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UNITED STATES DISTRICT COURT
DISTRICT OF CONNECTICUT

SELINA SOULE, a minor, by Bianca Stanescu, her mother; CHELSEA MITCHELL, a minor, by Christina Mitchell, her mother; ALANNA SMITH, a minor, by Cheryl Radachowsky, her mother,

Plaintiffs,

v.

CONNECTICUT ASSOCIATION OF SCHOOLS, INC. d/b/a CONNECTICUT INTERSCHOLASTIC ATHLETIC CONFERENCE; BLOOMFIELD PUBLIC SCHOOLS BOARD OF EDUCATION; CROMWELL PUBLIC SCHOOLS BOARD OF EDUCATION; GLASTONBURY PUBLIC SCHOOLS BOARD OF EDUCATION; CANTON PUBLIC SCHOOLS BOARD OF EDUCATION; DANBURY PUBLIC SCHOOLS BOARD OF EDUCATION,

Defendants.

Case No. 3:20-cv-00201-RNC

PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

Dated: February 12, 2020

ORAL ARGUMENT REQUESTED

PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

Pursuant to Federal Rule of Civil Procedure 65(a), Plaintiffs move this Court for a preliminary injunction against Defendants, as set out below. Plaintiffs request oral argument on their Motion.

Plaintiffs Selina Soule, Chelsea Mitchell, and Alanna Smith are elite level interscholastic track and field athletes. In this Motion, Plaintiffs challenge the Defendants' discriminatory Transgender Participation Policy that has enabled biological male athletes to displace them (along with other girls in competitive track and field events) from earned victories, honors, and opportunities for championship competition, as well as proper public recognition of their performances.

Plaintiffs request an injunction against Connecticut Association of Schools d/b/a Connecticut Interscholastic Athletic Conference (CIAC), and the Boards of Education for the Bloomfield, Cromwell, Glastonbury, Canton, and Danbury Public Schools, who have together acted to facilitate and enforce the discriminatory Policy that enables male athletes to participate in and dominate interscholastic girls' track and field competitions in Connecticut.

As presented more fully in their Memorandum in Support of Preliminary Injunction filed concurrently with this Motion, the design and effect of the Policy has denied and continues to deny equal athletic opportunity for female athletes including Plaintiffs, in violation of Title IX, 20 U.S.C. § 1681, and its implementing regulations. Absent equitable relief, each of the Plaintiffs will suffer further injury as a result of the Policy during the 2020 track and field season. The requested preliminary injunction is needed pending entry of a final order in this case due to

the irreparable harm attending the Plaintiffs' unrecoverable losses of athletic opportunity and attainment during the brief remaining portion of their high school athletic careers.

Plaintiffs submit that their petition for relief meets the standards for a preliminary injunction: Their case presents a likelihood of success on the merits; Plaintiffs will be irreparably harmed without the equitable relief they seek from this Court; the balance of hardship tips decisively in their favor as Defendants will not be harmed in any cognizable way by the requested injunction; and the injunction serves the public interest, as it would ensure conformity with a federal law serving an important public purpose.

Because a preliminary injunction presents no monetary risks to the Defendants, Plaintiffs request that no bond be required. Fed. R. Civ. P. 65(c).

Respectfully submitted this 12th day of February, 2020.

By: s/ *Howard M. Wood III*
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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Motion Preliminary Injunction, which was electronically filed in this case on February 12, 2020, will be served on all Defendants by service of process with the Verified Complaint and its accompanying documents.

/s/ Howard M. Wood III

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Defendants.

Case No.: 3:20-cv-00201-RNC

MEMORANDUM IN SUPPORT OF PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

Dated: February 12, 2020

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Introduction

For decades, Connecticut schools, coordinating through the Connecticut Interscholastic Athletic Conference (CIAC), have provided separate track and field meets, selective post-season competitions, and championship recognitions for girls and boys. Sometime before 2017, however, the schools acting through the CIAC enacted a new policy that permits males to enter, win, and be awarded victories and championships in the "girls'" competitions if that male claims a transgender female gender identity (the "Policy"). In 2017, a male student, Andraya Yearwood, began to compete in the girls' division of CIAC-sponsored track events; in 2018 a second male competitor—Terry Miller—followed.[1]

Whatever the intentions behind the Policy, on the track and on the victory podium it is having a devastating effect on girls—those born with XX chromosomes. It is rendering their athletic opportunities and experiences far inferior to those enjoyed by boys. As a result, the Policy violates the requirements of Title IX, a law specifically enacted to ensure that girls and women receive athletic opportunities and experiences in the educational setting *equal* to those available to boys and men.

Between them, these two male competitors have taken 15 girls' state championship titles formerly held by nine different Connecticut female athletes—often setting records far faster than the best times ever achieved in Connecticut by

[1] Because Title IX focuses on equal opportunities between the sexes, because this litigation is precisely concerned with physical and legal effects of biological differences between males and females, because the terms "boys" and "men" are commonly understood to refer to males, and to avoid otherwise inevitable confusion, we refer in this complaint to athletes who are biologically male variously as "boys," "men," or "males," and to athletes who are biologically female as "girls," "women," or "females." We use the names preferred by each student rather than legal names.

a girl. They have displaced girls from at least 40 separate opportunities to advance to participate in higher level competitions in the 2017, 2018, and 2019 seasons. Verified Complaint ("V.C.") ¶¶ 64–79. Repeatedly, the top two positions on the victory podium in girls' statewide competitions have been occupied by these two male athletes, leaving room for just one girl in the "third place" slot. V.C. ¶¶ 73, 74. In the seven major state-level competitive events across these three years in which males ran in girls' races, and looking at both the boys' competitions and the girls' competitions for these events, males captured first place in 13 out of 14 events, and 23 out of 28 first and second place awards, leaving nothing but crumbs for students who had the misfortune to be born female. V.C. ¶¶ 67–76. It is literally true, as one of the Plaintiffs said, that when girls step up to the starting line to compete against a comparably gifted and trained male, "I can't win." Female athletes in Connecticut are being deprived not just of victories, but of hope and aspiration.

It could hardly be otherwise. Athletics is about physical bodies and physical capabilities, not about subjective identities. The length of leaps is measured, the speed of sprints is clocked, wrestling and tackling is gauged and rewarded. Indisputable science documents that, after puberty, male bodies have radical physiological advantages over comparably gifted and trained females, including larger muscle mass, greater oxygen transport capabilities, and longer and stronger bones, all together providing consistent performance advantages totaling 10%–20% or more in most athletic events—an insurmountable margin in elite competition. V.C. ¶¶ 48. In athletic competition, males have—as even the CIAC Policy itself

recognizes—an "unfair advantage." V.C. ¶ 73. As a result, as Professor Coleman of Duke University has testified before Congress, the world's best women's Olympic athletes "would lose to literally thousands of boys and men." V.C. ¶ 45. Needless to say, the math is even worse for female high school athletes. And as is now actually being seen in Connecticut, "because it takes only three male-bodied athletes to preclude the best females from the medal stand, . . . it doesn't matter if only a handful turn out to be gender nonconforming." V.C. ¶ 45.

Each of the Plaintiffs has been personally impacted by this unfair competition, being denied championships, pushed off the victory podium, pushed down the rankings, and/or eliminated from eligibility for an elite meet. V.C. ¶¶ 70–78. Each of the Plaintiffs will almost certainly suffer further injury as a result of the Policy during 2020 winter season state-level competition and/or during the 2020 spring track and field season.

All of this is directly contrary to the goals of Title IX, and irreconcilable with its requirements. The Defendants' desire to affirm the gender identity asserted by a student grants no exemption to the requirements of Title IX, no license to deprive girls in Connecticut of equal opportunities for fair competition, victory, and recognition.

A track season lasts just a few weeks. Victories that girls have worked towards for years are either won or lost, with no chance for a "do-over." Accordingly, Plaintiffs bring this motion for a preliminary injunction to protect their right to

equal athletic opportunities in the remaining months of this academic year, as well as opportunities for Plaintiff Alanna Smith in the coming academic year.

Factual Background

A. The Plaintiffs

Plaintiffs Selina Soule, Chelsea Mitchell, and Alanna Smith are female high school students and varsity track and field athletes in Connecticut who compete in interscholastic girls' track and field competitions. Each of the Plaintiffs has trained hard for much of her life, striving for excellence in performance in her sport, and competes at an elite level in Connecticut. Each has been or hopes to be recruited to run as a varsity women's athlete in college, and likewise hopes to be awarded scholarship grants that will assist in making college affordable for her family. Each Plaintiff has lost titles and/or competitive opportunities as a result of the CIAC policy at the center of this lawsuit, V.C. ¶¶ 86-99, and each will almost certainly lose further titles and/or competitive opportunities in the coming Spring track season unless this Court grants the relief requested. Accordingly, the Plaintiffs have standing to bring this claim pursuant to Title IX. *See Cannon v. Univ. of Chi.*, 441 U.S. 677 (1979).

B. The CIAC Policy

In 2017, pursuant to the Policy adopted by the CIAC, CIAC and member-schools including Defendant Schools began allowing males who claim a transgender identity to compete in girls' athletic events. V.C. ¶ 76. In brief, the CIAC Policy determines—and requires member-schools to determine—eligibility to compete in

sex-specific athletic competitions solely based on "the gender identification of that student in current school records and daily life activities in the school." V.C. at ¶ 71.

