A23-0373
A23-0621

STATE OF MINNESOTA
IN THE SUPREME COURT

JAYCEE COOPER,

Appellant,

vs.

USA POWERLIFTING AND USA POWERLIFTING MINNESOTA,

Respondents.

BRIEF OF MADISON KENYON, CHELSEA MITCHELL AND BETH STELZER AS *AMICI CURIAE* IN SUPPORT OF RESPONDENTS

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INTEREST OF *AMICI CURIAE*

Amici are female athletes whose own athletic opportunities and experiences have been directly impacted by male athletes competing in the female category. This precedent-setting litigation may influence their athletic opportunities, their advocacy work, and related lawsuits in which some are parties. Science shows the clear physiological and athletic performance advantages that males have over women and girls. This advantage is particularly marked in strength sports including powerlifting. *Amici* seek to preserve sex-defined female competitive divisions in athletics, as the only means to provide equal opportunities for women and girls to experience fair competition, safety, and success in athletics.

Madison Kenyon

Madison Kenyon ran on the track and cross-country teams at Idaho State University. In a regional competition, she was defeated by a biologically male athlete, June Eastwood, in the Big Sky Indoor Championships and saw her teammate lose a spot on the podium to Eastwood. Eastwood had competed for three years on the Montana State University men's cross-country team before switching to compete in the women's division. During Madison's collegiate running career, she lost to a male competing in the female division five separate times. These unfair and discouraging experiences prompted Kenyon to join in the defense of Idaho's Fairness in

Women's Sports Act as an intervenor defendant in *Hecox v. Little*, 104 F.4th 1061 (9th Cir. 2024).

Chelsea Mitchell

As a high school runner, Chelsea Mitchell was one of the fastest girls in Connecticut. During her high school years, two male runners began competing in girls' races, one of them switching almost instantaneously—between indoor and outdoor track season. As a result, Chelsea lost four girls' division state championship titles to male competitors during her junior year alone. She likewise lost two All-New England awards, coming in behind the two male runners. During their high school years, these two males took 15 state "girls'" titles and displaced 85 girls from advancing to elite state or regional-level meets. Fred Lucas, *'Frustrating and Disheartening': 3 Girls, Losing to Biological Males in Track, Announce Lawsuit*, Daily Signal (Feb. 20, 2020), dailysign.al/3B4zgtj (Lucas (2020)). As a plaintiff in *Soule et al. v. Connecticut Ass'n of Schools*, Chelsea has challenged the state policy that allows males to compete on the girls' team as denying girls equal opportunities for fair competition and success in athletics, in violation of Title IX. 90 F.4th 34 (2d Cir. 2023). That case is pending before a federal district court in Connecticut.

Beth Stelzer

Beth Stelzer is a former amateur powerlifter. In competitive powerlifting, Beth found healing from the PTSD she suffered as a result of domestic abuse and stalking. As a result, Beth founded Save Women's Sports, an organization devoted to preserving the right and opportunity for the next

generation of girls and women to experience the empowerment, success, and restoration she herself found in women's competitive sports, and especially through powerlifting.

SUMMARY OF ARGUMENT

Careful science has now firmly established what human experience has always known: that in the human species, males are capable of reaching (in the words of the Olympic motto) *citius*, *altius*, *fortius*—that is faster, higher, and stronger. Reflecting this reality, protected categories for women's competition have been the norm since efforts to promote equal opportunities for females in athletics began. Doriane Lambelet Coleman et al, *Re-affirming the value of the sports exception to Title IX's general non-discrimination rule*, 27 Duke J. Gender L. & Pol. 69, 77–78 (2020), https://perma.cc/MZ6P-RJQ2 (Coleman, *Re-affirming the value of the sports exception* (2020)).

In service of its commitment to "the honor and integrity of competitive powerlifting" and to "provide a fair platform for competition," USA Powerlifting ("USAP") follows this longtime practice by permitting only natal females to compete in its women's division. *Code of Conduct*, USA Powerlifting, https://www.usapowerlifting.com/code-of-conduct/ (last visited Sept. 27, 2024). Cooper, a natal male, desired to compete in the women's division in Minnesota, and brought claims contending that that policy violated the Minnesota Human Rights Act ("MHRA"). The District Court granted summary judgment to Cooper on the grounds that USAP's policy discriminates based on "sex" and "sexual orientation" in violation of the MHRA because "USAPL's decision begins and ends with but one factor—

Cooper's protected status as a transgender woman." *Cooper v. USA Powerlifting & Powerlifting Minn.*, No. 62-CV-21-211, 2023 WL 11797169, at *12 (Minn. Dist. Ct. Feb. 27, 2023). USAP contends that, on the contrary, its refusal to allow Cooper to compete in the female division had nothing to do with gender *identity*, but instead turned solely on biology—that is, on the fact that Cooper "would have an unfair competitive advantage, having gone through puberty as a male." *Id*. at *13.

The Court of Appeals reversed the grant of summary judgment on Appellant's claims of unlawful discrimination in "public accommodation" (Count I) and in "business" (Count II). *Cooper v. USA Powerlifting*, 5 N.W.3d 689, 708 (Minn. Ct. App. 2024). That court held there is a question of fact regarding USAP's contention that it denied Cooper participation in the women's division "because [Cooper] experienced puberty as a male" giving Cooper "a competitive advantage over cisgender women"—a reason that the court held "is related to, but not the same as, Cooper's protected transgender status." *Id*. at 702. The court further held that this reason—if established—would be "a non-discriminatory reason." *Id*. at 706.

The Court of Appeals similarly held that that same factual question—whether USAP's action was motivated by the non-discriminatory purpose of protecting female athletes from a competitor with "an unfair competitive advantage" over natal women due to "male physiology"—would control the question (relevant to the "business discrimination" claim) of whether USAP had a "legitimate business purpose" for its policy. *Id.* at 706.

Amici cannot speak to Respondent's motives. But *Amici* and female athletes in schools, colleges, and amateur and professional leagues in Minnesota and across the country have a critical interest in the preservation of a protected category in which those born female can experience fierce, fair, and safe competition, and can experience success, victory, and recognition, free from the daunting—often insurmountable—competitive advantages provided by male physiology. Thus, *Amici* desire for the Court to be fully informed about: (1) the now extensive science documenting the fact and scale of those male advantages; (2) the extent to which biologically male competitors are now depriving girls and women of equal opportunities in sport; and (3) the extent to which international sporting bodies are increasingly recognizing these inflexible facts of the human species, and adopting policies that—like the USAP policy—protect girls and women from such unfair and unsafe competition.

