Equally, he suggested UCLH would not wish to have to apply to the court for consent on behalf of the child because it would delay treatment and put an additional burden on GIDS and the Trusts; and because "*it would also increase the distress suffered by the young people themselves, finding that their right to autonomous decision making had been removed from them.*"

42. Professor Butler said a full written information package is provided to older adolescents. For those under 15 there is an initial individual consultation because of the need for "*individualising the approach for very young people, taking special care to assess their level of knowledge and understanding and they are given the written information package then.*" In relation to impacts on fertility and sexual functioning he says:

> "It is also relevant for the consultation purposes that matters of fertility are discussed and counselling by the team takes place, and the option of meeting a fertility specialist is offered, and often taken up. The options of fertility preservation are discussed with all the young people and it is a requirement of the consent process that they fully understand this at an age appropriate level. This understanding must include that they are unable to have the typical sexual relationship of their identified gender with another person on account of their biological sex organ development, and that other surgical procedures may be necessary later on to achieve this possibility."

43. He then said: "*it is an absolute requirement before starting any treatment that a young person can fully understand this effect on fertility and sexual functioning according to their age and level of maturation.*"

44. The court asked for statistical material on the number, if any, of young people who had been assessed to be suitable for PBs but who were *not* prescribed them because the young person was considered not to be *Gillick* competent to make the decision, whether at GIDS or the Trusts. Ms Morris could not produce any statistics on whether this situation had ever arisen. She suggested that in the main, GIDS would work with the young person to give them further information, discuss the matter further and in some cases wait until they had achieved further maturity. The court gained the strong impression from the evidence and from those submissions that it was extremely unusual for either GIDS or the Trusts to refuse to give PBs on the ground that the young person was not competent to give consent. The approach adopted appears to be to continue giving the child more information and to have more discussions until s/he is considered *Gillick* competent or is discharged.

45. Relevant to the evidence of consent is the evidence of Professor Scott (Director of University College London's Institute of Cognitive Neuroscience). She *"seeks to explain, from a neuroscientific point of view, why I have significant doubts about the ability of young people under the age of 18 years old to adequately weigh and*

appreciate the significant consequences that will result from the decision to accept hormonal treatment for gender dysphoria."

46. She explained the neurological development of adolescents' brains that leads to teenagers making different, more risky decisions than adults. She said further that this is backed up by behavioural studies showing that when decision making is "hot" (i.e. more emotional), under 18 year olds make less rational decisions than when the responses are made in a colder, less emotional context. Her conclusion was that:

> "11. … given the risk of puberty blocking treatment, and the fact that these will have irreversible effects, that have life-long consequences, it is my view that even if the risks are well explained, that in the light of the scientific literature, that it is very possible for an adolescent to be unable to fully grasp the implications of puberty-blocking treatment. All the evidence we have suggests that the complex, emotionally charged decisions required to engage with this treatment are not yet acquired as a skill at this age, both in terms of brain maturation and in terms of behaviour."

Parental consent

47. If a child cannot give consent for treatment because they are not *Gillick* competent then the normal position in law would be that someone with parental responsibility could consent on their behalf. Mr Hyam sought at one point to argue that a decision as to giving PBs would fall outside the scope of parental responsibility because of the nature of the treatment concerned. However, the GIDS practice in relation to acting on parental consent alone is quite clear. In the response to the pre-action protocol letter the defendant said:

> "36. There is a fundamental misunderstanding in your letter, which states that parents can consent to pubertal suspension on behalf of a child who is not capable of doing so. This is not the case for this service, as is clear from the above. Although the general law would permit parent(s) to consent on behalf of their child, GIDS has never administered, nor can it conceive of any situation where it would be appropriate to administer blockers on a patient without their consent. The Service Specification confirms that this is the case."

It follows that is not necessary for us to consider whether parents could consent to the treatment if the child cannot lawfully do so because this is not the policy or practice of the defendant and such a case could not currently arise on the facts.

The effect of Puberty Blockers

48. PBs have been used for many years to stop precocious puberty. This is a condition experienced largely by children aged 7 or under when puberty commences at a very early age. This condition is seen more often in natal girls but sometimes in natal boys. PBs are used to stop this early onset of puberty and the use of them ceases when the child reaches an appropriate age for puberty. As can be seen from the evidence this use of PBs does not interfere with the onset of puberty at a normal biological age and, as such, will not interfere with normal development of puberty through adolescence.

49. The use of PBs in cases of GD is quite different. We have some evidence of the history of this treatment and the meaning of puberty from Professor Hruz (Associate Professor of Paediatrics, Endocrinology and Diabetes at Washington University, St Louis, USA) on behalf of the claimants.

50. In summary, PBs were first used for such treatment at a Dutch gender clinic in the late 1990s. That clinic developed a protocol, often referred to as the Dutch protocol. The Dutch protocol was published in the European Journal of Endocrinology in 2006 and called for puberty suppression to begin at the age of 12 after a diagnosis of GD. Puberty is understood in medicine or biology as a process of physiological change involving the process of maturation of the gonads. Hormones in a part of the brain secrete a gonadotropin-releasing hormone which, in turn, stimulates the pituitary gland to secrete other hormones. These stimulate the growth of the gonads, that is ovaries in females and testes in males. Further hormones are secreted which contribute to the further development of the primary sex characteristics, the uterus in females and the penis and scrotum in males. The hormones contribute to the development of secondary sex characteristics including breasts and wider hips in girls and wider shoulders, deeper voices and increased muscle mass in boys. Further growth hormones are released, which stimulate growth. With regular injection of the PBs there is no progression of puberty and some regression of the first stages of already developed sexual characteristics. This means that in girls *"breast tissue will become weak and may disappear completely"* and in boys *"testicular volume will regress to a lower volume."*

51. Under the Dutch protocol, the introduction of CSH starts at age 16. As Professor Hruz explained:

> "29. Then, starting at age 16, cross-sex hormones are administered while GnRH analogue treatment continues, in order to induce something like the process of puberty that would normally occur for members of the opposite sex. In female-to-male patients, testosterone administration leads to the development of "a low voice, facial and body hair growth, and a more masculine body shape" as well as to clitoral engagement and further atrophying of breast tissue. In patients seeking a male-to-female transition, the administration of estrogens will result in "breast development and a female-appearing body shape." Cross-sex hormone administration for these patients will be prescribed for the rest of their lives."

52. There is some dispute as to the purpose of prescribing PBs. According to Dr Carmichael, the primary purpose of PBs is to give the young person time to think about their gender identity. This is a phrase which is repeated on a number of the GIDS and Trust information documents. The Health Research Authority carried out an investigation into the Early Intervention Study in 2019. Its report was somewhat critical of the description of the purpose and said:

> "The research team described the purpose of pubertal suppression as 'to induce a sex hormone-neutral environment to provide young people with space to decide whether to progress further with gender reassignment treatment as an adult.' This phrase appears to have caused confusion as it has been interpreted by some that the puberty suppression was for use in

> any children presenting to the clinic, that there would be no change in the course of any gender identity dysphoria during this time, and that the child could then choose to progress to cross-sex hormone treatment or to stop treatment with subsequent onset of puberty in the birth gender. It has been noted that the participants in this study and other research involving early puberty suppression have progressed to cross-sex hormones. This has raised concerns that the treatment might be responsible for generating persistence, rather than 'creating space to decide'.
>
> It would have reduced confusion if the purpose of the treatment had been described as being offered specifically to children demonstrating a strong and persistent gender identity dysphoria at an early stage in puberty, such that the suppression of puberty would allow subsequent cross-sex hormone treatment without the need to surgically reverse or otherwise mask the unwanted physical effects of puberty in the birth gender. The present study was not designed to investigate the implications on persistence or desistence of offering puberty suppression to a wider range of patients, it was limited to a group that had already demonstrated persistence and were actively requesting puberty blockers."

53. Professor Butler said that PBs:

> "may have some help or advantage in the support of transgender adolescents in some aspects of mental health functioning, in particular with reducing the risk of reduction of suicidal ideation and actual suicidal actions themselves."

54. See further the reference at para 73 below to the paper presented by Dr Carmichael and Professor Viner in 2014, referring to the Early Intervention Study and the limited evidence of psychological benefit.

55. As is clear from the literature and referred to by the HRA, the other purpose of giving PBs is stopping the development of the physical effects of puberty (something that obviously varies depending on at what age and stage in pubertal development the PBs are commenced) because slowing or preventing the early development of secondary sex characteristics during puberty can make a later transition (both medical and social) to living as the opposite sex easier.

The relationship between Puberty Blockers and Cross-Sex Hormones (CSH)

56. GIDS and the Trust place reliance on the fact that Stage 1 treatment with PBs and Stage 2 treatment (CSH) are separate. Thus, so it is said, it is possible for a young person to come off the PBs at any point and not proceed to taking CSH. On one view, this is correct. However, the evidence that we have on this issue clearly shows that practically all children / young people who start PBs progress on to CSH.

57. No precise numbers are available from GIDS (as to the percentage of patients who proceed from PBs to CSH). There was some evidence based on a random sample of those who in 2019-2020 had been discharged or had what is described as a closing summary from GIDS. However the court did have the evidence of Dr de Vries. Dr de Vries is a founding board member of EPATH (European Professional Association for Transgender Health) and a member of the WPATH (World Professional Association for Transgender Health) Committee on Children and Adolescents and its Chair between 2010 and 2016, and leads the Centre of Expertise on Gender Dysphoria at the Amsterdam University Medical Centre in the Netherlands (CEGD). This is the institution which has led the way in the use of PBs for young people in the Netherlands; and is the sole source of published peer reviewed data (in respect of the treatment we are considering) produced to the court. She says that of the adolescents who started puberty suppression, only 1.9 per cent stopped the treatment and did not proceed to CSH.

58. We were told that the defendant did not have any data recording the proportion of those on puberty blockers who progress to cross-sex hormones. We were told that in part this resulted from the fact that some would have progressed to adult services and would not be recorded by the defendant. Ms Swarbrick had carried out an analysis of a random sample of 312 of 1648 files of patients discharged from GIDS from 1st March 2019 to 4th March 2020. Dr Carmichael summarised this as:

> "…based on a random sample of those referred to GIDS who had been discharged or had a closing summary from GIDS in 19-20 (analysis B) 16% of patients (49 individuals) had accessed the endocrinology service during their time with GIDS. Of those 16%, 55% (27 individuals) were subsequently approved for or accessed cross-sex hormones during their time with GIDS. This number represents 8.7% of all the patients discharged from GIDS that year. We also know that of the 49 patients who were referred to endocrinology for GnRHa whilst at GIDS, two did not commence GnRHa treatment, and a further five were discharged from GIDS without being referred on to another gender service."

59. We find it surprising that GIDS did not obtain full data showing the figures and the proportion of those on puberty blockers who remain within GIDS and move on to cross-sex hormones. Although neither Dr Carmichael nor Professor Butler could give the equivalent figures in the United Kingdom to those from the Netherlands, the language used in their witness statements suggests that a similarly high proportion of children and young people in the United Kingdom move from PBs onto CSH.

The impact of Puberty Blockers and their reversibility

60. Both WPATH and the Endocrine Society in their documentation describe PBs as fully reversible. Professor Butler says that "*we do not know everything about the blocker and as far as we know it is a safe reversible treatment with a well-established history."* Dr Alvi also referred to the history of the use of PBs as showing that they are fully reversible. However, it is important to note that apart from the Amsterdam study, the history of the use of PBs relied upon in this context is *from the treatment of precocious*

puberty which is a different condition from GD, and where PBs are used in a very different way.

61. Dr de Vries was somewhat more nuanced in her evidence. She said:

> "Puberty blocking treatment is fully reversible (see for example section 2.0 of the Endocrine Society's Clinical Practice Guidelines…). By fully reversible I mean that the administration of puberty blockers in young people has no irreversible physical consequences, for example for fertility, voice deepening or breast growth".

62. At para 20 of her evidence she said:

> "Ethical dilemmas continue to exist around … the uncertainty of apparent long-term physical consequences of puberty blocking on bone density, fertility, brain development and surgical options."

63. The GIDS Early Intervention Young Person Information Sheet states:

> "What are the possible benefits of starting on hormone blockers?
>
> We have looked at other countries who have given this treatment **and the results** suggest that:
>
> - Hormone blockers which block the body's natural sex hormones may improve the way you feel about yourself.
> - If you decide to stop the hormone blockers early **your physical development** will return as usual in your natal gender. **As far as we are aware**, the hormone blockers will not harm your physical or psychological development.
> - Hormone blockers will make you feel less worried about growing up in the wrong body and will give you more time and space to think about your gender identity.
>
> What are the possible disadvantages and risks of the hormone blockers?
>
> - Possible side effects from the hormone blockers are hot flushes, headache, nausea and weight gain.
> - A short term effect is that your bone strength is shown not to grow as fast as it usually would whilst you are on hormone blockers. However, this will resume once your body is exposed to hormones again. That is why we have to do a bone scan every year to check the thickness of your bones. **We do not fully know how hormone blockers will affect bone strength, the development of your sexual organs, body shape or your final adult height. There**

> **could be other long-term effects of hormone blockers in early puberty that we don't yet know about.**
>
> - Hormone blockers could affect your memory, your concentration or the way you feel about your gender and how likely you are to change your mind about your gender identity.
>
> - Hormone blockers could affect your ability to have a baby. It could take 6 to 12 months longer after stopping the hormone blockers before natal boys start making sperm again or natal girls start maturing eggs in their ovaries. However, hormone blockers do not work as a contraceptive. If you are sexually active, please ask your doctor for advice about birth control." (emphasis added)

64. A number of aspects of this asserted reversibility are raised by the claimants. PBs stop the physical changes in the body when going through puberty. But in reliance on the evidence of Professor Levine (Clinical Professor of Psychiatry at Western Reserve University, Ohio) and Professor Hruz, the claimants assert that neurological and psychological changes occurring in puberty are less well understood than the physiological changes. Further, the degree to which neurological differences are caused by biological factors like hormones and genes are matters of debate. Professor Levine set out evidence on the degree to which young people mature through adolescence through both social and personal experiences. For young people on PBs that maturing process is stopped or delayed with potential social and psychological impacts which could be described as non-reversible.

65. Thus, the central point made by the claimants is that although most of the physical consequences of taking PBs may be reversible if such treatment is stopped, the child or young person will have missed a period, however long, of normal biological, psychological and social experience through adolescence; and that missed development and experience, during adolescence, can never be truly be recovered or "reversed".

66. It is to be noted that prior to June 2020, the NHS website on PBs said:

> "The effects of treatment with GnRH analogues are considered to be fully reversible, so treatment can usually be stopped at any time."

67. In June 2020 this section was updated to read as follows:

> "**Little is known about the long-term side effects of hormone or puberty blockers in children with gender dysphoria.**
>
> Although the Gender Identity Development Service (GIDS) advises that is a physically reversible treatment if stopped, **it is not known what the psychological effects may be.**

> **It's also not known whether hormone blockers affect the development of the teenage brain or children's bones**. Side effects may also include hot flushes, fatigue and mood alterations." (emphasis added)

68. A second key part of the argument about reversibility turns on the relationship between PBs and CSH and the degree to which commencing PBs in practice puts a young person on a virtually inexorable path to taking CSH. CSH are to a very significant degree not reversible. As is set out above at para 57 above, a very high proportion of those who start PBs move on to CSH and thus in statistical terms once a child or young person starts on PBs they are on a very clear clinical pathway to CSH.

Evidence base to support the use of Puberty Blockers for Gender Dysphoria

69. The claimants submit that the treatment of PBs for GD is properly described as (i) experimental (ii) a treatment with a very limited evidence base, and (iii) as a highly controversial treatment. The claimants rely on witness statements from a number of undoubted experts in various relevant fields and from academic institutions in the United Kingdom, the USA, Sweden and Australia who refer to the controversial nature of the treatment and its limited evidential support.

70. It is not however the court's role to judge the weight to be given to various different experts in a judicial review. In our view, more important is the evidence from the defendant and the evidence base *it* relies upon for the use of PBs. In the USA the treatment of GD is not an FDA approved use and as such PBs can only be used "off-label". That does not prevent clinicians, whether in the USA or the United Kingdom, from using PBs for this purpose, as long as their use falls within the clinician's professional expertise. Professor Butler explained that it is very common for paediatric medicines to be used off-label and that this factor does not render the treatment in any sense experimental.

71. However, the lack of a firm evidence base for their use is evident from the very limited published material as to the effectiveness of the treatment, however it is measured.

72. Paul Jenkins, Chief Executive of the defendant said:

> "…it is correct that in recent years, some clinicians [at the Trust] have raised their concerns about the use of GnRHa for young people presenting with gender dysphoria. Indeed, some have called for the Trust to alter its practices and have done so in a variety of ways. We are keenly aware that the subject of gender dysphoria raises complex issues and that many have strong opinions about it."

73. The Evaluation Paper on the Early Intervention Study at GIDS, referred to in para 25 above, gives some (albeit limited) material on the outcome of that study. It summarised a meeting paper presented by Dr Carmichael and Professor Viner in 2014 (but not published in a peer review journal) as follows:

> "The reported qualitative data on early outcomes of 44 young people who received early pubertal suppression. It noted that 100% of young people stated that they wished to continue on GnRHa, that 23 (52%) reported an improvement in mood since starting the blocker but that 27% reported a decrease in mood. **Noted that there was no overall improvement in mood or psychological wellbeing using standardized psychological measures**." (emphasis added)

74. Ms Morris submitted it is not for this court to determine clinical disagreements between experts about the efficacy of a treatment. We agree. That is a matter for the relevant NHS and regulatory bodies to oversee and to decide. However the degree to which the treatment is experimental and has, as yet, an unknown impact, does go to the critical issue of whether a young person can have sufficient understanding of the risks and benefits to be able lawfully to consent to that treatment.

Persistence

75. The claimants submit that there is good evidence that for a significant proportion of young people presenting with GD, the condition resolves itself through adolescence without treatment with PBs. Further, that PBs serve to increase the likelihood of GD, and, as such, can be positively harmful to the child or young person's long-term health. According to DSM5: "*in natal males, persistence of [gender dysphoria] has ranged from 2.2% to 30%. In natal females, persistence has ranged from 12% to 50%."* These figures need to be treated with some caution because it may be that the cohort whose persistence was being considered in these statistics was at a lower age and with less clearly established GD than the young people being treated at GIDS.

76. The Dutch study argued that adolescents who show established GD rarely identify as their biological sex. Professor Hruz suggested there may be two reasons for this. It may be that the clinicians made sound diagnoses of persistent GD. Alternatively, it may be that the very fact of the diagnosis and the course of treatment which affirmed that diagnosis (that is, both gender affirmative psychotherapy and the use of PBs) solidified the feeling of cross-gender identification and led the young people to commit to sex reassignment more strongly than they would have done if there had been a different diagnosis and treatment.

77. As already indicated, it is not our role to adjudicate on the reasons for persistence or otherwise of GD. However, the nature of this issue highlights the highly complex and unusual nature of this treatment and the great difficulty there is in fully understanding its implications for the individual young person. In short, the treatment may be supporting the persistence of GD in circumstances in which it is at least possible that without that treatment, the GD would resolve itself.

SECTION B: EVIDENCE OF THE CLAIMANTS AND OTHER INDIVIDUALS

78. The first claimant was born a female. In her witness statement in these proceedings she set out her experience of being prescribed PBs and then CSH. It should be noted that some of the details relating to her treatment and the information she was given (at GIDS and the first defendant) is disputed. This case is a judicial review of the GIDS policy,

not a tort action relating to the specific facts surrounding the first claimant's treatment and it is not necessary therefore to resolve any factual dispute. We simply record the first claimant's account. She describes a highly traumatic childhood. From the age of 4 or 5 she displayed gender non-conformity, associating more with male games and clothes. She felt highly alienated at secondary school and took birth control pills to stop her periods. She felt disgusted by her body and became depressed and highly anxious. From the age of 14 she began actively to question her gender identity and started to look at YouTube videos and do research on the internet about gender identity disorder and the transition process. She said: "*I thought I had finally found the answer as to why I felt so masculine, uncomfortable with my female body and why I was so much more similar to a stereotypical boy than to a stereotypical girl in physical expression and interests."*

79. When she was 15, the first claimant was referred to GIDS. When she was at the local Children and Adolescent Mental Health Services clinic she remembered: *"the psychiatrist attempted to talk of the gender spectrum as a way of persuading me to not pursue medical transition. I took this as a challenge to how serious I was about my feelings and what I wanted to do and it made me want to transition more. Now I wish I had listened to her."* She was first seen at GIDS aged 16 and had a number of appointments spread out over 1 year and 9 months. She was referred to UCLH in June 2013 and after three appointments commenced PBs. She was given advice about the impact on her fertility, but her priority was to move on to testosterone. She said that at 16, she was not thinking about children and, in any event, egg storage was not available on the NHS.

80. In April 2014 she was referred to an adult Gender Identity Clinic to discuss surgery. She "*was visualising myself becoming a tall, physically strong young man where there was virtually no difference between me and a biological boy."* After commencing testosterone at 17, changes to her body commenced rapidly: these changes included genital changes, her voice dropping and the growth of facial and body hair. She was on testosterone for 3 years but increasingly began to doubt the process of transition:

> "27. I started to have my first serious doubts about transition. These doubts were brought on by for the first time really noticing how physically different I am to men as a biological female, despite having testosterone running through my body. There were also a lot of experiences I could not relate to when having conversations with men due to being biologically female and socialised in society as a girl. There was an unspoken "code" a lot of the time that I felt I was missing. I remember telling a close male friend at the time about these transition doubts, who responded by telling me that I was being silly and I believed him. This was reinforced by the online forums that I browsed where the consensus was that most transsexual people have doubts and that that is a normal part of transitioning, so the doubts should be ignored. I continued on, pushing the doubts in the far back of my mind and no more doubts creeped in for a while."

81. Despite these doubts, when she was 20, she had a double mastectomy. In the year following this:

> "31. … I started to realise that the vision I had as a teenager of becoming male was strictly a fantasy and that it was not possible. My biological make-up was still female and it showed, no matter how much testosterone was in my system or how much I would go to the gym. I was being perceived as a man by society, but it was not enough. I started to just see a woman with a beard, which is what I was. I felt like a fraud and I began to feel more lost, isolated and confused than I did when I was pre-transition."

82. She described facing the reality of taking a regular dose of drugs for the rest of her life to maintain her male appearance; and the need to have a hysterectomy if she remained a man because of the atrophy of her reproductive organs if she continued to take testosterone.

83. From January 2019 the first claimant stopped taking testosterone. She now wishes to identify as a woman and is seeking to change her legal sex back to that on her original birth certificate. She said:

> "39. … It is only until recently that I have started to think about having children and if that is ever a possibility, I have to live with the fact that I will not be able to breastfeed my children. I still do not believe that I have fully processed the surgical procedure that I had to remove my breasts and how major it really was. I made a brash decision as a teenager, (as a lot of teenagers do) trying to find confidence and happiness, except now the rest of my life will be negatively affected. I cannot reverse any of the physical, mental or legal changes that I went through. Transition was a very temporary, superficial fix for a very complex identity issue."

84. The defendant submits the first claimant was given the fullest possible information after a large number of consultations (at least 10) and that she was *Gillick* competent to make the decision to take PBs. Further, the defendant produced witness statements from a number of children and young people who are strongly supportive of the treatment they have received.

85. J is a 20 year old transgender man who received PBs in 2012 at the age of 12 followed by CSH in 2015. He described how he felt a strong need to become a boy from an early age and how he was bullied at school for his behaviour. He found the onset of female puberty horrifying and unbearable. After a number of sessions at GIDS he was prescribed PBs from the age of 12.

86. According to J he was given the fullest possible information from the clinicians at GIDS as to the benefits and disbenefits of the treatment. The clinicians strongly challenged his desire to transition and why he had chosen to express his gender identity as male. He was advised as to the impact on fertility if he chose to go on to CSH and surgery. He said: "*I made the decision to proceed with pubertal suppression without pursuing egg preservation. It was a difficult decision to make because I did not know whether I would want biological children in adulthood, but I was certain I would never want to*

carry a child and give birth. Ultimately, I made the decision because I had a poor quality of life and without immediate treatment I did not feel I had a future at all." He says: "*We discussed sex and I told them the idea of it disgusted me. I knew I would be unable to consider having a sexual relationship as an adult with my body so wrongly formed."* He ended his witness statement by saying that he is thankful that his pubertal development was halted as it removed the distress caused by continued development, but he wishes that the PBs were started earlier which would have prevented the need for breast surgery later.

87. S is a 13 year old trans boy who is on the waiting list at GIDS. He was told that he would have to wait for approximately 24 months to be seen and with his parents decided to see a private provider, GenderGP, where he has been prescribed PBs. We note at this point that the GP in question was removed from the professional register and now operates from outside the United Kingdom. S in his witness statement said:

> "13. … I haven't really thought about parenthood – I have been asked about it by the gender identity specialist I have mentioned but I just have no idea what me in the future is going to think. I haven't had a romantic relationship and it's just not a thing that is really on my radar at the moment."

88. N, an 18 year old trans woman, who was prescribed PBs when she was 17 years old said:

> "12. The treatment of hormone blockers may very well have saved my life. In the period of my life that I was prescribed them my mental health was spiralling due to my dysphoria and this impacting on my daily life, learning and social interactions. While the first injections of gonapeptyl were slow to take effect they eventually began to alleviate my dysphoria in very real ways. I had to shave less and I didn't have to fear pubertal development anymore. I had the time necessary to think about my situation and decide on further courses of action. This also helped my mental health as it gave me significantly less issues overall allowing me to focus and concentrate on aspects in my life alongside my gender identity rather than my fears of puberty and development overtaking everything else in my life."

89. The second claimant, Mrs A, is the mother of a 15 year old girl who has ASD. The daughter has a history of mental health and behavioural problems. She "*is desperate to run away from all that made her female"* and has been referred to CAMHS (Child and Adolescent Mental Health Services). Mrs A is very concerned that her daughter would be referred to GIDS and prescribed PBs. However the daughter has not currently been referred to GIDS and having regard to the defendant's current practice, would not meet the criteria for PBs because her parents would not support that treatment. Mrs A's interest in this action is therefore largely theoretical.

SECTION C: SUBMISSIONS

90. The claimants' primary case is that children or young persons under the age of 18 are not capable of giving consent to the administration of PBs. Their secondary case is that the information given by the defendant and the Interested Party is misleading and inadequate to form the basis for informed consent to be given. In their statement of issues, the claimants put issue one as the adequacy of the information and issue two whether children and young people are capable of giving consent. In our view, the first issue must be whether *Gillick* competence can be achieved, and the secondary or alternative issue, whether the information being given is adequate. We deal with the arguments in that order.

91. Mr Hyam also raised a third issue (at least in writing). This was a submission that if any young person under the age of 18 is prescribed PBs, their case should be referred to the Court of Protection. In oral argument he accepted that the Court of Protection, being a creature of statute, would have no jurisdiction to consider such referrals. We think that the substance of issue three falls within the terms of issue one.

92. Mr Hyam stressed that the claimants were not calling into question that GD existed. Nor were they questioning that it could cause extreme distress or that PBs should never be given to people under 18 or that it was never in their best interests for it to be prescribed. The central issue was whether those under 18 could give informed consent.

93. Mr Hyam submitted that a child still going through puberty is not capable of properly understanding the nature and effect of PBs and weighing the consequences and side effects properly. He pointed to the evidence of the individuals, including that put forward on behalf of the defendant, to show that children of this age cannot understand the implications of matters such as the loss of the ability to orgasm, the potential need to construct a neo-vagina, or the loss of fertility. He argued that the use of PBs to address GD does not have an adequate evidence base to support it and thus should properly be described as experimental treatment. There is evidence that PBs can have significant side effects and there is strong evidence that once a child commences on PBs they will progress to CSH which will cause irreversible changes to the child's body with lifelong medical, psychological and emotional implications for the child. He relies on the harm potentially caused to these vulnerable young people as evidenced by the witness statement of the first claimant.

94. He submitted that the advice given to the children and young persons is misleading because they are told that the PBs are fully reversible when the current evidence on reversibility or the long term implications of the treatment is limited and unclear. He said further, that the reality is that PBs pave the way for CSH which do have irreversible impacts. Further, the information provided by GIDS fails to tell the child that there are no proven benefits to this treatment in either physical or psychological terms. The information is misleading as to the reversibility of PBs, their purpose and their benefits.

95. In those circumstances he submitted that the court should be guided by the approach of the Court of Protection in its *Practice Guidance (Court of Protection: Serious Medical Treatment)* [2020] 1 WLR 641 which sets out those decisions relating to medical treatment where an application should be made to the Court of Protection.

96. Paras 10 and 11 of that Guidance state:

> "10. In any case which is not about the provision of life-sustaining treatment, but involves the serious interference with the person's rights under the ECHR, it is:
>
> "highly probable that, in most, if not all, professionals faced with a decision whether to take that step will conclude that it is appropriate to apply to the court to facilitate a comprehensive analysis of [capacity and] best interests, with [the person] having the benefit of legal representation and independent expert advice."
>
> This will be so even where there is agreement between all those with an interest in the person's welfare.
>
> 11. Examples of cases which may fall into paragraph 10 above will include, but are not limited to: (a) where a medical procedure or treatment is for the primary purpose of sterilisation; (b) where a medical procedure is proposed to be performed on a person who lacks capacity to consent to it, where the procedure is for the purpose of a donation of an organ, bone marrow, stem cells, tissue or bodily fluid to another person; (c) a procedure for the covert insertion of a contraceptive device or other means of contraception; (d) where it is proposed that an experimental or innovative treatment to be carried out; (e) a case involving a significant ethical question in an untested or controversial area of medicine."

97. The defendant and the first and second Interveners make common cause. Ms Morris argued that the care and treatment provided at GIDS fell within the terms of the Service Specification laid down by NHS England (NHSE) as required in accordance with the international frameworks of WPATH and the Endocrine Society and by the domestic regulatory frameworks of the General Medical Council and the Care Quality Commission. The NHSE is currently undertaking a review of the efficacy of treatment for GD (the Cass Review) which will report in due course, and its findings will be reflected in the Service Specification.

98. She argued that the process at GIDS was "deeply *Montgomery* compliant" (i.e. it met the requirements for informed consent identified by the Supreme Court in *Montgomery v Lanarkshire Health Board* [2015] AC 1430) having regard to the frequent consultations, discussions and the provision of detailed, but age appropriate, information. The "vast majority" of the children referred for PBs are 15 or older she said, and the information given is varied depending on the age and maturity of the child or young person. Where the assessment is that the individual is not initially *Gillick* competent, time is taken to see if their understanding develops and competency can be achieved. The information that is given is what is salient for that individual at that age.

99. As to those between the ages of 16-18, if the young person, the parents and the clinicians are agreed then she submitted there is no justiciable issue and the court has no jurisdiction.

100. Mr McKendrick for the first and second Interveners argued that the child or young person did not need to understand the impact of CSH on their fertility because that did

not fall to be decided at the stage of prescribing PBs. The PBs provided the space for the person to think about further stages. In appropriate cases, a natal girl or young person's eggs could be harvested and preserved in order to preserve their fertility. The critical thing for the child was that s/he had GD and that there was no alternative physical treatment to PBs. Once the child or young person had reached the Endocrine Clinic at the Trust, there was no alternative psychological treatment available because that was a matter within the purview of GIDS and GIDS had referred the child for PBs, although ongoing psychological treatment is provided at GIDS alongside treatment with PBs. Therefore, the Trust clinicians were faced with a child in acute distress with no alternative treatment options. The purpose of the treatment was to alleviate distress and that, according to Mr McKendrick, had been achieved.