The Policy on its face recognizes that a male competing in female events enjoys "an unfair advantage in competitive athletics" (an advantage that self-evidently does not exist where a girl seeks to compete in a boys' team or event), yet it is oddly indifferent to this "unfair advantage" over girls so long as the claim of a cross-gender identity is made in good faith. V.C. ¶ 73.

C. Sex-Specific Physiology and Athletic Performance

Of course, the "unfair advantage" that males enjoy over females flows from physiology, and depends not at all on "bona fide" intent or subjective gender identity. Dr. Gregory Brown, an expert in exercise physiology and the impact of testosterone on athletic performance, details with scientific precision what everyone knows from common experience: After puberty, boys and men enjoy measurable and large advantages in athletic capability over comparably gifted and fit girls and women. These advantages flow from identifiable and well-understood physiological differences produced by male puberty and circulating testosterone levels fifteen times higher than the upper range of circulating testosterone in healthy females. Declaration of Dr. Gregory Brown ¶¶ 68-72 (attached as Exhibit A). These measurable advantages detailed by Professor Brown include:

a. Larger lungs and denser alveoli in the lungs, enabling faster oxygen uptake;

b. Larger hearts and per-stroke pumping volume, and more hemoglobin per unit of blood, all enabling higher short-term and sustained levels of oxygen transport to the muscles;

c. An increased number of muscle fibers and increased muscle mass (for example, men have 75%-100% greater cross-sectional area of upper arm muscle than do comparably fit women, while women have 60-70% less trunk and lower body strength than comparably fit men);

d. Higher myoglobin concentration within muscle fibers, enabling faster transfer and "cellular respiration" of oxygen within the muscle to unleash power;

e. Larger bones, enabling the attachment of greater volumes of muscle fiber;

f. Longer bones, enabling greater mechanical leverage thus enabling males to unleash more power, for instance, in vertical jumps;

g. Increased mineral density in bones resulting in stronger bones, providing superior protection against both stress fractures and fractures from collisions;

h. U.S. adult males are on average 5 inches taller than U.S. adult women.

Indeed, the athletic performance-enhancing effects of testosterone are well known, and the anabolic steroids too often used by athletes to gain an unfair and prohibited advantage are often synthetic modifications of testosterone. V.C. ¶ 44. Basically, from puberty on, boys and men have a large and natural "doping" advantage over girls and women.

Meanwhile, female puberty brings distinctive changes to girls and women that identifiably *impede* athletic performance, including increased body fat levels which—while healthy and essential to female fertility—create increased weight to be carried without providing strength, as well as wider hips and different hip joint orientation that result in decreased joint rotation and running efficiency. Brown Decl. ¶¶ 67, 89-90.

As a result of these many inherent physiological differences between men and women after puberty, male athletes consistently achieve performance records 10%–20% better than comparably fit and trained women across almost all athletic events, with even wider consistent disparities in long-term endurance events and in contests of sheer strength such as weight-lifting. Brown Decl. ¶¶ 25-28, 30, 36-46, 48-50, 63-64. These are inescapable biological facts of the human species, not stereotypes, "social constructs," or relicts of past discrimination. As Justice Ginsberg has written, "Physical differences between men and women . . . are enduring: '[T]he two sexes are not fungible'." *United States v. Virginia*, 518 U.S. 515, 533 (1996).

The athletic significance of these "enduring physical differences" is written in bold type in the record books, as Dr. Brown also details. For example, in 2017 alone, thousands of men and boys achieved times in the 400 meter faster than the best lifetime performances of three women Olympic champions in that event. Each year, thousands of men—and dozens or hundreds of high school boys under the age of 18—achieve times (or heights or distances) in track events better than the world's single best elite woman competitor that year. Brown Decl. ¶ 14. In 2018, 275 high school boys ran the 400 meter faster than the lifetime best of Olympic Team USA member and world-record holding sprinter Allyson Felix, while in 2017 thousands of men ran the 400 meter faster than any of the world's three fastest women. V.C. ¶¶ 52; Brown Decl. ¶¶ 14.

The same pattern holds true here in Connecticut. As documented in the Complaint, in event after event, the fastest boys in Connecticut outpace the fastest girls by 10–15%, and *numerous* boys would beat the very fastest girl in each event if track and field were a co-ed sport. V.C. ¶ 46.

But again, it did not require modern science to know this. Testifying in 1975 in support of the Department of Health, Education and Welfare ("HEW") regulations implementing Title IX, Dr. Bernice Sandler—who has been called the "Godmother of Title IX" and credited as the driving force behind its passage—cautioned that ignoring differences in male and female physiology would for many sports "effectively eliminate opportunities for women to participate in organized competitive athletics. For these reasons, such an arrangement would not appear to be in line with the principle of equal opportunity.". V.C. ¶ 35. (citing Statement of Dr. Bernice Sandler, HEARINGS BEFORE THE SUBCOMMITTEE ON POSTSECONDARY EDUCATION OF THE COMMITTEE ON EDUCATION AND LABOR, HOUSE OF REPRESENTATIVES at 343 (June 1975), https://bit.ly/39rvo2H (last visited Feb. 10, 2020).

D. The Impact of Male Competition on Female Athletes in Connecticut

Dr. Sandler was correct, and the real-world impact of just two male athletes on the opportunities and experience of girls in track and field competition is evident in Connecticut today. As summarized above and detailed in the Complaint, these two male athletes are taking slots in elite girls' championship meets away from girls, sweeping first and second place "girls'" titles in almost every event in which they enter, and by their very presence denying to all girls even the *hope* of a

championship victory. *Supra* pp. 1-2; V.C. ¶¶ 77-99; Declaration of Chelsea Mitchell ¶¶ 11-37 (attached as Exhibit C). Quite simply, in Connecticut today, those born female have radically fewer opportunities for success, victory, and recognition in high school track and field competition than do those born male. If just one more reasonably competitive male in Connecticut were competing in girls' track events, it is very likely that in some events, all three victory positions in both the "boys" and "girls" categories will be taken by males. Girls will simply vanish from the victory podium and national rankings, erased from their own sports.

And given the recent rapid increases in the numbers of young people identifying as transgender, there is every reason to expect that—if the CIAC Policy is permitted to stand—this is what the future holds. This is a present, and a future, that strikes at the heart of Title IX.

E. The Defendants' Responsibility for the Policy and Failure to Correct the Denial of Equal Opportunities to Girls

Defendant Schools are "recipients" of federal funds subject to Title IX. V.C. ¶¶ 19-20.[2] Member schools including all Defendant Schools control CIAC through the CIAC Board of Control, and adopt CIAC Policies through the CIAC Legislative Body which is made up of the Principals of all member schools. V.C. ¶ 22. CIAC in

[2] While much case law and guidance relevant to Title IX is articulated in the context of collegiate athletics, Title IX applies with equal force to secondary schools. *See* 34 C.F.R. § 106.41(c) ("[a] recipient which operates or sponsors interscholastic… athletics shall provide equal athletic opportunity for members of both sexes"); *Elimination of Sex Discrimination in Athletic Programs*, 40 Fed. Reg. 52,655 (Nov. 11, 1975) (the "1975 Elimination of Sex Discrimination Memorandum". (Available at http://cdn.loc.gov/service/ll/fedreg/fr040/fr040218/fr040218.pdf); OCR Policy Interpretation, 44 Fed.Reg. at 71,413 (describing the scope of application of its general principles, which "often apply to … interscholastic athletic programs, which are also covered by regulation."); M*cCormick v. School District of Mamaroneck*, 370 F.3d 275, 290 (2d Cir. 2004) (applying Policy Interpretation standards to high school sports).

turn coordinates and governs essentially all High School interscholastic athletic competition in Connecticut, including the track competitions that are the subject of this Complaint. V.C. ¶ 23. In short, there is no doubt that the CIAC is so thoroughly entangled with the recipient schools that it is subject to Title IX. *See* V.C. ¶¶ 21-27; 34 C.F.R. § 106.2(i); *Brentwood Acad. v. Tenn. Secondary Sch. Athletic Ass'n*, 531 U.S. 288, 303–305 (2001); *Clark v. Ariz. Interscholastic Ass'n*, 695 F.2d 1126, 1128 (9th Cir. 1982).

CIAC and its member schools have chosen to provide track and field competition through separate teams and separate competitions for the two sexes. CIAC and its member schools including Defendant Schools are responsible for the adoption of the Policy. Despite repeatedly being made aware of the fact that the Policy is severely unfair to female athletes and violates Title IX, the CIAC has failed to take any steps whatsoever to change the Policy or in any other way cure the violation, and the Defendant Schools have refused to use their influence to press CIAC to change the Policy and cure the violation. The Defendant Schools have chosen to provide opportunities for track and field competition to their students through events governed by the CIAC policies including the Policy, despite being repeatedly warned that the CIAC Policy is unfair to girls and violates Title IX.