Indeed, a ruling that interprets the MHRA to prohibit a protected class of athletic competition for females in Minnesota would be an ironic twist so soon after the much celebrated 50th anniversary of the passage of Title IX in 1972, which first demanded fully equal athletic opportunities and experiences for girls and women as part of equal educational opportunities. It is widely accepted that Title IX's insistence on these equal opportunities has been a sharp tool importantly responsible for the great increase in women pursuing advanced degrees and leadership positions in business and society.[1] The

[1] *See, e.g.*, Remy Tumin, *Fifty Years On, Title IX's Legacy Includes Its Durability*, N.Y. Times (June 23, 2022), https://www.nytimes.com/

MHRA, enacted to protect the interests of disadvantaged groups, should not be construed so as to blunt this tool and *prohibit* the protection of equal, safe, and vigorous athletic opportunities for girls and women.

ARGUMENT

I. The Science of Male Athletic Advantage.

Males enjoy a large performance advantage over females in athletics, resulting from undisputed and sex-linked physiological differences. A meaningful advantage exists even before puberty, increases dramatically during puberty, and then persists even if natural male testosterone levels are later suppressed.

A. Males enjoy substantial athletic advantage over females even before puberty.

Evidence indicates that males outperform girls prior to puberty. While the facts of the present case do not involve pre-pubertal children or individuals who have undergone hormonal "pubertal suppression,"[2] it is important that courts and policymakers understand the reality that male athletic advantage exists even before and apart from male puberty.

While it is often casually asserted that the male advantage begins only with puberty, Duke University Professor Doriane Lambelet Coleman, who has published extensively in this field and who was herself an All-American

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2022/06/23/sports/title-ix-anniversary.html; R. Shep Melnick, *Whose educational opportunity?*, 33 Marq. Sports L. Rev. 7, 7–8 (2022).

[2] Appellant started testosterone suppression only at age 25, having fully completed male puberty with all the physical developments male puberty brings. (Complaint ¶ 20).

runner as a college student, recently described the "pre-pubertal performance gap" as "well documented," and she is correct. Doriane Lambelet Coleman, *Why elite women's sports need to be based on sex, not gender*, Wash. Post, (Aug. 16, 2024, 2:05 PM), https://www.washingtonpost.com/opinions/2024/08/16/womens-sports-transgender-dsd-olympics/. Two recent studies looked at (different) large datasets of competitive results for pre-pubertal children in multiple track or field events. One found that in elite competition, pre-pubertal boys ran an average of 2.9%–6.7% faster than girls across a wide range of distances, while the fastest boys were faster than the fastest girls in every event. Gregory A. Brown et al., *Sex-based differences in track running distances of 100, 200, 400, 800, and 1500m in the 8 and under and 9-10-year-old age groups*, 24 Eur. J. Sport Sci. 217, 217–25 (2024), DOI:10.1002/ejsc.12075[3] (Brown (2024)). The second found "a consistent sex difference in performance of about 5% across key track and field events." Mira A. Atkinson et al., *Sex differences in track and field in elite youth*, 56 Med. Sci. Sports Exercise 1390, 1394 (2024), DOI:10.1249/MSS.0000000000003423.

The results of these recent large studies echo earlier results from other countries and hold for nearly every measurement of athleticism. 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. Sports Sci. 736, 738,

[3] A DOI, or Digital Object Identifier, is a unique identifier now assigned to most scholarly articles. Pasting the DOI into the search line of any web browser will take one to the referenced article.

744 (2016), DOI:10.1080/17461391.2015.1088577 (Tambalis (2016)); Brown (2024) at 222; Mark J. Catley & Grant R. Tomkinson, *Normative health-related fitness values for children: analysis of 85347 test results on 9–17-year-old Australians since 1985*, 47 Brit. J. Sports Med. 98 (2013), DOI:10.1136/bjsports-2011-090218. Male performance is markedly superior beginning around age 6 in nearly every category except flexibility. Tambalis (2016) at 738, 744. Studies show that before puberty boys outperform girls in running, jumping, and swimming. David J. Handelsman, *Sex differences in athletic performance emerge coinciding with the onset of male puberty*, 87 Clinical Endocrinology 68 (2017), DOI:10.1111/cen.13350 (Handelsman, *Sex differences* (2017)).

Nor is this male advantage mysterious. The developmental pathway of even infant boys is not the same as infant girls; boys experience what has been called a first "mini-puberty" marked by a temporary surge in testosterone levels prenatally, and a second surge between three and six months of life. Sandra K. Hunter & Jonathon W. Senefeld, *Sex differences in human performance*, 602 J. Physiology 4129, 4136 (2024), DOI:10.1113/JP284198 (Hunter & Senefeld (2024)). Even before puberty, boys have identified physiological differences that provide athletic advantage. These include greater cardiac output, larger heart and lungs, greater maximal oxygen consumption (necessary to metabolism and energy release), a higher percentage of lean body mass, and stronger bones. Alison M. McManus & Neil Armstrong, *Physiology of elite young female athletes*, 56 J. Med. & Sport Sci. 23 (2011), DOI:10.1159/000320626 (McManus & Armstrong

(2011)); Brown (2024) at 223–24. "[T]here are differences between boys and girls in the aerobic responses to exercise which cannot be accounted for solely by size." "[Y]oung girl athletes are not simply smaller, less muscular boys." McManus & Armstrong (2011) at 35, 25.

B. Male physiological and athletic advantages over females multiply during male puberty.

During puberty, a sharp increase in circulating testosterone in boys multiples the male advantage,[4] resulting in what a recent thorough review of the available science characterized as "profound sex differences in human performance," Hunter & Senefeld (2024) at 4143, as boys grow notably taller, bigger, faster, and stronger. These attributes greatly enhance male athletic performance. Below, we review particularly important and undisputed sex-based physiological differences after puberty. *See* Emma N. Hilton & Tommy R. Lundberg, *Transgender women in the female category of sport: perspectives on testosterone suppression and performance advantage*, 51 Sports Med. 199, 204 (2021) DOI:10.1007/s40279-020-01389-3 (Hilton & Lundberg (2021)).