101. When asked by the court what evidence there was that the PBs did achieve the purpose of alleviating distress, in the light of the lack of published research, Mr McKendrick pointed to the evidence of experienced endocrinologists in both Trusts who could see the real benefits of the treatment.

102. Like Ms Morris, Mr McKendrick said the current practice was not to proceed only on parental consent. However, he did argue that if the child's consent was rendered invalid, the treatment would continue to be lawful if the parents had consented.

103. The third Intervener is Transgender Trend Ltd., an organisation that provides evidence-based information and resources for parents and schools concerning children with GD. Ms Davies-Arai is the director of that organisation and she has filed a witness statement in these proceedings. She set out concerns about the lack of evidence as to the impacts and effectiveness of PBs and in relation to which patients it is most likely to help. Much of her evidence focused on the increase of referrals to GIDS of teenage natal girls and the cultural factors, including material on the internet and social media, which may play a part in this. She said that GIDS does not offer young people with GD a range of ways to interpret their experience, and the GIDS pathway offers a minimal challenge to the beliefs and ideas of the young person.

104. Mr Skinner on behalf of Transgender Trend said the case was particularly important because it concerned the deliberate provision by the State of medical treatment to children and young people which may cause harm. The court should be anxious to ensure that vulnerable children, for example those with ASD, are provided with the full protection of the law.

SECTION D: THE LAW

105. In *Gillick v West Norfolk and Wisbech Health Authority* [1986] AC 112, the House of Lords considered the lawfulness of the Secretary of State's policy on giving contraceptive advice to children without parental consent. The House of Lords held by a majority that a doctor could lawfully give contraceptive advice and treatment to a girl aged under 16 if she had sufficient maturity and intelligence to understand that nature and implications of the proposed treatment and provided that certain conditions were satisfied.

106. Lord Fraser at p. 169B-E said:

> "It seems to me verging on the absurd to suggest that a girl or boy aged 15 could not effectively consent, for example, to have a medical examination of some trivial injury to his body or even to have a broken arm set. Of course the consent of the parents should normally be asked, but they may not be immediately available. Provided the patient, whether the boy or a girl, is capable of understanding what is proposed, and of expressing his or her own wishes, I see no good reason for holding that he or she lacks the capacity to express them validly and effectively and to authorise the medical man to make the examination or give the treatment which he advises. After all, a minor under the age of 16 can, with certain limits, enter into a contract. He or she can also sue and be sued, and can give evidence on oath. …."
>
> Accordingly, I am not disposed to hold now, for the first time, that a girl less than 16 lacks the power to give valid consent to contraceptive advice or treatment, merely on account of her age."

107. Lord Scarman at p. 186A-D said:

> "The law relating to parent and child is concerned with the problems of the growth and maturity of the human personality. If the law should impose upon the process of "growing up" fixed limits where nature knows only a continuous process, the price would be artificiality and a lack of realism in an area where the law must be sensitive to human development and social change. If certainty be thought desirable, it is better that the rigid demarcations necessary to achieve it should be laid down by legislation after a full consideration of all the relevant factors than by the courts confined as they are by the forensic process to the evidenced adduced by the parties and to whatever may properly fall within the judicial notice of judges. Unless and until Parliament should think fit to intervene, the courts should establish a principle flexible enough to enable justice to be achieved by its application to the particular circumstances proved by the evidence placed before them."

And at p.189C-E:

> "When applying these conclusions to contraceptive advice and treatment it has to be borne in mind there is much that has to be understood by a girl under the age of 16 if she is to have legal capacity to consent to such treatment. It is not enough that she should understand the nature of the advice which is being given: she must also have a sufficient maturity to understand what is involved. There are moral and family questions, especially her relationship with her parents; long-term problems associated with the emotional impact of pregnancy and its termination; and there are the risks to health of sexual intercourse at her age, risks which contraception may diminish but cannot eliminate. It follows that a doctor will have to satisfy himself that she is able to appraise these factors

> before he can safely proceed upon the basis that she has at law capacity to consent to contraceptive treatment. And it further follows that ordinarily the proper course will be for him, as the guidance lays down, first to seek to persuade the girl to bring her parents into consultation and, if she refuses, not to prescribe contraceptive treatment unless he is satisfied that her circumstances are such that he ought to proceed without parental knowledge and consent."

And p. 191C-D:

> "The truth may well be that the rights of parents and children in this sensitive area are better protected by the professional standards of the medical profession than by "a priori" legal lines of division between capacity and the lack of capacity to consent since any such general dividing line is sure to produce in some cases injustice, hardship, and injury to health."

108. In *R (Axon) v Secretary of State for Health (Family Planning Association Intervening)* [2006] QB 539 Silber J considered *Gillick* in the context of Article 8 of the Convention, the United Nations Convention on the Rights of the Child (UNCRC) and the increasing emphasis on the autonomy of the child. He held that the principles set out in *Gillick* continued to apply, see para 152.

109. There are two cases dealing with children aged 16 or over who refused medical treatment in circumstances where clinicians considered it was clinically indicated. The issue in each was whether the court could nevertheless, authorise the treatment. *Re W (a Minor) (Medical Treatment: Court's Jurisdiction)* [1993] Fam. 64, concerned the case of a 16 year old girl with anorexia nervosa. The local authority applied under the inherent jurisdiction of the High Court to give medical treatment to W without her consent and against her wishes. W relied on section 8 of the Family Law Reform Act 1969, which states:

> "Section 8 is in these terms:
>
> (1) The consent of a minor who has attained the age of 16 years to any surgical, medical or dental treatment which, in the absence of consent, would constitute a trespass to his person, shall be as effective as it would be if he were of full age; and where a minor has by virtue of this section given an effective consent to any treatment it shall not be necessary to obtain any consent for it from his parent or guardian. (2) In this section 'surgical, medical or dental treatment' includes any procedure undertaken for the purposes of diagnosis, and this section applies to any procedure which is ancillary to any treatment as it applies to that treatment. (3) Nothing in this section shall be construed

> as making ineffective any consent which would have been effective if this section had not been enacted."

110. The Court of Appeal held that section 8 did not confer on a minor an absolute right to determine whether or not she received medical treatment but protected the medical practitioner from an action in trespass. Lord Donaldson analysed *Gillick* and said that Lord Scarman would necessarily have considered that the purpose of section 8 was to provide the medical practitioners treating the child with a defence to either criminal assault or a civil claim for trespass, see pages 76G-H and 78D-F. Lord Donaldson described the effect of the section as being a *"legal flak jacket",* whereby the 16-17 year old is conclusively proved to be *Gillick* competent but this did not mean that someone else who has parental responsibility cannot give consent for the treatment.

111. When applying his analysis to the facts of W's case, Lord Donaldson said at p. 80G-81B:

> "I have no doubt that the wishes of a 16 or 17-year-old child or indeed of a younger child who is "Gillick competent" are of the greatest importance both legally and clinically, but I do doubt whether Thorpe J was right to conclude that W was of sufficient understanding to make an informed decision. I do not say this on the basis that I consider her approach irrational. I personally consider that religious or other beliefs which bar any medical treatment or treatment of particular kinds are irrational, but that does not make minors who hold those beliefs any the less "Gillick competent". They may well have sufficient intelligence and understanding fully to appreciate the treatment proposed and the consequences of their refusal to accept that treatment. What distinguishes W from them, and what with all respect I do not think that Thorpe J took sufficiently into account (perhaps because the point did not emerge as clearly before him as it did before us), is that it is a feature of anorexia nervosa that it is capable of destroying the ability to make an informed choice. It creates a compulsion to refuse treatment or only to accept treatment which is likely to be ineffective. This attitude is part and parcel of the disease and the more advanced the illness, the more compelling it may become. Where the wishes of the minor are themselves something which the doctors reasonably consider need to be treated in the minor's own best interests, those wishes clearly have a much reduced significance."

112. Lord Donaldson concluded at p. 84A-B that:

> "No minor of whatever age has power by refusing consent to treatment to override a consent to treatment by someone who has parental responsibility for the minor and a fortiori a consent by the court. Nevertheless such a refusal is a very important consideration in making clinical judgments and for parents and the courts in deciding whether themselves to give consent. Its importance increases with the age and maturity of the minor."

113. Balcombe LJ at p. 87G-H agreed with Lord Donaldson that the parents of a 16 and 17 year old retained the right to consent to treatment even if she did not consent, and that the court could continue to exercise its inherent jurisdiction. Nolan LJ did not express a view as to whether parents could consent to treatment where the child had refused, but considered that the court under its inherent jurisdiction could continue to do so. He said, at p. 94D-E:

> "To take it a stage further, if the child's welfare is threatened by a serious or imminent risk that the child will suffer grave and irreversible mental or physical harm, then once again the court when called upon has a duty to intervene. It makes no difference whether the risk arises from the action or inaction of others, or from the action or inaction of the child. Due weight must be given to the child's wishes, but the court is not bound by them. In the present case, Thorpe J was apparently satisfied on the evidence before him that such a risk existed. In my judgment, he was fully entitled to take this view. By the time the matter came to this court, it was impossible to take any other view. For these reasons, I would dismiss the appeal save to the extent of making the necessary variation of the order of Thorpe J."

114. We were taken to two cases concerning the application of *Gillick* in particularly difficult medical and ethical situations, which are of some assistance in the present case. In *Re L (Medical Treatment: Gillick Competency*) [1998] 2 F.L.R. 810 Sir Stephen Brown P. considered the case of a 14 year old girl with a life threatening condition involving the possibility of a blood transfusion. L was a Jehovah's Witness and would not consent to the blood transfusion. The court ordered that the medical treatment should take place without her consent. The expert clinician appointed by the Official Solicitor is recorded as giving the following evidence:

> "He makes the point that the girl's view as to having no blood transfusion is based on a very sincerely, strongly held religious belief which does not in fact lend itself in her mind to discussion. It is one that has been formed by her in the context of her own family experience and the Jehovah's Witness meetings where they all support this view. He makes the point that there is a distinction between a view of this kind and the constructive formulation of an opinion which occurs with adult experience. That has not happened of course in the case of this young girl."

115. Sir Stephen Brown then concluded at p. 813:

> "It is, therefore, a limited experience of life which she has – inevitably so – but this is in no sense a criticism of her or of her upbringing. It is indeed refreshing to hear of children being brought up with the sensible disciplines of a well-conducted family. But it does necessarily limit her understanding of matters which are as grave as her own present situation. It may be that because of her belief she is willing to say, and to mean it, 'I am willing to accept death rather than to have a blood transfusion', but it is quite clear in this case that she has not been able to be given all the

> details which it would be right and appropriate to have in mind when making such a decision.
>
> I do not think that in this case this young girl is 'Gillick competent'. I base that upon all the evidence that I have heard. She is certainly not 'Gillick competent' in the context of all the necessary details which it would be appropriate for her to be able to form a view about."

116. *Re S (A Child) (Child Parent: Adoption Consent)* [2019] 2 Fam 177 also concerned a child under 16. In that case Cobb J considered the competence of a mother under the age of 16 to consent to her baby being placed for adoption. Cobb J held that it was appropriate and helpful in determining *Gillick* competence to read across and borrow from the relevant concepts and language in the Mental Capacity Act 2005 but cognisant of some fundamental differences, in particular that the assumption of capacity in section 1(2) of that Act did not apply and there was no requirement for any diagnostic characteristic as there is in section 2(1) of the Mental Capacity Act 2005, see paras 15,16 and 60.

117. At paras 34 to 37 Cobb J considered what test he should apply to the information that S needed to understand and then set out the information that would be relevant for the decision in question:

> "34. Macur J in *LBL v RYJ and VJ* [2011] 1 FLR 1279, para 24 held that it would not be necessary for a decision-maker to be able to comprehend "all the peripheral detail" in the assessment of capacity to make the relevant decision; in a case concerning residence and the provision of education, Macur J went on to say, at para 58:
>
> "In [the expert's] view it is unnecessary for his determination of RYJ's capacity that she should understand all the details within the statement of special educational needs. It is unnecessary that she should be able to give weight to every consideration that would otherwise be utilised in formulating a decision objectively in her 'best interests'. I agree with his interpretation of the test in section 3 which is to the effect that the person under review must comprehend and weigh the salient details relevant to the decision to be made. To hold otherwise would place greater demands upon RYJ than others of her chronological age/commensurate maturity and unchallenged capacity."
>
> 35. In the same vein, Baker J remarked in *H v A Local Authority* [2011] EWHC 1704 at [16(xi)]: "[the] courts must guard against imposing too high a test of capacity to decide issues such as residence because to do so would run the risk of discriminating against persons suffering from a mental disability."
>
> 36. Although not cited in argument, I further remind myself of the comments of Chadwick LJ in the Court of Appeal in *Masterman-Lister v Brutton & Co (Nos 1 and 2)* [2003] 1 WLR 1511, para 79: "a person should not be held unable to understand the information relevant to a

decision if he can understand the explanation of that information in broad terms and simple language…" So, says Ms Dolan, it is not necessary for S to understand all the peripheral and non-salient information in the adoption consent form in order to be declared capacitous. Nor does she even need to fully understand the legal distinctions between placement for adoption under a placement order and not under a placement order. Indeed, Ms Dolan herself relies in this regard on *In re A (Adoption: Agreement: Procedure)* [2001] 2 FLR 455, para 43 where Thorpe LJ observes that the differences between freeing and adoption are "complex in their inter-relationship and it is not to be expected that social workers should have a complete grasp of the distinction between the two, or always to signify the distinction in their discussion with the clients" (my emphasis)." If social workers are not expected to understand the complexities of the legislation (or its predecessor) or explain the distinction accurately to the parents with whom they are working asks Ms Dolan, why should a person under the age of 16 be expected to be able to grasp them in order to be able to be declared capacitous?

37. Accordingly, argues the local authority, the salient or "sufficient" information which is required to be understood by the child parent regarding extra-familial adoption is limited to the fundamental legal consequences of the same. The factors discussed at the hearing include: (i) your child will have new legal parents, and will no longer be your son or daughter in law, (ii) adoption is final, and non-reversible; (iii) during the process, other people (including social workers from the adoption agency) will be making decisions for the child, including who can see the child, and with whom the child will live; (iv) you may obtain legal advice if you wish before taking the decision; (v) the child will live with a different family forever; you will (probably) not be able to choose the adopters; (vi) you will have no right to see your child or have contact with your child; it is highly likely that direct contact with your child will cease, and any indirect contact will be limited; (vii) the child may later trace you, but contact will only be re-established if the child wants this; (viii) there are generally two stages to adoption; the child being placed with another family for adoption, and being formally adopted; (ix) for a limited period of time you may change your mind; once placed for adoption, your right to change your mind is limited, and is lost when an adoption order is made."

118. Cobb J's conclusions were these:

"60… It follows that in order to satisfy the Gillick test in this context the child parent should be able to demonstrate "sufficient" understanding of the "salient" facts around adoption; she should understand the essential "nature and quality of the transaction" (per Munby J in *Sheffield City Council v E* [2005] Fam 326, para 19) and should not need to be concerned with the peripheral.

> 61. It will, however, be necessary for the competent child decision-maker to demonstrate a "full understanding" of the essential implications of adoption when exercising her decision-making, for the independent CAFCASS officer to be satisfied that the consent is valid. If consent is offered under section 19 and/or section 20 of the 2002 Act, it will be necessary for a form to be signed, even if not in the precise format of that identified by Practice Direction 5A. I accept that on an issue as significant and life-changing as adoption, there is a greater onus on ensuring that the child understands and is able to weigh the information than if the decision was of a lesser magnitude: see Baker J in *CC v KK and STCC* [2012] COPLR 627, para 69. This view is consistent with the Mental Capacity Act 2005 Code of Practice, which provides, at paragraph 4.19:
>
> "a person might need more detailed information or access to advice, depending on the decision that needs to be made. If a decision could have serious or grave consequences, it is even more important that a person understands the information relevant to that decision.""

119. In determining the level of understanding that the child needs to have to consent to PBs, Mr Hyam attached considerable importance to the decision of the Supreme Court in *Montgomery v Lancashire Health Board*. That case concerned an action in negligence brought by a mother on behalf of her child. The child was disabled as a result of complications during delivery and the mother argued that she should have been advised as to the possibility of delivery by elective caesarean. The central issue for present purposes was the information that the doctor needed to have given the patient in order to establish that she had given informed consent for the treatment.

120. Lord Kerr set out the requirements placed on a doctor in providing information on risks of injury from treatment in the following terms at para 87:

> "An adult person of sound mind is entitled to decide which, if any, of the available forms of treatment to undergo, and her consent must be obtained before treatment interfering with her bodily integrity is undertaken. The doctor is therefore under a duty to take reasonable care to ensure that the patient is aware of any material risks involved in any recommended treatment, and of any reasonable alternative or variant treatments. The test of materiality is whether, in the circumstances of the particular case, a reasonable person in the patient's position would be likely to attach significance to the risk, or the doctor is or should reasonably be aware that the particular patient would be likely to attach significance to it."

121. Mr Hyam submitted that in determining whether a child is *Gillick* competent the court should consider what would a *"reasonable person in the patient's position understand",* and in asking that question, he submitted that the "reasonable person" is one with adult knowledge.

122. Ms Morris went to the opposite extreme. She submitted that when deciding what information needs to be given to the patient and understood by them, the test is a reasonable person in that individual's position, i.e. a reasonable 12 year old (or other

age) with GD. She said that the "salient" information that needs to be provided is what that reasonable patient would attach importance to. She said that seeking consent, certainly for treatment with lifelong implications such as sterilisation will always involve some *"act of imagination"*. Many patients facing life changing treatment, such as the loss of fertility in cancer treatment or endometriosis, will not have had experience of what they are foregoing, for example, fertility. She submitted that the court ought not to be pronouncing on hypothetical cases: rather, it should or could consider the facts of one specific case as and when it arises.

123. Mr McKendrick submitted that the correct approach in deciding what information was material was to assume a reasonable child of the individual's age.

124. Mr Skinner pointed out that *Montgomery* concerned an adult and therefore the presumption of capacity in the Mental Capacity Act 2005 applied. That presumption is inapplicable in a case concerning *Gillick* competency where the very issue is whether the child is competent to make the decision. The decision in *Montgomery* was of limited assistance, therefore, in the present case. In determining competence, the child must have sufficient understanding of the factors that are not just relevant to him or her now but which on an objective basis ought to be given weight in the future.

125. In our view, the following principles can be derived from the cases to which we have referred:

126. First, the question as to whether a person under the age of 16 is *Gillick* competent to make the relevant decision will depend on the nature of the treatment proposed as well as that person's individual characteristics. The assessment is necessarily an individual one. Where the decision is significant and life changing then there is a greater onus to ensure that the child understands and is able to weigh the information, see *Re S* at para 60.

127. Secondly, however, that does not mean that it is not possible for the court to draw some lines. The Trusts themselves accept that a 7 year old being treated with PBs for precocious puberty cannot give informed consent and his or her parents must give that consent because of the young age of the child concerned and the nature of the treatment.

128. Thirdly, efforts should be made to allow the child or young person to achieve *Gillick* competency where that is possible. Clinicians should therefore work with the individual to help them understand the treatment proposed and its potential implications in order to help them achieve competence.

129. Fourthly, however, that does not mean that every individual under 16 can achieve *Gillick* competence in relation to the treatment proposed. As we discuss below, where the consequences of the treatment are profound, the benefits unclear and the long-term consequences to a material degree unknown, it may be that *Gillick* competence cannot be achieved, however much information and supportive discussion is undertaken.

130. Fifthly, in order to achieve *Gillick* competence it is important not to set the bar too high. It is not appropriate to equate the matters that a clinician needs to explain, as set out in *Montgomery*, to the matters that a child needs to understand to achieve *Gillick* competence. The consequence of Mr Hyam's approach would be significantly to raise

the bar for competence and capacity, which would be contrary both to the common law and to a child's Article 8 rights and the importance of supporting individual autonomy.

131. We adopt the language of Chadwick LJ in *Masterman-Lister v Brutton and Co (Nos 1 and 2)* [2003] 1 WLR 151: a person should be able to "*understand an explanation of that information in broad terms and simple language"*, see *Re S* at para 36. Although this was said in a case that concerned an adult's capacity, in our judgment the same approach should be applied to a case concerning *Gillick* competence. The child or young person needs to be able to demonstrate sufficient understanding of the salient facts, see *Re S* at para 60.

132. Sixthly, we agree with Mr Skinner, that in deciding what facts are salient and what level of understanding is sufficient, it is necessary to have regard to matters which are those which objectively ought to be given weight in the future although the child might be unconcerned about them now. On the facts of this case there are some obvious examples, including the impact on fertility and on future sexual functioning.

SECTION E: CONCLUSIONS

133. The principal issue before this court is in some ways a narrow one. Can a child or young person under the age of 16 achieve *Gillick* competence in respect of the decision to take PBs for GD? The legal position of 16 and 17 year olds is different, and we deal with that below.

134. The starting point is to consider the nature of the treatment proposed. The administration of PBs to people going through puberty is a very unusual treatment for the following reasons. Firstly, there is real uncertainty over the short and long-term consequences of the treatment with very limited evidence as to its efficacy, or indeed quite what it is seeking to achieve. This means it is, in our view, properly described as experimental treatment. Secondly, there is a lack of clarity over the purpose of the treatment: in particular, whether it provides a "pause to think" in a "hormone neutral" state or is a treatment to limit the effects of puberty, and thus the need for greater surgical and chemical intervention later, as referred to in the Health Research Authority report. Thirdly, the consequences of the treatment are highly complex and potentially lifelong and life changing in the most fundamental way imaginable. The treatment goes to the heart of an individual's identity, and is thus, quite possibly, unique as a medical treatment.

135. Furthermore, the nature and the purpose of the medical intervention must be considered. The condition being treated, GD, has no direct physical manifestation. In contrast, the treatment provided for that condition has direct physical consequences, as the medication is intended to and does prevent the physical changes that would otherwise occur within the body, in particular by stopping the biological and physical development that would otherwise take place at that age. There is also an issue as to whether GD is properly categorised as a psychological condition, as the DSM-5 appears to do, although we recognise there are those who would not wish to see the condition categorised in that way. Be that as it may, in our judgment for the reasons already identified, the clinical intervention we are concerned with here is different in kind to other treatments or clinical interventions. In other cases, medical treatment is used to remedy, or alleviate the symptoms of, a diagnosed physical or mental condition, and

the effects of that treatment are direct and usually apparent. The position in relation to puberty blockers would not seem to reflect that description.

136. Indeed the consequences which flow from taking PBs for GD and which must be considered in the context of informed consent, fall into two (interlinking) categories. Those that are a direct result of taking the PBs themselves, and those that follow on from progression to Stage 2, that is taking cross-sex hormones. The defendant and the Trusts argue that Stage 1 and 2 are entirely separate; a child can stop taking PBs at any time and that Stage 1 is fully reversible. It is said therefore the child needs only to understand the implications of taking PBs alone to be *Gillick* competent. In our view this does not reflect the reality. The evidence shows that the vast majority of children who take PBs move on to take cross-sex hormones, that Stages 1 and 2 are two stages of one clinical pathway and once on that pathway it is extremely rare for a child to get off it.

137. The defendant argues that PBs give the child "time to think", that is, to decide whether or not to proceed to cross-sex hormones or to revert to development in the natal sex. But the use of puberty blockers is not itself a neutral process by which time stands still for the child on PBs, whether physically or psychologically. PBs prevent the child going through puberty in the normal biological process. As a minimum it seems to us that this means that the child is not undergoing the physical and consequential psychological changes which would contribute to the understanding of a person's identity. There is an argument that for some children at least, this may confirm the child's chosen gender identity at the time they begin the use of puberty blockers and to that extent, confirm their GD and increase the likelihood of some children moving on to cross-sex hormones. Indeed, the statistical correlation between the use of puberty blockers and cross-sex hormones supports the case that it is appropriate to view PBs as a stepping stone to cross-sex hormones.

138. It follows that to achieve *Gillick* competence the child or young person would have to understand not simply the implications of taking PBs but those of progressing to cross-sex hormones. The relevant information therefore that a child would have to understand, retain and weigh up in order to have the requisite competence in relation to PBs, would be as follows: (i) the immediate consequences of the treatment in physical and psychological terms; (ii) the fact that the vast majority of patients taking PBs go on to CSH and therefore that s/he is on a pathway to much greater medical interventions; (iii) the relationship between taking CSH and subsequent surgery, with the implications of such surgery; (iv) the fact that CSH may well lead to a loss of fertility; (v) the impact of CSH on sexual function; (vi) the impact that taking this step on this treatment pathway may have on future and life-long relationships; (vii) the unknown physical consequences of taking PBs; and (viii) the fact that the evidence base for this treatment is as yet highly uncertain.

139. It will obviously be difficult for a child under 16 to understand and weigh up such information. Although a child may understand the concept of the loss of fertility for example, this is not the same as understanding how this will affect their adult life. A child's attitude to having biological children and their understanding of what this really means, is likely to change between childhood and adulthood. For many children, certainly younger children, and some as young as 10 and just entering puberty, it will not be possible to conceptualise what not being able to give birth to children (or conceive children with their own sperm) would mean in adult life. Similarly, the

meaning of sexual fulfilment, and what the implications of treatment may be for this in the future, will be impossible for many children to comprehend.

140. Ms Morris submitted that many decisions about complex and long-lasting medical treatment will involve the patient having, to some degree, to imagine themselves into an uncertain future of which they have no experience. However, for the reasons that we have explained in para 135 above we consider the treatment in this case to be in entirely different territory from the type of medical treatment which is normally being considered.

141. Some of the children and young people who have been treated at GIDS say in their witness statements that the thought of sex disgusted them, or they did not really think about fertility. These normal reactions do not detract from the difficulties surrounding consent and treatment with PBs. That adolescents find it difficult to contemplate or comprehend what their life will be like as adults and that they do not always consider the longer-term consequences of their actions is perhaps a statement of the obvious.

142. These various difficulties are compounded by the particular difficulties prevalent in the cohort of children treated at GIDS. On the defendant's case, they suffer considerable psychological distress by reason of their GD and are highly vulnerable. In those circumstances, the consequences of taking PBs on their fertility for example, or on their sexual life, may be viewed as a relatively small price to pay for what may be perceived as a solution to their immediate and real psychological distress. It would not follow however that their weighing of risks and benefits when they might start taking PBs would prevail in the longer-term.

143. The difficulty of achieving informed consent in these circumstances is further exacerbated by the lack of evidence as to the efficacy of PBs in treating GD and the long-term outcomes of taking it. We entirely accept that the fact that a treatment is experimental, or that the long-term outcomes are not yet known, does not of itself prevent informed consent being given. Otherwise no experimental treatment could ever be consented to. However, the combination here of lifelong and life changing treatment being given to children, with very limited knowledge of the degree to which it will or will not benefit them, is one that gives significant grounds for concern.

144. We do not think that the answer to this case is simply to give the child more, and more detailed, information. The issue in our view is that in many cases, however much information the child is given as to long-term consequences, s/he will not be able to weigh up the implications of the treatment to a sufficient degree. There is no age appropriate way to explain to many of these children what losing their fertility or full sexual function may mean to them in later years.

145. *Gillick* makes clear that any decision is treatment and person specific. However, for the reasons that we have set out above, we think that it is appropriate in this case to give clear guidance as to the application of the *Gillick* tests to the treatment and cohort of children in question. The conclusion we have reached is that it is highly unlikely that a child aged 13 or under would ever be *Gillick* competent to give consent to being treated with PBs. In respect of children aged 14 and 15, we are also very doubtful that a child of this age could understand the long-term risks and consequences of treatment in such a way as to have sufficient understanding to give consent. However, plainly the

increased maturity of the child means that there is more possibility of achieving competence at the older age.

146. In respect of a young person aged 16 or over, the legal position is different. There is a presumption of capacity under section 8 of the Family Law Reform Act 1969. As is explained in *Re W*, that does not mean that a court cannot protect the child under its inherent jurisdiction if it considers the treatment not to be in the child's best interests. However, so long as the young person has mental capacity and the clinicians consider the treatment is in his/her best interests, then absent a possible dispute with the parents, the court generally has no role. We do not consider that the court can somehow adopt an intrusive jurisdiction in relation to one form of clinical intervention for which no clear legal basis has been established.

147. We do however recognise that in the light of the evidence that has emerged, and the terms of this judgment, clinicians may well consider that it is not appropriate to move to treatment, such as PBs or CSH, without the involvement of the court. We consider that it would be appropriate for clinicians to involve the court in any case where there may be any doubt as to whether the long-term best interests of a 16 or 17 year old would be served by the clinical interventions at issue in this case.

148. We express that view for these reasons. First, the clinical interventions involve significant, long-term and, in part, potentially irreversible long-term physical, and psychological consequences for young persons. The treatment involved is truly life changing, going as it does to the very heart of an individual's identity. Secondly, at present, it is right to call the treatment experimental or innovative in the sense that there are currently limited studies/evidence of the efficacy or long-term effects of the treatment.

149. The position of the defendant and the Trusts is that they consider it would be an intrusion into the child or young person's autonomy if a decision about treatment with PBs were to be made by the court not by the patient. They are concerned about the use of NHS and court resources if these decisions have to be made by the court. We do not consider that this is the correct approach. In principle, a young person's autonomy should be protected and supported; however, it is the role of the court to protect children, and particularly a vulnerable child's best interests. The decisions in respect of PBs have lifelong and life-changing consequences for the children. Apart perhaps from life-saving treatment, there will be no more profound medical decisions for children than whether to start on this treatment pathway. In those circumstances we consider that it is appropriate that the court should determine whether it is in the child's best interests to take PBs. There is a real benefit in the court, almost certainly with a child's guardian appointed, having oversight over the decision. In any case, under the inherent jurisdiction concerning medical treatment for those under the age of 18, there is likely to be a conflict between the support of autonomy and the protective role of the court. As we have explained above, we consider this treatment to be one where the protective role of the court is appropriate.

150. The claimants' alternative ground is that the information provided by the defendant and the Trusts is inadequate to form the basis of informed consent. We accept that the defendant and the Trusts have in their written information, to children, young people and their parents and carers, tried hard to explain the potential consequences of PBs, including that of moving on to CSH, and to give full information. They have also

attempted to do this in an age appropriate manner. The problem is not the information given, but the ability of the children and young people, to understand and most importantly weigh up that information. The approach of the defendant appears to have been to work on the assumption that if they give enough information and discuss it sufficiently often with the children, they will be able to achieve *Gillick* competency. As we have explained above, we do not think that this assumption is correct.

OVERALL CONCLUSION

151. A child under 16 may only consent to the use of medication intended to suppress puberty where he or she is competent to understand the nature of the treatment. That includes an understanding of the immediate and long-term consequences of the treatment, the limited evidence available as to its efficacy or purpose, the fact that the vast majority of patients proceed to the use of cross-sex hormones, and its potential life changing consequences for a child. There will be enormous difficulties in a child under 16 understanding and weighing up this information and deciding whether to consent to the use of puberty blocking medication. It is highly unlikely that a child aged 13 or under would be competent to give consent to the administration of puberty blockers. It is doubtful that a child aged 14 or 15 could understand and weigh the long-term risks and consequences of the administration of puberty blockers.

152. In respect of young persons aged 16 and over, the legal position is that there is a presumption that they have the ability to consent to medical treatment. Given the long-term consequences of the clinical interventions at issue in this case, and given that the treatment is as yet innovative and experimental, we recognise that clinicians may well regard these as cases where the authorisation of the court should be sought prior to commencing the clinical treatment.