Argument

I. The CIAC Policy Violates Title IX

A. The goals and achievements of Title IX

Title IX is concerned with the status and treatment of the sexes. It 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 *North Haven Bd. of Educ. v. Bell*, 456 U.S. 512, 523–24 & n.13 (1982)). Before the enactment of Title IX in 1972, schools often emphasized boys' athletic programs "to the exclusion of girls' athletic programs," *Williams v. School District of Bethlehem*, 998 F.2d 168, 175 (3rd Cir. 1993), and vastly fewer girls participated in competitive interscholastic athletics than did boys. Many have argued that the competitive drive and spirit taught by athletics is one important educational lesson that carries over and contributes to lifetime success in the workplace, and Title IX applies as rigorously to athletic programs of schools as to academic programs. 34 C.F.R. § 106.41(a).

Title IX has been strikingly successful towards its intended goals in the realm of athletics. "For example, between 1972 and 2011, girls' participation in high school athletics increased from approximately 250,000 to 3.25 million students." PROTECTING CIVIL RIGHTS, ADVANCING EQUITY 33 (U.S. Dept. of Educ. Office of Civil Rights, 2015), https://www2.ed.gov/about/reports/annual/ocr/report-to-president-and-secretary-of-education-2013-14.pdf (last visited Feb. 10, 2020). In college, women's numbers have grown almost as steeply, from 30,000 to more than 288,000

in 2017–18. V.C. ¶ 39. Title IX is regularly given substantial credit for this change. Following the United States' famed 1999 Women's World Cup win, the Ninth Circuit wrote that:

> "The victory sparked a national celebration and a realization by many that women's sports could be just as exciting, competitive, and lucrative as men's sports. And the victorious athletes understood as well as anyone the connection between a 27–year–old statute [Title IX] and tangible progress in women's athletics."

Neal, 198 F.3d at 773.

B. Title IX, the 1975 Regulations, and Sex-Segregated Athletics

What Title IX requires in the realm of athletics is complicated . . . yet at the end of the day it is simple fairness.

1. The Text of Title IX.

Title IX itself is brief, and does not mention athletics specifically:

> "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance . . . ."

20 U.S.C. § 1681(a).

Plaintiffs believe that the facts reviewed above unambiguously establish that they are being denied the enjoyment of equal benefits in interscholastic athletic competition "on the basis of [their] sex," but this is all the more clear in light of subsequent implementing regulations as well as regulatory and judicial interpretations of Title IX, as Plaintiffs discuss in detail in Subsection I.B below.

From the start, it has been recognized that Title IX does not require that all athletic teams and competitions be co-ed. On the contrary, as discussed later below,

multiple voices have recognized that in many sports, Title IX's goal of non-discrimination could *not* be achieved with sex-blind programs. In this, Title IX is quite different from the civil rights statutes that are concerned with race. Indeed, The DOE 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."[3]

2. The 1975 HEW Regulations

In 1975, at Congress' explicit behest, the Department of Health, Education and Welfare promulgated implementing regulations (the "Regulations") that have been recognized as authoritative by all Circuit courts that have considered the question, including the Second Circuit. *McCormick,* 370 F.3d at 288–90. The Regulations made explicit Title IX's application to school athletic programs. Section (a) of the Regulations declares 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 any interscholastic, intercollegiate, club or intramural athletics offered by a recipient, and no recipient shall provide any such athletics separately on such basis."

[3] Available at https://www2.ed.gov/about/offices/list/ocr/docs/clarific.html (last visited Feb. 10, 2020). The Second Circuit identifies the OCR 1996 Clarification Letter as "entitled to substantial deference under *Auer v. Robbins*, [519 U.S. 452, 461 (1997)]", as it "reflect[s] reasonable agency interpretations of ambiguities in its own regulation, and there is no reason to think that the agency's interpretations do not reflect its 'fair and considered judgment on the matter in question.'" *Biediger v. Quinnipiac University*, 691 F.3d 85, 97 (2d Cir. 2012) (citation omitted).

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*, 998 F.2d at 175.

Section (b) of the Regulations 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." The reason for this "athletic exception" to the general civil rights and Title IX principle of non-discrimination is, of course, the physiological difference between male and female bodies—the fact that women are on the whole not as fast, strong, tall, or heavy as comparably gifted and trained men. *Supra* pp. 5-8; V.C. ¶¶ 43-55; Brown Decl. ¶¶ 11-113.

Section (c) of § 106.41, for its part, requires that all subject entities "shall provide equal athletic opportunity for members of both sexes," and goes on to provide a non-exhaustive list of 10 factors to be considered in evaluating whether opportunities for both sexes are indeed equal. These include whether the program provides "levels of competition" that "effectively accommodate the . . . abilities of [girls]," and whether the program provides equal opportunities for public recognition or "publicity" to both sexes. 34 C.F.R. § 106.41(c)(1), (10) (emphasis added).

Importantly, multiple courts have held that if a school chooses to provide sex-separated athletic opportunities, then that intentional segregation satisfies the "intent" element of a Title IX violation, leaving only the objective question of

whether the opportunities provided are equal. This is because the relevant legal "intent" is the intent to treat persons differently according to sex; proof of animus or *malicious* intent is not required. *See Bangerter v. Orem City Corp.*, 46 F.3d 1491, 1501 (10th Cir. 1995); *Communities for Equity v. Mich. High Sch. Athletic Ass'n.*, *Haffer v. Temple Univ.*, 678 F. Supp. 517, 527 (E.D. Pa. 1987) (university's "explicit classification of intercollegiate athletic teams on the basis of gender" demonstrated discriminatory intent).

Because the necessary intent to differentiate by sex is established by the simple fact of separate teams, "[a] school's decision to provide students with athletic participation opportunities through separate sports programs for each sex thus necessarily raises a disparate treatment rather than disparate impact claim in that the school decides which athletic opportunities are available to particular students 'on the basis of sex';" once a school has decided to segregate athletics by sex, the question is not whether a particular policy is facially neutral or has a "disparate impact," but whether opportunities accorded one sex "constituted unlawful discrimination under Title IX." *Biediger*, 691 F.3d at 97–98; *see also Neal*, 198 F.3d at 772 & n.8 (9th Cir. 1999) ("Because men are not 'qualified' for women's teams (and vice versa), athletics require a gender conscious allocation of opportunities in the first instance."). Thus, for example, when Brown University applied a gender-neutral across-the-board percentage reduction to the funding and programs for both men and women, the First Circuit analyzed (and rejected) this measure under a

disparate treatment analysis. *Cohen v. Brown Univ.*, 991 F.2d 888, 895–900 (1st Cir. 1993).

C. As a result of the Policy, CIAC and the Defendant Schools do not provide equal athletic opportunities for girls.

Subsequent regulatory guidance and case law have broken out the "equal athletic opportunity" requirement of 34 CFR § 106.41(c) into two separate evaluations. This division is embodied in the "Policy Interpretation" issued by the Department of Education Office of Civil Rights ("OCR") (successor to HEW) in 1979, 44 Fed. Reg. at 71,413 (the "Policy Interpretation").[4] The Second Circuit has found the Policy Interpretation to be "both persuasive and not unreasonable," and so has accorded it deference in construing Title IX and the Regulations. *McCormick*, 370 F.3d at 289–91.

Starting from the overarching requirement of "equal athletic opportunities" for both sexes, the Policy Interpretation gathers and categorizes non-exhaustive factors 2 through 10 listed in 34 CFR § 106.41(c) as concerned with ensuring that girls receive "equivalent treatment, benefits, and opportunities" in athletics; claims asserting that this is not being achieved are commonly referred to as "equal treatment" claims.

The Policy Interpretation presents a separate analysis for claims based on the requirement of the first factor (34 CFR § 106.41(c)(1)) that separate programs "effectively accommodate the . . . abilities of both sexes;" these are commonly

[4] The Federal Register version of the Policy Interpretation is difficult to access, so is provided as Exhibit B hereto.The document is also available on the Department of Education website at https://www2.ed.gov/about/offices/list/ocr/docs/t9interp.html (last visited Feb. 10, 2020).

referred to as "effective accommodation" claims. *McCormick*, 370 F.3d at 291 (citing Policy Interpretation and 34 C.F.R. §106.41(c)(1)).

The CIAC Policy violates both of these prongs.

1. The CIAC Policy denies girls equal treatment in athletic opportunities and experience.

The Regulation, authoritative regulatory interpretations, and courts have provided a variety of articulations of what makes up the "equal treatment" required by Title IX. None of these articulations are exhaustive; none are inconsistent with basic intuition about fairness and equality. The CIAC Policy runs afoul of one after another.

The Policy Interpretation does not lose track of the big picture, summarizing in an "Overall Determination of Compliance" that the Department will "base its compliance determination . . .upon an examination of . . . whether the policies of an institution are discriminatory in language or effect." *McCormick*, 370 F.3d at 292 (citing Policy Interpretation, 44 Fed.Reg. at 71,417). Elsewhere in that document the OCR similarly framed the question as whether "program components reveal that treatment, benefits, or opportunities are not equivalent in kind, quality or availability" between the sexes. *Id*. (citing Policy Interpretation, 44 Fed.Reg. at 71,415).

Given the physiological facts and real-world impacts on girls in Connecticut reviewed above and at more length in the declaration of Dr. Brown and in the Verified Complaint, it is inescapable that the Policy is at the very least "discriminatory in . . . effect" and that the competitive opportunities provided to

girls in track and field in Connecticut are not remotely equivalent in "kind, quality or availability."