Bone differences

Men have bigger, stronger, and denser bones than women of the same age. David J. Handelsman et al., *Circulating testosterone as the hormonal basis of sex differences in athletic performance*, 39 Endocrine Rev. 803, 818 (Oct. 2018), DOI:10.1210/er.2018-00020 (Handelsman, *Circulating testosterone* (2018)). These differences not only confer size, leverage, and

[4] Sandra Hunter et al., *The biological basis of sex differences in athletic performance: consensus statement for the American College of Sports Medicine*, 55 Med. Sci. Sports Exercise 2328, 2349 (2023), DOI:10.1249/MSS.0000000000003300 (Hunter, *Consensus Statement* (2023)).

injury-resistance advantages on men, but provide an average of 10% greater bone surface area allowing more space for muscles to attach. Taryn Knox et al., *Transwomen in elite sport: scientific and ethical considerations*, 45 J. Med. Ethics 395, 397 (2019), DOI:10.1136/medethics-2018-105208 (Knox (2019)); Handelsman, *Circulating testosterone* (2018) at 818. This in turn contributes to 78% greater upper body strength for men, giving a striking competitive advantage, particularly in sports that draw heavily on upper body strength including boxing, weightlifting, and cross-country skiing. Knox (2019) at 397. Conversely, endogenous (natural) estrogen during female puberty causes women to develop a wider pelvis and different hip joint angles than men, resulting in less efficient leveraging of muscle strength on those joints. *Id.*

Muscle Mass and Fat-Free Mass

"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." Handelsman, *Circulating testosterone* (2018) at 812. Healthy women also possess much lower fat-free mass and a higher fat mass than men. A study of NCAA Division I male and female basketball guards found the male guards had 77.7 ± 6.4 kilograms of fat free mass and 7.4 ± 3.1 kilograms of fat mass on average. In contrast, the female guards had 54.6 ± 4.4 kilograms of fat free mass and 13.4 ± 5.4 kilograms of fat mass. Jennifer B. Fields et al., *Seasonal and longitudinal changes in body composition by sport-position in NCAA Division I basketball athletes*, 6 Sports 1, 3 (2018), DOI:10.3390/sports6030085. Lean body mass differences are particularly

marked in highly fit athletes. The *leanest* 1% of women aged 20–29 years old average 170% more fat per pound of body weight than the leanest 1% of men in that age group. Gary Liguori, *ACSM's guidelines for exercise testing and prescription* 73 (11th ed. 2021) (Tables 3.4 and 3.5) (*ACSM's Guidelines*). Lean body mass is correlated with upper body strength. Karen Charlton, et al., *Lean body mass associated with upper body strength in healthy older adults while higher body fat limits lower extremity performance and endurance*, 7 Nutrients 7126 (2015), DOI:10.3390/nu7095327.

Height

Men are on average 7%–8% taller than women. A survey of 20 countries in 4 continents found that the 50th percentile for women is 5'5" and for men is 5'10". The 90th percentile for women is 5'10" and for men is 6'4". At each percentile, men are taller than women. Max Roser et al., *Human Height*, OurWorldInData.org (2013), https://ourworldindata.org/human-height. Interestingly, it has been shown that suppressing puberty has minimal if any impact on the young person's growth to the height otherwise predicted based on his or her biological sex and parents' stature. Lidewij Sophia Boogers et al., *Transgender girls grow tall: adult height is unaffected by GnRH analogue and estradiol treatment*, 107 J. Clinical Endocrinology Metabolism e3805 (2022), DOI:10.1210/clinem/dgac349.

Pulmonary and Cardiovascular Capacity

Oxygen is essential to metabolism and the release of energy at the cellular and muscular level. Men have greater lung capacity than women (even of the same height); male tracheas have a broader cross-sectional area

(again even when matched for lung size) allowing greater amounts of air to move in and out of the lungs in a given time; and the alveoli (minute air sacs within the lungs) are denser in male lungs.[5] The combined result of these factors is that on average, men can oxygenate substantially more blood per unit of time than can women.

More, men have higher hemoglobin concentrations in their blood, allowing greater oxygen absorption and transport per unit of blood. Knox (2019) at 397. And men's hearts can pump and circulate more units of blood per minute than those of women. *Id.; see also* Sarah R. St. Pierre et al., *Sex matters: a comprehensive comparison of female and male hearts*, 13 Frontiers Physiology 1 (Mar. 22, 2022), DOI:10.3389/fphys.2022.831179. On average, males can pump about 30% more oxygenated blood each minute than women. Hilton & Lundberg (2021) at 202. As a result, males can release from 20%–40% more aerobic power per minute than can females. Hunter & Senefeld (2024) at 4142. These combined cardio-pulmonary capacity advantages provide athletic advantages most clearly manifested during intense exertion. Paolo B. Dominelli & Yannick Molgat-Seon, *Sex, gender and the pulmonary physiology of exercise*, 31 Eur. Respiratory Rev. 1, 9–10 (2022), DOI:10.1183/16000617.0074-2021.

[5] Hunter & Senefeld (2024) at 4142 (describing males' greater V_{O2max} and larger left ventricle); Knox (2019) at 397 ("greater lung volume is complemented by testosterone-driven enhanced alveolar multiplication rate during the early years of life."); Hilton & Lundberg (2021) at 201 (describing males' cardiovascular and respiratory advantages).

Strength

Males exhibit insuperable strength advantages over females across all measures. A 2023 study looking at nearly all muscle groups found that female muscle groups were an average of only 50–70% as strong as those of males.[6]

Overall strength is often calculated using grip strength as a proxy; one study showed that the average male grip strength is 57% greater than the female average. Richard W. Bohannon et al., *Handgrip strength: a comparison of values obtained from the NHANES and NIH toolbox studies*, 73 Am. J. Occupational Therapy 1 (2019), DOI:10.5014/ajot.2019.029538. Another study found the grip strength difference to be closer to 67%. Handelsman, *Sex differences* (2017) at 17. The practical impact of this strength disparity is striking—"the strength level attainable [by females] by extremely high training will rarely surpass the 50th percentile of untrained or not specifically trained men." Dieter Leyk et al., *Hand-grip strength of young men, women and highly trained female athletes*, 99 Eur. J. Applied Physiology 415, 415 (2007), DOI:10.1007/s00421-006-0351-1. This means that in a strength-based event, even average male performance will dominate the performance of elite women, and that the most elite women will have little or no chance against comparably trained male competitors.

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[6] James L. Nuzzo, *Narrative review of sex differences in muscle strength, endurance, activation, size, fiber type, and strength training participation rates, preferences, motivations, injuries, and neuromuscular adaptations*, 37 J. Strength & Conditioning Rsch. 494 (2023), DOI:10.1519/JSC.0000000000004329.

Looking more specifically at arm and leg strength—capabilities particularly important for powerlifting—"[o]n average, women have . . . 50% to 60% of men's upper limb strength and 60% to 80% of men's leg strength." Handelsman, *Circulating testosterone* (2018) at 812. Or, looking at it from the perspective of women, men have 66% to 100% greater upper limb strength, and 25% to 66% greater leg strength than do women.