153. We have granted a declaration to reflect the terms of this judgment.

EXHIBIT G

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF WEST VIRGINIA
AT CHARLESTON

B.P.J., by her next friend and mother,
HEATHER JACKSON,

Plaintiff,

vs.

Civil Action No. 2:21-cv-00316
Hon. Joseph R. Goodwin

WEST VIRGINIA STATE BOARD OF EDUCATION; HARRISON COUNTY BOARD OF EDUCATION; WEST VIRGINIA SECONDARY SCHOOL ACTIVITIES COMMISSION; W. CLAYTON BURCH in his official capacity as State Superintendent; and, DORA STUTLER in her official capacity as Harrison County Superintendent,

Defendants.

DECLARATION OF DR. CHAD T. CARLSON, M.D., FACSM

I, Dr. Chad T. Carlson, pursuant to 28 U.S. Code § 1746, declare under penalty of perjury under the laws of the United States of America that the facts contained in my paper entitled "White Paper by Dr. Chad Thomas Carlson, MD, Concerning Injury Risks Associated with Transgender Participation in Female Athletics," attached hereto, are true and correct to the best of my knowledge and belief, and that the opinions expressed therein represent my own expert opinions.

Executed on June 22, 2021.

Chad T. Carlson MD

Dr. Chad T. Carlson, M.D.

White Paper by Dr. Chad Thomas Carlson, MD Concerning Injury Risks Associated With Transgender Participation in Female Athletics

June 22, 2021

Introduction

Up to the present, the great majority of news, debate, and even scholarship about transgender participation in female athletics has focused on track and field events and athletes, and the debate has largely concerned questions of fairness and inclusion. However, the transgender eligibility policies of the NCAA and many high school athletic associations in the United States apply with equal force to all sports, including sports in which players frequently collide with each other, or can be forcefully struck by balls or equipment such as hockey or lacrosse sticks. And in fact, biologically male, transgender athletes have competed in a wide range of high school, collegiate, and professional girls' or women's sports, including, at least, basketball,* soccer,† volleyball,‡ softball,§ lacrosse,** and even women's tackle football.††

The science of sex-specific differences in physiology, intersecting with the physics of sports injury, leaves little doubt that participation by biological males in

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* https://www.espn.com/espnw/athletes-life/story/_/id/10170842/espnw-gabrielle-ludwig-52-year-old-transgender-women-college-basketball-player-enjoying-best-year-life (accessed 6/20/21)

† https://www.unionleader.com/news/education/nh-bill-limits-women-s-sports-to-girls-born-female/article_d1998ea1-a1b9-5ba4-a48d-51a2aa01b910.html; https://www.outsports.com/2020/1/17/21069390/womens-soccer-mara-gomez-transgender-player-argentina-primera-division-villa-san-marcos (accessed 6/20/21)

‡ https://news.ucsc.edu/2016/09/challenging-assumptions.html (accessed 6/20/21); https://www.outsports.com/2017/3/20/14987924/trans-athlete-volleyball-tia-thompson (accessed 6/20/21)

§ https://www.foxnews.com/us/californias-transgender-law-allows-male-high-schooler-to-make-girls-softball-team (accessed 6/20/21)

** https://savewomenssports.com/f/emilys-story?blogcategory=Our+Stories (accessed 6/20/21)

†† https://www.outsports.com/2017/12/13/16748322/britney-stinson-trans-football-baseball (accessed 6/20/21); https://www.mprnews.org/story/2018/12/22/transgender-football-player-prevails-in-lawsuit (accessed 6/20/21)

these types of girls' or women's sports, based on gender identity, creates significant additional risk of injury for the biologically female participants competing alongside these transgender athletes.

In 2020, after an extensive review of the scientific literature, consultation with experts, and modeling of expected injuries, World Rugby published revised rules governing transgender participation, along with a detailed explanation of how the new policy was supported by current evidence. World Rugby concluded that "there is currently no basis with which safety and fairness can be assured to biologically female rugby players should they encounter contact situations with players whose biological male advantage persists to a large degree," and that after puberty, "the lowering of testosterone removes only a small proportion of the documented biological differences." Hence, World Rugby concluded that trans women should not compete in women's rugby.(World Rugby 2020 at 17.) World Rugby has been criticized by some for its new guidelines, but those criticisms have often avoided discussions of medical science entirely, or have asserted that modeling scenarios can overstate true risk. What cannot be denied however, is that World Rugby's approach is evidence-based, and rooted in concern for athlete safety. As a medical doctor who has spent my career in sports medicine, it is my opinion that World Rugby's assessment of the evidence is scientifically sound, and that injury modeling meaningfully predicts that biologically male transgender athletes do constitute a safety risk for the female athlete in women's sports.

Unfortunately, apart from World Rugby's careful review, the public discourse is lacking any careful consideration of the question of safety. As a physician who has spent my career caring for athletes, I find this silence about safety both surprising and concerning. It is my hope through this white paper to equip and motivate sports leagues and policy makers to give adequate attention to the issue of safety for female athletes. I first explain the nature and causes of common sports injuries. I then review physiological differences between male and female bodies that affect the risk and severity of injuries to females when biological males compete in the female category, and explain why testosterone suppression does not eliminate these heightened risks to females. Finally, I explain certain conclusions about those risks.

Credentials

1. I am a medical doctor practicing Sports Medicine, maintaining an active clinical practice at Stadia Sports Medicine in West Des Moines, Iowa. I received my M.D. from the University of Nebraska College of Medicine in 1994 and completed a residency in family medicine at the University of Michigan in 1997.

2. Following my time in Ann Arbor, I matched to a fellowship in Sports Medicine at Ball Memorial Hospital in Muncie, Indiana, training from 1997 to 1999, with clinical time split between Central Indiana Orthopedics, the Ball State Human Performance Laboratory, and the Ball State University training room. I received my board certification in Sports Medicine in 1999, which I continue to hold. Since

residency training, my practice has focused on Sports Medicine–the treatment and prevention of injuries related to sport and physical activity.

3. Since 1997, I have served in several clinical practices and settings as a treating physician, including time as team physician for both the University of Illinois and Ball State University, where I provided care to athletes in several sports, including ice hockey, basketball, field hockey, softball, gymnastics, soccer, and volleyball. In the course of my career, I have provided coverage for NCAA Power Five Conference championships and NCAA National Championship events in basketball, field hockey and gymnastics, among other sports, as well as provided coverage for national championship events for U.S.A. gymnastics, and U.S. Swimming and Diving. I have also covered professional soccer in Des Moines.

4. Since 2006, I have been the physician owner of Stadia Sports Medicine in West Des Moines, Iowa. My practice focuses on treatment of sports and activity-related injury, including concussive injury, as well as problems related to the physiology of sport.

5. I have served in, and provided leadership for several professional organizations over the course of my career. In 2004, I was designated a Fellow of the American College of Sports Medicine (ACSM). I have served on ACSM's Health and Science Policy Committee since 2010, and for a time chaired their Clinical Medicine Subcommittee. From 2009 to 2013, I served two elected terms on the Board of Directors of the American Medical Society for Sports Medicine (AMSSM), and during that time served as Chair of that body's Practice and Policy Committee.

I was subsequently elected to a four year term on AMSSM's executive committee in 2017, and from 2019-20, I served as AMSSM's President. AMSSM is the largest organization of sports medicine physicians in the world. I gained fellowship status through AMSSM in 2020–my first year of eligibility. My work for ACSM and AMSSM has brought with it extensive experience in public policy as relates to Sports Medicine.

6. In 2020, I was named as a board delegate to the newly-constituted Physical Activity Alliance. I am a named member of an NCAA advisory group on COVID-19, through which I provided input regarding the cancellation of the basketball tournament in 2020. I also serve as a member of the Iowa Medical Society's Sports Medicine Subcommittee, and have recently been asked to serve on the Iowa High School Athletic Association's newly-forming Sports Medicine Advisory Committee.

7. I have served as a manuscript reviewer for organizational policy pronouncements, and for several professional publications, most recently a sports medicine board review book just published in April, 2021. I have published several articles on topics related to musculoskeletal injuries in sports and rehabilitation, which have been published in peer-reviewed journals such as Clinical Journal of Sports Medicine, British Journal of Sports Medicine, Current Reviews in Musculoskeletal Medicine, Athletic Therapy Today, and the Journal of Athletic Training. In conjunction with my work in policy advocacy, I have helped write several pieces of legislation, including the initial draft of what became the Sports

Medicine Licensure Clarity Act, signed into law by President Trump in 2018, which eases the restrictions on certain practitioners to provide health services to athletes and athletic teams outside of the practitioner's home state.

I. OVERVIEW

8. In this statement, I offer information and my own professional opinion on the potential for increased injury risk to females in sports when they compete against biologically male transgender athletes.* At many points in this statement, I provide citations to published, peer-reviewed articles that provide relevant and supporting information to the points I make.

9. The principal conclusions that I set out in this white paper are as follows:

a. Government and sporting organizations have historically considered the preservation of athlete safety as one component of competitive equity.

b. Injury in sport is somewhat predictable based on modeling assumptions that take into account relevant internal and external risk factors.

c. Males exhibit large average advantages in size, weight, and physical capacity over females—often falling far outside female ranges. As a result, entry of male athletes, for any reason, into female competition in contact sports (broadly defined) will ultimately increase both the frequency and severity of injury suffered by female athletes who share playing space with these males.

* In the body of this paper, I use the terms "male" and "female" according to their ordinary medical meaning–that is to say, to refer to the two biological sexes. I also use the word "man" to refer to a biologically male human, and "woman" to refer to a biologically female human. In the context of this opinion, I include in these categories non-syndromic, biologically-normal males and females who identify as a member of the opposite sex, including those who use endogenous hormone suppression to alter their body habitus. In contexts that are not focused on questions of biology and physiology, terms of gender are sometimes used to refer to subjective identities rather than to biological categories – something I avoid for purposes of a paper focused on sports science.

d. Current research supports the conclusion that suppression of testosterone levels by males who have already begun puberty will not fully reverse the effects of testosterone on skeletal size, strength, or muscle hypertrophy, leading to persistence of sex-based differences in power, speed, and force-generating capacity.

10. In this white paper, I use the term "contact sports" to refer broadly to all sports in which collisions between players, or collisions between equipment such as a stick or ball and the body of a player, occur with some frequency (whether or not permitted by the rules of the game), and are well recognized in the field of sports medicine as causes of sport-related injuries.* The 1975 Title IX implementing regulations (34 CFR § 106.41) say that "for purposes of this [regulation] contact sports include boxing, wrestling, rugby, ice hockey, football, basketball, and other sports the purpose or major activity of which involves bodily contact," and certainly all of the sports specifically named in the regulation fall within my definition of "contact sport." Field hockey (Barboza 2018), soccer (Kuczinski 2018), rugby (Viviers 2018), lacrosse (Pierpoint 2019), volleyball,† baseball, and softball also routinely involve collisions that can and do result in collision-caused injuries, and so also fall within my definition.

* It is common to see, within the medical literature, reference to distinctions between "contact" and "collision" sports. For purposes of clarity, I have combined these terms, since in the context of injury risk, there is no practical distinction between them.

† See https://www.latimes.com/sports/story/2020-12-08/stanford-volleyball-hayley-hodson-concussions-cte-lawsuit, and https://volleyballmag.com/corinneatchison/ (both accessed 6/20/21)

II. A BRIEF HISTORY OF THE RATIONALE FOR SEPARATION OF SPORT BY SEX

11. World Rugby is correct when it notes that "the women's category exists to ensure protection, safety, and equality" for women. (World Rugby 2020 at 15.) To some extent, those in charge of sport governing bodies in the modern era have always recognized the importance of grouping athletes together based on physical attributes, in order to ensure both safety and competitive balance. Weight classifications have existed in wrestling since it reappeared as an Olympic event in 1904. Women and men have participated in separate categories since the advent of intercollegiate sporting clubs early in the 20th century. When Title IX went into effect in 1975, there were just under 300,000 female high school athletes, and fewer than 10,000 female collegiate athletes. With the changes that resulted from Title IX, it was assumed that newly-available funds for women in sport would ensure the maintenance of existing, or creation of new, sex-segregated athletic teams that would foster greater participation by women. This has been borne out subsequently; by the first half of the 1980's these numbers had risen to 1.9 million and nearly 100,000 respectively. (Hult 1989.)

12. The rationale for ongoing "separate but equal" status when it came to sex-segregated sports was made clear within the language of the original implementing regulations of Title IX , which, acknowledging real, biologically-driven differences between the sexes, created carve-out exceptions authorizing sex-separation of sport for reasons rooted in the maintenance of competitive equity. Importantly, the effect

of these innate sex-based differences on the health and safety of the athlete were acknowledged by the express authorization of sex-separated teams for sports with higher perceived injury risk—i.e., "contact sports." (Coleman 2020.)

13. In the almost half century since those regulations were adopted, the persistent reality of sex-determined differences in athletic performance and safety has been recognized by the ongoing and nearly universal segregation of men's and women's teams–even those that are not classically defined as being part of a contact or collision sport.

14. Now, however, many schools and sports leagues in this country are permitting males to compete in female athletics—including in contact sports—based on gender identity. In my view, these policies have been adopted without careful analysis of safety implications. Others have addressed questions of the negative impact of such policies on fairness, or equality of athletic experiences for girls and women, in published articles and in court submissions. One recent review of track and field performances, including sprints, distance races and field events, noted that men surpass the top female performance in each category between 1000 and 10,000 times *each year*, with hundreds or thousands of men beating the top women in each event. (Coleman & Shreve.) Although this was not their primary focus, World Rugby well-summarized the point when it observed that in a ranking list of the top thousand performances in most sports, every year, *every one* will have been achieved by a biological male. (World Rugby 2020 at 14.) In sum, a large and

unbridgeable performance gap between the sexes is well-studied and equally well-documented. In this white paper, I instead focus on the question of athlete safety.

III. UNDERSTANDING THE CAUSES OF SPORTS INJURIES

15. The causes for injury in sport are multifactorial. In recent decades, medical researchers have provided us an evolving understanding of how sports injuries occur, as well as the factors that make them more or less probable, and more or less severe. Broadly speaking, there are two ways of modeling injury: the epidemiological model, and the biomechanical model. These models are not mutually exclusive, but provide complementary conceptual frameworks to help us stratify risk in sport.

A. The epidemiological model of injury

16. From a practical standpoint, sports medicine researchers and clinicians often use the "epidemiological model" to explain, prevent and manage sports injuries. Broadly speaking, this model views an injury in sport as the product of internal and external risk factors, triggered by an inciting event. In other words, a given injury is "caused" by a number of different factors that are unique to a given situation. (Meeuwise 1994.) When the interplay of these factors exceeds the injury threshold, injury occurs. One example of how this interplay might work would be a female distance runner in track who develops a tibial stress fracture, with identified risks of low estrogen state from amenorrhea (suppression of menses), an aggressive winter training program on an indoor tile surface, and shoes that have been used for too many miles, and are no longer providing proper shock absorption. Most risk

factors ebb and flow, with the overall injury risk at any given time fluctuating as well. Proper attention to risk factor reduction *before* the start of the sports season (including appropriate rule-making) is the best way to reduce actual injury rates *during* the season.

17. As alluded to, the risk factors associated with injury can be broadly categorized as internal or external. Internal risk factors are internal to the athlete. These include relatively fixed variables, such as the athlete's age, sex, bone mineral density (which affects bone strength) and joint laxity, as well as more mutable variables such as body weight, fitness level, hydration state, current illness, prior injury, or psychosocial factors such as aggression.

18. External risk factors are, as the name suggests, external to the athlete. These include non-human risks such as the condition of the playing surface or equipment, athletic shoe wear, or environmental conditions. Other external risk factors come from the competitors themselves, and include such variables as opposing player size, speed, aggressiveness, and overall adherence to the rules of the game. As already mentioned, these risks can be minimized through the proper setting and enforcement of rules, as well as the appropriate grouping of athletes together for purposes of competition. To the latter point, children don't play contact sports with adults and, as has already been discussed, after the onset of puberty, men and women compete in categories specific to their own biological sex. Certainly these categorical separations are motivated in part by average performance differences and considerations of fairness and opportunity. But they are also

motivated by safety concerns. These divisions enhance safety because, when it comes to physical traits such as body size, weight, speed, muscle girth, and bone strength, although a certain amount of variability exists within each group, the averages and medians differ widely *between* the separated groups.*

19. Thus, each of these commonly utilized groupings of athletes represents a pool of individuals with predictable commonalities. Epidemiological risk assessment is somewhat predictable and translatable as long as their pool remains intact. But the introduction of outside individuals into the pool (e.g. an adult onto a youth football team, or males into women's sports) would change the balance of risk inside the pool. Simply put, when you introduce larger, faster, and stronger athletes from one pool into a second pool of athletes who are categorically smaller (whether as a result of age or sex), you have altered the characteristics of the second pool, and have increased the injury risk for the original athletes in that pool.

20. Most clinical studies of the epidemiology of sports injuries use a multivariate approach, not only identifying risk factors but also examining how these factors might interact, in order to distinguish between correlation and

* In some cases, safety requires even further division or exclusion. A welterweight boxer would not compete against a heavyweight, nor a heavyweight wrestle against a smaller athlete. In the case of youth sports, when children are at an age where growth rates can vary widely, leagues will accommodate for naturally-occurring large discrepancies in body size by limiting larger athletes from playing positions where their size and strength is likely to result in injury to smaller players. Thus, in youth football, players exceeding a certain weight threshold may be temporarily restricted to playing on the line and disallowed from carrying the ball, or playing in the defensive secondary, where they could impose high-velocity hits on smaller players.

causation (i.e. which factors are merely associated with an injury, and which are truly causes). (Meeuwise 1994.)

21. Determining causality in clinical injury research through a multivariate approach involves attempting to keep as many variables as possible the same, so as to isolate the effect of a single variable, such as biological sex, on injury risk. Researchers focusing on differences between male and female athletes, for example, would not compare concussion rates of a high school girls' soccer team to concussion rates of a professional men's soccer team, because differences in the concussion rate might be due to a number of factors besides sex, such as age, body mass, relative differences in skill, speed, or power, as well as differences in training volume and intensity.

22. As indicated earlier, an injury event is usually the end product of a number of different risk factors coming together. (Bahr 2005.) A collision between two soccer players who both attempt to head the ball, for example, might be the inciting event that causes a concussion. Although the linear and angular forces that occur through sudden deceleration would be the proximate cause of this injury, the epidemiological model of injury would also factor in "upstream" risks, predicting the possibility of an injury outcome for each athlete differently depending on the sum of these risks. If the collision injury described above occurs between two disparately-sized players, the smaller athlete will tend to decelerate more abruptly than the larger athlete, increasing the smaller athlete's risk for injury. Additional discrepancies in factors such as neck strength, running speeds, and muscle force

generation capacity all result in differing risks and thus, the potential for differing injury outcomes from the same collision. As I discuss later in this white paper, there are significant statistical differences between the sexes when it comes to each of these variables, meaning that in a collision sport where skeletally-mature males and females are playing against one another, there is a higher statistical likelihood that injury will result when collisions occur, and in particular there is a higher likelihood that a female will suffer injury. This is the basis for the recent decision by World Rugby to disallow the crossover of men into women's rugby, regardless of gender identity. (World Rugby 2020.) The decision-making represented by this policy change is rational and rooted in objective facts and objective risks of harm, because it takes real, acknowledged, and documented physical differences between the sexes, and models expected injury risk on the basis of the known differences that persist even after hormone manipulation.

B. The biomechanical model of injury

23. Sports medicine researchers and clinicians also consider a biomechanical approach when it comes to understanding sports injuries. In the biomechanical model of injury, injury is considered to be analogous to the failure of a machine or other structure. Every bone, muscle, or connective tissue structure in an athlete's body has a certain load tolerance. Conceptually, when an external "load" exceeds the load tolerance of a given structure in the human body, an injury occurs. (Fung 1993 at 1.) Thus, researchers focus on the mechanical load—the force exerted on a bone, ligament, joint or other body part—and the load tolerance of that impacted or

stressed body part, to understand what the typical threshold for injury is, and how predictable this might be. (McIntosh 2005 at 2-3.) Biomechanical models of injury usually consider forces in isolation. The more consistent the movement pattern of an individual, and the fewer the contributions of unexpected outside forces to the athlete, the more accurate biomechanical predictions of injury will be.

24. Biomechanical modeling can be highly predictive in relatively simple settings. For example, in blunt trauma injury from falls, mortality predictably rises the greater the fall. About 50% of people who fall four stories will survive, while only 10% will survive a fall of seven stories. (Buckman 1991.) As complexity increases, predictability in turn decreases. In sport, the pitching motion is highly reproducible, and strain injury to the ulnar collateral ligament (UCL) of the elbow can be modeled. The load tolerance of the UCL of a pitcher's elbow is about 32 Newton-meters, but the failure threshold of a ligament like this in isolation is not the only determinant of whether injury will occur. During the pitching motion, the valgus force imparted to the elbow (gapping stress across the inner elbow that stretches the UCL) routinely reaches 64 Newtons, which is obviously greater than the failure threshold of the ligament. Since not all pitchers tear their UCLs, other variables innate to an athlete must mitigate force transmission to the ligament and reduce risk. The load tolerance of any particular part of an athlete's body is thus determined by other internal factors such as joint stiffness, total ligament support, muscle strength across the joint, or bone mineral density.

25. Injury load can be self-generated, as in the case of a pitcher's elbow, or externally-generated, as in the case of a linebacker hitting a wide receiver. While load tolerance will vary by individual, as described above, and is often reliant on characteristics innate to a given athlete, external load is determined by outside factors such as the nature of the playing surface or equipment used, in combination with the weight and speed of other players or objects (such as a batted ball) with which the player collides. (Bahr 2005.)

26. As this suggests, the two "models" of sports injuries described above are not in any sense inconsistent or in tension with each other. Instead, they are complementary ways of thinking about injuries that can provide different insights. But the important point to make regarding these models is that in either model, injury risk (or the threshold for injury) rises and falls depending on the size of an externally-applied force, and the ability of a given athlete to absorb or mitigate that force.

IV. THE PHYSICS OF SPORTS INJURY

27. Sports injuries often result from collisions between players, or between a player and a rapidly moving object (e.g. a ball or hockey puck, a lacrosse or hockey stick). In soccer, for example, most head injuries result from collisions with another player's head or body, collision with the goal or ground, or from an unanticipated blow from a kicked ball. (Boden 1998; Mooney 2020.) In basketball, players often collide with each other during screens, while diving for a loose ball, or while driving

to the basket. In lacrosse or field hockey, player-to-player, or player-to-stick contact is common.

28. But what are the results of those collisions on the human body? Basic principles of physics can cast light on this question from more than one angle. A general understanding of these principles can help us identify factors that will predictably increase the risk, frequency, and severity of sports injuries, given certain assumptions.

29. First, we can consider **energy**. Every collision involves an object or objects that possess energy. The energy embodied in a moving object (whether a human body, a ball, or anything else) is called kinetic energy.

30. Importantly, the kinetic energy of a moving object is expressed as:

$$e = \frac{1}{2} Mass * velocity^2$$

That is, kinetic energy is a function of the mass of the object multiplied by the *square* of its velocity. (Dashnaw 2012.) To illustrate with a simple but extreme example: if athletes A and B are moving at the same speed, but athlete A is twice as heavy, athlete A carries twice as much kinetic energy as athlete B. If the two athletes weigh the same amount, but athlete A is going twice as fast, athlete A carries four times as much kinetic energy as athlete B. But as I have noted, the kinetic energy of a moving object is a function of the mass of the object multiplied by

the square of its velocity. Thus, if athlete A is twice as heavy, and moving twice as fast, athlete A will carry eight times the kinetic energy of athlete B into a collision.*

31. The implication of this equation means that what appear to be relatively minor discrepancies in size and speed can result in major differences in energy imparted in a collision, to the point that more frequent and more severe injuries can occur. To use figures that correspond more closely to average differences between men and women, if Player M weighs only 20% more than Player F, and runs only 15% faster, Player M will bring *58% more kinetic energy* into a collision than Player F.†

32. The law of conservation of energy tells us that energy is never destroyed or "used up." If kinetic energy is "lost" by one body in a collision, it is inevitably transferred to another body, or into a different form. In the case of collision between players, or between (e.g.) a ball and a player's head, some of the energy "lost" by one player, or by the ball, may be transformed into (harmless) sound; some may result in an increase in the kinetic energy of the player who is struck (through acceleration, which I discuss below); but some of it may result in *deformation* of the player's body—which, depending on its severity, may result in injury. Thus, the greater the kinetic energy brought into a collision, the greater the potential for injury, all other things being equal.

* $2*(2)^2 = 8$

† $1.2*(1.15)^2 = 1.587$

33. Alternately, we can consider force and **acceleration**, which is particularly relevant to concussion injuries.

34. Newton's third law of motion tells us that when two players collide, their bodies experience equal and opposite forces at the point of impact.

35. Acceleration refers to the rate of change in speed (or velocity). When two athletes collide, their bodies necessarily accelerate (or decelerate) rapidly: stopping abruptly, bouncing back, or being deflected in a different direction. Newton's second law of motion tells us that Force = Mass * Acceleration (or, $A = F/M$). From this equation we see that when a larger and a smaller body collide, and (necessarily) experience equal and opposite forces, the smaller body (or smaller player, in sport) will experience more rapid acceleration. We observe this physical principle in action when we watch a bowling ball strike bowling pins: the heavy bowling ball only slightly changes its course and speed; the lighter pins go flying.

36. This same equation also tells us that if a given player's body or head is hit with a *larger* force (e.g., from a ball that has been thrown or hit faster), it will experience *greater* acceleration, everything else being equal.

37. Of course, sport is by definition somewhat chaotic, and forces are often not purely linear. Many collisions also involve angular velocities, with the production of rotational force, or torque. Torque can be thought of as force that causes rotation around a central point. A different but similar equation of Newtonian physics

governs the principles involved.* Torque is relevant to injury in several ways. When torque is applied through joints in directions those joints are not able to accommodate, injury can occur. In addition, rotational force can cause different parts of the body to accelerate at different rates—in some cases, very rapid rates, also leading to injury. For example, a collision where the body is impacted at the waist can result in high torque and acceleration on the neck and head.

38. Sport-related concussion—a common sports injury and one with potentially significant effects—is attributable to linear, angular, or rotational acceleration and deceleration forces that result from impact to the head, or from an impact to the body that results in a whiplash "snap" of the head. (Rowson 2016.) In the case of a concussive head injury, it is the brain that accelerates or decelerates on impact, colliding with the inner surface of the skull. (Barth 2001 at 255.)

39. None of this is mysterious: each of us, if we had to choose between being hit either by a large, heavy athlete running at full speed, or by a small, lighter athlete, would intuitively choose collision with the small, light athlete as the lesser of the two evils. And we would be right. One author referred to the "increase in kinetic energy, and therefore imparted forces" resulting from collision with larger, faster players as "profound." (Dashnaw 2012.)

* In this equation, Torque = Moment of Inertia x Angular Acceleration, where "Moment of Inertia" is defined as Mass x Distance to the Rotational Axis (squared).

V. GENDER DIFFERENCES RELEVANT TO INJURY

40. It is important to state up front that it is self-evident to most people familiar with sport and sport injuries that if men and women were to consistently participate together in competitive contact sports, there would be higher rates of injury in women. This is one reason that rule modifications often exist in leagues where co-ed participation occurs.[*] Understanding the physics of sports injuries helps provide a theoretical framework for why this is true, but so does common sense and experience. All of us are familiar with basic objective physiological differences between the sexes which become apparent after the onset of puberty, and persist throughout adulthood. And as a result of personal experience, all of us also have some intuitive sense of what types of collisions are likely to cause pain or injury. Not surprisingly, our "common sense" on these basic facts about the human condition are also consistent with the observations of medical science. Below, I provide quantifications of some of these well-known differences between the sexes that are relevant to injury risk, as well as some categorical differences that may be less well known.

A. Height and weight

41. It is an inescapable fact of the human species that males as a group are statistically larger and heavier than females. On average, men are 7% to 8% taller

[*] For example, see https://www.athleticbusiness.com/college/intramural-coed-basketball-playing-rules-vary-greatly.html (detailing variety of rule modifications applied in co-ed basketball). Similarly, coed soccer leagues often prohibit so-called "slide tackles," which are not prohibited in either men's or women's soccer. See, e.g.., http://www.premiercoedsports.com/pages/rulesandpolicies/soccer.

than women. (Handelsman 2018 at 818.) According to the most recently available Centers for Disease Control and Prevention (CDC) statistics, the weight of the average U.S. adult male is 16% greater than that of the average U.S. adult female. (CDC 2018.) This disparity persists into the athletic cohort. Researchers find that while athletes tend on average to be lighter than non-athletes, the weight difference between the average adult male and female athlete remains within the same range—between 14% and 23%, depending on the sport analyzed. (Santos 2014; Fields 2018.) Indeed, World Rugby estimates that the average male rugby player weighs 20% to 40% more than the average female rugby player. (World Rugby 2020 at 10.) This size advantage by itself allows men to bring more force to bear in a collision.

B. Bone and connective tissue strength

42. Men have bones in their arms, legs, feet and hands that are both larger and stronger per unit volume than those of women, due to greater cross-sectional area, greater bone mineral content, and greater bone density. The advantage in bone size (cross-sectional area) holds true in both upper and lower extremities, even when adjusted for lean body mass. (Handelsman 2018 at 818; Nieves 2005 at 530.) Greater bone size in men is also correlated with stronger tendons that are more adaptable to training (Magnusson 2007), and an increased ability to withstand the forces produced by larger muscles (Morris 2020 at 5). Male bones are not merely larger, they are stronger per unit of volume. Studies of differences in arm and leg bone mineral density – one component of bone strength – find that male bones are

denser, with measured advantages of between 5% and 14%. (Gilsanz 2011; Nieves 2005.)

43. Men also have larger ligaments than women (Lin 2019 at 5), and stiffer connective tissue (Hilton 2021 at Table 1), providing greater protection against joint injury.

C. Speed

44. When it comes to acceleration from a static position, and either sprinting or sustained running, men are consistently faster than women. World record sprint performance between the sexes remains significant at between 7% and 10.5%, with world record times in women now exhibiting a plateau (no longer rapidly improving with time) similar to the historical trends seen in men. (Cheuvront 2005.) This performance gap has to do with, among other factors, increased skeletal stiffness, greater cross-sectional muscle area, denser muscle fiber composition and greater limb length. (Handelsman 2018.) For all these reasons, males, on average, run about 10% faster than females. (Lombardo 2018 at 93.) This becomes important as it pertains to injury risk, because males involved in sport will often be travelling at faster speeds than their female counterparts in comparable settings, with resultant faster speed at impact in a given collision.

D. Strength/Power

45. In 2014, a male mixed-martial art fighter identifying as female and fighting under the name Fallon Fox fought a woman named Tamikka Brents, and

caused significant facial injuries in the course of their bout. Speaking about their fight later, Brents said:

> "I've fought a lot of women and have never felt the strength that I felt in a fight as I did that night. I can't answer whether it's because she was born a man or not because I'm not a doctor. I can only say, I've never felt so overpowered ever in my life, and I am an abnormally strong female in my own right."*

46. So far as I am aware, mixed martial arts is not a collegiate or high school interscholastic sport. Nevertheless, what Brent experienced in an extreme setting is true and relevant to safety in all sports that involve contact. In absolute terms, males as a group are substantially stronger than women.