Descending to more specificity, the Policy Interpretation states that "equal treatment" requires equal "opportunities to engage in . . . post-season competition," *McCormick*, 370 F.3d at 289 (quoting 44 Fed.Reg. at 71,416), and the Second Circuit has agreed that "opportunities" must be "real, not illusory." *Biediger v. Quinnipac Univ.*, 691 F.3d 85, 93 (2d Cir. 2012). When girls are excluded from post-season and State-level competition because a male has occupied one of their limited qualifying slots, V.C. ¶¶ 104-05—while of course males also occupy all such slots in the boys' division—then female athletes are not receiving equal opportunities to participate in post-season competition.

More, where girls do get an "opportunity" to compete, in its 1996 Clarification the OCR emphasized that this is not just a game of numbers: the program must provide girls an equal "*quality* of competition." 1996 Clarification (emphasis added). When even the fastest girls in the state must step to the starting line knowing that "I can't win," this is a frankly degraded, illusory, and unequal *quality* of competition. *See* Mitchell Decl. ¶¶ 12, 15, 23-25, 47. And for *all* girls—confronted with male competitors whose participation imposes a "ceiling . . . [girls] cannot break through no matter how hard they strive," *McCormick*, 370 F.3d at 295—their training, striving, and competing without even a *hope* of recognition as a champion is a decidedly second-class "quality of competition."

The Second Circuit has elaborated on this very point at some length: "The greater the potential victory, the greater the motivation to the athletes. . . . A primary purpose of competitive athletics is to strive to be the best." *McCormick,* 370 F.3d at 294–95. In *McCormick*, the Second Circuit rejected as inconsistent with Title IX a scheduling policy that had the effect of foreclosing girls from achieving state-level championships and recognition, observing that this:

> "places a ceiling on the possible achievement of the female soccer players that they cannot break through no matter how hard they strive. The boys are subject to no such ceiling. 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."

Id. at 295.

As the court declaimed elsewhere, "[w]e are unpersuaded by the School Districts' attempt to downplay the significance of the opportunity that they are denying their female athletes but affording their male athletes—*the chance to be State champions*." *McCormick*, 370 F.3d at 279 (emphasis added). Instead, the court found that denying the high school girls "treatment equal to boys *in a matter so fundamental to the experience of sports* denies equality of athletic opportunity to the female students." *Id.* (emphasis added).

The harms ripple outward far beyond the girls on the track. The little sister on the sidelines sees that those born female—like her—can't win, don't win, are not recognized as champions. Athletics is not a direction in which she can hope to strive,

achieve, and win recognition. That "collateral damage" is antithetical to the goals and spirit of Title IX.

Closely related to an equal opportunity for victory—or an equal ability to legitimately *aspire* to victory—is the equal opportunity for "publicity" required by 34 C.F.R. §106.41(c)(10). In part, this provision speaks to equal investments by athletic programs in publicity for girls' or women's athletics. But in track events, the starting place for public recognition is the finish line of the race; those who win are the ones who are photographed, written up in the local newspaper, praised in school assemblies and publications . . . and recognized in long-lived public records.

As a result of the CIAC Policy, girls are denied equal treatment in publicity. For example, Plaintiff Alanna Smith lost out on the recognition as a precocious star that would have come had she been awarded the statewide silver medal in the women's outdoor 200-meter race that she legitimately earned in her freshman year. V.C. ¶ 98. Likewise, instead of recording Plaintiff Chelsea Mitchell's earned first place performance in the 55 meter race at the 2019 State Open Championship, the CIAC written records give that honor to male runner Terry Miller, and announce Chelsea's accomplishment as a third-place finish (without mentioning that the gold and silver were taken by males). Chelsea was likewise deprived of public recognition as "State Open Champion" and "All State Athlete," which her training and performance on the track had legitimately earned. V.C. ¶¶ 90-94; Mitchell Decl. ¶ 26, 29. The fastest boy in the boys' category, of course, was recognized as the

champion in that division, while male athlete Terry Miller was named "All-Courant girls indoor track and field athlete of the year." (V.C. ¶ 97.)

Likewise, when male competitors seized the top two slots in the qualifying heat for the state final for the indoor 55 meter event in 2019 (by insurmountable margins), Plaintiff Selina Soule was not just denied the opportunity to participate in the finals, she was also denied the public recognition that surrounds being one of those elite finalists, and was excluded from posted lists of the finalists. V.C. ¶¶ 90-91. No footnote explains that she was indeed one of the seven fastest girls in the state. Here as in every disadvantage reviewed above, "[m]ale athletes do not suffer from any comparable disadvantage." *McCormick*, 370 F.3d at 294. Under the CIAC Policy, female athletes simply do not receive equal opportunities for publicity.

Unequal opportunities for publicity, in turn, lead to unequal opportunities for recruiting and scholarships. Not surprisingly, the Policy Interpretation identifies equality in access to scholarships as one aspect of compliance with Title IX. 44 Fed. Reg. at 71,415. The Second Circuit has rightly observed that if girls are excluded from championship competitions, this is likely to reduce their visibility to college coaches who "do their recruiting at the high level club tournaments. . . ." *McCormick*, 370 F.3d at 282. That case concerned scheduling that prevented participation in post-season competitions, but the same is equally true when girls are excluded from championships and even participation in championship meets because males are filling the qualifying top slots in the "girls" competitions.

The simple truth is that because of the unalterable facts of human physiology, in track and field, as in many sports, the *only* way to provide "equal treatment" for girls, and competitive opportunities and experiences that are equal in "kind" and in "quality," is the traditional way: competitions and records separated by sex. If males are permitted to compete in the girls' categories, girls will become invisible in athletics. "The Godmother of Title IX" Dr. Sandler said as much near the beginning. *Supra* p. 8. HEW instructed schools on this point in early guidance, in its 1975 "Elimination of Sex Discrimination" memorandum, writing that programs above the elementary school level (i.e., once boys and girls are changed by puberty), should "determine the relative abilities of members of each sex for each . . . sport offered, in order to decide whether to have single sex teams or teams composed of both sexes . . . [A]n institution would not be effectively accommodating the interests and abilities of women if it abolished all of its women's teams and opened up its men's teams to women, but only a few women were able to qualify for the men's team." 40 Fed.Reg. 52656.[5]

HEW successor OCR made the same point in its binding 1979 Policy Interpretation, stating that schools "must" provide separate competitive opportunities where "[m]embers of the excluded sex do not possess sufficient skill to be selected for a single integrated team, or to compete actively on such a team if selected." 44 Fed.Reg. at 71,418. In the case of track, of course, the relevant "skill" is

[5] Available at http://cdn.loc.gov/service/ll/fedreg/fr040/fr040218/fr040218.pdf (last visited Feb. 10, 2020).

speed, and when the competition is mixed, comparably talented and trained female athletes cannot compete successfully.

Numerous courts have agreed. The Sixth Circuit offered frankly: "It takes little imagination to realize that were play and competition not separated by sex, the great bulk of the females would quickly be eliminated from participation and denied any meaningful opportunity for athletic involvement." *Cape v. Tenn. Secondary Sch. Athletic Ass'n.*, 563 F.2d 793, 795 (6th Cir. 1977), *abrogated on other grounds*, as recog'd by *Brentwood Acad. v. Tenn. Secondary Sch. Athletic Ass'n*, 190 F.3d 705 (6th Cir. 1999). 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. *Clark v. Ariz. Interscholastic Ass'n.*, 695 F.2d 1126 (9th Cir. 1982). It found it a "physiological fact" to reveal that "males would have an undue advantage competing against women," and that the record evidence in that case 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 (highlighting expert testimony that "if positions on the field hockey team were open to girls and boys, 'eventually boys would dominate, eliminating the opportunities of females.'").

This is exactly, and predictably, what is happening now in Connecticut to these Plaintiffs, and to many girls.

2. The CIAC Policy does not effectively accommodate the athletic abilities of girls.

The "effective accommodation" standard of the Regulation articulates different tests than the "equal treatment" standard, but in this context it is simply another window into the same basic unfairness, flowing from the same unalterable physiological differences between the sexes, and the Defendants' refusal to recognize and accommodate those differences.

Speaking to the "effective accommodation" requirement, the Policy Interpretation elaborates that schools must provide "equal opportunity in . . . *levels of competition*," and competitive opportunities "which *equally reflect [girls'] abilities*." 44 Fed. Reg. at 71,417–418 (emphasis added).

Courts interpret this to require that "the *quality of competition* provided to male and female athletes equally reflects their abilities," *Roberts v. Colo. State Bd. of Agric.*, 998 F.2d 824, 829 (10th Cir.1993) (emphasis added), and the OCR has agreed that this is a component of "effective accommodation." *See* 1996 Clarification ("OCR also considers the quality of competition offered to members of both sexes in order to determine whether an institution effectively accommodates the interests and abilities of its students.").

To evaluate whether the competitive opportunities offered are equivalent, the Policy Interpretation offers a two-part test. This test is directed principally at issues of scheduling, but the *goal* it highlights is that men and women athletes enjoy "equivalently advanced competitive opportunities." 44 Fed.Reg at 71,418. In

evaluating "effective accommodation," "'[a]thletic opportunities' means real opportunities, not illusory ones." *Williams*, 998 F.2d at 175.