A metric that compares strength separate and apart from the average male advantage in size is *weight lifted per unit of body weight*. Men under the age of 20 in the 95th percentile of strength can bench press on average *100% more* for every kilogram of body mass than women in the 95th percentile of strength (1.76 kg for men compared to 0.88 kg for women). *ACSM's Guidelines* at 95–97 (Table 3.11). A press of 0.88 kilograms per kilogram of body mass would be very poor for a male—between the 15th and 20th percentiles. *Id.*

Punching is an action that employs the combined strength of multiple muscle groups. In a recent study, moderately trained males generated 162% greater punching power than females even though men do not possess nearly this large an advantage in any single bio-mechanical variable. Jeremy S. Morris et al., *Sexual dimorphism in human arm power and force: implications for sexual selection on fighting ability*, J. Experimental Biology, Jan. 2020, at 1, DOI:10.1242/jeb.212365. If we combine the strikingly stronger male punch with the weaker female bone structure and greater female vulnerability to concussion and associated brain injury,[7] it becomes

[7] Studies of concussion rates in middle school, high school, and collegiate athletics have consistently found that girls and women suffer concussions far

clear that if the District Court's interpretation of the MHRA is upheld, the implications for women in women's boxing and other combat sports will be not merely grossly unequal and unfair, but devastatingly unsafe.

Speed

Male advantages in running and swimming have been the most "in the news" illustrations of the differences in male and female athletic capability, perhaps because the differences are so readily apparent to the layperson's eye. Interestingly, the male performance advantage is significantly *greater* in events that employ muscle groups different from or in addition to those used in running—including weightlifting, pitching, tennis serve speed, volleyball serves, pole vaulting, golf drives, field jumping events, and more, according to a recent records analysis. Hilton & Lundberg (2021) at 201–02.

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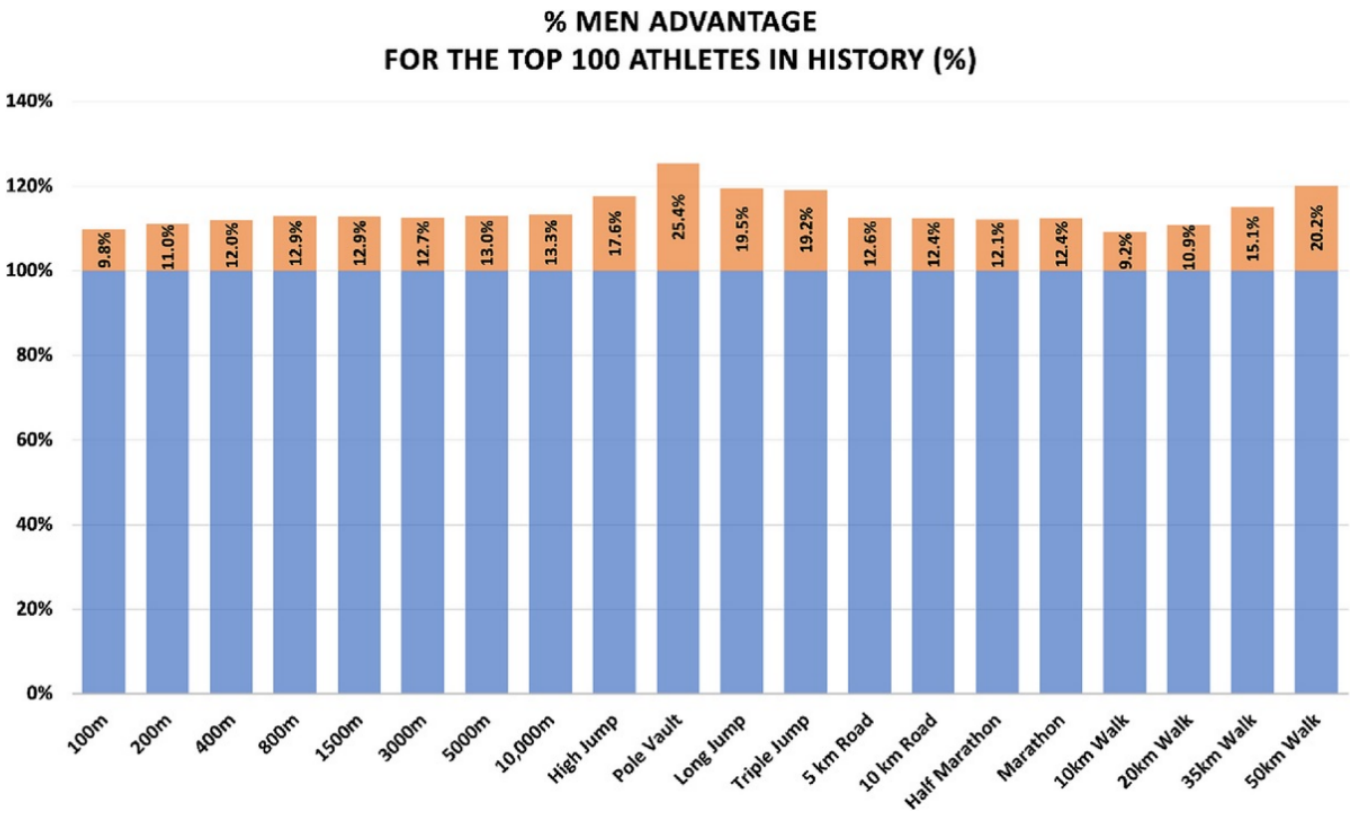
more frequently than do boys and men, ranging from 30% to 100% more frequent and even higher, depending on age and sport. Samatha Hacherl et al., *Concussion rates and sports participation time loss in sex-comparable middle school sports*, 36 Archives Clinical Neuropsychology 650 (2021), DOI:10.1093/arclin/acab035.10; Mallika Marar et al., *Epidemiology of concussions among United States high school athletes in 20 sports*, 40 Am. J. Sports Med. 747 (2012), DOI:10.1177/0363546511435626; Tracey Covassin et al., *Sex differences in reported concussion injury rates and time loss from participation: an update of the National Collegiate Athletic Association Injury Surveillance Program from 2004-2005 through 2008-2009*, 51 J. Athletic Training 189 (2016), DOI:10.4085/1062-6050-51.3.05. What's more, females on average suffer materially greater cognitive impairment when they do suffer concussion. Donna K. Broshek et al., *Sex differences in outcome following sports-related concussion*, 102 J. Neurosurgery 856 (2005), DOI:10.3171/jns.2005.102.5.0856; Alexis Colvin et al., *The role of concussion history and gender in recovery from soccer-related concussion*, 37 Am. J. Sports Med. 1699 (2009), DOI:10.1177/0363546509332497.