47. Compared to women, men have "larger and denser muscle mass, and stiffer connective tissue, with associated capacity to exert greater muscular force more rapidly and efficiently." (Hilton 2021.) Research shows that on average, during the prime athletic years (ages 18-29) men have, on average, 54% greater total muscle mass than women (33.7 kg vs. 21.8 kg) including 64% greater muscle mass in the upper body, and 47% greater in the lower body. (Janssen 2000 at Table 1.) The cross-sectional area of muscle in women is only 50% to 60% that of men in the upper arm, and 65% to 70% of that of men in the thigh. This translates to women having only 50% to 60% of men's upper limb strength and 60% to 80% of men's lower limb strength. (Handelsman 2018 at 812.) Male weightlifters have been shown to be approximately 30% stronger than female weightlifters of equivalent

* https://bjj-world.com/transgender-mma-fighter-fallon-fox-breaks-skull-of-her-female-opponent/

stature and mass. (Hilton 2021 at 5.) But in competitive athletics, since the stature and mass of the average male exceeds that of the average female, actual differences in strength between average body types will, on average, exceed this. The longer limb lengths of males augment strength as well. Statistically, in comparison with women, men also have lower total body fat, and differently distributed and greater lean muscle mass, which increases their power-to-weight ratios and upper-to-lower limb strength ratios as a group. Looking at another common metric of strength, moderately trained males average 57% greater grip strength (Bohannon 2019) and 54% greater knee extension torque (Neder 1999).

48. Using their legs and torso for power generation, men can apply substantially larger forces with their arms and upper body, enabling them to generate more ball velocity through overhead motions, as well as generate more pushing or punching power. In other words, isolated sex-specific differences in muscle strength in one region (even differences that in isolation seem small) can, and do combine to generate even greater sex-specific differences in more complex sport-specific functions. One study looking at moderately-trained individuals found that males can generate 162% more punching power than females. (Morris 2020.) Thus, multiple small advantages aggregate into larger ones.

E. Throwing and kicking speed

49. One result of the combined effects of these sex-determined differences in skeletal structure is that men are, on average, able to throw objects faster than women. (Lombardo 2018; Chu 2009; Thomas 1985.) By age seventeen, the *average*

male can throw a ball farther than 99% of seventeen-year-old females—which necessarily means at a faster initial speed assuming a similar angle of release—despite the fact that factors such as arm length, muscle mass, and joint stiffness individually don't come close to exhibiting this degree of sex-defined advantage. One study of elite male and female baseball pitchers showed that men throw baseballs 35% faster than women—81 miles/hour for men vs. 60 miles/hour for women. The authors of this study attribute this to a sex-specific difference in the ability to generate muscle torque and power. (Chu 2009.) A study showing greater throwing velocity in male versus female handball players attributed it to differences in body size, including height, muscle mass, and arm length. (Van Den Tillaar 2012.) Interestingly, significant sex-related difference in throwing ability has been shown to manifest even before puberty, but the difference increases rapidly during and after puberty. (Thomas 1985 at 266.) These sex-determined differences in throwing speed are not limited to sports where a ball is thrown. Males have repeatedly been shown to throw a javelin more than 30% farther than females. (Lombardo 2018 Table 2; Hilton 2021 at 5.)

50. Men also serve and spike volleyballs with higher velocity than women, with a performance advantage in the range of 29-34%. (Hilton 2021) Analysis of first and second tier Belgian national elite male volleyball players shows ball spike speeds of 63 mph and 56 mph respectively. (Forthomme 2005.) NCAA Division I female volleyball players—roughly comparable to the second-tier male elite group referenced above—average a ball spike velocity of approximately 40 mph (18.1 m/s).

(Ferris 1995 at Table 2.) Notably, based on the measurements of these studies, male spiking speed in *lower* elite divisions is almost 40% greater than that of NCAA Division I female collegiate players. Separate analyses of serving speed between elite men and women Spanish volleyball players showed that the average power serving speed in men was 54.6 mph (range 45.3–64.6 mph), with maximal speed of 76.4 mph. In women, average power serving speed was 49 mph (range 41–55.3 mph) with maximal speed of 59 mph. This translates to an almost 30% advantage in maximal serve velocity in men. (Palao 2014.)

51. Recall that kinetic energy is dependent on mass and the square of velocity. A volleyball (with fixed mass) struck by a male, and traveling an average 35% faster than one struck by a female, will deliver 82% more energy to a head upon impact.

52. Men's greater leg strength and jumping ability confer a further large advantage in volleyball that is relevant to injury risk. In volleyball, an "attack jump" is a jump to position a player to spike the ball downward over the net against the opposing team. Research on elite national volleyball players found that on average males exhibited a 50% greater vertical jump height during an "attack" than did females. (Sattler 2015.) Similar data looking at countermovement jumps (to block a shot) in national basketball players reveals a 35% male advantage in jump height. (Kellis 1999.) In volleyball, this dramatic difference in jump height means that male players who are competing in female divisions will more often be able to successfully perform a spike, and this will be all the more true considering that the

women's net height is seven inches lower than that used in men's volleyball. Confirming this inference, research also shows that the successful attack percentage (that is, the frequency with which the ball is successfully hit over the net into the opponent's court in an attempt to score) is so much higher with men than women that someone analyzing game statistics can consistently identify games played by men as opposed to women on the basis of this statistic alone. These enhanced and more consistently successful attacks by men directly correlate to their greater jumping ability and attack velocity at the net. (Kountouris 2015.)

53. The combination of the innate male-female differences cited above, along with the lower net height in women's volleyball, means that if a reasonably athletic male is permitted to compete against women, the participating female players will likely be exposed to higher ball velocities that are outside the range of what is typically seen in women's volleyball. When we recall that ball-to-head impact is a common cause of concussion among women volleyball players, this fact makes it clear that participation in girls' or women's volleyball by biologically male individuals will increase concussion injury risk for participating girls or women.

54. Male sex-based advantages in leg strength also lead to greater kick velocity. In comparison with women, men kick balls harder and faster. A study comparing kicking velocity between university-level male and female soccer players found that males kick the ball with an average 20% greater velocity than females. (Sakamoto 2014.) Applying the same principles of physics we have just used above, we see that a soccer ball kicked by a male, travelling an average 20% faster than a

ball kicked by a female, will deliver 44% more energy on head impact. Greater force-generating capacity will thus increase the risk of an impact injury such as concussion.

VI. ENHANCED FEMALE VULNERABILITY TO CERTAIN INJURIES

55. Above, I have reviewed physiological differences that result in the male body bringing greater weight, speed, and force to the athletic field or court, and how these differences can result in a greater risk of injury to females when males compete against them. But it is also true that the female body is more vulnerable than the male body to certain types of injury even when subject to comparable forces. In this regard, I will focus on two areas of heightened female vulnerability to collision-related injury which have been extensively studied: concussions, and ACL injuries.

A. Concussions

56. Females are more likely than males to suffer concussions in comparable sports, and on average suffer more severe and long-lasting disability once a concussion does occur. (Harmon 2013 at 4; Berz 2015; Blumenfeld 2016; Covassin 2003; Rowson 2016.) Females also seem to be at higher risk for post-concussion syndrome than males. (Berz 2015; Blumenfeld 2016; Broshek 2005; Colvin 2009; Covassin 2012; Dick 2009; Marar 2012; Preiss-Farzanegan 2009.)

57. The most widely-accepted definition of sport-related concussion* comes from the Consensus Statement on Concussion in Sport (see below). (McCrory 2018.) To summarize, concussion is "a traumatically induced transient disturbance of brain function, involving a complex pathophysiological process that can manifest in a variety of ways." (Harmon 2013 at 1.)

58. Sport-related concussions have undergone a significant increase in societal awareness and concurrent injury reporting since the initial passage of the Zachery Lystedt Concussion Law in Washington State in 2009 (Bompadre 2014), and the subsequent passage of similar legislation governing return-to-play criteria for concussed athletes in most other states in the U.S. (Nat'l Cnf. of State Leg's 2018). Concussion is now widely-recognized as a common sport-related injury, occurring in both male and female athletes. (CDC 2007.) Sport-related concussions can result from player-surface contact or player-equipment contact in virtually any

* "Sport related concussion is a traumatic brain injury induced by biomechanical forces. Several common features that may be utilised in clinically defining the nature of a concussive head injury include:

► SRC may be caused either by a direct blow to the head, face, neck or elsewhere on the body with an impulsive force transmitted to the head.

► SRC typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, signs and symptoms evolve over a number of minutes to hours.

► SRC may result in neuropathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.

► SRC results in a range of clinical signs and symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive features typically follows a sequential course. However, in some cases symptoms may be prolonged.

The clinical signs and symptoms cannot be explained by drug, alcohol, or medication use, other injuries (such as cervical injuries, peripheral vestibular dysfunction, etc) or other comorbidities (eg, psychological factors or coexisting medical conditions).

sport. However, sudden impact via a player-to-player collision, with rapid deceleration and the transmission of linear or rotational forces through the brain, is also with a common cause of concussion injury. (Covassin 2016 at 242-243; Marar 2012; Barth 2001; Blumenfeld 2016; Boden 1998; Harmon 2013 at 4.)

59. A large retrospective study of U.S. high school athletes showed a higher rate of female concussions in soccer (79% higher), volleyball (0.6 concussions/10,000 exposures, with 485,000 reported exposures, vs. no concussions in the male cohort), basketball (31% higher), and softball/baseball (320% higher). (Marar 2012.) A similarly-sized, similarly-designed study comparing concussion rates between NCAA male and female collegiate athletes showed, overall, a concussion rate among females 40% higher than that of males. Higher rates of injury were seen across individual sports as well, including ice hockey (10% higher); soccer (54% higher); basketball (40% higher); and softball/baseball (95% higher). (Covassin 2016.) The observations of these authors, my own observations from clinical practice, and the acknowledgment of our own Society's Position Statement (Harmon 2013), all validate the higher frequency and severity of sport-related concussions in women and girls.

60. In addition, females on average suffer materially greater cognitive impairment than males when they do suffer a concussion. Group differences in cognitive impairment between females and males who have suffered concussion have been extensively studied. A study of 2340 high school and collegiate athletes who suffered concussions determined that females had a 170% higher frequency of

cognitive impairment following concussions, and that in comparison with males, female athletes had significantly greater declines in simple and complex reaction times relative to their preseason baseline levels. Moreover, the females experienced greater objective and subjective adverse effects from concussion even after adjusting for potentially protective effect of helmets used by some groups of male athletes. (Broshek 2005 at 856, 861; Colvin 2009; Covassin 2012.)

61. This large discrepancy in frequency and severity of concussion injury is consistent with my own observations across many years of clinical practice. The large majority of student athletes who have presented at my practice with severe and long-lasting cognitive disturbance have been adolescent girls. I have seen girls remain symptomatic for over a year, and lose ground academically and become isolated from their peer groups due to these ongoing symptoms. For patients who experience these severe effects, post-concussion syndrome can be life-altering.

62. Some of the anatomical and physiological differences that we have considered between males and females help to explain the documented differences in concussion rates and in symptoms between males and females. (Covassin 2016; La Fountaine 2019; Lin 2019; Tierney 2005; Wunderle 2014.) Anatomically, there are significant sex-based differences in head and neck anatomy, with females exhibiting in the range of 30% to 40% less head-neck segment mass and neck girth, and 49% lower neck isometric strength. This means that when a female athlete's head is subjected to the same load as an analogous male, there will be a greater tendency for head acceleration, and resultant injury. (Tierney 2005 at 276-277.)

63. When modeling the effect of the introduction of male mass, speed, and strength into women's rugby, World Rugby gave particular attention to the resulting increases in forces and acceleration (and injury risk) experienced in the head and neck of female players. Their analysis found that "the magnitude of known risk factors for head injury are . . . predicted by the size of the disparity in mass between players . . . . The addition of [male] speed as a biomechanical variable further increases these disparities," and their model showed an increase of up to 50% in neck and head acceleration that would be experienced in a typical tackle scenario in women's rugby. As a result, "a number of tackles that currently lie beneath the threshold for injury would now exceed it, causing head injury." (World Rugby 2020 at 12-13.) While rugby is notoriously contact-intensive, similar increases to risk of head and neck injury to women are predictable in any sport context in which males and females collide at significant speed, as happens from time to time in sports including soccer and basketball.

64. In addition, even when the heads of female and male athletes are subject to identical accelerative forces, there are sex-based differences in neural anatomy and physiology, cerebrovascular organization, and cellular response to concussive stimuli that make the female more likely to suffer concussive injury, or more severe concussive injury. For instance, hypothalamic-pituitary disruption is thought to play a role in post-concussion symptomatology that differentially impacts women. (McGroarty 2020; Broshek 2005 at 861.) Another study found that elevated progesterone levels during one portion of the menstrual cycle were associated with

more severe post-concussion symptomatology that differentially impacted women. (Wunderle 2014.)

65. As it stands, when women compete against each other, they already have higher rates of concussive injury than men, across most sports. The addition of biologically male athletes into women's contact sports will inevitably increase the risk of concussive injury to girls and women, for the multiple reasons I have explained. Because the effects of concussion can be severe and long-lasting, particularly for girls and women, we can predict with some confidence that if participation by biological males in women's contact sports based on gender identity becomes more common, more girls and women will suffer substantial concussive injury and the potential for long-term harm as a result.

B. Anterior Cruciate Ligament injuries

66. The Anterior Cruciate Ligament ("ACL") is a key knee stabilizer that prevents anterior translation of the tibia relative to the femur and also provides rotatory and valgus* knee stability. (Lin 2019 at 4.) Girls and women are far more vulnerable to ACL injuries than are boys and men. The physics of injury that we have reviewed above makes it inevitable that the introduction of biologically male athletes into the female category will increase still further the occurrence of ACL injuries among girls or women who encounter these players on the field.

* Valgus force at the knee is a side-applied force that gaps the medial knee open.

67. Sports-related injury to the ACL is so common that it is easy to overlook the significance of it. But it is by no means a trivial injury, as it can end sports careers, require surgery, and usually results in post-traumatic osteoarthritis, triggering long-term pain and mobility problems later in life. (Wang 2020.)

68. Even in the historic context in which girls and women limit competition to (and so only collide with) other girls and women, the rate of ACL injury is substantially higher among female than male athletes. (Flaxman 2014; Lin 2019; Agel 2005.) One meta-analysis of 58 studies reports that female athletes have a 150% relative risk for ACL injury compared with male athletes, with other estimates suggesting as much as a 300% increased risk. (Montalvo 2019; Sutton 2013.) Particularly in those sports designated as contact sports, or sports with frequent cutting and sharp directional changes (basketball, field hockey, lacrosse, soccer), females are at greater risk of ACL injury. In basketball and soccer, this risk extends across all skill levels, with female athletes between two and eight times more likely to sustain an ACL injury than their male counterparts. (Lin 2019 at 5.) These observations are widely validated, and consistent with the relative frequencies of ACL injuries that I see in my own practice.

69. When the reasons underlying the difference in the incidence of ACL injury between males and females were first studied in the early 1990s, researchers speculated that the difference might be attributable to females' relative inexperience in contact sports, or to their lack of appropriate training. However, a follow-up 2005 study looking at ACL tear disparities reported that, "Despite vast

attention to the discrepancy between anterior cruciate ligament injury rates between men and women, these differences continue to exist." (Agel 2005 at 524.) Inexperience and lack of training do not explain the differences. Sex seems to be an independent predictor of ACL tear risk.

70. In fact, as researchers have continued to study this discrepancy, they have determined that multiple identifiable anatomical and physiological differences between males and females play significant roles in making females more vulnerable to ACL injuries than males. (Flaxman 2014; Lin 2019; Wolf 2015.) Summarizing the findings of a number of separate studies, one researcher recently cited as anatomical risk factors for ACL injury smaller ligament size, decreased femoral notch width, increased posterior-inferior slope of the lateral tibia plateau, increased knee and generalized laxity, and increased body mass index (BMI). With the exception of increased BMI, each of these factors is more likely to occur in female than male athletes. (Lin 2019 at 5.) In addition, female athletes often stand in more knee valgus (that is, in a "knock-kneed" posture) due to wider hips and a medially-oriented femur. Often, this is also associated with a worsening of knee valgus during jump landings. The body types and movement patterns associated with these valgus knee postures are more common in females and increase the risk for ACL tear. (Hewett 2005.)

71. As with concussion, the cyclic fluctuation of sex-specific hormones in women is also thought to be a possible risk factor for ACL injury. Estrogen acts on ligaments to make them more lax, and it is thought that during the ovulatory phase

of menses (when estrogen levels peak), the risk of ACL tear is higher. (Chidi-Ogbolu 2019 at 1; Herzberg 2017.)

72. Whatever the factors that increase the injury risk for ACL tears in women, the fact that a sex-specific difference in the rate of ACL injury exists is well established and widely accepted.

73. Although non-contact mechanisms are the most common reason for ACL tears in females, tears related to contact are also common, with ranges reported across multiple studies of from 20%-36% of all ACL injuries in women. (Kobayashi 2010 at 672.) For example, when a soccer player who is kicking a ball is struck by another player in the lateral knee of the stance leg, the medially-directed force can tear the medial collateral ligament (MCL), the ACL, and the meniscus. Thus, as participation in the female category based on identity rather than biology becomes more common, and as collision forces suffered by girls and women increase accordingly, the risk for orthopedic injury and in particular ACL tears among impacted girls and women will inevitably rise.

74. Of course there exists variation in all these factors within a given group of males or females. However, it is also true that within sex-specific pools, size differential is somewhat predictable and bounded, even considering outliers. When males are permitted to enter into the pool of female athletes based on gender identity rather than biological sex, there is an increased possibility that a statistical outlier in terms of size, weight, speed, and strength—and potentially an extreme outlier—is now entering the female pool. Although injury is not guaranteed, risks to

female participants will increase. And as I discuss later, the available evidence together suggests that this will be true even with respect to males who have been on testosterone suppression for a year or more. World Rugby relied heavily upon this when they were determining their own policy, and I think it is important to reiterate that this policy, rooted in concern for athlete safety, is justifiable based upon current evidence from medical research and what we know about biology.

VII. TESTOSTERONE SUPPRESSION WILL NOT PREVENT THE HARM TO FEMALE SAFETY IN ATHLETICS

75. A recent editorial in the New England Journal of Medicine opined that policies governing transgender participation in female athletics "must safeguard the rights of all women—whether cisgender or transgender." (Dolgin 2000.) Unfortunately, the physics and medical science reviewed above tell us that this is not practically possible. If biological males are given a "right" to participate in the female category based on gender identity, then biological women will be denied the right to reasonable expectations of safety and injury risk that have historically been guaranteed by ensuring that females compete (and collide) only with other females.

76. Advocates of unquestioning inclusion based on gender identity often contend that hormonal manipulation of a male athlete can feminize the athlete enough that he is comparable with females for purposes of competition. The NCAA's Office of Inclusion asserts that "It is also important to know that any strength and endurance advantages a transgender woman arguably may have as a result of her prior testosterone levels dissipate after about one year of estrogen or testosterone-

suppression therapy." (NCAA 2011 at 8.) Whether or not this is true is a critically important question.

77. At the outset, we should note that while advocates sometimes claim that testosterone suppression *can* eliminate physiological advantages in a biological male, none of the relevant transgender eligibility policies that I am aware of require any demonstration that it has *actually* achieved that effect in a particular male who seeks admission into the female category. The Connecticut policy that is currently at issue in ongoing litigation permits admission to the female category at the high school level without requiring any testosterone suppression at all. The NCAA policy requires no demonstration of any reduction of performance capability, change in weight, or regression of any other physical attribute of the biological male toward female levels. It does not require achievement of any particular testosterone level, and does not provide for any monitoring of athletes for compliance. The IOC policy likewise requires no showing of any diminution of any performance capability or physical attribute of the biological male, and requires achievement and compliance monitoring only of a testosterone level below 10nmol/liter—a level far above levels occurring in normal biological females (0.06 to 1.68 nmol/L[*]). Indeed, female athletes with polycystic ovarian disorder—a condition that results in elevated testosterone levels—rarely exceed 4.8 nmol/L, which is the basis for setting the testing threshold to detect testosterone *doping* in females at 5.0 nmol/L. Thus,

[*] Normal testosterone range in a healthy male averages between 7.7 and 29.4 nmol/L)

males who qualify under the current IOC policy to compete as transgender women may have testosterone levels—even after hormone suppression—*double* the level that would disqualify a biological female for doping with testosterone.

78. As Dr. Emma Hilton has observed, the fact that there are over 3000 sex-specific differences in skeletal muscle alone makes the hypothesis that sex-linked performance advantages are attributable solely to current circulating testosterone levels improbable at best. (Hilton 2021 at 2-3.)

79. In fact, the available evidence strongly indicates that no amount of testosterone suppression can eliminate male physiological advantages relevant to performance and safety. Several authors have recently reviewed the science and statistics from numerous studies that demonstrate that one year (or more) of testosterone suppression does not substantially eliminate male performance advantages. (Hilton 2021; DeVarona 2021; Harper 2021.) As a medical doctor, I will focus on those specific sex-based characteristics of males who have undergone normal sex-determined pubertal skeletal growth and maturation that are relevant to the *safety* of female athletes. Here, too, the available science tells us that testosterone suppression does not eliminate the increased risk to females or solve the safety problem.

80. The World Rugby organization reached this same determination based on the currently available science, concluding that male physiological advantages that "create risks [to female players] appear to be only minimally affected" by testosterone suppression. (World Rugby 2020 at 15.)

81. Surprisingly, so far as public information reveals, the NCAA's Committee on Competitive Safeguards is not monitoring and documenting instances of transgender participation on women's teams for purposes of injury reporting. In practice, the NCAA is conducting an experiment which in theory predicts an increased frequency and severity of injuries to women in contact sports, while at the same time failing to collect the relevant data from its experiment.

A. Size and weight

82. Males are, on average, larger and heavier. As we have seen, these facts alone mean that males bring more kinetic energy into collisions, and that lighter females will suffer more abrupt deceleration in collisions with larger bodies, creating heightened injury risk for impacted females.

83. I start with what is obvious and so far as I am aware undisputed—that after the male pubertal growth spurt, suppression of testosterone does not materially *shrink* bones so as to eliminate height, leverage, performance, and weight differences that follow from simply having longer, larger bones, and being subsequently taller.

84. In addition, multiple studies have found that testosterone suppression may modestly reduce, but does not come close to eliminating the male advantage in muscle mass and lean body mass, which together contribute to the greater average male weight. Researchers looking at transitioning adolescents found that the weight of biological male subjects *increased* rather than decreased after treatment with an antiandrogen testosterone suppressor. (Tack 2018.) In one recent meta-analysis,

researchers looking at the musculoskeletal effects of hormonal transition found that even after males had undergone 36 months of therapy, their lean body mass and muscle area remained above those of females. (Harper 2021.) Another group in 2004 studied the effects of testosterone suppression to less than 1 nmol/L in men by the end of the first year, and continuing, but still found only a 12% total loss of muscle area by the end of three years. (Gooren 2004.)

B. Bone density

85. Bone mass (which includes both size and density) is maintained over *at least* two years of testosterone suppression (Singh-Ospina 2017; Fighera 2019), and one study found it to be preserved even over a median of 12.5 years of suppression (Hilton 2021; Ruetsche 2005).

C. Strength

86. A large number of studies have now observed minimal or no reduction in strength in male subjects following testosterone suppression. In one recent meta-analysis, strength loss after twelve months of hormone therapy ranged from negligible to 7%. (Harper 2021.) Given the baseline male strength advantage in various muscle groups of from 30% to 100% above female levels that I have noted in Section VI.D above, even a 7% reduction leaves a large retained advantage in strength. Another study looking at handgrip strength—which is a proxy for general strength—showed a 9% loss of strength after two years of hormonal treatment in males who were transitioning, leaving a 23% retained advantage over the female baseline. (Hilton 2021.) Yet another study which found a 17% retained grip strength

advantage noted that although this placed transitioning males at the 25th percentile for grip strength in men, it placed them in the 90th percentile for grip strength in women. (Scharff 2019.) Researchers looking at transitioning adolescents showed no loss of grip strength after hormone treatment. (Tack 2018.)

87. One recent study on male Air Force service members undergoing transition showed that they retained more than two thirds of pretreatment performance advantage over females in sit-ups and push-ups after between one and two years of testosterone-reducing hormonal treatment. (Roberts 2020.) Another recently-published observational cohort study looked at thigh strength and thigh muscle cross-sectional area in men undergoing hormonal transition to transgender females. After one year of hormonal suppression, this group saw only a 4% decrease in thigh muscle cross-sectional area, and a negligible decrease in thigh muscle strength. (Wiik 2020.) Wiik and colleagues looked at isokinetic strength measurements in individuals who had undergone at least 12 months of hormonal transition and found that muscle strength was comparable to baseline, leaving transitioned males with a 50% strength advantage over reference females. (Wiik 2020.) Finally, one cross-sectional study that compared men who had undergone transition at least three years prior to analysis, to age-matched, healthy males found that the transgender individuals had retained enough strength that they were still outside normative values for women. This imbalance continued to hold even after *eight* years of hormone suppression. The authors also noted that since males who identify as women often have lower baseline (i.e., before hormone

treatment) muscle mass than the general population of males, and since baseline measures for this study were unavailable, the post-transition comparison may actually represent an overestimate of muscle mass regression in transgender females. (Lapauw 2008; Hilton 2021.)

88. World Rugby came to the same conclusion based on its own review of the literature, reporting that testosterone suppression "does not reverse muscle size to female levels," and in fact that "studies assessing reductions in mass, muscle mass, and/or strength suggest that reduction in these variables range between 5% and 10%. Given that the typical male vs female advantages range from 30% to 100%, these reductions are small." (World Rugby 2020 at 15-16.)

89. It is true that most studies of change in physical characteristics or capabilities over time after testosterone suppression involve untrained subjects rather than athletes, or subjects with low to moderate training. It may be assumed that all of the Air Force members who were subjects in the study I mention above were physically fit and engaged in regular physical training. But neither that study nor those studies looking at athletes quantify the volume or type of strength training athletes are undergoing. The important point to make is that the only effect strength training could have on these athletes is to *counteract* and reduce the limited loss of muscle mass and strength that does otherwise occur to some extent over time with testosterone blockade. There has been at least one study that illustrates this, although only over a short period, measuring strength during a twelve-week period where testosterone was suppressed to levels of 2 nmol/L. During

that time, subjects actually increased leg lean mass by 4%, and total lean mass by 2%, and subject performance on the 10 rep-max leg press improved by 32%, while their bench press performance improved by 17%. (Kvorning 2006.)

90. The point for safety is that superior strength enables a biological male to apply greater force against an opponent's body during body contact, or to throw, hit, or kick a ball at speeds outside the ranges normally encountered in female-only play, with the attendant increased risks of injury that I have already explained.

D. Speed

91. As to speed, the study of transitioning Air Force members found that these males retained a 9% running speed advantage over the female control group after one year of testosterone suppression, and their average speed had not declined significantly farther by the end of the 2.5 year study period. (Roberts 2020.) Again, I have already explained the implications of greater male speed on safety for females on the field and court, particularly in combination with the greater male body weight.

Conclusion

Since the average male athlete is larger, and exerts greater power than the average female athlete in similar sports, male–female collisions will produce greater energy at impact, and impart greater risk of injury to a female, than would occur in most female-female collisions. We have seen that males who have undergone hormone therapy in transition toward a female body type nevertheless retain musculoskeletal "legacy" advantages in muscle girth, strength, and size. We have

also seen that the additive effects of these individual advantages create multiplied advantages in terms of power, force generation and momentum on the field of play. In contact or collision sports, sports involving projectiles, or sports where a stick is used to strike something, the physics and physiology reviewed above tell us that permitting male-bodied athletes to compete against, or on the same team as females—even when undergoing testosterone suppression—must be expected to create predictable, identifiable, substantially increased, and unequal risks of injuries to the participating women.

Based on its independent and extensive analysis of the literature coupled with injury modeling, World Rugby recognized the inadequacy of the International Olympic Committee's policy to preserve safety for female athletes in their contact sport (the NCAA policy is even more lax in its admission of biological males into the female category). Among the explicit findings of the World Rugby working group were the following:

- Forces and inertia faced by a smaller and slower player during collisions are significantly greater when in contact with a larger, faster player.
- Discrepancies in mass and speed (such as between two opponents in a tackle) are significant determinants of various head and other musculoskeletal injury risks.
- The risk of injury to females is increased by biological males' greater ability to exert force (strength and power), and also by females' reduced ability to receive or tolerate that force.
- Testosterone suppression results in only "small" reductions in the male physiological advantages. As a result, heightened injury risks remain for females who share the same field or court with biological males.

- These findings together predict a significant increase in injury rates for females in rugby if males are permitted to participate based on gender identity, *with or without testosterone suppression*, since the magnitude of forces and energy transfer during collisions will increase substantially, directly correlated to the differences in physical attributes that exist between the biological sexes.

Summarizing their work, the authors of the World Rugby Guidelines stated that, "World Rugby's number one stated priority is to make the game as safe as possible, and so World Rugby cannot allow the risk to players to be increased to such an extent by allowing people who have the force and power advantages conferred by testosterone to play with and against those who do not." (World Rugby 2020 at 3.) As my own analysis above makes clear, I agree with World Rugby's conclusions regarding risk to female athletes. Importantly, I also agree that it must be a high priority for sports governing bodies to make each sport as safe as reasonably possible. And in my view, medical practitioners with expertise in this area have an obligation to advocate for science-based policies that promote safety.

The *performance* advantages retained by males who participate in women's sports based on gender identity are readily recognized by the public. When an NCAA hurdler who ranked 200th while running in the collegiate male division transitions and immediately leaps to a number one ranking in the women's division;* when a high school male sprinter who ranked 181st in the state running in the boys' division transitions and likewise takes first place in the girls' division (DeVarona 2021), the problem of fairness and equal opportunities for girls and

* https://en.wikipedia.org/wiki/Cece_Telfer (accessed 6/20/21).

women is immediately apparent, and indeed this problem is being widely discussed today in the media.

The causes of sports injuries, however, are multivariate and not always as immediately apparent. While, as I have noted, transgender individuals have indeed competed in a variety of girls' and women's contact sports, the numbers up till now have been small. But recent studies have reported very large increases in the number of children and young people identifying as transgender compared to historical experience. For example, an extensive survey of 9th and 11th graders in Minnesota found that 2.7% identified as transgender or gender-nonconforming—well over 100 times historical rates (Rider 2018), and many other sources likewise report this trend.* Faced with this rapid social change, it is my view as a medical doctor that policymakers have a pressing duty not to wait while avoidable injuries are inflicted on girls and women, but instead to proactively establish policies governing participation in female athletics that give proper and scientifically-based priority to safety in sport for girls and women. Otherwise, the hard science that I have reviewed in this white paper leaves little doubt that current eligibility policies based on ideology rather than science will result in increased, and more serious, injuries to girls and women who are forced to compete against biologically male transgender athletes. When basic science and physiology both predict increased

* https://www.nytimes.com/2016/07/01/health/transgender-population.html?.?mc=aud_dev&ad-keywords=auddevgate&gclid=Cj0KCQjwkZiFBhD9ARIsAGxFX8BV5pozB9LI5Ut57OQzuMhurWThvBMisV9NyN9YTXIzWl7OAnGT6VkaAu0jEALw_wcB&gclsrc=aw.ds (accessed 6/20/21).

injury, then leagues, policy-makers, and even legislators have a responsibility to act.

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EXHIBIT H

TRANSGENDER GUIDELINE

WORLD RUGBY

WORLD RUGBY TRANSGENDER GUIDELINE

INTRODUCTION

This World Rugby Transgender Guideline document has been developed to provide guidance and information in relation to the participation of transgender players in rugby. The terminology used when discussing issues involving transgender players can be controversial. A glossary is available here that contains more detailed explanations of frequently used terms. The glossary is provided to ensure that the Guideline is clear to everyone who reads it, but it is acknowledged that not all terms are used or agreed on by all people. For the purpose of this Guideline, we will use the terms "women's rugby" and "men's rugby" to refer to the existing participation categories in rugby union.