Finally, lest we mistake the various means of measurement for the goal itself the Policy Interpretation reminds us that the "overall" question of compliance with the "effective accommodation" requirement will be based on a determination of "whether the policies . . . are discriminatory in . . . effect," or whether there are "disparities" in the program with respect to benefits, treatment, or opportunities that deny equal opportunity. 44 Fed. Reg at 71,417-418.

Again, the CIAC Policy fails under every one of these tests. On its face, the Policy makes no attempt whatsoever to "accommodate" the distinctive abilities of female athletes. In practice, given that boys have consistent and large physiological advantages in athletic performance, the competitive reality that the Policy presents to girls when competent males run in the girls' division is "Sorry, you lose." When girls face insurmountable competition from males, then they do *not* enjoy "equal opportunity in levels of competition," nor equal "quality of competition." Their opportunity to win—or in many cases even to participate in championship-level competition—is rendered "illusory." Boys, of course, face no such impossible odds when they step to the starting line.

And empirically, as detailed in the Complaint, because the Policy does not accommodate the athletic abilities of girls, girls are not only being denied "equal quality of competition," they are being displaced from large numbers of competitive opportunities and competitive victories. V.C. ¶¶ 77-99; Mitchell Decl. ¶¶ 11-37. The

Policy is decidedly "discriminatory in effect." Again, in the case of track and field, at least, where speed is everything, the *only* mechanism that can "effectively accommodate" the athletic abilities of girls is separate, sex-specific recognition of victories, records, and qualification for advancement to elite competition. As HEW specified 45 years ago, "If by opening a team to both sexes . . . an educational institution does not effectively accommodate the abilities of members of both sexes, . . . separate teams in that sport will be required. . . ." 1975 Elimination of Sex Discrimination Memorandum, supra n. 1, 40 Fed. Reg. at 52,656. Speaking in the context of athletic scholarships, HEW elaborated that "effective accommodation" requires: "criteria which do not inherently disadvantage members of either sex . . . ." *Id*. "For example, when 'ability' is used as a basis for scholarship award and the range of ability . . . differs widely between the sexes, separate norms must be developed for each sex." *Id.* 52656–57. In track events, victory, advancement, post-season opportunities, and recognition all depend entirely on athletic "ability." For all the same reasons, "effective accommodation" of the different capabilities of the sexes requires that sex-separated competition.

II. The Court should grant a preliminary injunction prohibiting males from competing in girls' interscholastic track and field competitions in Connecticut.

A. Legal standard for preliminary injunctive relief

To obtain a preliminary injunction, the moving party must show: (1) a likelihood of success on the merits; (2) a likelihood of irreparable harm; (3) the balance of hardships tips in his favor; and (4) an injunction is in the public interest.

Am. Civil Liberties Union v. Clapper, 804 F.3d 617, 622 (2d Cir. 2015); *Cohen.*, 991F.2d at 902) (applying same standard in Title IX context).

The facts and law reviewed above establish a strong likelihood of success on the merits. The other factors also weigh in favor of granting preliminary injunctive relief.

1. Likelihood of irreparable harm

"A showing of irreparable harm is the single most important prerequisite for the issuance of a preliminary injunction." *Singas Famous Pizza Brands Corp. v. New York Advertising LLC*, 468 Fed. Appx. 43 (2d Cir. 2012). It hardly needs elaboration to say that lost chances to run in State finals and other elite meets (V.C. ¶¶ 104-05); lost chances to win new levels of recognition for one's high school (V.C. ¶ 94); lost recognition as a remarkable freshman state-wide silver-medalist (*supra* p. 20); lost gold medals and recognition as a State Open Champion and All State Athlete (*supra* p. 20)—these are indeed irreplaceable, and cannot be "made right" by a later monetary award or adjustment to records. These are once-in-a-lifetime experiences, and lifetime memories. Further, the experience in recent seasons, in which males have again and again taken the top medals in almost every girls' event in which they enter, leaves no room to doubt that similar harms to Plaintiff Alanna Smith—and to other girls in Connecticut—will be repeated in the Spring 2020 track season if no injunctive relief is granted.

The loss to these Plaintiffs of the experience of *fair* competition; being forced to labor under a "ceiling on … achievement" and without that sense of *potential* for victory which the Second Circuit has described as central to athletics, *McCormick,*

370 F.3d at 295—these are less tangible, but no less grave and irreparable. And flowing from this insurmountable unfairness, Plaintiffs suffer emotional distress, anxiety, and even depression and nausea on an ongoing basis, race after race. Cmpl. ¶ 113; Mitchell Decl. ¶ 46-47.

This factor thus weighs strongly in favor of injunctive relief. *See Barrett v. West Chester Univ.*, 2003 WL 22803477, No. Civ. A. 03–CV–4978, at *14 (E.D. Pa. 2003) (issuing a preliminary injunction reinstating a sports team, finding irreparable harm in "the fact that Plaintiffs have a finite period of time in which to compete. . . . Several of the players are in their final year of school and would be denied their last opportunity to compete."); *Favia v. Indiana Univ. of Pennsylvania*, 812 F. Supp. 578, 583 (W.D. Pa. 1993) ("The opportunity to compete in undergraduate interscholastic athletics vanishes quickly, but the benefits do not. We believe that the harm emanating from lost opportunities for the plaintiffs are likely to be irreparable."); *Beasley v. Ala. State Univ.*, 966 F. Supp. 1117, 1127 (M.D. Ala. 1997) ("The mere protractedness of [a] lawsuit should not vitiate the named plaintiff's capacity to vindicate the broad remedial purpose of Title IX.").

2. Balance of hardships

The "balance of hardships" tips decidedly in Plaintiffs' favor. When males take first place in 13 out of 14 CIAC state-level events across both "boys" and "girls" categories in events in which males were permitted to compete in girls' events; when males are awarded 51 opportunities to participate in state-level competition in those events, while girls are awarded only 31, V.C. ¶ 101; when girls must step to the starting line in the "girls' race" knowing that it is almost certain that a male

will win, V.C.¶¶ 84, 108-113—the harm to girls is dramatic, and stabs at the heart of all that Title IX was crafted to achieve. If Title IX is important, then the very type of hardship that these Plaintiffs are suffering must be rated as severe.

Meanwhile, the requested injunction will restore what has been the status quo within Connecticut athletics since Title IX was enacted and until 2017—providing separate competition categories in track and field based on sex because of the physiological differences and abilities between the sexes—and will ensure fair and equal competitive opportunities and experiences for female athletes while this case is litigated. There will be no financial cost to Defendants from complying with the requested preliminary injunction, and Defendants have no cognizable state interest in maintaining the discriminatory treatment of female athletes at issue in this case.

3. The public interest

Finally, if Title IX is in the public interest, then the requested injunction is in the public interest. Courts have recognized that just as "[t]he Government does not have an interest in the enforcement of an unconstitutional law," *New York Progress and Protection PAC v. Walsh*, 733 F.3d 483, 488 (2d Cir. 2013) (internal citations omitted), so also "the overriding public interest [lies] in the firm enforcement of Title IX." *Cohen.*, 991 F.2d at 906.

No doubt, it will be urged that there is a public interest in accommodating male athletes who claim a transgender identity. But that goal grants no license to nullify or ignore the requirements of Title IX by according a lower priority to its statutory goal of ensuring fair and equal opportunities to females.

> "Title IX requires that schools provide equal athletic opportunity to boys and girls. To base our measurement of the significance of a denial of opportunity on the lesser value that may be placed on the success of girls in athletic competition would be contrary to the mandate of the statute."

McCormick, 370 F.3d at 296.

In the same way, even if some would assign a "lesser value" to equal opportunities for girls than they do to the participation choices of male students who assert a transgender identity, that preference "must not play a role in our assessment of the significance of the denial of opportunity to the female athletes in this case." *Id.*

Finally, because it attempts to substitute a purely subjective and self-declared state of mind for the objective reality of the biological sexes which is the concern of Title IX and the express basis for sex-separation of athletic competitions, the CIAC Policy is also incoherent. Advocates assert that "gender" is a "spectrum;" a Tumblr blog currently lists 112 different genders that users may claim. TUMBLR, GENDERFLUID SUPPORT, https://genderfluidsupport.tumblr.com/gender (last visited Feb. 10, 2020). It is not possible to map this subjective concept to the two biological sexes which are not only the concern, but the essential backbone of Title IX, both in logic and in enforcement. There can be no public interest in reducing Title IX to incoherence and thus negating its very purpose.

CONCLUSION

For the reasons set forth above and in the accompanying Declarations and Verified Complaint, Plaintiffs respectfully request that the Court enter a preliminary injunction in the form submitted herewith.

Respectfully submitted this 12th day of February, 2020.

By: s/ *Howard M. Wood III*

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**Motions to Appear Pro Hac Vice pending*

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Memorandum in Support of Motion for Preliminary Injunction, which was electronically filed in this case on February 12, 2020, will be served on all Defendants by service of process with the Verified Complaint and its accompanying documents.