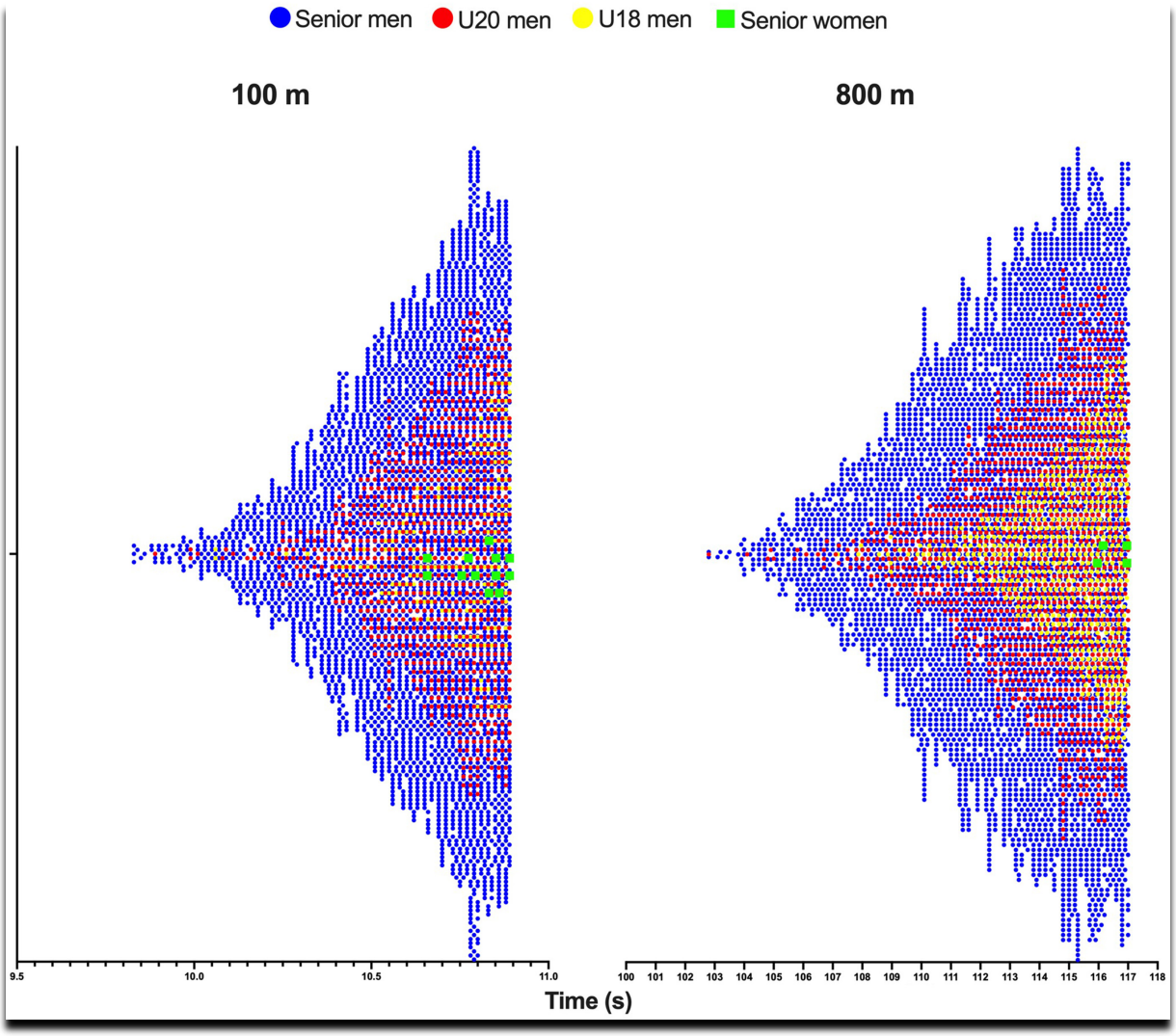
Sex differences in performance between the top 100 men and top 100 women in track and field outdoor events. Shown is the mean advantage men have relative to women in 20 track and field events. Hunter, *Consensus Statement* (2023) at 8 (figure 5) (using data from World Athletics (worldathletics.org)).

That said, the male speed advantage in running—with a fairly consistent average advantage of around 10% faster than females by age 17[8]—is decisive. And these advantages are firmly established before the completion of puberty, with 14- and 15-year-old boys surpassing adult women's all-time

[8] Espen Tønnessen et al., *Performance development in adolescent track and field athletes according to age, sex, and sport discipline*, PLoS One, June 4, 2015, at 8, DOI:10.1371/journal.pone.0129014; Handelsman, *Circulating testosterone* (2018) at 812–13, Handelsman, *Sex differences* (2017) at 70; Thibault et al., *Women and men in sport performance: the gender gap has not evolved since* 1983. 9 J. Sports Sci. & Med. 214, 217 (2010), PMID: 24149688; Hunter & Senefeld (2024) at 4136 (The gap in the marathon world record between men and women has remained stable within the range of 9% to 12% for 40 years).

world records in multiple track and field events. Hilton & Lundberg (2021) at 204. As a result, "it must be recognized that the size of the male biological advantage, and the number of males who compete in most sports, makes it extremely unlikely that any female would ever win medals at the highest level without the protection of a closed category that excludes male advantage." Tommy Lundberg et al., *The International Olympic Committee framework on fairness, inclusion and nondiscrimination on the basis of gender identity and sex variations does not protect fairness for female athletes*, 34 Scandinavian J. Med. Sci. Sports 1, 5 (2024), DOI:10.1111/sms.14581 (Lundberg (2024)).

Indeed, Lundberg et al. graphically illustrate that in 2023, literally thousands of men and hundreds of boys (under age 18) beat the best times of the world's top-ranked women in the 100m and 800m events.



Lundberg (2024) Figure 2

Similarly, Professor Coleman has documented that thousands of boys and men have beat the *lifetime* records of women's Olympic medalists Sanya Richards-Ross, Allyson Felix, and Christine Ohuruogu. Coleman, *Re-affirming the value of the sports exception* (2020) at 89.