This Transgender Guideline aims to facilitate the participation of transgender players in rugby where it is possible to do so safely and fairly. Rugby is a sport that involves frequent physical confrontation and collisions and so physiological attributes such as size, stature, strength, speed, and power are important contributors to player safety/welfare and performance. Given rugby's documented risk of injury and the prioritisation of player welfare, it is a sport that faces unique and specific challenges with respect to the participation of transgender players.

The Guideline was developed by a World Rugby working group following research into available scientific literature, detailed and extensive consultation where the working group heard from independent experts in the fields of performance, physiology, medicine, risk, law and socio-ethics, and subsequent research and consultation on matters arising from the meeting. The presentations delivered by each of those experts at the meeting are available on World Rugby's Player Welfare website[1].

Having carefully considered the currently available information, the working group determined World Rugby's current policy. A summary of the position for transgender women is set out here and full guidelines for transgender women are here, a summary of the position for transgender men is set out are here and full guidelines for transgender men are here and the guidelines for non-binary people are set out here.

[1] https://playerwelfare.worldrugby.org/?subsection=84.

SUMMARY FOR TRANSGENDER WOMEN

Transgender women may not currently play women's rugby

Why? Because of the size, force- and power-producing advantages conferred by testosterone during puberty and adolescence, and the resultant player welfare risks this creates

Biological Advantages from Testosterone	Resultant Performance Differences
• Significant increases in total body mass • Significant increases in lean/muscle mass and muscle density • Reduction in body fat mass, improving strength and power-to-weight ratio • Increased height, changed dimensions of important levers, greater bone density • Increased haemoglobin levels • Increased heart and lung size	• Significantly greater strength (between 50% and 60% percent by adulthood, with relatively greater upper body strength) • Significant speed advantages (between 10% and 15% over various durations) • Greater capacity to produce force/power (advantages of between 30% and 40% in explosive movement capabilities) • Strength-to-weight and power-to-weight advantages (even after adjusting for mass, height and similar level of performance (elite, untrained etc), males have a 30-40% strength advantage)

Risk of Injury is too great

It has been proposed that the suppression of testosterone for a period of 12 months is sufficient to remove the biological differences that create performance differences summarised above.

Research contradicts this, consistently showing that total mass, muscle mass and/or strength are reduced by at most 5% to 10% when testosterone is suppressed to levels in the female range, for a period of 12 months. With the additional factor of training, either before or during the period of testosterone suppression, it is expected that baseline/pre levels for these variables will be higher, and that training will attenuate the decline in these variables with testosterone reduction. The consequence is that given the size of the biological differences prior to testosterone suppression, this comparatively small effect of testosterone reduction allows substantial and meaningful differences to remain. This has significant implications for the risk of injury in rugby.

Forces and inertia faced by a smaller and slower player during frequent collisions are significantly greater when in contact with a much larger, faster player. Research has found that the discrepancy in mass and speed is a significant determinant of various head injury risk factors, including neck forces, neck moments and linear and angular acceleration of the head. When two opponents in a tackle are significantly different with respects to mass or speed, these risk factors increase significantly. All these factors are 20% and 30% greater when typical male mass is modelled against typical female body mass in the tackle. Further, the ability to exert force (strength and power) is greater in biological males, and the ability to receive or tolerate that force is reduced in relatively weaker players. Collectively, this means a dynamic tackle situation would create a large increase in risk for players who lack these physiological attributes relative to their opponents. Similarly, scrum forces are significantly greater in men's rugby (twice as high for elite men vs elite women, and 40% higher for community level men compared to elite women). The implication of this finding is a significant increase in injury rates in contact situations, since the magnitude of forces and energy transfer in those contacts will increase substantially as a result of the collection of physical attributes that differ by biological sex.

World Rugby's number one stated priority is to make the game as safe as possible and so World Rugby cannot allow the risk to players to be increased to such an extent by allowing people who have the force and power advantages conferred by testosterone to play with and against those who do not.

Retention of Meaningful Performance Advantages

Given that the typical male vs female advantage in the above-described biological variables and hence performance outcomes ranges from 30% to 100%, a substantial and meaningful advantage is retained even after testosterone suppression. This has implications for performance, given the premium on contact and collisions, speed, force-production and power in rugby.

A detailed explanation of the biological rationale, along with explanations of the effects of testosterone and its potential influence on safety and performance factors can be read in the guidelines for transgender women here.

SUMMARY FOR TRANSGENDER MEN

Transgender men may play men's rugby having provided confirmation of physical ability. Transgender men may not play women's rugby after the process of sex reassignment has begun, if this reassignment includes supplementation with testosterone

Why? Transgender men need to provide confirmation of physical ability to ensure that they are not putting themselves at an unacceptable level of risk when playing against men.

Confirmation of Physical Ability for men's rugby	Therapeutic Use Exemption
• Transgender men will typically not be as heavy, strong and fast as those that they would play with and against • Some transgender men will be on testosterone treatments which may reduce some of the biological and performance differences • Allowing transgender men to play men's rugby does not increase the risk of injury to teammates or opposition players • Transgender men must confirm they understand any increased risk to themselves • An experienced independent medical practitioner must provide confirmation that the player is physically capable of playing men's rugby	• Transgender men who are undergoing treatment involving testosterone will be required to obtain a Therapeutic Use Exemption because testosterone is a substance on the WADA Prohibited List[2] • If a player played rugby without a valid TUE, he risks committing an Anti-Doping Violation which could result in a significant suspension from rugby

A detailed explanation rationale can be read in the guidelines for transgender men here.

COMMITMENT TO ONGOING EVALUATION AND EVIDENCE-BASED GUIDELINES

World Rugby is fully committed to evidence-based player welfare decisions. As such, the present guidelines have been developed by assessing all currently available scientific evidence pertaining to biological and physiological differences between biological males and females, and the effects of testosterone suppression on those differences. Related to

[2] https://www.wada-ama.org/en/resources/science-medicine/prohibited-list-documents

these changes are known injury risks and risks factors, which have produced these guidelines.

The Guidelines remain subject to the presentation and publication of new evidence. World Rugby are thus committed to a formal review of the Guideline every three years and will remain current with respects to all available high-quality evidence, with a view to modifying, changing to improving upon this document in future. In support of this, World Rugby has also committed to including transgender research in its annual research priorities and inviting academic institutions from around the world to submit proposals that may be funded if deemed sufficiently high quality. In this way, these guidelines are open to change, as led by high-quality evidence.

INCLUSION

World Rugby is committed to encouraging transgender people to be involved with rugby. World Rugby actively encourages transgender players to be involved with rugby whether in coaching, refereeing, administration or non-contact forms of the game and World Rugby will offer training courses to those who may find that the way that they are involved in rugby must change because of this Guideline. Further details are available here.

World Rugby is currently funding research into the safe participation of all players in rugby. Details of the research currently underway, along with details of how to apply for research funding for those who may be interested in that, is available here.

Mixed-Gender contact rugby

World Rugby is currently exploring the possibility of an "open category" of rugby in which any player could play, regardless of gender. World Rugby has committed to exploring this option with its Unions, Associations, International Rugby Players, and trans-advocate groups including Gendered Intelligence and International Gay Rugby.

Mixed-Gender non-contact rugby

All players (including transgender players and players with DSD) can play mixed-gender touch or tag rugby.

Union Responsibilities

It is strongly recommended that each Union adopts its own regulations to determine the eligibility of transgender players to compete in events taking place under its own jurisdiction. Unions should take account of the information provided in this Guideline but may also take into account any relevant aspects of local law which apply within the Union's jurisdiction and with which the Union is legally obliged to comply. See here for further details.

TRANSGENDER INFORMATION

WHAT DOES TRANSGENDER MEAN?

The term '**Transgender**' is used in this Guideline to refer to individuals whose gender identity (i.e. how they identify) is different from the sex identified at birth (whether they are pre- or post-puberty, and whether or not they have undergone any form of medical intervention).

Transgender man: a term used to describe someone who is identified as female at birth but identifies and lives as a man. This is sometimes shortened to trans man, or FTM, an abbreviation for female-to-male.

Transgender woman: A term used to describe someone who is identified as male at birth but identifies and lives as a woman. This is sometimes shortened to trans woman, or MTF, an abbreviation for male-to-female.

A glossary is available here that contains more detailed explanations of frequently used terms.

WHAT ABOUT PLAYERS WITH DIFFERENCES OF SEX DEVELOPMENT (DSD)?

People with "Differences of Sex Development" (DSD) are not transgender (necessarily, although a person with DSD could of course identify as transgender). DSDs are a group of rare conditions involving chromosomes, hormones and reproductive organs which usually results in a person's sex development being atypical. Numerous DSD conditions exists, with different implications for sporting performance, and they should thus not be considered as a single group.

A separate World Rugby Guideline is being developed for players with DSDs and it will be made available upon completion.

GUIDELINES FOR TRANSGENDER WOMEN

CAN TRANSGENDER WOMEN PLAY RUGBY?

- Transgender women who transitioned pre-puberty and have not experienced the biological effects of testosterone during puberty and adolescence can play women's rugby (subject to confirmation of medical treatment and the timing thereof)[3]
- Transgender women who transitioned post-puberty and have experienced the biological effects of testosterone during puberty and adolescence cannot currently play women's rugby
- Transgender women can play mixed-gender non-contact rugby
- World Rugby are committed to ongoing evaluation of the guideline and will remain current on all published research that pertains to the biological and physiological implications of testosterone suppression, with a formal review of the Guideline every three years. In support of this, World Rugby will prioritize support for high quality research projects on transgender rugby players, as part of this commitment to evidence-based guidelines.

WHY CAN'T TRANSGENDER WOMEN PLAY WOMEN'S RUGBY?

EFFECTS OF TESTOSTERONE

Where reference is made to "females" and "males" to explain the effects of testosterone, the references are used to differentiate between "Biological Males" (those who have undergone the androgenizing effects of testosterone commencing at puberty) and "Biological Females" (who have not received the benefits of such androgenization).

Testosterone is an androgenic-anabolic hormone whose functions include reproductive maturation, along with the genesis of male secondary sex characteristics. From puberty onwards, testosterone levels increase 20-fold in males, but remain low in females, resulting in circulating testosterone concentrations at least 15 times higher in males than in females of any age [1,2]. Among the biological changes initiated by testosterone and its derivatives are:

- Larger and denser lean muscle mass [3,4];
- Greater force-producing capacity of skeletal muscle [5,6];
- Stiffer connective tissue [7];
- Reduced fat mass and different distribution of body fat and lean muscle mass [3];

[3] See the Legal Section here for details of how this review would be carried out

- Longer, larger and denser skeletal structure [8,9];
- Changes to cardiovascular and respiratory function that include higher haemoglobin concentration, greater cross-sectional area of the trachea and lower oxygen cost of respiration (as described in [1,10-12]).

Collectively, these biological differences account for large sporting performance differences between males and females. These include gaps between 9% and 15% for running, swimming and jumping events [13], between 15% and 35% for functional tasks like kicking, throwing, bowling and weightlifting, and in excess of 50% for tasks that involve upper body force production [10], since the biological effects of testosterone creates disproportionately greater strength on their upper compared to lower body, while females show the inverse [14,15]. In weight-lifting events, for instance, even when matched for mass and stature, males lift approximately 30% more weight than females. Evaluated differently, males are able to lift weights similar to females who weigh 30% to 40% more than them [10]. Functional movements such as explosive jumping are similarly larger in elite males than females, with approximately 30% more power generated during a counter-movement jump [10].

The result of these biological differences is that males outperform females in all sporting activities where speed, size, power, strength, cardiorespiratory and anthropometric characteristics are crucial determinants of performance. This is true for many thousands of boys and men who have undergone a testosterone-induced puberty, with an effect large enough that 14 to 15-year old boys outperform the best female athletes in history in a range of running, jumping, throwing and strength events [13,16]. The size of these performance differences varies depending on the contributions made by each of the biological variables to performance, and indeed, some may be detrimental to performance in some events (mass during endurance running or cycling events, for example). Generally, however, there is no overlap in performance between males compared to females at all matched levels of competition from high school to the elite level. The performance disparity is illustrated by the observation that thousands of teenage boys and adult males are able to outperform the very best biological females every year [13].

Similar performance differences between males and females have been described in non-athletically trained individuals. Males have muscle mass 30% to 40% greater than females [4], maximal cardiorespiratory capacities (VO_2max) 25% to 50% greater than in females [17], cardiovascular parameters between 11% and 43% greater than in females, lower limb strength approximately 50% higher than in females across the lifespan, and upper body strength 50% to 100% higher than in age-matched females [6]. Even when elite females, trained in sports where grip strength is an important component of performance (judo and handball), do not outperform untrained males in a grip strength task, with the very best female performance corresponding to approximately the 58th percentile for males, and a 26% advantage for untrained males compared to typical elite females. Punching performance, a composite movement reliant on strength, power, co-ordination and mass, has been found to be 162% higher in males than in females [18], and 17-year old boys are able to throw a ball further than 99% of adult females [19].

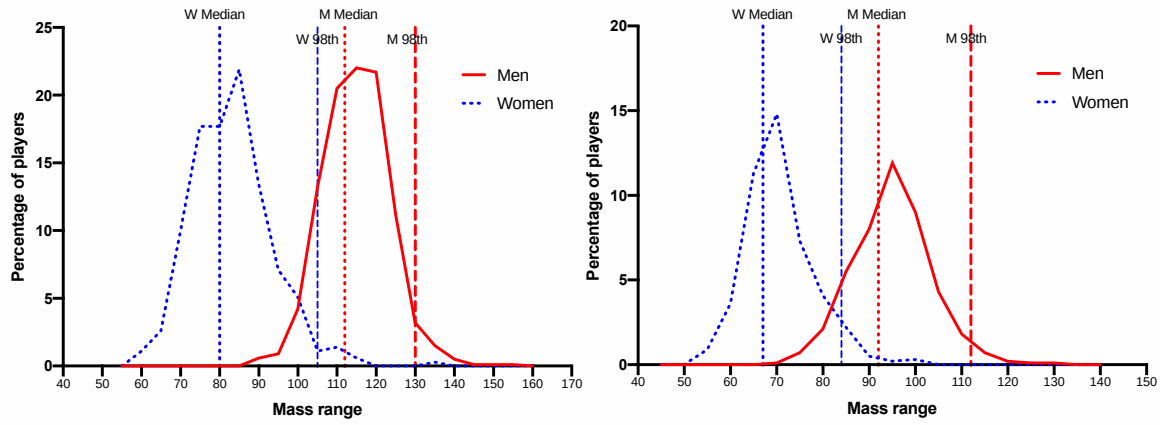
BIOLOGICAL CONSIDERATIONS FOR RUGBY UNION

The implications of biological and performance differences for rugby are two-fold. First, significant differences in strength, size, speed and power have potential consequences for the safety of participants in rugby, where much of the sport involves contacts in the form of tackles, rucks and mauls, as well as numerous periods of high force production during static contests for the ball, such as the scrum and ruck. Given the documented risk of injury in rugby from contact events in particular [20-24], the elevated possibility of all injuries, including serious injury, from large disparities in size, speed, power, and force, is of concern. Recent modelling of tackles using validated biomechanical models [25,26] suggests that the discrepancy in mass and speed of direct opponents in tackles predicts neck forces, moments and head accelerations. Since these factors contribute directly to injury risk, it is clear that large discrepancies create greater risks for smaller and slower players, particularly when size and speed exist in combination.

Given that the typical male player mass is 20% to 40% greater than typical women mass, that males have strength 40% to 80% greater (unadjusted for mass), and that men are 10% to 15% faster than women despite being heavier, the risk of injury created by large imbalances in mass and speed may be considered significant. To explore this, we assessed the range of masses of players at the international level and applied the findings to a biomechanical model to explore possible implications for injury risk should cross-over scenarios occur.

With respect to mass, we documented the range of sizes of elite men's and women's players from the 2011 Rugby World Cup up to the 2019 Rugby World Cup, finding:

- Typical (median) men's players are 41.1% heavier than typical women's players (103 kg vs 73 kg)
- Among forwards, the heaviest 1% of women players are smaller than the typical men's forward (109kg for women vs 112kg for men)
- The heaviest 1% of women's backs are smaller than typical men's backs (89kg vs 92kg)
- The lightest 1% of men's forwards are approximately equal in mass to the heaviest 10% of women's forwards, while the lightest 2% of men's backs are approximately equal to the heaviest 10% of women's backs
- Figure 1 below shows the frequency histograms for men's and women's players in forward and back positions



Percentiles	Men (n=998)	Women (n=351)
1	92	59
2	95	63
5	99	66
10	101	68
25	106	73
50	112	80
75	118	85
90	122	93
95	125	97
98	130	105
99	132	109

Percentiles	Men (n=796)	Women (n=289)
1	72	53
2	75	55
5	78	56
10	81	60
25	86	63
50	92	67
75	97	72
90	102	77
95	105	81
98	110	84
99	112	89

Figure 1: Frequency histograms for mass of forwards (left panel) and backs (right panel) in elite men's and women's rugby players. Dotted lines indicate the 50th percentile, while dashed lines indicated the 98th percentile for each group

IMPLICATION FOR INJURY RISK – HEAD INJURY MODELS

The differences observed between men and women with respects to mass may be combined with differences in speed to create a theoretical framework in which the inertial load and forces faced by a smaller and slower player is significantly greater when in contact with a larger, faster player. This model is intended for illustrative purposes and demonstrates the impact of only one variable known to differ between biological males and females – namely mass – on head injury risk, in a basic parametric model, absent force application and complex movements, as a preliminary impact analysis. The principles illustrated by the model would apply to other injuries. The addition of speed, and strength or force exerted during contact would further increase the implications of the findings of this illustrative model, summarized below.

The representative figure below illustrates the concept of mass disparity as a risk for injury for ball carriers. It depicts the linear acceleration (A), angular acceleration (B), neck force (C) and neck moment (D) experienced by ball carriers of different masses when tackled by players with different masses. Using the known masses of international rugby players, the position of the average male (M_{50}) and average female (F_{50}) are plotted on each heat map. F_{90} shows the scenario where a tackler (T) corresponding to the 90th percentile for women's mass (see Figure 1) tackles a typical female mass ball carrier (BC). X indicates the

hypothetical cross-over scenario in which a typical male tackler mass is involved in a tackle against a ball carrier with a typical female mass.

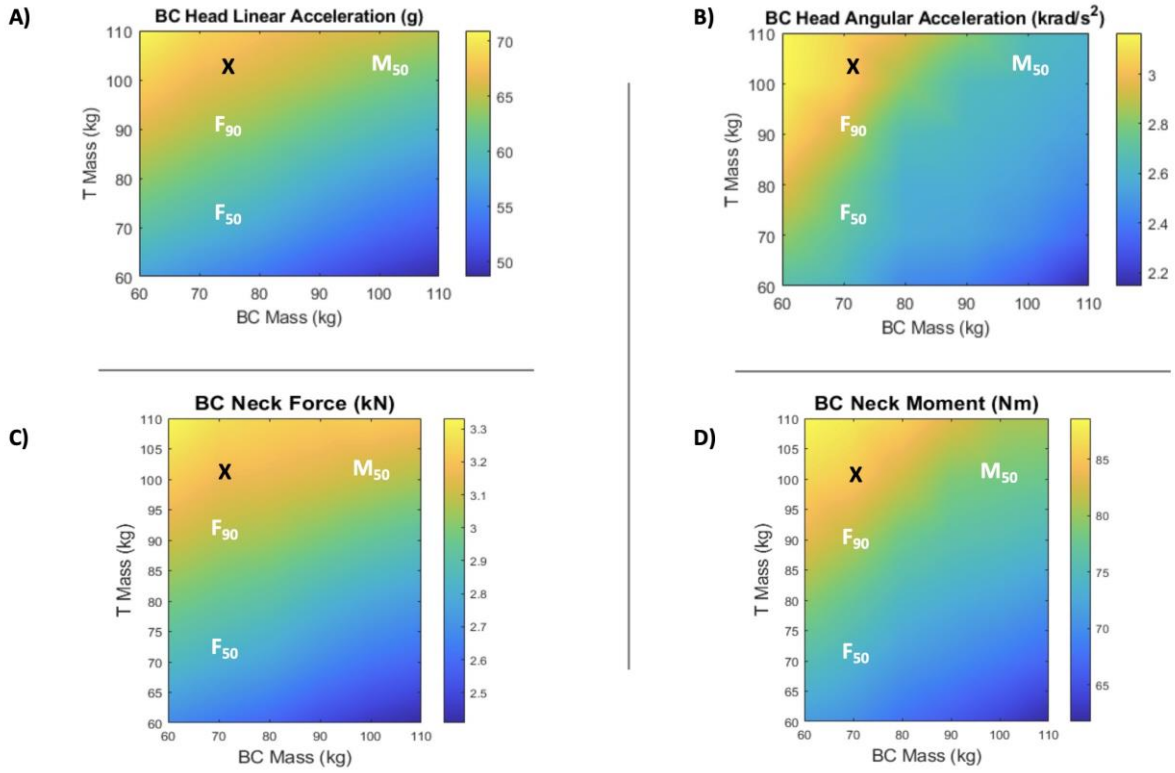


Figure 2. Graphical representations of linear acceleration (A), angular acceleration (B), neck force (C) and neck moment (D) for ball carriers of different masses during tackles by tacklers with different masses. M_{50} and F_{50} show the modelled situation when typical/median players tackle one another for men and women, respectively. F_{90} represents a female ball-carrier with typical mass against a tackler in the heaviest 10% of women's body mass. X denotes the cross-over situation that would hypothetically occur for a tackler at the men's median mass tackling a typical female ball carrier

The modelling shows that a tackle involving players with typical or average mass produces slightly greater accelerations and forces in men (M_{50}) than in women (F_{50}). This is a function of the higher mass of men's players. Head and neck kinematic and kinetic variables increase significantly when the heaviest 10% of women's body mass is used for the tackler against a typical ball carrier (F_{90}), but this extreme "within female-bodied" scenario produces smaller kinetic and kinematic outcomes than if the hypothetical cross-over scenario were to occur, where an average male-bodied player is the tackler and the average female-bodied player the ball carrier (X). The magnitude of the increase in neck forces, moments and accelerations for the ball carrier is between 20% and 30% for typical cross-over scenario compared to the typical female vs female scenario, and is 10% greater for the male-bodied vs female-bodied crossover scenario than a tackle where the heaviest 10% of women are matched against typical women's mass (F_{90}).

Were the cross-over to occur in a heavier male-bodied player (for example, the heaviest 10% of male-bodied players), the increase in neck load and head acceleration for the ball carrier approaches 50% compared to the typical tackle scenario in women's rugby. The magnitude of these extreme head accelerations and neck forces are not seen in women and

are created by cross-over of male-bodied players to women's rugby. Similar differences are seen when examining the accelerations and forces for the tackler's head and neck.

The magnitude of the known risk factors for head injury are thus predicted by the size of the disparity in mass between players involved in the tackle. The addition of speed as a biomechanical variable further increases these disparities, which is relevant given that male players weighing 103kg (the median for men) would be expected to run between 10% and 15% faster than typical female players (mass 73kg), and thus considerably faster than female players who are heavier than the median (eg females at the 90th percentile, Fig 1). This would further compound the disparity created.

Next, it is important to also consider that these models do not account for the ability of players to actively exert force at high rates during tackles. This would be a function of power and strength, which are similarly known to be 30% to 80% greater in biological males than females. When these active applications of force during contact are added to the mass and speed characteristics illustrated and described above, the resultant neck and head forces and accelerations will increase even further, such that the illustrative model shown above depicts the smallest possible risk increase for typical players involved in a tackle as a result of mass alone. The addition of speed and force disparities will increase the magnitude of these risk factors beyond the 20% to 30% we illustrate above.

The implication of these increases is complex to quantify but would result in increased injury risk for the player experiencing the elevated risk outcomes (force and acceleration). This is because head injuries occur when forces and accelerations on the head and neck reach a threshold necessary to cause injury, and which is unique to each tackle situation. A tackle situation that typically produces risk factors within 20% of this threshold would, in the circumstance of a typical male-bodied vs typical female-bodied player illustrated above, be sufficiently increased to cause an injury. The higher risk scenario involving heavier male-bodied players would further increase injury likelihood, since all tackle situations that normally produce kinetic and kinematic variables within 40% to 50% of an injury threshold would now exceed it, a scenario unseen in women's rugby. The addition of strength and speed as described, further increases the risk, such that a number of tackles that currently lie beneath the threshold for injury would now exceed it, causing head injury.

Finally, it must also be considered that the ability to withstand or tolerate forces on the head and neck are required to avoid brain injury. This is the reason neck strength is critical in injury prevention. Since the strength disparities between males and females is so large, including a 50% lower neck isometric strength in females, the reduced ability of female players to tolerate or withstand the forces in tackles is a further risk factor for injury, including head injury as described above, but relevant to all injuries where the rapid application of force or load are responsible for injury.

IMPLICATIONS FOR INJURY RISK – SCRUM FORCES

The implication of greater mass and force-producing ability in males can be seen in forces measured during scrums in both elite and community level rugby. Research on the forces applied during scrums shows that at the elite level, males produce approximately twice the peak force of females in the scrum. Even at the community level, where peak force is 30% lower than in the elite game, males produce approximately 40% greater peak force during scrums than elite females. Given that force producing and receiving ability is likely to be significantly lower in female community players, the implication is that men's community

level rugby scrums will be considerably more forceful than women's community level scrums.

The risk of particularly serious and catastrophic injuries during scrums has led to a number of law changes specifically designed to depower the scrum to reduce injury risk. This risk would be amplified by large mismatches in strength between opposing players, since the force applied must be withstood by a direct opponent. This is an illustration of how mismatches in strength and size are directly responsible for forces that result in injury.

TESTOSTERONE AS A PREDICTOR OF PERFORMANCE

It must be noted that the actual testosterone level, measurable in the body, is not a strong predictor of performance within men and within women [27-29]. This is because performance is multifactorial, and testosterone's androgenzing effects contribute to, but do not solely influence the biology and resultant performance outcomes within a group who are able to utilize it. The biological basis for male vs female differences is thus the result of testosterone, but it does not necessarily follow that within men and within women, the hormone is a predictor of performance.

Further, differences in the sensitivity to testosterone between individuals mean that a given level of testosterone is not a sensitive or specific predictor of performance within each group (males and females). This is in part because most males have elevated levels and some degree of sensitivity, while the level in females is significantly lower and rarely exceeds even the very low end of the male range [1]. Therefore, in two homogenous groups that are matched for either the presence or absence of a given variable (males and females for the presence or absence of testosterone, in this case), the predictive value of that variable within a group is greatly diminished, the same way that VO2max is a significant predictor of running or cycling performance across the whole population, but not within a group of elite marathon runners or cyclists, who are already relatively homogenous for that characteristics [30]. Similarly, height is clearly advantageous for professional basketball, but within the National Basketball Association (NBA), where height has already been selected for and participants are in the extreme upper end of the overall population for that characteristic [31], it becomes a poorer predictor of performance.

However, when the same question – does testosterone predict performance across humans of both sexes – is asked of binary categories (males vs females in sport, rather than within males or females), then the predictive power of testosterone is strong, because "high testosterone" during adulthood is a very reliable indicator that the androgenizing effects of testosterone have occurred earlier during life. When understood and assessed this way, testosterone is necessary for peak performance (since the top performers within humans are all male), but it is not sufficient to attain it. It is here that the almost perfect sensitivity of biological sex emerges, since in a ranking list of the top thousand performances in most sport, every year, every single one will be biologically male.

SUMMARY

In summary, across all performance levels and ages after puberty, testosterone is primarily (though not exclusively) responsible for very large typical differences in the biology of males and females, and consequently, performances between the sexes. These are summarized in Figure 3 below, which combines the biological differences between males

and females with their performance implications, and is reproduced from a recent article currently in review [10].

Biological differences

Variable	Magnitude of sex difference
Body composition	
Lean body mass	45%
Fat%	-30%
Muscle mass	
Lower body	33%
Upper body	40%
Muscle strength	
Grip strength	57%
Knee extension peak torque	54%
Anthropometry and bone geometry	
Femur length	9.4%
Humerus length	12.0%
Radius length	14.6%
Pelvic width relative to pelvis height	-6.1%
Tendon properties	
Force	83%
Stiffness	41%
VO2 max	
Absolute values	50%
Relative values	25%
Respiratory function	
Pulmonary ventilation (maximal)	48%
Cardiovascular function	
Left ventricular mass	31%
Cardiac output (rest)	22%
Cardiac output (maximal)	30%
Stroke volume (rest)	43%
Stroke volume (maximal)	34%
Hemoglobin concentration	11%

Performance differences

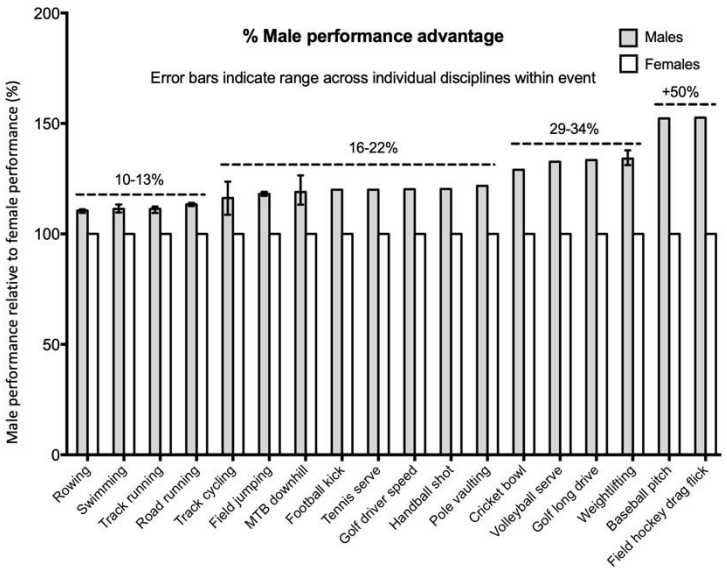


Figure 3: Summary comparison of biological (left table) and performance (right figure) differences between males and females for a range of biological variables and physical activities/events. Reproduced from Hilton & Lundberg [10]

Given that the women's category exists to ensure protection, safety and equality for those who do not benefit from the biological advantage created by these biological performance attributes, the relevant and **crucial question is whether the suppression of testosterone for a period of 12 months, currently required for transgender women participation in women's sport, is sufficient to remove the biological differences summarized above**?

EFFECTS OF SUPPRESSION OF TESTOSTERONE

Current policies regulating the inclusion of transgender women in sport are based on the premise that reducing testosterone to levels found in biological females is sufficient to remove many of the biologically-based performance advantages described above. However, peer-reviewed evidence suggests that this is not the case, and particularly that the reduction in total mass, muscle mass, and strength variables of transgender women may not be sufficient in order to remove the differences between males and females, and thus assure other participants of safety or fairness in competition.

Based on the available evidence provided by studies where testosterone is reduced, the biological variables that confer sporting performance advantages and create risks as described previously appear to be only minimally affected. Indeed, most studies assessing mass, muscle mass and/or strength suggest that the reductions in these variables range between 5% and 10% (as described by Hilton & Lundberg [10]). Given that the typical male vs female advantage ranges from 30% to 100%, these reductions are small and the biological differences relevant to sport are largely retained.