/s/ Howard M. Wood III

UNITED STATES DISTRICT COURT
DISTRICT OF CONNECTICUT

SELINA SOULE, a minor, by Bianca Stanescu, her mother; CHELSEA MITCHELL, a minor, by Christina Mitchell, her mother; ALANNA SMITH, a minor, by Cheryl Radachowsky, her mother, *Plaintiffs*, v. CONNECTICUT ASSOCIATION OF SCHOOLS d/b/a CONNECTICUT INTERSCHOLASTIC ATHLETIC CONFERENCE; BLOOMFIELD PUBLIC SCHOOLS BOARD OF EDUCATION; CROMWELL PUBLIC SCHOOLS BOARD OF EDUCATION; GLASTONBURY PUBLIC SCHOOLS BOARD OF EDUCATION; CANTON PUBLIC SCHOOLS BOARD OF EDUCATION; DANBURY PUBLIC SCHOOLS BOARD OF EDUCATION, *Defendants*.	Case No. 3:20-cv-00201-RNC Dated: February 12, 2020

DECLARATION OF PROFESSOR GREGORY BROWN

I, Gregory A. Brown, declare as follows:

1. I serve as Professor of Exercise Science in the Department of Kinesiology and Sport Sciences at the University of Nebraska Kearney.

2. In the attached Expert Declaration which I executed on January 7, 2020, I provide certain information and certain expert opinions based on my

expertise and professional familiarity with exercise physiology and my review of the currently available science.

3. The statements made in my Expert Declaration do represent my expert opinion, and I believe all facts asserted therein to be true and correct.

I declare under penalty of perjury that the foregoing is true and correct.

Signed: _____

Dr. Gregory A. Brown

Date: Feb. 10, 2020

Signed and affirmed before me on the 10th day of February, 2020 by Gregory A. Brown, who proved to me on the basis of satisfactory evidence to be the person who appeared before me.

_____
(Signature)

Bethany L. Johnson
(Printed Name)

GENERAL NOTARY - State of Nebraska
BETHANY L. JOHNSON
My Comm. Exp. December 27, 2022

My commission expires: Dec 27, 2022

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

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 nontenured) professor at universities for over a decade.

2. I teach classes in Exercise Physiology.

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. I have authored chapters for multiple books 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, 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 min/km), 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.

8. I have been asked 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 not been compensated for my time spent in preparing this declaration.

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, it is my professional opinion that:

a. At the level of elite competition, men, or adolescent boys, have an advantage over women, or adolescent girls, in almost all athletic contests;

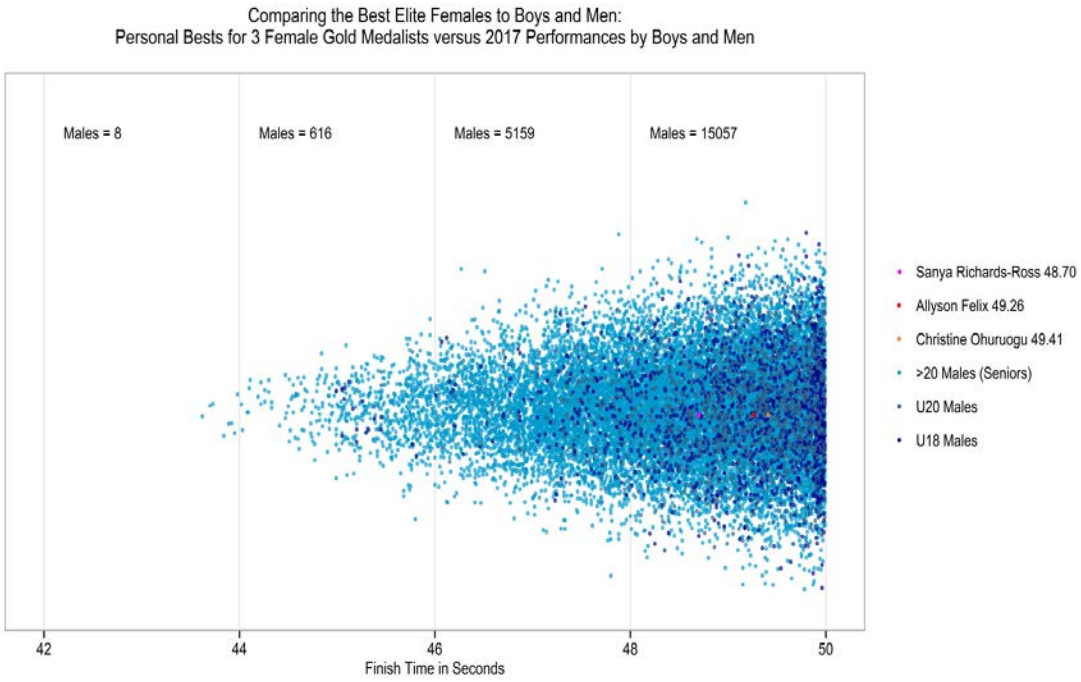
b. Biological male physiology is the basis for the performance advantage that men, or adolescent boys, have over women, or adolescent girls, in almost all athletic contests; and

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.

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, 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 offers 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, I cite nine articles published in scientific journals. I provide capsule summaries of those nine articles below.

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 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 girls, after the onset of male puberty.

h. The eighth 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 1 year does not eliminate (or even come close to eliminating) the performance advantage of their male physiology.

i. The ninth 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 increases the overlap in muscle mass with women but does not reverse certain effects of androgenization that had occurred during male puberty.

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

Opinions

I. Biological men, or adolescent boys, have an advantage over women, or adolescent 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

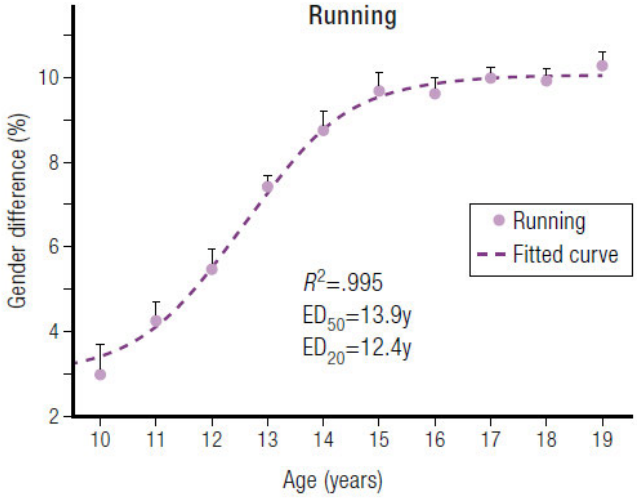
speed, swimming speed, cycling speed, jumping height, jumping distance, and strength (to name a few, but not all, of the performance differences). These performance advantages for men, and adolescent boys, are inherent to the biological differences between the sexes and are not due to social or cultural 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.

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

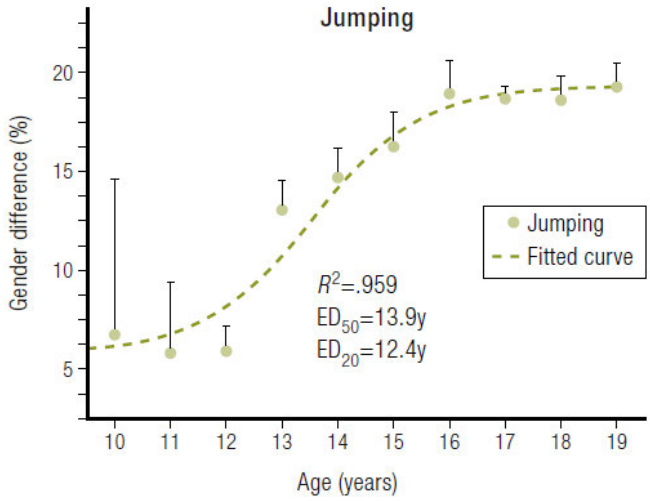
A. David J. Handelsman, Angelica L. Hirschberg, et al., *Circulating Testosterone as the Hormonal Basis of Sex Differences in Athletic Performance*, 39:5 ENDOCRINE REVIEWS 803 (2018):

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)

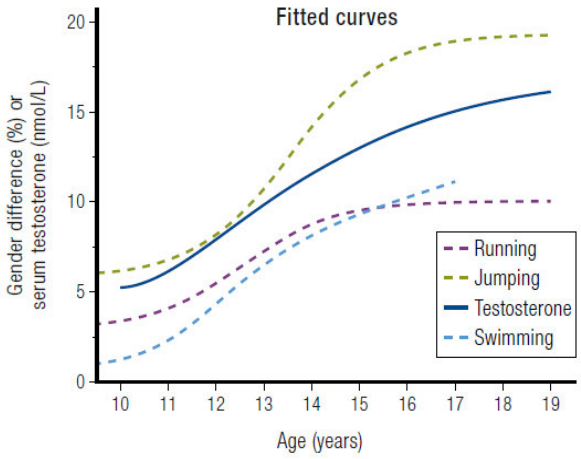
26. Taken from Handelsman's Figure 1, the chart below indicates "sex differences in performance (in percentage) according to age (in years) in running events, including 50m to 2 miles." (813)



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 Handelman'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 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. 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 8km.[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. 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. 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)

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.