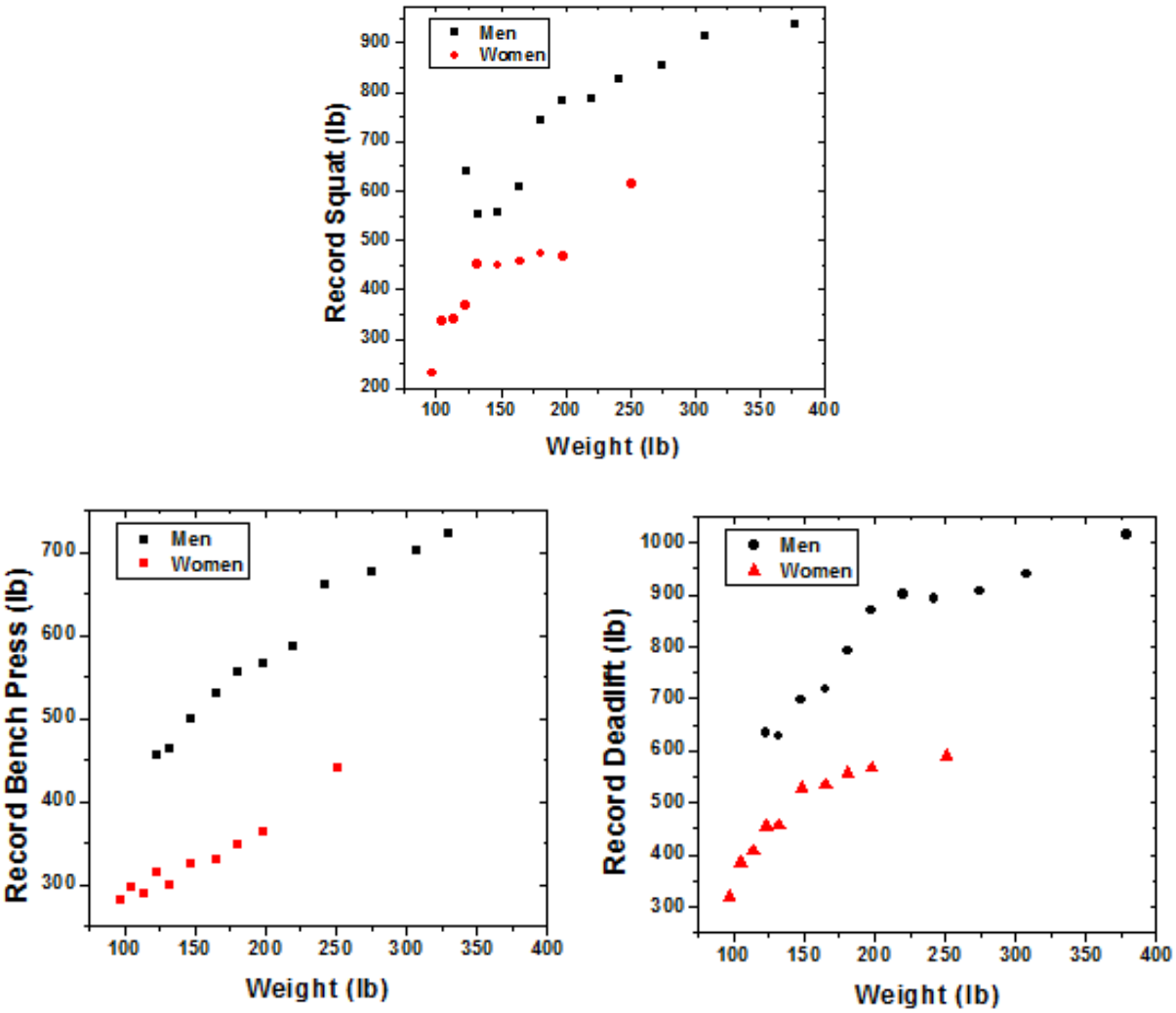
While the male speed advantage is influenced importantly by bone length and configuration and by muscle mass, males also simply have faster muscles: "The contractile speed of whole muscle is faster among males than females largely because the whole muscle of females possesses a greater relative area of type I (slow) fibres and a smaller relative area of the type II (fast) fibres compared with males." Hunter & Senefeld (2024) at 4139.

C. The male advantage is most stark in pure measures of muscular strength such as powerlifting.

Male advantage is dramatic in strength-based athletic competitions such as **powerlifting**—threefold that of running. Handelsman, *Circulating testosterone* (2018) at 812–13; Handelsman, *Sex differences* (2017) at 70; Hilton & Lundberg (2021) at 203. The male powerlifting record is 65% higher than the female record, and this vast advantage is by no means due only to the larger average size and weight of men. Hilton & Lundberg (2021) at 203. Males in the lightest International Powerlifting Federation division routinely outlift women even in the higher weight categories, Ryo Kataoka et al., *Sex segregation in strength sports: do equal-sized muscles express the same levels of strength between sexes?*, 35 Am. J. Hum. Biology 1 (2023), DOI:10.1002/ajhb.23862. An analysis of Olympic weight-lifting records found that men are 30% stronger than women *of the same body mass*—so much so that even "females who are 60% heavier than males do not overcome these strength deficits." Hilton & Lundberg (2021) at 203–204.

The principal powerlifting events are squat, deadlift, and bench press. The graphs below show the world record lifts in each of these events (as of

2015) for men and women by the athletes' weight. The differences between men and women of the same body weight are stark and insurmountable.



* *World Records in Weightlifting and Powerlifting*, Post-Doc Ergo Propter Hoc (Oct. 26, 2015) https://perma.cc/DU8G-RRAK

D. Testosterone suppression after male puberty does not meaningfully reduce the large male physiological advantage.

It is undisputed that Cooper went through the complete physiological development process of male puberty. Cooper now claims to have undergone some degree of testosterone suppression, but makes no representation as to

how long, how consistently, or what testosterone levels have been achieved and sustained. Compl. at ¶ 20–21, 71, 74. In any case, those details would be immaterial to the essential fairness and necessity of maintaining protected women's sports divisions defined by biological sex.

Of course, testosterone suppression after male puberty cannot reverse the athlete's mechanical advantages in size, bone configuration, and lung and heart capacity.

But multiple studies have gone further and directly shown that testosterone suppression does not meaningfully mitigate the substantial male strength and performance advantages resulting from male puberty. "[N]o study has demonstrated that transgender women with suppressed testosterone levels after puberty reach biological or physical parity with females." Lundberg (2024) at 4. Instead, as Professor Handelsman has recently summarized in a major paper, "recent studies largely refute [the] hypothesis" that testosterone suppression after puberty "can neutralize the male physiological advantages." David J. Handelsman, *Toward a robust definition of sport sex*, 45 Endocrine Revs. 709, 721 (2024), DOI:10.1210/endrev/bnae013 (Handelsman, *Robust definition* (2024)). Instead, "Twelve controlled longitudinal studies collectively following more than 800 untrained or moderately trained transgender women have shown that testosterone suppression for 1 year induces only a 5% loss of pre-transition muscle mass/strength." That 5% reduction "accounts for only a fraction (one-fifth or less) of typically observed male versus female muscle mass and strength differences." Lundberg (2024) at 4.