For instance, bone mass is typically maintained in transgender women over the course of at least 24 months of testosterone suppression, with some evidence even indicating small but significant increases in bone mineral density at the lumbar spine [32-34]. Height and other skeletal measurements such as bone length and hip width have also not been shown to change with testosterone suppression, and nor is there any plausible biological mechanism by which this might occur, and so sporting advantages due to skeletal differences between males and females appear unlikely to change with testosterone reduction.

With respects to strength, 1 year of testosterone suppression and oestrogen supplementation has been found to reduce thigh muscle area by 9% compared to baseline measurement [35]. After 3 years, a further reduction of 3% from baseline measurement occurred [36]. The total loss of 12% over three years of treatment meant that transgender women retained significantly higher thigh muscle size ($p<0.05$) than the baseline measurement of thigh muscle area in transgender men (who are born female and experience female puberty), leading to a conclusion that testosterone suppression in transgender women does not reverse muscle size to female levels [36].

This finding has been replicated and confirmed by numerous studies examining the effects of testosterone suppression on lean body mass or muscle size in transgender women [37-44]. Collectively, these studies find that 1 year of testosterone suppression to female-typical reference levels results in a comparatively modest loss of lean body mass (LBM) or muscle size, with consistent changes between 3% and 5% reduction in LBM after 1 year of treatment (as summarized from source research studies by Hilton & Lundberg [10]).

Muscle force-producing capability is reduced after testosterone suppression, though as appears to be the case for muscle/lean mass, these reductions are considerably smaller in magnitude that the initial male-vs-female differences in these variables. For instance, hand-grip strength was reduced by 7% and 9% after 1 and 2 years, respectively, of cross-hormone treatment in transgender women [39], and by 4% in 249 transwomen after 1 year of gender-affirming treatment, with no variation between different testosterone levels, age or BMI tertiles [45]. Transgender women retained a 17% grip-strength advantage over transgender men at baseline measurement, with a similarly large, retained advantage when compared to normative data from a reference or comparison group of biological females.

Most recently, Wiik et al found that isokinetic knee extension and flexion strength were not significantly reduced in 11 transgender women after 12 months of testosterone suppression, with a retained advantage of 50% compared to a reference group of biological females and the group of transgender men at baseline [41]. This absence of a reduction in strength occurred in conjunction with a 4% to 5% reduction in thigh volume, and no difference in the contractile density of the muscle, which suggests that the reduction of testosterone for a period of a year had no effect on the force-producing capacity per unit of cross sectional area [41], a variable that is known to be higher in males than females.

In conclusion, longitudinal research studies that have documented changes in lean mass, muscle mass/area and strength show consistently that small decreases occur as a result of testosterone suppression, with a resultant relatively large retained advantage in these variables compared to a group of biological females.

CONCLUSION

Testosterone exerts significant biological effects on biological males during puberty and adolescence. This creates large differences in strength, mass, speed, power, and endurance capacity. In turn, these create player welfare concerns and performance inequality in rugby, given the importance of physical contact and strength in the sport. Longitudinal research studies on the effect of reducing testosterone to female levels for periods of 12 months or more do not support the contention that variables such as mass, lean mass and strength are altered meaningfully in comparison to the original male-female differences in these variables. The lowering of testosterone removes only a small proportion of the documented biological differences, with large, retained advantages in these physiological attributes, with the safety and performance implications described previously. There is currently no basis with which safety and fairness can be assured to biologically female rugby players should they encounter contact situations with players whose biologically male advantages persist to a large degree.

While there is overlap in variables such as mass, strength, speed and the resultant kinetic and kinematic forces we have modelled to explore the risk factors, the situation where a typical player with male characteristics tackles a typical player with female characteristics increases the magnitude of known risk factors for head injuries by between 20% and 30%. In the event of smaller female players being exposed to that risk, or of larger male players acting as opponents, the risk factors increase significantly, and may reach levels twice as large, at the extremes. The basis for regulation is the typical scenario, though risk mitigation must be mindful of the potential for worst-case scenarios that may arise. Both are deemed unacceptably high, because they would result in a number of tackle situations that currently lie beneath a threshold required to cause injury increasing to exceed that threshold.

Thus, it is on the basis of male vs female biological differences, combined with no evidence for removal of their implications for safety and performance, that the guideline is that trans women should not compete in women's rugby.

ASSESSMENT OF RESEARCH LIMITATIONS AND IMPLICATIONS

It is acknowledged that the published studies currently available on testosterone suppression and physiological changes (compiled and described in Hilton and Lundberg, 2020 and reviewed individually in the proposed policy document) have been conducted in untrained transgender women. This invites questions over the validity and generalizability of the studies to a sports-playing population.

This is a valid question, and it is acknowledged that research is required to fully address questions arising out of this limitation. World Rugby is committed to supporting high-quality research proposals in this area, should they be submitted as part of World Rugby's Research programme.

However, this limitation can also be assessed within an understanding of the physiological implications of trained compared to untrained individuals undergoing testosterone suppression. The application of insights from complementary studies leads to a conclusion that the available research is in fact sufficient to arrive at firm conclusions about safety, performance and retained advantages, and thus the recognized limitations are not

sufficient to refrain from drawing a conclusion on the likely implications of the transgender research for athletes.

In assessing this issue, two primary questions may be asked:

1. How would training undertaken during the process of testosterone suppression affect the changes observed in muscle and lean body mass, and strength variables, compared to studies done in individuals who do not perform training?

2. How would training prior to a period of testosterone suppression influence:

    a. The baseline or pre-suppression measures for muscle mass and strength in transgender women, and thus the differences in these variables compared to a reference or control group of biological women (cisgender women)?

    b. The likely "end-point" for muscle and lean body mass as well as strength after the testosterone suppression for a period of at least twelve months, once again compared to a reference or comparison group of cisgender women?

Both these questions can be answered by exploring complementary research studies. At present, there is evidence that:

1. **Training during the intervention to lower testosterone levels** can reduce, eliminate, and even reverse any losses in muscle and lean body mass, muscle volume, and muscle strength. This is supported by evidence from various study models in which biological males reduce testosterone to within the female range, and are able to maintain or even increase these physiological variables through training [46-48].

    The implication is that any performance decline as a result of androgen deprivation is minimized or eliminated, and so the studies cited in support of the World Rugby Guideline, while conducted on non-training individuals, establish the minimum possible retained advantage for trans women. That is, they establish that in the absence of training during testosterone suppression, an advantage is retained compared to cisgender women. That advantage is either the same, or very plausibly increased as a result of training.

2. **Training prior to the intervention** will cause increased muscle mass and strength variables at baseline. This means that the initial or "pre-suppression" differences in these variables compared to biological females will be greater than in an untrained trans woman. This rebuts the assertion that trans women are weaker, less muscular and thus more similar to biological females at baseline, within a sporting context, since the transgender woman being considered by World Rugby is much more likely to be trained (or will train once transition begins, as described above).

    Further, once the period of testosterone suppression begins, then the degree to which muscle mass and strength decreases may be either the same or relatively greater in the trained trans women as a result of this higher baseline. Even if the relative loss of muscle mass and strength are higher than in untrained trans women, it is inconceivable, and even physiologically impossible, that a pre-trained athletic

> trans woman is going to lose so much muscle mass and strength that they end at a point where they are less muscular/lean and weaker than a theoretically untrained (and even 'self-starved') transgender woman.
>
> Therefore, if research on untrained trans women establishes that the retained advantage in muscle mass and strength is corresponds to a value of X percent, this is the smallest possible remaining advantage for a pre-trained trans woman. The effect of training can only be to increase this value or to achieve the same value of X percent retained advantage, but it cannot reduce it further, unless one argues that a trained trans woman will lose so much lean mass and strength that they end up weaker and less muscular than a completely non-athletic individual.

Finally, it is relevant that studies comparing untrained biological males and highly trained females, males retain an advantage despite the training status of biological females. For instance, in a study on grip strength, the strongest elite athletically trained females in sports where grip strength is a performance advantage (judo and handball) are only as strong as untrained biological males at the 58th percentile, with a 26% difference in strength between typical elite females and typical untrained males [49]. Similarly, Morrow & Hosler (1981) found that untrained college-aged males were more than twice as strong as trained female basketball and volleyball players in a bench press task, with the top 5% strongest trained females equal in strength to the weakest 14% of untrained males This establishes that pre-trained biological females can increase strength beyond that of untrained females, but still do not compare to untrained biological males.

The implication is also that since even typical untrained biological males have a large strength advantage compared to elite and trained females, studies that have documented only small reductions in strength and thus persistence of strength advantages with androgen deprivation in untrained biological males (as in Kvorning et al [46], Chen et al [47] and in studies on transgender women cited herein) should be considered relevant for establishing the smallest possible retained advantage that would exist in the absence of training. As described above, and in studies where training is conducted while testosterone is suppressed [46-48], the advantage will only remain this size or increase.

Finally, it is also recognized that not all sports are affected similarly by the variables we have weighted as crucial for rugby (size, strength, speed, power). Indeed, in some sports, excess mass may be disadvantageous, and thus the model for retained advantage and persistent risk may present differently for different physical activities.

In conclusion, with those recognized limitations, World Rugby is committed to supporting research that may in future establish that biological differences between those to whom testosterone confers significant physiological and performance advantages and those to whom it does not are removed sufficiently to enable participation of transgender women in women's rugby. At the present time, however, based on the best published scientific evidence, that position is unsupported.

The referenced research used to support this position can be viewed here.

CONCLUSION – TESTOSTERONE, WELFARE AND PERFORMANCE

Having considered all of the currently available information, the working group determined that the best evidence **currently** available means that those who experienced the biological

effects of testosterone during puberty and adolescence cannot safely or fairly compete in women's rugby. That means that currently, transgender women may not compete in women's rugby.

World Rugby is committed to encouraging transgender people to remain involved with rugby and is currently funding research to continue to review any evidence that may emerge to enable the participation of transgender women in women's rugby. Details of the research currently underway, along with details of how to apply for research funding for those who may be interested, is available here.

GUIDELINES FOR TRANSGENDER MEN

CAN TRANSGENDER MEN PLAY MEN'S RUGBY?

Transgender men who have transitioned pre- or post-puberty can play men's rugby subject to the following conditions:

- Transgender men who have transitioned pre- or post-puberty can play men's rugby subject to certain conditions (currently: confirmation of physical ability and a Therapeutic Use Exemption (TUE) where necessary, see 1 & 2 below).
- Transgender men who have transitioned pre- or post-puberty cannot play women's rugby, irrespective of the obtaining of a TUE
- Transgender men can play mixed-gender non-contact rugby

1. Confirmation of physical ability which must include:

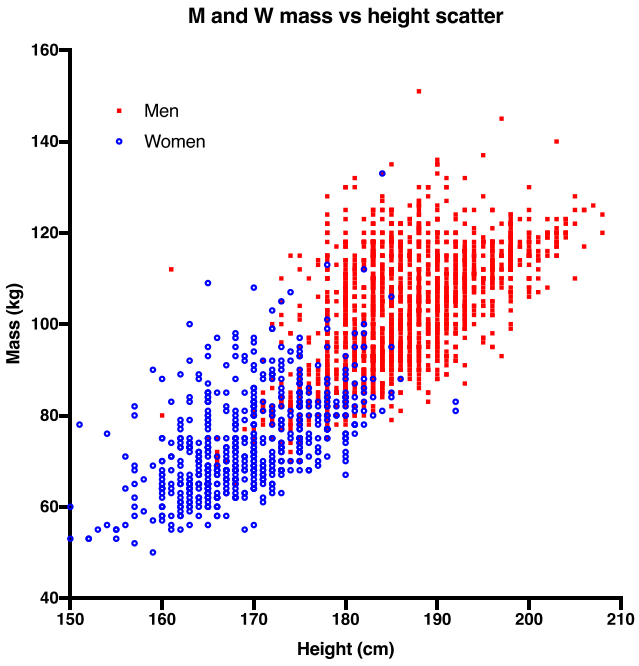
   - Written acknowledgement and acceptance by the player of the associated risks of playing contact rugby with males who are statistically likely to be stronger, faster and heavier than them, given the predictions this combination of variables makes for injury risk, as described
   - Written confirmation from a medical practitioner or qualified coach with an understanding of the demands of rugby, to whom the player is known, that the player is in a physical condition to play and that this view is supported by a musculo-skeletal evaluation and/or other appropriate assessments. The Union/ competition can adopt the spirit of the guideline and make it fit the laws/realities of that particular jurisdiction.
   - A template confirmation is attached here.

2. Therapeutic Use Exemption (where necessary, to play men's rugby)

   - It is important for transgender men to consider whether any medical treatment that they are undergoing requires them to obtain a TUE for the use of a substance on the WADA Prohibited List. Treatment with testosterone would require a TUE and playing without a TUE may result in an Anti-Doping Rule Violation which might result in a significant suspension from rugby
   - Nothing in this Guideline would be deemed to permit, excuse or justify non-compliance with any of the WADA requirements so it is very important that the player fully understands their obligations
   - Further information can be found by contacting your Union and in the WADA Transgender Player TUE Physician Guidelines, available at www.wada-ama.org.

WHY IS CONFIRMATION OF PHYSICAL ABILITY REQUIRED?

As described previously, males are typically significantly heavier, faster, stronger, and more powerful than typical females. Thus, when comparing typical males to females, there are large and meaningful differences, with similar or even larger differences present when the extreme cases (heaviest male player vs heaviest female player) are compared. This does not necessarily preclude some men from being lighter, less strong and less powerful than many women, but the frequency distributions of, for example, elite rugby players suggests than when matched for performance level, there is small overlap between these variables (see Figure below, which shows the mass and height overlap and spread in elite rugby players). Biomechanical modelling suggests a similar frequency distribution for injury risk factors such as neck forces and moments, and head linear and angular accelerations, where the smaller and slower player experiences larger outcomes suggestive of increased injury risk, as described previously.



Similarly, grip strength, a proxy for upper body strength, is 30 to 40% greater in men than women, while still allowing for overlap, and performance outcomes such as countermovement jump and running speed are significantly different, with males outperforming females by approximately 30% and 15%, respectively.

The principle is thus that transgender men, who have not benefited from the biological changes created by testosterone's effects at puberty, will typically have mass and strength variables that fall into the range of those belonging to biological females in the above-mentioned studies, and will therefore be smaller and less strong, on average, than the men whose data are included in the above studies.

It is therefore prudent, for the purposes of welfare and safety, to request certification to ensure that imbalances are not so large as to create a safety risk to that player. This is done for various other scenarios in Rugby Union, including in permitting a youth or junior player to play adult rugby, where the differences in size, strength and speed are in fact very similar to those documented between men's and women's rugby players at any given age after puberty.

Similarly, World Rugby's guideline for age-grade participation recognizes that permission may be given to girls to continue playing rugby against boys after the age of 13 (when puberty begins to create physiological differences as a result of testosterone) provided certification is given. Finally, players are assessed and deemed competent to play in the front row positions, also for their own safety.

HOW DO I PROVIDE THE CONFIRMATION?

The confirmation of physical ability should be provided to the player's Union's Chief Medical Officer.

WHY MIGHT A THERAPEUTIC USE EXEMPTION (TUE) BE REQUIRED?

Some transgender men may be undergoing medical treatment that includes the prescription of testosterone (or other drugs) which are "Prohibited Substances" on the WADA Prohibited List (i.e. they are considered to be performance enhancing substances) and they are not permitted without a Therapeutic Use Exemption (TUE). A TUE provides a player with authorisation to use a Prohibited Substance whilst continuing to play rugby. Players who medically require the use of a Prohibited Substance are required to obtain a TUE.

Without a TUE, players whose treatment include Prohibited Substances risk committing an Anti-Doping Rule Violation, an offence that may result in a sanction (regardless of the player's circumstances or reasons for such treatment). That could result in a four-year suspension from sport and therefore it is very important that players understand their obligations to obtain a TUE.

GUIDELINES FOR NON-BINARY PEOPLE

"Non-binary" is a term used by people whose gender is identified by them as neither male nor female, or both male and female, or whose gender is not identified as male and/or female.

For non-binary people, the factor that determines which of the categories of rugby they may play in (i.e. men's or women's rugby) is whether or not the player has experienced the biological effects of testosterone during puberty and adolescence.

- Non-binary people who have experienced the biological effects of testosterone during puberty and adolescence can play men's rugby without any restrictions.
- Non-binary people who have experienced the biological effects of testosterone during puberty and adolescence cannot currently play women's rugby.
- Non-binary people who were identified as female at birth and have not experienced the biological effects of testosterone during puberty and adolescence can play women's rugby (subject to confirmation of medical treatment and the timing thereof).[4]
- Non-binary people who were identified as female at birth and have not experienced the biological effects of testosterone during puberty and adolescence can play men's rugby subject to certain conditions (currently: certification of physical ability and a TUE where necessary).
- Non-binary people who are pre-puberty can play either boys or girls or mixed-gender rugby up to age 12 (in line with World Rugby's mixed-gender guideline[5]) and thereafter, shall participate in rugby in accordance with the above criteria for non-binary people depending on whether they are experiencing the biological effects of testosterone during puberty and adolescence or not.

PLAYERS WHO HAVE EXPERIENCED OR ARE EXPERIENCING THE BIOLOGICAL EFFECTS OF TESTOSTERONE DURING PUBERTY OR ADOLESCENCE:

WHY CAN'T THEY PLAY WOMEN'S RUGBY?

Concerns have emerged following the publication of new research that suggests that the suppression of testosterone does not reduce the strength of transgender women to the extent previously thought to be the case.

For a detailed explanation of the effects of testosterone on performance and injury risk in rugby, please visit the relevant section here.

[4] See the Legal Section here for details of how this review would be carried out
[5] https://playerwelfare.worldrugby.org/?documentid=117

Having considered all of the currently available information, the working group determined that the best evidence currently available means that those who experienced the biological effects of testosterone during puberty cannot safely or fairly compete in women's rugby.

World Rugby is committed to encouraging transgender people to remain involved with rugby and is currently funding research to review any new evidence that may emerge to enable the participation of those who had experienced the biological effects of testosterone during puberty in women's rugby if they so wish. Details of the research currently underway, along with details of how to apply for research funding for those who may be interested, is available here.

NON-BINARY PLAYERS WHO WERE IDENTIFIED AT BIRTH AS FEMALE AND HAVE NOT EXPERIENCED THE BIOLOGICAL EFFECTS OF TESTOSTERONE DURING PUBERTY:

WHY IS A CONFIRMATION OF PHYSICAL ABILITY REQUIRED?

Individuals who have undergone the androgenizing effects of testosterone during puberty are typically heavier, stronger, and faster than those who have not. Hence, it is prudent for safety reasons to ensure that large mismatches, which may increase the risk of injury, are avoided. The male-female differences relevant to these risks are described here.

WHY MIGHT A THERAPEUTIC USE EXEMPTION (TUE) BE REQUIRED?

Some non-binary people may be undergoing medical treatment that includes the prescription of testosterone, spironolactone or GnRH agonists which are "Prohibited Substances" on the WADA Prohibited List (i.e. they are considered to be performance enhancing substances) and they are not permitted without a Therapeutic Use Exemption (TUE). A TUE provides a player with authorisation to use a Prohibited Substance whilst continuing to play rugby. Players who medically require the use of a Prohibited Substance are required to obtain a TUE.

Without a TUE, Players risk committing an Anti-Doping Rule Violation, an offence that may result in a sanction regardless of the medical circumstances. That could result in a four-year suspension from sport and therefore it is very important that players understand their obligations to obtain a TUE.

HOW DO I STAY INVOLVED IN RUGBY IF I CAN NO LONGER PLAY IN THE CATEGORY THAT I WANT TO?

World Rugby acknowledges that the introduction of this Guideline will mean that some players can no longer play in the category that they want to. It is possible that will change in the future and World Rugby is funding research to try to find out if there are ways to allow that safely and fairly (see here for details). In the meantime, there are many other ways to stay involved with rugby:

- Other forms of the game: Many forms of non-contact Rugby exist such as: Tag; Touch; Flag etc all have open categories.

- Coaching: Coaching can be hugely rewarding and can provide players with life lessons, engender a love for the sport and provide an enjoyable vehicle for improvement. World Rugby and its member Unions offer several courses for coaches of children, adolescents, and adults. All courses are open to any participant.

- Refereeing: For many people who may not be able to play, refereeing is a viable alternative to stay close to the game. World Rugby and its member Unions offer several introductory courses and a pathway exists in all Unions for fast-tracking talented individuals.

- Administration: All clubs rely on volunteer administrators. As individuals enter the latter stages of the long-term participant model, then administration becomes a realistic outlet for many. A number of Unions have dedicated support resources for individuals who wish to pursue this path of staying involved.

World Rugby is currently exploring the possibility of an “open category” of rugby in which any player could play, regardless of gender identity. World Rugby has committed to exploring this option with its Unions, Associations, International Rugby Players, and trans-advocate groups including Gendered Intelligence and International Gay Rugby.

WHAT IF I HAVE CONCERNS ABOUT SAFETY OR FAIRNESS RELATING TO SOMEONE I AM PLAYING WITH OR AGAINST?

It is important to note that many people do not meet cultural or local norms or stereotypes related to the expression of gender identity. All players and Unions ought to take care to consider this when raising any concerns about another player. In the event that a player or Union has a genuine concern about safety or fairness in relation to another player, the concern should be dealt with as follows:

1. The concerned person should raise their concerns with their Union's Chief Medical Officer (CMO).

2. The Union's CMO should carefully consider the concerns raised, in the context of all of the known facts and if having done so, the CMO determines that the concerns are not frivolous or vexatious, the CMO should contact the World Rugby CMO setting out the basis for the concerns.

3. The World Rugby CMO will engage with the CMO of the Union of the player about whom the concerns have been raised, ensuring confidentiality for the player and involved team-mates and opponents throughout the engagement.

4. The World Rugby CMO and the relevant player's CMO will discuss the situation and agree on the most appropriate actions, based on the specific circumstances

5. In some circumstances, such appropriate actions may include a recommendation that a standardised endocrinological assessment be performed [Appendix].

6. For the avoidance of doubt, no player should or would be forced to undergo any medical or other assessment. It is a player's responsibility to decide on whether he or she wishes to proceed with any assessment. However, it should be noted that deciding not to participate in an assessment, having been requested to do so, may have consequences in terms of the player's eligibility to participate in the category of competition that is consistent with his/her/their gender identity, since it may not be possible to determine whether issues of safety or fairness arise without such assessment.

GLOSSARY

Below are some commonly used terms. They are provided to ensure that the Guideline is clear to everyone who reads it, but it is acknowledged that not all terms are used or agreed on by all people.

Transgender: used in this Guideline to refer to individuals whose gender identity (i.e. how they identify) is different from the sex identified at birth (whether they are pre- or post-puberty, and whether or not they have undergone any form of medical intervention).

Transgender man: used in this Guideline to refer to an individual who is identified as female at birth and did not experience a testosterone-driven puberty but identifies and lives as a man. This is sometimes shortened to trans man, or FTM, an abbreviation for female-to-male.

Transgender woman: used in this Guideline to refer to an individual who is identified as male at birth and experienced a testosterone-driven puberty but identifies and lives as a woman. This is sometimes shortened to trans woman, or MTF, an abbreviation for male-to-female.

Non-binary person: used in this Guideline to refer to individuals whose gender is neither male nor female, or both male and female, or whose gender does not relate to male and/or female**.**

Sex: used in this Guideline to refer to an individual person's biological and physical characteristics, associated with being male or female.

Gender: used in this Guideline to refer to the social and cultural contexts related to masculinity and femininity. It is also often used to refer to a person's sense of self as, for example, a man, woman or non-binary person, and to associated behavioural expressions.

Expression of gender: The gender-related signals a person uses, such as name, pronoun, title, clothing, hair, walk, speech and mannerisms and so on.

Biological male: For the purposes of this document, refers to a person who produces testosterone at puberty and adolescence, and experiences the resultant androgenizing effects thereof.

Biological female: For the purposes of this document, refers to a person who does not produce male levels of testosterone at puberty and adolescence, and thus does not experience the resultant androgenizing effects thereof.

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FUTURE RESEARCH FUNDING CONSIDERATIONS

As described previously, the current evidence strongly suggests that the reduction of testosterone levels in transwomen is insufficient to remove biological advantages created during puberty and adolescence, which is the basis for the current policy that disallows transwomen from playing in women's rugby. This is however based on current evidence, and does not preclude the possibility that future evidence, specifically in an athletic, trained population, may emerge to contradict this position, and offer alternative policies.

To this end, World Rugby is committed to supporting such research as part of its global research prioritization. Currently, World Rugby invites research proposals from any eligible applicant, and then assesses the applications through a Scientific Committee comprised of internal and external independent researchers and experts. Those studies that are deemed to fall within the high-priority research areas, and to be of sufficient standard, are then funded by World Rugby.

As part of its commitment to an open, transparent engagement with the rugby-playing community, matters related to transgender physiology and performance will henceforth be included in the World Rugby high priority research areas. This means that any researchers who are exploring questions related to biological differences between males and females can apply to World Rugby for funding. This is not a guarantee that funding will be provided, as the studies are evaluated against a checklist according to best-practice principles, but the field of research will be prioritized, and so candidates may apply for funding that will advance understanding in this field and ensure that the policies that govern the sport are continuously challenged by best-available evidence.

See further details on World Rugby's research process and application for funding at: https://playerwelfare.worldrugby.org/?subsection=72

LEGAL ASPECTS OF THE TRANSGENDER GUIDELINE AND APPLICATION IN WORLD RUGBY TOURNAMENT

1. World Rugby, as the international federation responsible for the global governance and regulation of the sport of rugby, has adopted this Transgender Guideline (the "Guideline") in order to facilitate the participation of transgender and non-binary players at the international level of the sport in the category of competition that is consistent with their gender identity, where it is safe and fair to do so.

2. The Guideline operates as a "Policy" in all World Rugby Tournaments. This means that it will be applied as set out within the Guideline with no amendments thereto.

3. It is strongly recommended that each Union adopts its own regulations to determine the eligibility of transgender players to compete in events taking place under its own jurisdiction. Unions should take account of the information provided in this Guideline but may also take into account any relevant aspects of local law which apply within the Union's jurisdiction and with which the Union is legally obliged to comply. For the avoidance of doubt, however, anything that the Union does (or does not do) at national level will not affect the eligibility of transgender players to compete in World Rugby Tournaments. That will instead be determined exclusively by reference to this Guideline.

4. World Rugby wishes to be as inclusive as possible, to impose only necessary and proportionate restrictions on eligibility, and to provide a clear path to participation in the sport for all.

5. World Rugby recognises that transgender players may wish to compete in rugby in accordance with their gender identity. World Rugby wishes to encourage and facilitate such participation, on conditions that go only so far as is necessary to protect the safety of all participants and to ensure fair and meaningful competition.

6. World Rugby took the following into account when developing this Guideline:

    a. World Rugby needs to establish conditions for participation in the sport of rugby, including eligibility categories, that (a) protect the health and safety of participants; and (b) guarantee fair and meaningful competition that displays and rewards the fundamental values and meaning of the sport:

    b. World Rugby wants its Players to be incentivised to make the huge commitments required to excel in the sport, and so to inspire new generations to join the sport and aspire to the same excellence. It does not want to risk discouraging those aspirations by permitting competition that is not safe, fair, or meaningful.

    c. Those who experience a testosterone-driven puberty gain significant advantages in size, strength, and power over those who do not. Owing to the impact that such advantages can have on sporting performance and on safety, it is necessary to have separate competition categories for males and females in order to preserve the safety fairness and integrity of the sport, for the benefit of all of its participants and stakeholders.

7. The eligibility conditions established in this Guideline are driven solely by the desire to guarantee fairness and safety within the sport. In no way are they intended as any kind of judgement on or questioning of the gender identity or the dignity of any Transgender Player.

8. The need to respect and preserve the dignity and privacy of transgender players, and to avoid improper discrimination and stigmatisation on grounds of gender identity. All cases arising under this Guideline must be handled and resolved in a fair, consistent, and confidential manner, recognising the sensitive nature of such matters.

9. This Guideline will come into effect on 9TH October 2020 and will apply both to cases arising prior to that date and to cases arising after that date. It will be subject to periodic review to take account of any relevant scientific or medical developments, and may be amended from time to time by World Rugby, with such amendments to take effect from the date specified by World Rugby when it issues the amendments.

10. In the event an issue arises that is not foreseen in this Guideline, it will be addressed by World Rugby in a manner that protects and promotes the imperatives identified above.

11. Queries in relation to this Guideline should be directed as set out here.

APPLICATION IN WORLD RUGBY TOURNAMENTS

12. This Guideline establishes the conditions enabling transgender and non-binary players ("Relevant Players") to compete in World Rugby Tournaments in the category of competition that is consistent with their gender identity. Further guidance on certain medical aspects of the Guideline can be found in the Appendix.

13. Any Relevant Player who wishes to participate in a World Rugby Tournament agrees, as a condition to such participation:

    a. to comply in full with this Guideline;

    b. to cooperate promptly and in good faith with the Chief Medical Officers ("CMO") of the relevant Union and/or World Rugby and, if necessary the Expert Panel of the relevant Union and/or World Rugby in the discharge of their respective responsibilities under this Guideline, including providing them with all of the information and evidence they request to assess his/her compliance and/or monitor his/her continuing compliance with the eligibility conditions referred to in this Guideline;

    c. to the fullest extent permitted and required under all applicable data protection and other laws, to the collection, processing, disclosure and use of information (including his/her sensitive personal information) as required to implement and apply this Guideline effectively and efficiently;

    d. to follow the procedures set out herein to challenge this Guideline and/or to appeal decisions made under this Guideline, and not to bring any proceedings

in any court or other forum that are inconsistent with the relevant clauses herein; and

e. to provide written confirmation of his/her agreement with this Guideline upon request by World Rugby.

14. A player may revoke at any time, with or without giving reasons, the player's agreement to participate in a World Rugby Tournament in accordance with this Guideline. In that event, the player will be deemed to have withdrawn any claim to satisfy the eligibility conditions for transgender players set out herein and may not participate in a World Rugby Tournament.

ELIGIBILITY CONDITIONS FOR TRANSGENDER MALE ATHLETES

15. Transgender men who have transitioned pre- or post-puberty can play in the male category subject to certain conditions which are currently: (i) certification of physical ability and (ii) possession of a valid Therapeutic Use Exemption where necessary.

16. The confirmation of physical ability must include:

- Written acknowledgement and acceptance by the player of the associated risks of playing contact rugby with males who are statistically more likely to be heavier, stronger, faster and consequently produce more force and power during physical contact situations

- Written confirmation from a medical practitioner with an understanding of the demands of rugby, to whom the player is known, that the player is in a physical condition to play and that this view is supported by a musculo-skeletal evaluation and/or other appropriate assessments.

- A template confirmation is attached here.

17. The Player must provide the confirmation of physical ability (and TUE if applicable) to his Union's CMO for review. If satisfied with same, the Union's CMO shall provide a copy to World Rugby's Chief Medical Officer no later than six weeks ahead of the World Rugby Tournament in which he wishes to participate.

18. If satisfied with the confirmation of physical ability (and TUE if applicable), World Rugby's CMO will issue a written confirmation, to the player's Union, of that player's eligibility to compete in the male category of competition in World Rugby Tournaments.

19. In the event that the player does not agree with a decision of World Rugby's CMO, he may appeal such decision to the World Rugby Expert Group in accordance with the "Appeals" process set out below.

20. Transgender men who have been treated with testosterone (or similar) may not compete in the female category.

21. In the event that a transgender man decides to stop his hormone treatment and later wishes to take part in the female category of competition, the player's Union's CMO should request World Rugby's CMO to convene the World Rugby Expert Group to consider the individual circumstances and make a decision on whether to permit his participation in the female category, taking all the circumstances into account.