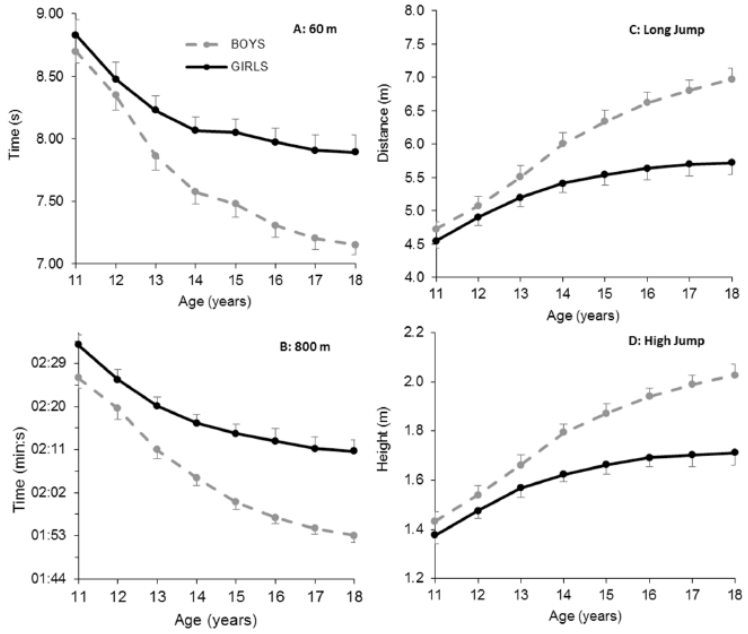
52. Tønnessen and Svendsen's Table 2 below shows the "[s]ex ratio in running and jumping performance for 11-18 [year] old males and females," as deduced from "[t]he 100 all-time best Norwegian male and female 60-m, 800-m, long jump and high jump athletes in each age category . . . ." (1, 6)

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

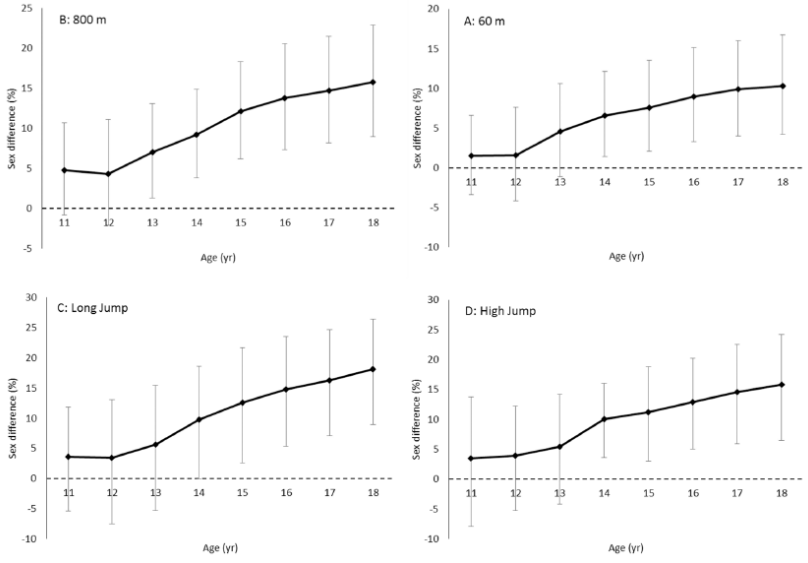
	60 m	*800 m*	*Long Jump*	*High Jump*
11	0.99	0.95	0.96	0.97
12	0.98	0.96	0.97	0.96
13	0.96	0.93	0.94	0.95
14	0.94	0.92	0.90	0.90
15	0.93	0.89	0.87	0.89
16	0.92	0.88	0.85	0.87
17	0.91	0.87	0.84	0.85
18	0.91	0.86	0.82	0.84

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)



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:

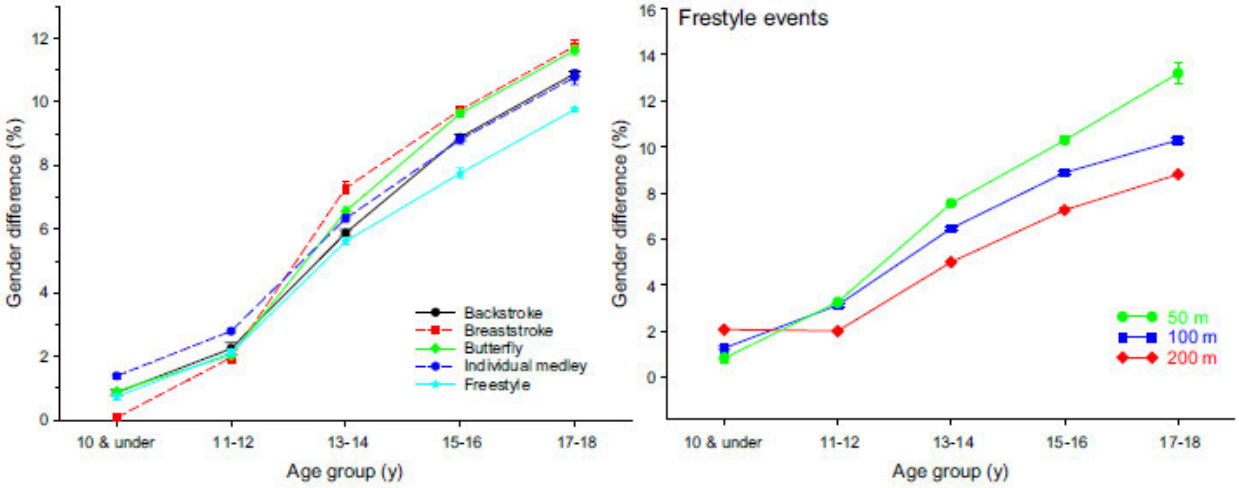
a. "[B]oys improve their high jump performance by 11–13 cm each year up to the age of 14 (7–8%; very large annual effects). Both absolute and relative annual improvement peaks between age 13 and 14 (13 cm; 8.1%; very large effect), then gradually decreases to 4 cm from age 17 to 18 (1.9%; moderate annual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

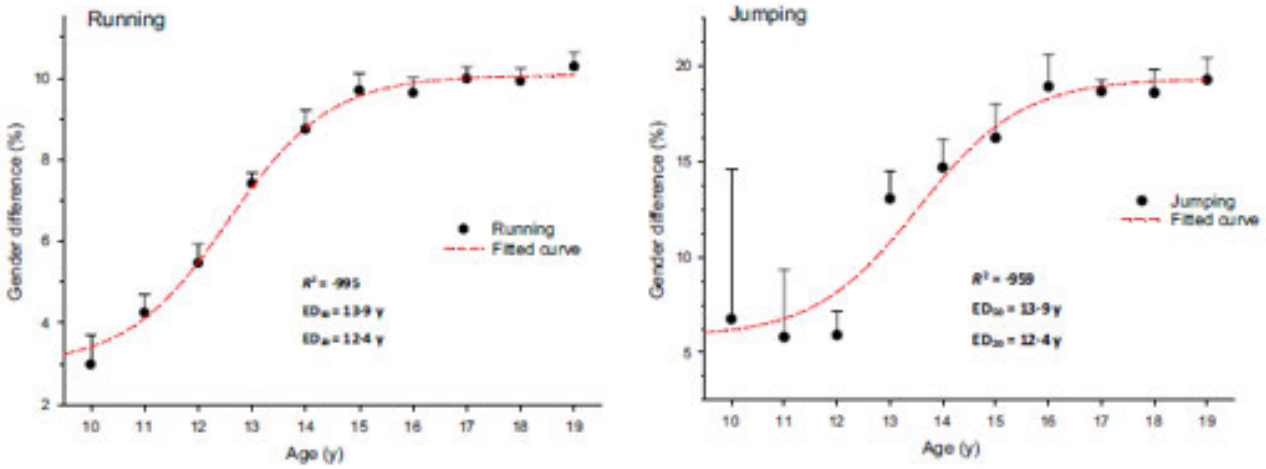
F. David J. Handelsman, *Sex Differences in Athletic Performance Emerge Coinciding with the Onset of Male Puberty*, 87 CLINICAL ENDOCRINOLOGY 68 (2017):

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.

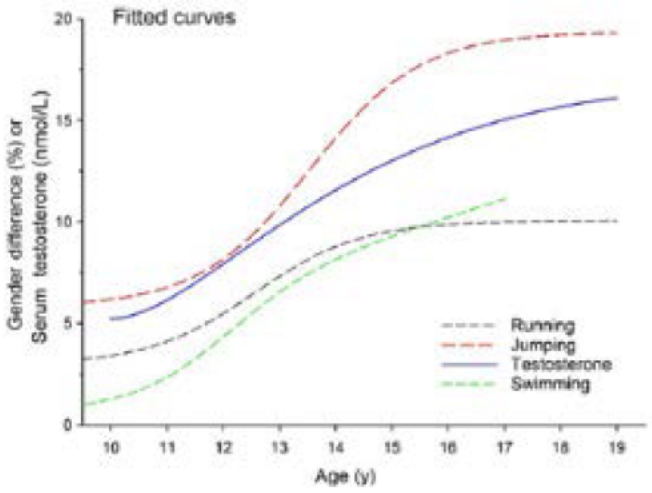
60. As illustrated by Figure 1 of Handelsman (2017) below, study results showed that "[i]n swimming performance, the overall gender differences were highly significant . . . ." (69)



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. International Weightlifting Federation "World Records":

63. 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.