Consistent with this, a 2022 controlled study of 15 males (average age 34 years old) who had gone through complete or substantial male pubertal development, but later underwent testosterone suppression for from 5 to 30 years (average 14.4 years), found that this group nevertheless retained 19% higher handgrip strength than the control group of women, with an *average* strength that fell within the 95th percentile of grip strength reported for women aged 30–34 years old in a separate study. Leonardo Alvares et al., *Cardiopulmonary capacity and muscle strength in transgender women on long-term gender-affirming hormone therapy: a cross-sectional study*, 56 Brit. J. Sports Med. 1292, 1297 (2022), DOI:10.1136/bjsports-2021-105400; *ACSM's Guidelines* at 94. This finding of sustained strength advantage was not significantly different even for the four male subjects who had undergone the extreme testosterone suppression step of gonadectomy (castration), in each case at least 10 years prior to the study measurements. Alvares (2022) at 2 (Supplementary Table 1).

Again, a longitudinal study of biological males aged 15–17 years who began to take antiandrogens (testosterone blockers) after undergoing at least substantial male puberty found that their muscle strength did not decrease after treatment and that their increases in weight and body mass index "were similar to age-matched male peers." Lloyd Tack et al., *Proandrogenic and antiandrogenic progestins in transgender youth: differential effects on body composition and bone metabolism*, 103 J. Clinical Endocrinology Metabolism 2147, 2150 (2018), DOI:10.1210/jc.2017-02316.

A concrete example of testosterone suppression's failure to mitigate male advantage in real-world competitive sports can be seen in the performance of CeCé Telfer before and after suppressing testosterone.

Below are Telfer's times when running in the male division and then the female division after the NCAA's required 12-month testosterone suppression.[9]

As Craig Telfer (male division)		**As CeCé Telfer (female division after 1 year of testosterone suppression)**	
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

† Men's hurdle height is 42 inches, women's is 33 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[10]

[9] *Female division times at* https://perma.cc/LVP2-7DX2 (last visited Sept. 20, 2024); *male division times at* https://perma.cc/3F9B-UBX8 (last visited Sept. 20, 2024).

[10] *Hurdle Heights*, Track Start USA, https://perma.cc/7KNA-H4QM (last visited Sept. 20, 2024).

Telfer's results align with the conclusions of related studies showing that testosterone suppression does not come close to eliminating the competitive advantages possessed by males.[11]

II. The Real-World Impact of Male Competitors on Female Athletes

Professor David Handelsman, a leading scholar and researcher in the field of the effects of sex and testosterone on athletic performance, has recently observed that "the winning margin in Olympic swimming and athletic events is consistently < 1%," Handelsman, *Robust definition* (2024) at 17, while the Court of Arbitration for Sport has stated that "a 10% to 12% advantage could be considered inherently unfair." *Id.*

As we have reviewed above, the systematic male advantage is 10% or far greater across all sports dependent on strength or speed, and the impact of the "inherently unfair" male advantage in women's athletic competition has become increasingly widespread in recent years. When CeCé Telfer began competing in the women's collegiate division in 2019, advocates of redefining

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[11] *See also* Timothy A. Roberts, *Effect of gender affirming hormones on athletic performance in transwomen and transmen: implications for sporting organisations and legislator*, 55 Brit. J. Sports Med. 577, 582 (2020), DOI:10.1136/bjsports-2020-102329 ("the pretreatment differences between transgender and cis gender women persist beyond the 12 month time requirement…"); Joanna Harper, *How does hormone transition in transgender women change body composition, muscle strength and haemoglobin? Systematic review with a focus on the implications for sport participation*, 55 Brit. J. Sports Med. 865, 865 (2021), DOI:10.1136/bjsports-2020-103106 ("[V]alues for strength, LBM [lean body mass], and muscle area in transwomen remain above those of cisgender women, even after 36 months of hormone therapy."); Hilton & Lundberg (2021) at 211 ("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").

the women's category based on gender identity rather than sex argued that this was a rare and extraordinary occurrence that posed no meaningful threat to safety, fairness, and equal athletic opportunities for women. Experience has proven the contrary. The number of individuals claiming a transgender identity has sharply escalated, and on a large and growing number of occasions, biological males have taken medals and competitive opportunities in women's divisions. As those born male take more athletic victories and enjoy more opportunities for elite competition, those born female are getting extra lessons in "losing gracefully."

For example, Chelsea Mitchell, the fastest female high school 55-meter runner in Connecticut, was beaten repeatedly by two biologically male athletes during her high school career. One of the athletes, Terry Miller, had competed as a boys' track runner and never placed in the top 20 in the 55-meter dash until switching to the female division. Compare *Terry Miller Track & Field Bio*, Athletic.net, https://perma.cc/ACW2-GDB5 (last visited Aug. 26, 2024) (male profile), and *Terry Miller Track & Field Bio*, Athletic.net, https://perma.cc/756G-RGKL (last visited Sept. 30, 2024) (female profile). But in the female division, Miller seized first place over 30 times in the 55-meter dash alone and received first place over 115 times in a variety of girls' track and field events across 2017 through 2020. *Id.* Together, Miller and another biologically male athlete competing in the girls' division took 15 state championships and more than 85 opportunities to participate in higher-level competitions from female track athletes during those years. Lucas (2020).

Women's powerlifting has seen similar impact. Mary Gregory was celebrated for setting four women's powerlifting world records in a single day—before the 100% Raw Powerlifting Federation was alerted to the fact that Gregory was biologically male. Rich Maese, *Stripped of women's records, transgender powerlifter asks, 'Where do we draw the line?'*, Wash. Post (May 19, 2019, 6:14 PM), https://wapo.st/3zuH6ft. Anne Andres, who began hormonal treatments only after the age of 20, in a single day broke Canadian women's records in the over 84 kilogram Master's Women's division for bench, squat, and deadlift. Valerie Richardson, *Transgender powerlifter Anne Andres stokes backlash by breaking women's records*, Wash. Times (Aug. 21, 2023), https://www.washingtontimes.com/news/2023/aug/21/transgender-powerlifter-anne-andres-stokes-backlas/. Andres's total lift weight was over 463 pounds greater than that of the closest female competitor. *Id.*

To provide a few more examples:

- **Lia Thomas:** After competing on the men's team at the University of Pennsylvania, Thomas declared a gender transition and entered the female category. After 24 (self-reported) consecutive months of testosterone suppression, Thomas's times "were slower by ~5% across all relevant swimming event distances," but this was by no means enough to eliminate the male advantages;[12] Thomas promptly launched to radically higher rankings in NCAA women's events including the 100, 200, 500, and 1650 yard freestyle events,

[12] Jonathon Senefeld et al., *Case studies in physiology: male to female transgender swimmer in college athletics*. 134 J. Applied Physiology 1032, 1034 (2023), DOI:10.1152/japplphysiol.00751.2022.

moving from a 65th place ranking in the 500 yard freestyle in the male division to taking the first place women's NCAA championship in the 500 freestyle, and being named All-American in several women's division events.[13]

- **Laurel Hubbard:** Formerly a competitive male weightlifter, Laurel Hubbard filled one of the few slots to compete for New Zealand in the women's weightlifting competitions at the 2021 Olympics, depriving a biological female of that opportunity.[14]
- **Tiffany Newell:** Tiffany Newell, a biological male, broke the Canadian women's age 45–49 record in the 5,000-meter race and later pushed a biological female into second place to take first in the 2023 Canadian Masters Indoor Championships.[15]

Examples of the denial of victory and recognition to those born female are now almost endless. The website www.shewon.org compiles and documents a list of 331 males who have competed in some 60 different girls' or women's division athletic events, taking a total of over 1000 championships or medals in sports ranging from track and field, marathon, powerlifting, swimming, weightlifting, cycling, rowing, skiing and more.

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[13] *Lia Thomas*, Penn. Athletics, https://pennathletics.com/sports/womens-swimming-and-diving/roster/lia-thomas/19456 (last visited Aug. 26, 2024).

[14] *Olympics-NZ weightlifter Hubbard to become first transgender athlete to compete at Games*, Reuters (June 21, 2021, 9:33 PM), https://www.reuters.com/lifestyle/sports/new-zealand-names-transgender-athlete-hubbard-womens-tokyo-olympics-2021-06-20/.

[15] Marley Dickinson, *Canadian Masters Athletics ratifies first national record by a trans female*, Running Mag. (Jan. 2, 2023), https://perma.cc/Z2PS-YW7U.

III. International Sporting Bodies Are Increasingly Recognizing the Science, and Adopting Polices that Protect Sex-Based Women's Athletic Divisions.

As the scientific understanding of the scale and impact of sex differences in sport has developed, the threat to fairness and safety for girls and women on the track, court, and pool in real-world competition has become undeniable. And because of the asymmetrical realities of human physiology, defining "eligibility for opposite-sex categories based only on gender identity has an asymmetrical impact on equal opportunities for female athletes at all levels." Lundberg (2024) at 8. In response, more and more national and international sporting bodies have enacted policies to rigorously protect a female competitive category defined based on biological sex. As Professor Handelsman summarizes the resulting policy evolution, "there is a growing consensus from several major international federations for individual sports that *any* exposure to male puberty requires complete exclusion" from female competition. Handelsman, *Robust definition* (2024) at 12 (emphasis added). By contrast only "a minority of international federations" still allow biological males to compete in female divisions "if they undertake sustained, postpubertal complete suppression of circulating testosterone for periods of typically 2 years." *Id.*

Sporting bodies that have adopted absolute or near-absolute sex-based definitions of the protected women's category include:

- **World Athletics**: In 2023, World Athletics, which governs international track and field competition, adopted a policy reserving the women's division to females, with a narrow exception allowing males who have "not have experienced any part of male puberty

either beyond Tanner Stage 2 or after age 12 (whichever comes first)….Since puberty they must have continuously maintained the concentration of testosterone in their serum below 2.5 nmol/L.…They must continue to maintain the concentration of testosterone in their serum below 2.5 nmol/L at all times.…"[16] No example of a male able to meet these criteria seeking to participate in women's competition is known.

- **World Aquatics:** In 2023, World Aquatics, which governs international swimming competition, adopted a policy closely similar to that of World Athletics, thus preserving a female category protected from competition from biological males in almost all cases—and perhaps all cases as a practical matter.[17]
- **Union Cycliste Internationale**: In 2023, the UCI, which governs professional cycling competition internationally, adopted a policy closely aligned with the World Athletics policy.[18]

[16] *Eligibility Regulations for Transgender Athletes*, World Athletics (Mar. 2023) https://perma.cc/8G9F-2379.

[17] *Policy on Eligibility for the Men's & Women's Competition Categories*, World Aquatics (Mar. 2023) https://perma.cc/K9R2-KETE.

[18] *Eligibility Regulations for Transgender Athletes*, Union Cycliste Internationale, https://perma.cc/J9A6-A3G5 (last visited September 13, 2024).

- **British Triathlon:** In 2022, British Triathlon adopted a female and open category. The female category is only open to natal females.[19]
- **World Rugby**: In 2020, World Rugby amended its gender policy to exclude from the women's division all males who underwent any portion of male puberty, with rigorous verification requirements.[20]
- **England and Irish Rugby:** In 2023, England and Irish Rugby adopted a policy that reserves the women's division for natal females.[21]

CONCLUSION

"Fair and safe competition in sports is a core value for athletes at every level of sport, and should be available for all female athletes." Lundberg (2024) at 7. Scientific evidence powerfully illustrates the performance advantages that males possess over females at every stage, but particularly after undergoing male puberty. As Professor Coleman has written, given the increasing prevalence and acceptance of transgender identification in our society, "carving out an exception to the sex segregation rule for males who identify as women and girls will result in the exclusion of females from

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[19] *Transgender Policy*, British Triathlon (2023), https://www.britishtriathlon.org/britain/documents/about/edi/transgender-policy-effective-from-01-jan-2023.pdf.

[20] *Transgender Women Guidelines*, World Rugby, https://perma.cc/ZU9Q-5G3U (last visited Aug. 26, 2024).

[21] *IRFU Gender Participation Policy 2023*, Irish Rugby Football Union (2023), https://perma.cc/J3JV-6STJ.

teams, finals, and podiums." Coleman, *Re-affirming the value of the sports exception* (2020) at 121.

USA Powerlifting aims to empower women by "provid[ing] a fair platform for competition."[22] Its policy of protecting the female category is essential to that goal, is justified by the science, and is in line with the growing international consensus that such a policy is the only way to preserve fair and safe competition for girls and women. The Court should not construe the Minnesota Human Rights Act to prohibit the effective protection of fair competition in women's athletics.

[22] *Code of Conduct*, USA Powerlifting, https://www.usapowerlifting.com/code-of-conduct/ (last visited Sept. 27, 2024).

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CERTIFICATE OF BRIEF LENGTH

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