ELIGIBILITY CONDITIONS FOR TRANSGENDER FEMALE ATHLETES

22. Transgender women who transitioned pre-puberty and have not experienced the biological effects of testosterone during puberty and adolescence can play women's rugby subject to confirmation of medical treatment and the timing thereof as set out below.

23. In the event that a transgender woman who transitioned pre-puberty wishes to participate in the female category, she must provide medical documentation, from an appropriately qualified medical specialist, to her Union's Chief Medical Officer that she has not experienced and is actively suppressing a testosterone-driven puberty]. The Union's CMO will consider such evidence and if he or she is satisfied, he/she will provide a copy to the World Rugby CMO who if satisfied, will issue a written confirmation, to the player's Union, of that player's eligibility to compete in the female category of competition in World Rugby Tournaments. This process would be renewed on an annual basis.

24. In the event that the player does not agree with a decision of World Rugby's Chief Medical Officer, she may appeal such decision to the World Rugby Expert Group in accordance with the "Appeals" process set out below.

25. Transgender women who transitioned post-puberty and have experienced the biological effects of testosterone during puberty and adolescence cannot currently play women's rugby

26. Transgender women can play mixed-gender non-contact rugby

ELIGIBILITY CONDITIONS FOR NON-BINARY ATHLETES

27. Non-binary people who were identified as male at birth and have experienced the biological effects of testosterone during puberty and adolescence may play men's rugby.

28. Non-binary people who were identified as male at birth and have experienced the biological effects of testosterone during puberty and adolescence cannot currently play women's rugby.

29. Non-binary people who were identified as male at birth but who have not have not experienced the biological effects of testosterone during puberty and adolescence may participate in female rugby subject to the following conditions: In the event that a non-binary person who was identified as male at birth wishes to participate in women's rugby, they must provide medical documentation, from an appropriately qualified medical specialist, to her Union's Chief Medical Officer that she has not experienced and is actively suppressing a testosterone-driven puberty testosterone-influenced puberty. The Union's CMO will consider such evidence and if he or she is

satisfied, he/she will provide a copy to the World Rugby CMO who if satisfied, will issue a written confirmation, to the player's Union, of that player's eligibility to compete in the female category of competition in World Rugby Tournaments. This process would be renewed on an annual basis.

30. In the event that the player does not agree with a decision of World Rugby's Chief Medical Officer, she may appeal such decision to the World Rugby Expert Group in accordance with the "Appeals" process set out below.

31. Non-binary people who were identified as female at birth and have not experienced the biological effects of testosterone during puberty and adolescence and who have not undergone any treatment including testosterone (or any similar substance) may play women's rugby.

32. Non-binary people who were identified as female at birth and have experienced the biological effects of testosterone during puberty and adolescence can play men's rugby subject to certain conditions (currently: confirmation of physical ability and a TUE where necessary).

33. The confirmation of physical ability must include:

    - Written acknowledgement and acceptance by the player of the associated risks of playing contact rugby with males who are statistically more likely to be heavier, stronger, faster, and consequently produce more force and power during physical contact situations

    - Written confirmation from a medical practitioner with an understanding of the demands of rugby, to whom the player is known, that the player is in a physical condition to play and that this view is supported by a musculo-skeletal evaluation and/or other appropriate assessments.

    - A template confirmation is attached here.

34. The Player must provide the confirmation of physical ability (and TUE if applicable) to their Union's CMO for review. If satisfied with same, the Union's CMO shall provide a copy to World Rugby's Chief Medical Officer no later than six weeks ahead of the World Rugby Tournament in which he wishes to participate.

35. If satisfied with the confirmation of physical ability (and TUE if applicable), World Rugby's CMO will issue a written confirmation, to the player's Union, of that player's eligibility to compete in the male category of competition in World Rugby Tournaments.

36. In the event that the player does not agree with a decision of World Rugby's CMO, they may appeal such decision to the World Rugby Expert Group in accordance with the "Appeals" process set out below.

37. For the avoidance of doubt, transgender men who have been treated with testosterone (or similar) may not compete in the female category.

38. For the avoidance of doubt, a transgender men who have not been treated with testosterone (or similar) may choose to play in the female category if they so wish to do so but World Rugby acknowledges that many transgender men would not wish to play in a category that is not consistent with their gender identity.

39. In the event that a transgender man decides to stop his hormone treatment and later wishes to take part in the female category of competition, the player's Union's CMO should request World Rugby's CMO to convene the World Rugby Expert Group to consider the individual circumstances and make a decision on whether to permit his participation in the female category, taking all the circumstances into account

40. Non-binary people who are pre-puberty can play either boys or girls or mixed-gender rugby up to age 12 (in line with World Rugby's mixed-gender guideline[6]) and thereafter, shall participate in rugby in accordance with the above criteria for non-binary people depending on whether they are experiencing the biological effects of testosterone during puberty and adolescence or not.

RAISING CONCERNS ABOUT A PLAYER

41. In the event that a player or Union has a genuine concern about safety or fairness in relation to another player, the concern shall be dealt with as set out in this section.

42. It is important to note that many people do not meet cultural or local norms or stereotypes related to the expression of gender identity and World Rugby will remind those raising concerns that they ought to take care to consider this when raising any concerns about another player.

43. The concerned person will raise their concerns with their Union's Chief Medical Officer (CMO).

44. The Union's CMO will carefully consider the concerns raised, in the context of all of the known facts and if having done so, the CMO determines that the concerns are not frivolous or vexatious, the CMO will contact the World Rugby CMO setting out the basis for the concerns.

45. The World Rugby CMO will contact the CMO of the Union of the player about whom the concerns have been raised.

46. The World Rugby CMO and the relevant player's CMO will discuss the situation and agree on the most appropriate actions, based on the specific circumstances

47. In some circumstances, such appropriate actions may include an assessment which will involve a multi-disciplinary approach that includes genetic, endocrine and psychological input from a range of experts who specialize in the field of andrology. Further details of testing protocol are available here.

[6] https://playerwelfare.worldrugby.org/?documentid=117

48. Having taken the above steps, the World Rugby CMO will make a determination as to whether the player can participate in their selected category, if in the CMO's view, the player complies with this Guideline.

49. In the event that the player or Union does not agree with a decision of World Rugby's CMO, they may appeal such decision to the World Rugby Expert Group in accordance with the "Appeals" process set out below.

PROVISIONS APPLICABLE TO ALL TRANSGENDER PLAYERS

50. No player should or would be forced to undergo any medical or other assessment. It is a player's responsibility to decide on whether he or she wishes to proceed with any assessment. However, it should be noted that deciding not to participate in an assessment, having been requested to do so, may have consequences in terms of the player's eligibility to participate in the category of competition that is consistent with his/her/their gender identity, since it may not be possible to determine whether issues of safety or fairness arise without such assessment.

51. The following are not required or relevant in order for a transgender player to compete in the category of competition at a World Rugby Tournament that is consistent with his/her gender identity:

    a. legal recognition of the Player's gender identity as the Player's sex; or

    b. surgical anatomical changes.

52. For the avoidance of doubt, the eligibility conditions for transgender players set out in this Guideline operate without prejudice to all other eligibility requirements that are applicable to all players (transgender or otherwise) under the World Rugby Regulations Relating to the Game which must also be satisfied at all relevant times.

53. Nothing in this Guideline is intended to undermine or affect in any way any of the requirements of the World Rugby Regulations Relating to the Game, the World Anti-Doping Code, the WADA International Standards (including the International Standard for Therapeutic Use Exemptions), or World Rugby's anti-doping rules. Nothing in this Guideline will be deemed to permit, excuse or justify non-compliance with any of those requirements, including (without limitation) any requirement for an Player to obtain a Therapeutic Use Exemption for the use of a substance on the WADA Prohibited List, such as testosterone, spironolactone or GnRH agonists.[7]

APPEALS HEARD BY THE WORLD RUGBY EXPERT PANEL

54. Where the World Rugby CMO requires it, or where a player wishes to appeal the decision of the World Rugby CMO, the World Rugby Expert Group will be convened.

55. The World Rugby Expert Group shall be comprised of a panel of independent experts from the following fields: scientific; medical; legal & risk; social & ethical.

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[7] See, e.g., the WADA Transgender Athlete TUE Physician Guideline, available at www.wada-ama.org.

56. In order to appeal a decision of the CMO, the player must send a Notice of Appeal to World Rugby's CMO within 7 days of receiving the decision.

57. The Notice of Appeal must set out in writing the basis for the player's appeal.

58. Upon receipt of such Notice of Appeal, the World Rugby CMO shall convene the World Rugby Expert Group who shall consider the Player's Appeal as soon as is practicable.

59. The World Rugby Expert Group shall have the power to regulate their own procedures.

60. All decisions of the World Rugby Expert Group shall be final and binding.

61. The Player is responsible for ensuring that the information provided is accurate and complete, and that nothing relevant to the Expert Panel's assessment of the case is withheld. The Player must also provide the appropriate consents and waivers (in a form satisfactory to the Chief Medical Officer) to enable her physician(s) to disclose to the Expert Panel any information that the Expert Panel deems necessary to its assessment.

62. If the Expert Panel has any concerns about the adequacy of the evidence provided by the Player on any particular point, it must give the Player a fair opportunity to try to address those concerns before it comes to its final decision.

63. The Expert Panel will complete its assessment as soon as is reasonably practicable in all of the circumstances of the case. However, in no circumstance will World Rugby or any member of the Expert Panel be liable for any detriment allegedly suffered by the Player or anyone else as a result of the length of time taken by the Expert Panel to complete its assessment.

64. Once it has completed its assessment, the Expert Panel will send its decision in writing to the World Rugby CMO and the relevant Union CMO.

65. The Expert Panel's decision will be final and binding on all parties.

DISCIPLINARY PROCEEDINGS

66. Where a Player competes in a World Rugby Tournament in a category of competition for which he/she has not satisfied the eligibility conditions set out in this Guideline, World Rugby may take disciplinary action against such person/entity in accordance with World Rugby Regulation 18 pursuant to which the various sanctions set out in World Rugby Regulation 18 may be imposed.

67. In such disciplinary proceedings, a player may not challenge the validity of this Guideline nor may they challenge any decision made under this Guideline.

DISPUTE RESOLUTION

68. Decisions by the Expert Panel may be appealed to a World Rugby Appeal Committee in accordance with the provisions of World Rugby Regulation 18.

CONFIDENTIALITY

69. All cases arising under this Guideline, and in particular all Player information provided to World Rugby under this Guideline, and all results of examinations and assessments conducted under this Guideline, will be dealt with in strict confidence at all times. All medical information and data relating to a player will be treated as sensitive personal information and the CMO and Expert Panel will ensure at all times that it is processed as such in accordance with applicable data protection and privacy laws. Such information will not be used for any purpose not contemplated in this Guideline, and will not be disclosed to any third party save (a) as is strictly necessary for the effective application and enforcement of this Guideline; or (b) as is required by law.

70. World Rugby will not comment publicly on the specific facts of a pending case (as opposed to general descriptions of the process and science involved) except in response to public comments attributed to the Player or the Player's representatives.

71. Each member of the Expert Panel must sign an appropriate conflict of interest declaration and confidentiality undertaking in relation to his/her work as a member of the panel if requested to do so.

COSTS

72. The costs of any assessment, examination, monitoring, reporting, and any other costs involved in complying with the Guideline will be borne by the relevant Player. The standing costs of the Expert Panel will be borne by World Rugby.

RECOGNITION OF OTHER ELIGIBLITY DECISIONS

73. Noting the specific requirements of each individual sport, it may not be appropriate for World Rugby to recognise and give effect to an eligibility decision of the international federation of another sport with respect to a specific player. The Guideline applies to all players regardless of any decision or finding as to the player's gender made by any other sporting, public or private entity.

LIMITATION OF LIABILITY

74. In no circumstances will World Rugby, any member of the Expert Panel, or any of World Rugby's (or any company associated with World Rugby) employees, officers, agents, representatives and other persons involved in the administration of this Guideline be liable in any way in relation to acts done or omitted to be done in good faith in connection with the administration of this Guideline.

TEMPLATE FOR CONFIRMATION OF PHYSICAL ABILITY

Confirmation of physical ability of _____[name], transgender man who wishes to take part in male rugby:

I acknowledge and accept the injury risks associated with transgender males playing contact rugby with males who are statistically likely to be stronger, faster and heavier than transgender males, as described in the World Rugby Transgender Guidelines which I have read and understand. I acknowledge and agrees that I am voluntarily assuming the risk of injury and World Rugby (and/or any of its associated entities) shall have no responsibility or liability in respect of my participation in male rugby.

Signature of player:

Date:

I confirm that I have an understanding of the physical demands of rugby, and having examined the above-named player, I confirm that the player is in a physical condition to play rugby and that this view is supported by a musculo-skeletal evaluation and/or other appropriate assessments.

Name of medical practitioner or qualified coach:

Signature of medical practitioner or qualified coach:

Date:

The Union/ competition can adopt the spirit of the guideline and make it fit the laws/realities of that particular jurisdiction.

QUERIES AND CONTACT INFORMATION

Queries

- In the case of general queries regarding this Transgender Guideline, please contact: Head of Technical Services, World Rugby, World Rugby House, 8-10 Pembroke Street Lower, Dublin 2

- In the case of confidential queries regarding cases affected by this Transgender Guideline, please contact: Chief Medical Officer, World Rugby, World Rugby House, 8-10 Pembroke Street Lower, Dublin 2.

EXHIBIT I

Sports Medicine
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REVIEW ARTICLE

Transgender Women in the Female Category of Sport: Perspectives on Testosterone Suppression and Performance Advantage

Emma N. Hilton[1] · **Tommy R. Lundberg**[2,3]

Abstract

Males enjoy physical performance advantages over females within competitive sport. The sex-based segregation into male and female sporting categories does not account for transgender persons who experience incongruence between their biological sex and their experienced gender identity. Accordingly, the International Olympic Committee (IOC) determined criteria by which a transgender woman may be eligible to compete in the female category, requiring total serum testosterone levels to be suppressed below 10 nmol/L for at least 12 months prior to and during competition. Whether this regulation removes the male performance advantage has not been scrutinized. Here, we review how differences in biological characteristics between biological males and females affect sporting performance and assess whether evidence exists to support the assumption that testosterone suppression in transgender women removes the male performance advantage and thus delivers fair and safe competition. We report that the performance gap between males and females becomes significant at puberty and often amounts to 10–50% depending on sport. The performance gap is more pronounced in sporting activities relying on muscle mass and explosive strength, particularly in the upper body. Longitudinal studies examining the effects of testosterone suppression on muscle mass and strength in transgender women consistently show very modest changes, where the loss of lean body mass, muscle area and strength typically amounts to approximately 5% after 12 months of treatment. Thus, the muscular advantage enjoyed by transgender women is only minimally reduced when testosterone is suppressed. Sports organizations should consider this evidence when reassessing current policies regarding participation of transgender women in the female category of sport.

Key Points

Given that biological males experience a substantial performance advantage over females in most sports, there is currently a debate whether inclusion of transgender women in the female category of sports would compromise the objective of fair and safe competition.

Here, we report that current evidence shows the biological advantage, most notably in terms of muscle mass and strength, conferred by male puberty and thus enjoyed by most transgender women is only minimally reduced when testosterone is suppressed as per current sporting guidelines for transgender athletes.

This evidence is relevant for policies regarding participation of transgender women in the female category of sport.

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1 Introduction

Sporting performance is strongly influenced by a range of physiological factors, including muscle force and power-producing capacity, anthropometric characteristics, cardiorespiratory capacity and metabolic factors [1, 2]. Many of these physiological factors differ significantly between biological males and females as a result of genetic differences and androgen-directed development of secondary sex characteristics [3, 4]. This confers large sporting performance advantages on biological males over females [5].

When comparing athletes who compete directly against one another, such as elite or comparable levels of school-aged athletes, the physiological advantages conferred by biological sex appear, on assessment of performance data, insurmountable. Further, in sports where contact, collision or combat are important for gameplay, widely different physiological attributes may create safety and athlete welfare concerns, necessitating not only segregation of sport into male and female categories, but also, for example, into weight and age classes. Thus, to ensure that both men and women can enjoy sport in terms of fairness, safety and inclusivity, most sports are divided, in the first instance, into male and female categories.

Segregating sports by biological sex does not account for transgender persons who experience incongruence between their biological sex and their experienced gender identity, and whose legal sex may be different to that recorded at birth [6, 7]. More specifically, transgender women (observed at birth as biologically male but identifying as women) may, before or after cross-hormone treatment, wish to compete in the female category. This has raised concerns about fairness and safety within female competition, and the issue of how to fairly and safely accommodate transgender persons in sport has been subject to much discussion [6–13].

The current International Olympic Committee (IOC) policy [14] on transgender athletes states that "it is necessary to ensure insofar as possible that trans athletes are not excluded from the opportunity to participate in sporting competition". Yet the policy also states that "the overriding sporting objective is and remains the guarantee of fair competition". As these goals may be seen as conflicting if male performance advantages are carried through to competition in the female category, the IOC concludes that "restrictions on participation are appropriate to the extent that they are necessary and proportionate to the achievement of that objective".

Accordingly, the IOC determined criteria by which transgender women may be eligible to compete in the female category. These include a solemn declaration that her gender identity is female and the maintenance of total serum testosterone levels below 10 nmol/L for at least 12 months prior to competing and during competition [14]. Whilst the scientific basis for this testosterone threshold was not openly communicated by the IOC, it is surmised that the IOC believed this testosterone criterion sufficient to reduce the sporting advantages of biological males over females and deliver fair and safe competition within the female category.

Several studies have examined the effects of testosterone suppression on the changing biology, physiology and performance markers of transgender women. In this review, we aim to assess whether evidence exists to support the assumption that testosterone suppression in transgender women removes these advantages. To achieve this aim, we first review the differences in biological characteristics between biological males and females, and examine how those differences affect sporting performance. We then evaluate the studies that have measured elements of performance and physical capacity following testosterone suppression in untrained transgender women, and discuss the relevance of these findings to the supposition of fairness and safety (i.e. removal of the male performance advantage) as per current sporting guidelines.

2 The Biological Basis for Sporting Performance Advantages in Males

The physical divergence between males and females begins during early embryogenesis, when bipotential gonads are triggered to differentiate into testes or ovaries, the tissues that will produce sperm in males and ova in females, respectively [15]. Gonad differentiation into testes or ovaries determines, via the specific hormone milieu each generates, downstream in utero reproductive anatomy development [16], producing male or female body plans. We note that in rare instances, differences in sex development (DSDs) occur and the typical progression of male or female development is disrupted [17]. The categorisation of such athletes is beyond the scope of this review, and the impact of individual DSDs on sporting performance must be considered on their own merits.

In early childhood, prior to puberty, sporting participation prioritises team play and the development of fundamental motor and social skills, and is sometimes mixed sex. Athletic performance differences between males and females prior to puberty are often considered inconsequential or relatively small [18]. Nonetheless, pre-puberty performance differences are not unequivocally negligible, and could be mediated, to some extent, by genetic factors and/or activation of the hypothalamic–pituitary–gonadal axis during the neonatal period, sometimes referred to as "minipuberty". For example, some 6500 genes are differentially expressed between males and females [19] with an estimated 3000 sex-specific

differences in skeletal muscle likely to influence composition and function beyond the effects of androgenisation [3], while increased testosterone during minipuberty in males aged 1–6 months may be correlated with higher growth velocity and an "imprinting effect" on BMI and bodyweight [20, 21]. An extensive review of fitness data from over 85,000 Australian children aged 9–17 years old showed that, compared with 9-year-old females, 9-year-old males were faster over short sprints (9.8%) and 1 mile (16.6%), could jump 9.5% further from a standing start (a test of explosive power), could complete 33% more push-ups in 30 s and had 13.8% stronger grip [22]. Male advantage of a similar magnitude was detected in a study of Greek children, where, compared with 6-year-old females, 6-year-old males completed 16.6% more shuttle runs in a given time and could jump 9.7% further from a standing position [23]. In terms of aerobic capacity, 6- to 7-year-old males have been shown to have a higher absolute and relative (to body mass) VO_{2max} than 6- to 7-year-old females [24]. Nonetheless, while some biological sex differences, probably genetic in origin, are measurable and affect performance pre-puberty, we consider the effect of androgenizing puberty more influential on performance, and have focused our analysis on musculoskeletal differences hereafter.

Secondary sex characteristics that develop during puberty have evolved under sexual selection pressures to improve reproductive fitness and thus generate anatomical divergence beyond the reproductive system, leading to adult body types that are measurably different between sexes. This phenomenon is known as sex dimorphism. During puberty, testes-derived testosterone levels increase 20-fold in males, but remain low in females, resulting in circulating testosterone concentrations at least 15 times higher in males than in females of any age [4, 25]. Testosterone in males induces changes in muscle mass, strength, anthropometric variables and hemoglobin levels [4], as part of the range of sexually dimorphic characteristics observed in humans.

Broadly, males are bigger and stronger than females. It follows that, within competitive sport, males enjoy significant performance advantages over females, predicated on the superior physical capacity developed during puberty in response to testosterone. Thus, the biological effects of elevated pubertal testosterone are primarily responsible for driving the divergence of athletic performances between males and females [4]. It is acknowledged that this divergence has been compounded historically by a lag in the cultural acceptance of, and financial provision for, females in sport that may have had implications for the rate of improvement in athletic performance in females. Yet, since the 1990s, the difference in performance records between males and females has been relatively stable, suggesting that biological differences created by androgenization explain most of the male advantage, and are insurmountable [5, 26, 27].

Table 1 outlines physical attributes that are major parameters underpinning the male performance advantage [28–38]. Males have: larger and denser muscle mass, and stiffer connective tissue, with associated capacity to exert greater muscular force more rapidly and efficiently; reduced fat mass, and different distribution of body fat and lean muscle mass, which increases power to weight ratios and upper to lower limb strength in sports where this may be a crucial determinant of success; longer and larger skeletal structure, which creates advantages in sports where levers influence force application, where longer limb/digit length is favorable, and where height, mass and proportions are directly responsible for performance capacity; superior cardiovascular and respiratory function, with larger blood and heart volumes, higher hemoglobin concentration, greater cross-sectional area of the trachea and lower oxygen cost of respiration [3, 4, 39, 40]. Of course, different sports select for different physiological characteristics—an advantage in one discipline may be neutral or even a disadvantage in another—but examination of a variety of record and performance metrics in any discipline reveals there are few sporting disciplines where males do not possess performance advantage over females as a result of the physiological characteristics affected by testosterone.

3 Sports Performance Differences Between Males and Females

3.1 An Overview of Elite Adult Athletes

A comparison of adult elite male and female achievements in sporting activities can quantify the extent of the male performance advantage. We searched publicly available sports federation databases and/or tournament/competition records to identify sporting metrics in various events and disciplines, and calculated the performance of males relative to females. Although not an exhaustive list, examples of performance gaps in a range of sports with various durations, physiological performance determinants, skill components and force requirements are shown in Fig. 1.

The smallest performance gaps were seen in rowing, swimming and running (11–13%), with low variation across individual events within each of those categories. The performance gap increases to an average of 16% in track cycling, with higher variation across events (from 9% in the 4000 m team pursuit to 24% in the flying 500 m time trial). The average performance gap is 18% in jumping events (long jump, high jump and triple jump). Performance differences larger than 20% are generally present when considering sports and activities that involve extensive upper body contributions. The gap between fastest recorded tennis serve

Table 1 Selected physical difference between untrained/moderately trained males and females. Female levels are set as the reference value

Variable	Magnitude of sex difference (%)	References
Body composition		
Lean body mass	45	Lee et al. [28]
Fat%	− 30	
Muscle mass		
Lower body	33	Janssen et al. [29]
Upper body	40	
Muscle strength		
Grip strength	57	Bohannon et al. [30]
Knee extension peak torque	54	Neder et al. [31]
Anthropometry and bone geometry		
Femur length	9.4	Jantz et al. [32]
Humerus length	12.0	Brinckmann et al. [33]
Radius length	14.6	
Pelvic width relative to pelvis height	− 6.1	
Tendon properties		
Force	83	Lepley et al. [34]
Stiffness	41	
VO_{2max}		
Absolute values	50	Pate et al. [35]
Relative values	25	
Respiratory function		
Pulmonary ventilation (maximal)	48	Åstrand et al. [36]
Cardiovascular function		
Left ventricular mass	31	Åstrand et al. [36]
Cardiac output (rest)	22	Best et al. [37]
Cardiac output (maximal)	30	Tong et al. [38]
Stroke volume (rest)	43	
Stroke volume (maximal)	34	
Hemoglobin concentration	11	

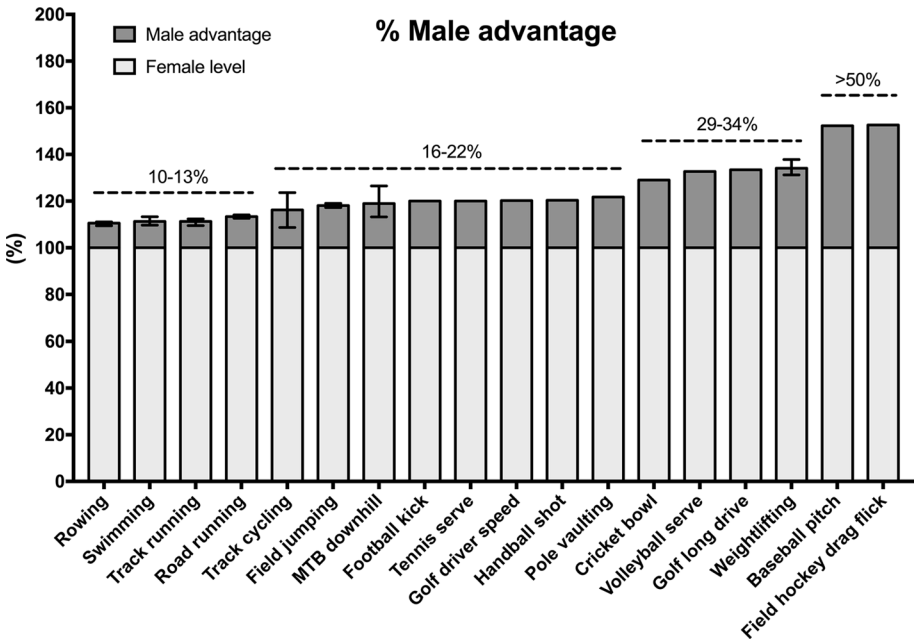

Fig. 1 The male performance advantage over females across various selected sporting disciplines. The female level is set to 100%. In sport events with multiple disciplines, the male value has been averaged across disciplines, and the error bars represent the range of the advantage. The metrics were compiled from publicly available sports federation databases and/or tournament/competition records. *MTB* mountain bike

is 20%, while the gaps between fastest recorded baseball pitches and field hockey drag flicks exceed 50%.

Sports performance relies to some degree on the magnitude, speed and repeatability of force application, and, with respect to the speed of force production (power), vertical jump performance is on average 33% greater in elite men than women, with differences ranging from 27.8% for endurance sports to in excess of 40% for precision and combat sports [41]. Because implement mass differs, direct comparisons are not possible in throwing events in track and field athletics. However, the performance gap is known to be substantial, and throwing represents the widest sex difference in motor performance from an early age [42]. In Olympic javelin throwers, this is manifested in differences in the peak linear velocities of the shoulder, wrist, elbow and hand, all of which are 13–21% higher for male athletes compared with females [43].

The increasing performance gap between males and females as upper body strength becomes more critical for performance is likely explained to a large extent by the observation that males have disproportionately greater strength in their upper compared to lower body, while females show the inverse [44, 45]. This different distribution of strength compounds the general advantage of increased muscle mass in upper body dominant disciplines. Males also have longer arms than females, which allows greater torque production from the arm lever when, for example, throwing a ball, punching or pushing.

3.2 Olympic Weightlifting

In Olympic weightlifting, where weight categories differ between males and females, the performance gap is between 31 and 37% across the range of competitive body weights between 1998 and 2020 (Fig. 1). It is important to note that at all weight categories below the top/open category, performances are produced within weight categories with an upper limit, where strength can be correlated with "fighting weight", and we focused our analysis of performance gaps in these categories.

To explore strength–mass relationships further, we compared Olympic weightlifting data between equivalent weight categories which, to some extent, limit athlete height, to examine the hypothesis that male performance advantage may be largely (or even wholly) mediated by increased height and lever-derived advantages (Table 2). Between 1998 and 2018, a 69 kg category was common to both males and females, with the male record holder (69 kg, 1.68 m) lifting a combined weight 30.1% heavier than the female record holder (69 kg, 1.64 m). Weight category changes in 2019 removed the common 69 kg category and created a common 55 kg category. The current male record holder (55 kg, 1.52 m) lifts 29.5% heavier than the female record holder (55 kg, 1.52 m). These comparisons demonstrate that males are approximately 30% stronger than females of equivalent stature and mass. However, importantly, male vs. female weightlifting performance gaps increase with increasing bodyweight. For example, in the top/open weight category of Olympic weightlifting, in the absence of weight (and associated height) limits, maximum male lifting strength exceeds female lifting strength by nearly 40%. This is further manifested in powerlifting, where the male record (total of squat, bench press and deadlift) is 65% higher than the female record in the open weight category of the World Open Classic Records. Further analysis of Olympic weightlifting data shows that the 55-kg male record holder is 6.5% stronger than the 69-kg female record holder (294 kg vs 276 kg), and that the 69-kg male record is 3.2% higher than the record held in the female open category by a 108-kg female (359 kg vs 348 kg). This Olympic weightlifting analysis reveals key differences between male and female strength capacity. It shows that, even after adjustment for mass, biological males are significantly stronger (30%) than females, and

Table 2 Olympic weightlifting data between equivalent male–female and top/open weight categories

	Sex	Weight (kg)	Height (m)	Combined record (kg)	Strength to weight ratio	Relative performance (%)
2019 record in the 55 kg weight-limited category						
Liao Qiuyun	F	55	1.52	227	4.13	
Om Yun-chol	M	55	1.52	294	5.35	29.5
1998–2018 record in the 69-kg weight-limited category						
Oxsana Slivenko	F	69	1.64	276	4.00	
Liao Hui	M	69	1.68	359	5.20	30.1
Comparative performances for top/open categories (all time heaviest combined lifts)						
Tatiana Kashirina	F	108	1.77	348	3.22	
Lasha Talakhadze	M	168	1.97	484	2.88	39.1

F female, *M* male

that females who are 60% heavier than males do not overcome these strength deficits.

3.3 Perspectives on Elite Athlete Performance Differences

Figure 1 illustrates the performance gap between adult elite males and adult elite females across various sporting disciplines and activities. The translation of these advantages, assessed as the performance difference between the very best males and very best females, are significant when extended and applied to larger populations. In running events, for example, where the male–female gap is approximately 11%, it follows that many thousands of males are faster than the very best females. For example, approximately 10,000 males have personal best times that are faster than the current Olympic 100 m female champion (World Athletics, personal communication, July 2019). This has also been described elsewhere [46, 47], and illustrates the true effect of an 11% typical difference on population comparisons between males and females. This is further apparent upon examination of selected junior male records, which surpass adult elite female performances by the age of 14–15 years (Table 3), demonstrating superior male athletic performance over elite females within a few years of the onset of puberty.

These data overwhelmingly confirm that testosterone-driven puberty, as the driving force of development of male secondary sex characteristics, underpins sporting advantages that are so large no female could reasonably hope to succeed without sex segregation in most sporting competitions. To ensure, in light of these analyses, that female athletes can be included in sporting competitions in a fair and safe manner, most sports have a female category the purpose of which is the protection of both fairness and, in some sports, safety/welfare of athletes who do not benefit from the physiological changes induced by male levels of testosterone from puberty onwards.

Table 3 Selected junior male records in comparison with adult elite female records

Event	Schoolboy male record	Elite female (adult) record
100 m	10.20 (age 15)	10.49
800 m	1:51.23 (age 14)	1:53.28
1500 m	3:48.37 (age 14)	3:50.07
Long jump	7.85 m (age 15)	7.52 m
Discus throw	77.68 m (age 15)	76.80 m

M meters

Time format: minutes:seconds.hundredths of a second

3.4 Performance Differences in Non-elite Individuals

The male performance advantages described above in athletic cohorts are similar in magnitude in untrained people. Even when expressed relative to fat-free weight, VO_{2max} is 12–15% higher in males than in females [48]. Records of lower-limb muscle strength reveal a consistent 50% difference in peak torque between males and females across the lifespan [31]. Hubal et al. [49] tested 342 women and 243 men for isometric (maximal voluntary contraction) and dynamic strength (one-repetition maximum; 1RM) of the elbow flexor muscles and performed magnetic resonance imaging (MRI) of the biceps brachii to determine cross-sectional area. The males had 57% greater muscle size, 109% greater isometric strength, and 89% greater 1RM strength than age-matched females. This reinforces the finding in athletic cohorts that sex differences in muscle size and strength are more pronounced in the upper body.

Recently, sexual dimorphism in arm force and power was investigated in a punch motion in moderately-trained individuals [50]. The power produced during a punch was 162% greater in males than in females, and the least powerful man produced more power than the most powerful woman. This highlights that sex differences in parameters such as mass, strength and speed may combine to produce even larger sex differences in sport-specific actions, which often are a product of how various physical capacities combine. For example, power production is the product of force and velocity, and momentum is defined as mass multiplied by velocity. The momentum and kinetic energy that can be transferred to another object, such as during a tackle or punch in collision and combat sports are, therefore, dictated by: the mass; force to accelerate that mass, and; resultant velocity attained by that mass. As there is a male advantage for each of these factors, the net result is likely synergistic in a sport-specific action, such as a tackle or a throw, that widely surpasses the sum of individual magnitudes of advantage in isolated fitness variables. Indeed, already at 17 years of age, the average male throws a ball further than 99% of 17-year-old females [51], despite no single variable (arm length, muscle mass etc.) reaching this numerical advantage. Similarly, punch power is 162% greater in men than women even though no single parameter that produces punching actions achieves this magnitude of difference [50].

4 Is the Male Performance Advantage Lost when Testosterone is Suppressed in Transgender Women?

The current IOC criteria for inclusion of transgender women in female sports categories require testosterone suppression below 10 nmol/L for 12 months prior to and during competition. Given the IOC's stated position that the "overriding sporting objective is and remains the guarantee of fair competition" [14], it is reasonable to assume that the rationale for this requirement is that it reduces the male performance advantages described previously to an acceptable degree, thus permitting fair and safe competition. To determine whether this medical intervention is sufficient to remove (or reduce) the male performance advantage, which we described above, we performed a systematic search of the scientific literature addressing anthropometric and muscle characteristics of transgender women. Search terms and filtering of peer-reviewed data are given in Supplementary Table S1.

4.1 Anthropometrics

Given its importance for the general health of the transgender population, there are multiple studies of bone health, and reviews of these data. To summarise, transgender women often have low baseline (pre-intervention) bone mineral density (BMD), attributed to low levels of physical activity, especially weight-bearing exercise, and low vitamin D levels [52, 53]. However, transgender women generally maintain bone mass over the course of at least 24 months of testosterone suppression. There may even be small but significant increases in BMD at the lumbar spine [54, 55]. Some retrieved studies present data pertaining to maintained BMD in transgender women after many years of testosterone suppression. One such study concluded that "BMD is preserved over a median of 12.5 years" [56]. In support, no increase in fracture rates was observed over 12 months of testosterone suppression [54]. Current advice, including that from the International Society for Clinical Densitometry, is that transgender women, in the absence of other risk factors, do not require monitoring of BMD [52, 57]. This is explicable under current standard treatment regimes, given the established positive effect of estrogen, rather than testosterone, on bone turnover in males [58].

Given the maintenance of BMD and the lack of a plausible biological mechanism by which testosterone suppression might affect skeletal measurements such as bone length and hip width, we conclude that height and skeletal parameters remain unaltered in transgender women, and that sporting advantage conferred by skeletal size and bone density would be retained despite testosterone reductions compliant with the IOC's current guidelines. This is of particular relevance to sports where height, limb length and handspan are key (e.g. basketball, volleyball, handball) and where high movement efficiency is advantageous. Male bone geometry and density may also provide protection against some sport-related injuries—for example, males have a lower incidence of knee injuries, often attributed to low quadriceps (Q) angle conferred by a narrow pelvic girdle [59, 60].

4.2 Muscle and Strength Metrics

As discussed earlier, muscle mass and strength are key parameters underpinning male performance advantages. Strength differences range between 30 and 100%, depending upon the cohort studied and the task used to assess strength. Thus, given the important contribution made by strength to performance, we sought studies that have assessed strength and muscle/lean body mass changes in transgender women after testosterone reduction. Studies retrieved in our literature search covered both longitudinal and cross-sectional analyses. Given the superior power of the former study type, we will focus on these.

The pioneer work by Gooren and colleagues, published in part in 1999 [61] and in full in 2004 [62], reported the effects of 1 and 3 years of testosterone suppression and estrogen supplementation in 19 transgender women (age 18–37 years). After the first year of therapy, testosterone levels were reduced to 1 nmol/L, well within typical female reference ranges, and remained low throughout the study course. As determined by MRI, thigh muscle area had decreased by − 9% from baseline measurement. After 3 years, thigh muscle area had decreased by a further − 3% from baseline measurement (total loss of − 12% over 3 years of treatment). However, when compared with the baseline measurement of thigh muscle area in transgender men (who are born female and experience female puberty), transgender women retained significantly higher thigh muscle size. The final thigh muscle area, after three years of testosterone suppression, was 13% larger in transwomen than in the transmen at baseline ($p < 0.05$). The authors concluded that testosterone suppression in transgender women does not reverse muscle size to female levels.

Including Gooren and Bunck [62], 12 longitudinal studies [53, 63–73] have examined the effects of testosterone suppression on lean body mass or muscle size in transgender women. The collective evidence from these studies suggests that 12 months, which is the most commonly examined intervention period, of testosterone suppression to female-typical reference levels results in a modest (approximately − 5%) loss of lean body mass or muscle size (Table 4). No

Table 4 Longitudinal studies of muscle and strength changes in adult transgender women undergoing cross-sex hormone therapy

Study	Participants (age)	Therapy	Confirmed serum testosterone levels	Muscle/strength data	Comparison with reference females
Polderman et al. [73]	*N* = 12 TW 18–36 yr (age range)	T suppression + E supplementation	< 2 nmol/L at 4 mo	*LBM* 4 mo − 2.2%	*LBM* 4 mo 16%
Gooren and Bunck [62]	*N* = 19 TW 26 ± 6 yr	T suppression + E supplementation	≤ 1 nmol/L at 1 and 3 yr	*Thigh area* 1 yr − 9% / 3 yr -12%	*Thigh area* 1 yr 16%/3 yr 13%
Haraldsen et al. [63]	*N* = 12 TW 29 ± 8 yr	E supplementation	< 10 nmol/L at 3 mo and 1 yr	*LBM* 3 mo/1 yr—small changes, unclear magnitude	
Mueller et al. [64]	*N* = 84 TW 36 ± 11 yr	T suppression + E supplementation	≤ 1 nmol/L at 1 and 2 yr	*LBM* 1 yr − 4%/2 yr − 7%	
Wierckx et al. [65]	*N* = 53 TW 31 ± 14 yr	T suppression + E supplementation	< 10 nmol/L at 1 yr	*LBM* 1 yr − 5%	*LBM* 1 yr 39%
Van Caenegem et al. [53] (and Van Caenegem et al. [76])	*N* = 49 TW 33 ± 14 yr	T suppression + E supplementation	≤ 1 nmol/L at 1 and 2 yr	*LBM* 1 yr − 4%/2 yr − 0.5% *Grip strength* 1 yr − 7%/2 yr − 9% *Calf area* 1 yr − 2%/2 yr − 4% *Forearm area* 1 yr − 8%/2 yr − 4%	*LBM* 1 yr 24%/2 yr 28% *Grip strength* 1 yr 26%/2 yr 23% *Calf area* 1 yr 16%/2 yr 13% *Forearm area* 1 yr 29%/2 yr 34%
Gava et al. [66]	*N* = 40 TW 31 ± 10 yr	T suppression + E supplementation	< 5 nmol/L at 6 mo and ≤ 1 nmol/L at 1 yr	*LBM* 1 yr − 2%	
Auer et al. [67]	*N* = 45 TW 35 ± 1 (SE) yr	T suppression + E supplementation	< 5 nmol/L at 1 yr	*LBM* 1 yr − 3%	*LBM* 1 yr 27%
Klaver et al. [68]	*N* = 179 TW 29 (range 18–66)	T suppression + E supplementation	≤ 1 nmol/L at 1 yr	*LBM 1 yr* Total − 3% Arm region − 6% Trunk region − 2% Android region 0% Gynoid region − 3% Leg region − 4%	*LBM 1 yr* Total 18% Arm region 28% Leg region 19%
Fighera et al. [69]	*N* = 46 TW 34 ± 10	E supplementation with or without T suppression	< 5 nmol/L at 3 mo ≤ 1 nmol/L at 31 mo	*ALM* 31 mo − 4% from the 3 mo visit	
Scharff et al. [70]	*N* = 249 TW 28 (inter quartile range 23–40)	T suppression + E supplementation	≤ 1 nmol/L at 1 yr	*Grip strength* 1 yr − 4%	*Grip strength* 1 yr 21%
Wiik et al. [71]	*N* = 11 TW 27 ± 4	T suppression + E supplementation	≤ 1 nmol/L at 4 mo and at 1 yr	*Thigh volume* 1 yr − 5% *Quad area* 1 yr − 4% *Knee extension strength* 1 yr 2% *Knee flexion strength* 1 yr 3%	*Thigh volume* 1 yr 33% *Quad area* 26% *Knee extension strength* 41% *Knee flexion strength* 33%

Studies reporting measures of lean mass, muscle volume, muscle area or strength are included. Muscle/strength data are calculated in reference to baseline cohort data and, where reported, reference female (or transgender men before treatment) cohort data. Tack et al. [72] was not included in the table since some of the participants had not completed full puberty at treatment initiation. van Caenegem et al. [76] reports reference female values measured in a separately-published, parallel cohort of transgender men

N number of participants, *TW* transgender women, *Yr* year, *Mo* month, *T* testosterone, *E* estrogen. ± Standard deviation (unless otherwise indicated in text), *LBM* lean body mass, *ALM* appendicular lean mass

study has reported muscle loss exceeding the −12% found by Gooren and Bunck after 3 years of therapy. Notably, studies have found very consistent changes in lean body mass (using dual-energy X-ray absorptiometry) after 12 months of treatment, where the change has always been between −3 and −5% on average, with slightly greater reductions in the arm compared with the leg region [68]. Thus, given the large baseline differences in muscle mass between males and females (Table 1; approximately 40%), the reduction achieved by 12 months of testosterone suppression can reasonably be assessed as small relative to the initial superior mass. We, therefore, conclude that the muscle mass advantage males possess over females, and the performance implications thereof, are not removed by the currently studied durations (4 months, 1, 2 and 3 years) of testosterone suppression in transgender women. In sports where muscle mass is important for performance, inclusion is therefore only possible if a large imbalance in fairness, and potentially safety in some sports, is to be tolerated.

To provide more detailed information on not only gross body composition but also thigh muscle volume and contractile density, Wiik et al. [71] recently carried out a comprehensive battery of MRI and computed tomography (CT) examinations before and after 12 months of successful testosterone suppression and estrogen supplementation in 11 transgender women. Thigh volume (both anterior and posterior thigh) and quadriceps cross-sectional area decreased −4 and −5%, respectively, after the 12-month period, supporting previous results of modest effects of testosterone suppression on muscle mass (see Table 4). The more novel measure of radiological attenuation of the quadriceps muscle, a valid proxy of contractile density [74, 75], showed no significant change in transgender women after 12 months of treatment, whereas the parallel group of transgender men demonstrated a +6% increase in contractile density with testosterone supplementation.

As indicated earlier (e.g. Table 1), the difference in muscle strength between males and females is often more pronounced than the difference in muscle mass. Unfortunately, few studies have examined the effects of testosterone suppression on muscle strength or other proxies of performance in transgender individuals. The first such study was published online approximately 1 year prior to the release of the current IOC policy. In this study, as well as reporting changes in muscle size, van Caenegem et al. [53] reported that hand-grip strength was reduced from baseline measurements by −7% and −9% after 12 and 24 months, respectively, of cross-hormone treatment in transgender women. Comparison with data in a separately-published, parallel cohort of transgender men [76] demonstrated a retained hand-grip strength advantage after 2 years of 23% over female baseline measurements (a calculated average of baseline data obtained from control females and transgender men).

In a recent multicenter study [70], examination of 249 transgender women revealed a decrease of −4% in grip strength after 12 months of cross-hormone treatment, with no variation between different testosterone level, age or BMI tertiles (all transgender women studied were within female reference ranges for testosterone). Despite this modest reduction in strength, transgender women retained a 17% grip strength advantage over transgender men measured at baseline. The authors noted that handgrip strength in transgender women was in approximately the 25th percentile for males but was over the 90th percentile for females, both before and after hormone treatment. This emphasizes that the strength advantage for males over females is inherently large. In another study exploring handgrip strength, albeit in late puberty adolescents, Tack et al. noted no change in grip strength after hormonal treatment (average duration 11 months) of 21 transgender girls [72].

Although grip strength provides an excellent proxy measurement for general strength in a broad population, specific assessment within different muscle groups is more valuable in a sports-specific framework. Wiik et al., [71] having determined that thigh muscle mass reduces only modestly, and that no significant changes in contractile density occur with 12 months of testosterone suppression, provided, for the first time, data for isokinetic strength measurements of both knee extension and knee flexion. They reported that muscle strength after 12 months of testosterone suppression was comparable to baseline strength. As a result, transgender women remained about 50% stronger than both the group of transgender men at baseline and a reference group of females. The authors suggested that small neural learning effects during repeated testing may explain the apparent lack of small reductions in strength that had been measured in other studies [71].

These longitudinal data comprise a clear pattern of very modest to negligible changes in muscle mass and strength in transgender women suppressing testosterone for at least 12 months. Muscle mass and strength are key physical parameters that constitute a significant, if not majority, portion of the male performance advantage, most notably in those sports where upper body strength, overall strength, and muscle mass are crucial determinants of performance. Thus, our analysis strongly suggests that the reduction in testosterone levels required by many sports federation transgender policies is insufficient to remove or reduce the male advantage, in terms of muscle mass and strength, by any meaningful degree. The relatively consistent finding of a minor (approximately −5%) muscle loss after the first year of treatment is also in line with studies on androgen-deprivation therapy in males with prostate cancer, where the annual loss

of lean body mass has been reported to range between −2 and −4% [77].

Although less powerful than longitudinal studies, we identified one major cross-sectional study that measured muscle mass and strength in transgender women. In this study, 23 transgender women and 46 healthy age- and height-matched control males were compared [78]. The transgender women were recruited at least 3 years after sex reassignment surgery, and the mean duration of cross-hormone treatment was 8 years. The results showed that transgender women had 17% less lean mass and 25% lower peak quadriceps muscle strength than the control males [78]. This cross-sectional comparison suggests that prolonged testosterone suppression, well beyond the time period mandated by sports federations substantially reduces muscle mass and strength in transgender women. However, the typical gap in lean mass and strength between males and females at baseline (Table 1) exceeds the reductions reported in this study [78]. The final average lean body mass of the transgender women was 51.2 kg, which puts them in the 90th percentile for women [79]. Similarly, the final grip strength was 41 kg, 25% higher than the female reference value [80]. Collectively, this implies a retained physical advantage even after 8 years of testosterone suppression. Furthermore, given that cohorts of transgender women often have slightly lower baseline measurements of muscle and strength than control males [53], and baseline measurements were unavailable for the transgender women of this cohort, the above calculations using control males reference values may be an overestimate of actual loss of muscle mass and strength, emphasizing both the need for caution when analyzing cross-sectional data in the absence of baseline assessment and the superior power of longitudinal studies quantifying within-subject changes.

4.3 Endurance Performance and Cardiovascular Parameters

No controlled longitudinal study has explored the effects of testosterone suppression on endurance-based performance. Sex differences in endurance performance are generally smaller than for events relying more on muscle mass and explosive strength. Using an age grading model designed to normalize times for masters/veteran categories, Harper [81] analyzed self-selected and self-reported race times for eight transgender women runners of various age categories who had, over an average 7 year period (range 1–29 years), competed in sub-elite middle and long distance races within both the male and female categories. The age-graded scores for these eight runners were the same in both categories, suggesting that cross-hormone treatment reduced running performance by approximately the size of the typical male advantage. However, factors affecting performances in the interim, including training and injury, were uncontrolled for periods of years to decades and there were uncertainties regarding which race times were self-reported vs. which race times were actually reported and verified, and factors such as standardization of race course and weather conditions were unaccounted for. Furthermore, one runner improved substantially post-transition, which was attributed to improved training [81]. This demonstrates that performance decrease after transition is not inevitable if training practices are improved. Unfortunately, no study to date has followed up these preliminary self-reports in a more controlled setting, so it is impossible to make any firm conclusions from this data set alone.

Circulating hemoglobin levels are androgen-dependent [82] and typically reported as 12% higher in males compared with females [4]. Hemoglobin levels appear to decrease by 11–14% with cross-hormone therapy in transgender women [62, 71], and indeed comparably sized reductions have been reported in athletes with DSDs where those athletes are sensitive to and been required to reduce testosterone [47, 83]. Oxygen-carrying capacity in transgender women is most likely reduced with testosterone suppression, with a concomitant performance penalty estimated at 2–5% for the female athletic population [83]. Furthermore, there is a robust relationship between hemoglobin mass and VO_{2max} [84, 85] and reduction in hemoglobin is generally associated with reduced aerobic capacity [86, 87]. However, hemoglobin mass is not the only parameter contributing to VO_{2max}, where central factors such as total blood volume, heart size and contractility, and peripheral factors such as capillary supply and mitochondrial content also plays a role in the final oxygen uptake [88]. Thus, while a reduction in hemoglobin is strongly predicted to impact aerobic capacity and reduce endurance performance in transgender women, it is unlikely to completely close the baseline gap in aerobic capacity between males and females.

The typical increase in body fat noted in transgender women [89, 90] may also be a disadvantage for sporting activities (e.g. running) where body weight (or fat distribution) presents a marginal disadvantage. Whether this body composition change negatively affects performance results in transgender women endurance athletes remains unknown. It is unclear to what extent the expected increase in body fat could be offset by nutritional and exercise countermeasures, as individual variation is likely to be present. For example, in the Wiik et al. study [71], 3 out of the 11 transgender women were completely resistant to the marked increase in total adipose tissue noted at the group level. This inter-individual response to treatment represents yet another challenge for sports governing bodies who most likely, given the many obstacles with case-by-case assessments, will form policies based on average effect sizes.

Altogether, the effects of testosterone suppression on performance markers for endurance athletes remain

insufficiently explored. While the negative effect on hemoglobin concentration is well documented, the effects on VO_{2max}, left ventricular size, stroke volume, blood volume, cardiac output lactate threshold, and exercise economy, all of which are important determinants of endurance performance, remain unknown. However, given the plausible disadvantages with testosterone suppression mentioned in this section, together with the more marginal male advantage in endurance-based sports, the balance between inclusion and fairness is likely closer to equilibrium in weight-bearing endurance-based sports compared with strength-based sports where the male advantage is still substantial.

5 Discussion

The data presented here demonstrate that superior anthropometric, muscle mass and strength parameters achieved by males at puberty, and underpinning a considerable portion of the male performance advantage over females, are not removed by the current regimen of testosterone suppression permitting participation of transgender women in female sports categories. Rather, it appears that the male performance advantage remains substantial. Currently, there is no consensus on an acceptable degree of residual advantage held by transgender women that would be tolerable in the female category of sport. There is significant dispute over this issue, especially since the physiological determinants of performance vary across different sporting disciplines. However, given the IOC position that fair competition is the overriding sporting objective [14], any residual advantage carried by transgender women raises obvious concerns about fair and safe competition in the numerous sports where muscle mass, strength and power are key performance determinants.

5.1 Perspectives on Athletic Status of Transgender Women

Whilst available evidence is strong and convincing that strength, skeletal- and muscle-mass derived advantages will largely remain after cross-hormone therapy in transgender women, it is acknowledged that the findings presented here are from healthy adults with regular or even low physical activity levels [91], and not highly trained athletes. Thus, further research is required in athletic transgender populations.

However, despite the current absence of empirical evidence in athletic transgender women, it is possible to evaluate potential outcomes in athletic transgender women compared with untrained cohorts. The first possibility is that athletic transgender women will experience similar reductions (approximately −5%) in muscle mass and strength as untrained transgender women, and will thus retain significant advantages over a comparison group of females. As a result of higher baseline characteristics in these variables, the retained advantage may indeed be even larger. A second possibility is that by virtue of greater muscle mass and strength at baseline, pre-trained transgender women will experience larger relative decreases in muscle mass and strength if they converge with untrained transgender women, particularly if training is halted during transition. Finally, training before and during the period of testosterone suppression may attenuate the anticipated reductions, such that relative decreases in muscle mass and strength will be smaller or non-existent in transgender women who undergo training, compared to untrained (and non-training) controls.

It is well established that resistance training counteracts substantial muscle loss during atrophy conditions that are far more severe than testosterone suppression. For example, resistance exercise every third day during 90-days bed rest was sufficient to completely offset the 20% reduction in knee extensor muscle size noted in the resting control subjects [92]. More relevant to the question of transgender women, however, is to examine training effects in studies where testosterone has been suppressed in biological males. Kvorning et al. investigated, in a randomized placebo-controlled trial, how suppression of endogenous testosterone for 12 weeks influenced muscle hypertrophy and strength gains during a training program (3 days/week) that took place during the last 8 weeks of the 3-month suppression period [93]. Despite testosterone suppression to female levels of 2 nmol/L, there was a significant + 4% increase in leg lean mass and a + 2% increase in total lean body mass, and a measurable though insignificant increase in isometric knee extension strength. Moreover, in select exercises used during the training program, 10RM leg press and bench press increased + 32% and + 17%, respectively. While some of the training adaptations were lower than in the placebo group, this study demonstrates that training during a period of testosterone suppression not only counteracts muscle loss, but can actually increase muscle mass and strength.

Males with prostate cancer undergoing androgen deprivation therapy provide a second avenue to examine training effects during testosterone suppression. Testosterone levels are typically reduced to castrate levels, and the loss of lean mass has typically ranged between −2 and −4% per year [77], consistent with the findings described previously in transgender women. A recent meta-analysis concluded that exercise interventions including resistance exercise were generally effective for maintaining muscle mass and increasing muscle strength in prostate cancer patients undergoing androgen deprivation therapy [94]. It is important to emphasize that the efficacy of the different training programs may vary. For example, a 12-week training study of prostate cancer patients undergoing androgen deprivation therapy

included drop-sets to combine heavy loads and high volume while eliciting near-maximal efforts in each set [95]. This strategy resulted in significantly increased lean body mass (+3%), thigh muscle volume (+6%), knee extensor 1RM strength (+28%) and leg press muscle endurance (+110%).

In addition to the described effects of training during testosterone suppression, the effect of training prior to testosterone suppression may also contribute to the attenuation of any muscle mass and strength losses, via a molecular mechanism referred to as 'muscle memory' [96]. Specifically, it has been suggested that myonuclei acquired by skeletal muscle cells during training are maintained during subsequent atrophy conditions [97]. Even though this model of muscle memory has been challenged recently [98], it may facilitate an improved training response upon retraining [99]. Mechanistically, the negative effects of testosterone suppression on muscle mass are likely related to reduced levels of resting protein synthesis [100], which, together with protein breakdown, determines the net protein balance of skeletal muscle. However, testosterone may not be required to elicit a robust muscle protein synthesis response to resistance exercise [100]. Indeed, relative increases in muscle mass in men and women from resistance training are comparable, despite marked differences in testosterone levels [101], and the acute rise in testosterone apparent during resistance exercise does not predict muscle hypertrophy nor strength gains [102]. This suggests that even though testosterone is important for muscle mass, especially during puberty, the maintenance of muscle mass through resistance training is not crucially dependent on circulating testosterone levels.

Thus, in well-controlled studies in biological males who train while undergoing testosterone reduction, training is protective of, and may even enhance, muscle mass and strength attributes. Considering transgender women athletes who train during testosterone suppression, it is plausible to conclude that any losses will be similar to or even smaller in magnitude than documented in the longitudinal studies described in this review. Furthermore, pre-trained transgender women are likely to have greater muscle mass at baseline than untrained transgender women; it is possible that even with the same, rather than smaller, relative decreases in muscle mass and strength, the magnitude of retained advantage will be greater. In contrast, if pre-trained transgender women undergo testosterone suppression while refraining from intense training, it appears likely that muscle mass and strength will be lost at either the same or greater rate than untrained individuals, although there is no rationale to expect a weaker endpoint state. The degree of change in athletic transgender women is influenced by the athlete's baseline resistance-training status, the efficacy of the implemented program and other factors such as genetic make-up and nutritional habits, but we argue that it is implausible that athletic transgender women would achieve final muscle mass and strength metrics that are on par with reference females at comparable athletic level.

5.2 The Focus on Muscle Mass and Strength

We acknowledge that changes in muscle mass are not always correlated in magnitude to changes in strength measurements because muscle mass (or total mass) is not the only contributor to strength [103]. Indeed, the importance of the nervous system, e.g. muscle agonist activation (recruitment and firing frequency) and antagonist co-activation, for muscle strength must be acknowledged [104]. In addition, factors such as fiber types, biomechanical levers, pennation angle, fascicle length and tendon/extracellular matrix composition may all influence the ability to develop muscular force [105]. While there is currently limited to no information on how these factors are influenced by testosterone suppression, the impact seems to be minute, given the modest changes noted in muscle strength during cross-hormone treatment.

It is possible that estrogen replacement may affect the sensitivity of muscle to anabolic signaling and have a protective effect on muscle mass [106] explaining, in part, the modest change in muscle mass with testosterone suppression and accompanying cross-hormone treatment. Indeed, this is supported by research conducted on estrogen replacement therapy in other targeted populations [107, 108] and in several different animal models, including mice after gonadectomy [109] and ovariectomy [110].

In terms of other performance proxies relevant to sports performance, there is no research evaluating the effects of transgender hormone treatment on factors such as agility, jumping or sprint performance, competition strength performance (e.g. bench press), or discipline-specific performance. Other factors that may impact sports performance, known to be affected by testosterone and some of them measurably different between males and females, include visuospatial abilities, aggressiveness, coordination and flexibility.

5.3 Testosterone-Based Criteria for Inclusion of Transgender Women in Female Sports

The appropriate testosterone limit for participation of transgender women in the female category has been a matter of debate recently, where sports federations such as World Athletics recently lowered the eligibility criterion of free circulating testosterone (measured by means of liquid chromatography coupled with mass spectrometry) to < 5 nmol/L. This was based, at least in part, on a thorough review by Handelsman et al. [4], where the authors concluded that, given the nonoverlapping distribution of circulating testosterone between males and females, and making an allowance

for females with mild hyperandrogenism (e.g. with polycystic ovary syndrome), the appropriate testosterone limit should be 5 rather than 10 nmol/L.

From the longitudinal muscle mass/strength studies summarised here, however, it is apparent that most therapeutic interventions result in almost complete suppression of testosterone levels, certainly well below 5 nmol/L (Table 4). Thus, with regard to transgender women athletes, we question whether current circulating testosterone level cut-off can be a meaningful decisive factor, when in fact not even suppression down to around 1 nmol/L removes the anthropometric and muscle mass/strength advantage in any significant way.

In terms of duration of testosterone suppression, it may be argued that although 12 months of treatment is not sufficient to remove the male advantage, perhaps extending the time frame of suppression would generate greater parity with female metrics. However, based on the studies reviewed here, evidence is lacking that this would diminish the male advantage to a tolerable degree. On the contrary, it appears that the net loss of lean mass and grip strength is not substantially decreased at year 2 or 3 of cross-hormone treatment (Table 4), nor evident in cohorts after an average 8 years after transition. This indicates that a plateau or a new steady state is reached within the first or second year of treatment, a phenomenon also noted in transgender men, where the increase in muscle mass seems to stabilise between the first and the second year of testosterone treatment [111].

6 Conclusions

We have shown that under testosterone suppression regimes typically used in clinical settings, and which comfortably exceed the requirements of sports federations for inclusion of transgender women in female sports categories by reducing testosterone levels to well below the upper tolerated limit, evidence for loss of the male performance advantage, established by testosterone at puberty and translating in elite athletes to a 10–50% performance advantage, is lacking. Rather, the data show that strength, lean body mass, muscle size and bone density are only trivially affected. The reductions observed in muscle mass, size, and strength are very small compared to the baseline differences between males and females in these variables, and thus, there are major performance and safety implications in sports where these attributes are competitively significant. These data significantly undermine the delivery of fairness and safety presumed by the criteria set out in transgender inclusion policies, particularly given the stated prioritization of fairness as an overriding objective (for the IOC). If those policies are intended to preserve fairness, inclusion and the safety of biologically female athletes, sporting organizations may need to reassess their policies regarding inclusion of transgender women.

From a medical-ethical point of view, it may be questioned as to whether a requirement to lower testosterone below a certain level to ensure sporting participation can be justified at all. If the advantage persists to a large degree, as evidence suggests, then a stated objective of targeting a certain testosterone level to be eligible will not achieve its objective and may drive medical practice that an individual may not want or require, without achieving its intended benefit.

The research conducted so far has studied untrained transgender women. Thus, while this research is important to understand the isolated effects of testosterone suppression, it is still uncertain how transgender women athletes, perhaps undergoing advanced training regimens to counteract the muscle loss during the therapy, would respond. It is also important to recognize that performance in most sports may be influenced by factors outside muscle mass and strength, and the balance between inclusion, safety and fairness therefore differs between sports. While there is certainly a need for more focused research on this topic, including more comprehensive performance tests in transgender women athletes and studies on training capacity of transgender women undergoing hormone therapy, it is still important to recognize that the biological factors underpinning athletic performance are unequivocally established. It is, therefore, possible to make strong inferences and discuss potential performance implications despite the lack of direct sport-specific studies in athletes. Finally, since athlete safety could arguably be described as the immediate priority above considerations of fairness and inclusion, proper risk assessment should be conducted within respective sports that continue to include transgender women in the female category.

If transgender women are restricted within or excluded from the female category of sport, the important question is whether or not this exclusion (or conditional exclusion) is necessary and proportionate to the goal of ensuring fair, safe and meaningful competition. Regardless of what the future will bring in terms of revised transgender policies, it is clear that different sports differ vastly in terms of physiological determinants of success, which may create safety considerations and may alter the importance of retained performance advantages. Thus, we argue against universal guidelines for transgender athletes in sport and instead propose that each individual sports federation evaluate their own conditions for inclusivity, fairness and safety.

Compliance with Ethical Standards

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