64. 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

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.

65. 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.

66. 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.

67. 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)

68. 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)

69. 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)

70. "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)

71. "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)

72. "[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)

73. "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)

74. **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)

75. "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)

76. "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)

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

78. "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)

79. "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)

80. **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)

81. 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)

82. 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)

83. 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)

84. 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 (Cureton et al., 1986; Maldonado-Martin et al., 2004; Perez-Gomez et al., 2008; Sparling and Cureton, 1983)." (214)

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

85. 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)

86. "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)

87. "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)

88. 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)

89. 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)

90. 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)

91. "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)

92. 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)

93. "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)

94. 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)

95. "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)

96. 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)

97. "[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)

98. "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)

99. "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)

100. "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)

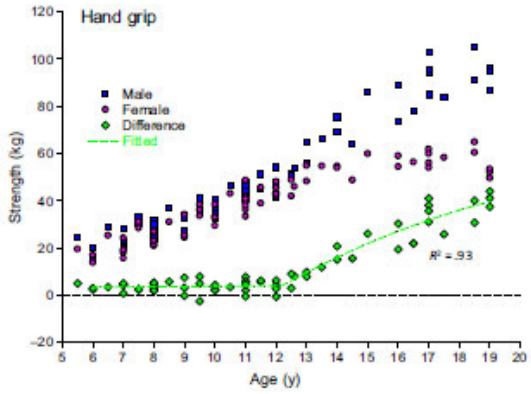
G. Louis J. G. Gooren & Mathijs C. M. Bunck, *Tanssexuals & Competitive Sports*, 151 EUROPEAN J. OF ENDOCRINOLOGY 425 (2004):

101. 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)

102. 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)

103. 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)



104. 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)

105. "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)

106. "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)

107. "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)

108. 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)

109. 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):

110. 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.

111. 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)

112. 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)

113. The average body mass index for a U.S. adult man is 29.1, and the average body mass index for a U.S. adult woman is 29.6. (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.

114. So far as I am aware, secondary school leagues do not have rules requiring testosterone suppression as a condition of males qualifying to compete in girls' athletic events based on a claim of a female gender identity. 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. The International Olympic Committee requires that males be on testosterone suppression treatment that successfully reduces testosterone to less than 10 nmol/L in order to compete in women's events.

115. In fact, the effects of hormone administration of testosterone suppression on elite athletes remains largely unquantified from a scientific perspective due to the lack of research in this population.

116. That said, 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.

117. 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.

118. 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 will impair a male's athletic potential it is still highly unlikely to be reduced to that of a

comparably aged and trained female. I review below relevant findings from several studies.

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

119. 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)

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

121. With respect to muscle mass and strength, Handelsman et al. (2018) observe that suppression of testosterone in males to levels currently accepted for transsexual 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)

122. 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.

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

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

124. 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.

125. 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)

126. 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)

127. 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)

128. 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)

129. 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-ß 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)

130. 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)

131. 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)

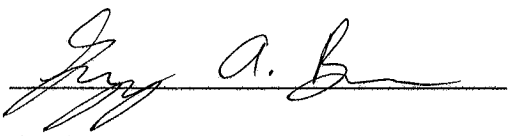
132. With respect to muscle mass, Gooren and Bunk reported what other authors have since described in more detail: "After 1 year of androgen deprivation, mean muscle area in [male-to-female transsexuals] had decreased significantly but remained significantly greater than in [female-to-male transsexuals]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

133. "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)

E. Likely effects of proposed more stringent testosterone suppression requirements.

134. There have been reports that the IOC plans to reduce the acceptable level of circulating testosterone in males seeking to compete in women's events to 5 nmol/L. However, more recent reports indicate that this proposal has been put on hold due to objections that this lower level would still not eliminate the physiological advantage of such males over women. See *"IOC delays new transgender guidelines after scientists fail to agree,"* THE GUARDIAN, Sept. 24, 2019.

135. I am not aware of studies measuring the impact on athletic performance of reducing circulating testosterone in males to 5 nmol/L. However, in light of the facts reviewed above concerning physiological characteristics that are irreversible after male puberty, it is clearly correct that a reduction of the IOC requirement to this level would not eliminate the physiological advantage of males over women. Further, given that the *mean* female concentration of circulating testosterone is 0.9 nmol/L (Handelsman et al. (2018) (821)), with the *high* end of the normal female range being about 1.7 nmol/L (Knox et al. (2019) (398)), a level of 5 nmol/L of circulating testosterone remains between *300% and 500% higher* than normal female levels. Given the findings of Huang et al. and Karunasena et al. reported in Handelsman et al. (2018) (821) and quoted above concerning the effects of suppressing circulating testosterone in adult males to 7.3 and 7 nmol/L respectively (just 46% and 40% respectively above the IOC's proposed 5 nmol/L level), it is reasonable to expect that males in whom testosterone is suppressed to 5 nmol/L will also continue to enjoy physiological advantages even in somewhat malleable parameters including muscle size, muscle strength, and circulating hemoglobin, as compared to females.

By: 

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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.
4. Bice MR, Hollman A, Bickford S, Bickford N, Ball JW, Wiedenman EM, Brown GA, Dinkel D, and Adkins M. Kinesiology in 360 Degrees. International Journal of Kinesiology in Higher Education, 1: 9-17, 2017

5. Shaw I, Shaw BS, Brown GA, and Shariat A. Review of the Role of Resistance Training and Musculoskeletal Injury Prevention and Rehabilitation. Gavin Journal of Orthopedic Research and Therapy. 1: 5-9, 2016
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
8. Shaw BS, Shaw I, & Brown GA. Resistance Exercise is Medicine. Int J Ther Rehab. 22: 233-237, 2015.
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
12. Abbey BA, Heelan KA, Brown, GA, & Bartee RT. Validity of HydraTrend™ Reagent Strips for the Assessment of Hydration Status. J Strength Cond Res. 28: 2634-9. 2014
13. Scheer KC, Siebrandt SM, Brown GA, Shaw BS, & Shaw I. Wii, Kinect, & Move. Heart Rate, Oxygen Consumption, Energy Expenditure, and Ventilation due to Different Physically Active Video Game Systems in College Students. International Journal of Exercise Science: 7: 22-32, 2014
14. Shaw BS, Shaw I, & Brown GA. Effect of concurrent aerobic and resistive breathing training on respiratory muscle length and spirometry in asthmatics. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). Supplement 1 (November), 170-183, 2013
15. Adkins M, Brown GA, Heelan K, Ansorge C, Shaw BS & Shaw I. Can dance exergaming contribute to improving physical activity levels in elementary school children? African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 19: 576-585, 2013
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
17. Brown GA, Krueger RD, Cook CM, Heelan KA, Shaw BS & Shaw I. A prediction equation for the estimation of cardiorespiratory fitness using an elliptical motion trainer. West Indian Medical Journal. 61: 114-117, 2013.

18. Shaw BS, Shaw I, & Brown GA. Body composition variation following diaphragmatic breathing. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 18: 787-794, 2012.
19. Shaw I, Shaw BS, & Brown GA. Concurrent Training and Pulmonary Function in Smokers. Int J Sports Med. 32:776-80, 2011
20. Nienhueser J, Brown, GA, Shaw BS & I Shaw. Effects of Energy Drinks on Metabolism at Rest and During Submaximal Treadmill Exercise in College Age Males. Int J Exerc Sci 4: 321-332, 2011
21. Shaw I, Shaw BS, & Brown GA. Relationship between Resistance Training and Self-Reported Habitual Nutrient Intake. South African Journal for Research in Sport, Physical Education and Recreation. 32: 109-116, 2010
22. Brown GA, Swendener AM, Shaw I, & Shaw BS. Comparison of anthropometric and metabolic responses to a short term carbohydrate restricted diet and exercise versus a traditional diet and exercise. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 16: 535-544, 2010
23. Brown GA, Ray M, Abbey BA, Shaw BS, & Shaw I. 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. 24:275-82. 2010
24. Shaw I, Shaw BS, Brown GA, & Cilliers JF. Concurrent Resistance and Aerobic Training as Protection against Heart Disease. Cardiovasc J Afr 21: 196-199, 2010
25. Brown GA, Cook CM, Krueger RD, & Heelan KA Comparison of energy expenditure on a treadmill vs. an elliptical device at a self-selected exercise intensity. J Str Cond Res 24:1643-9, 2010
26. Shaw I, Shaw BS, & Brown GA. Role of Diaphragmatic Breathing and Aerobic Exercise in Improving Maximal Oxygen Consumption in Asthmatics. Science & Sports 25:139-145, 2010
27. Shaw I, Shaw BS, & Brown GA. Comparison of Resistance and Concurrent Resistance and Endurance Training Regimes in the Development of Strength. J Str Cond Res. 23: 2507-2514, 2009
28. Castell LM, Burke LM, Stear SJ, Wolfe RR, Newsholme EA, Trudeau F, Curi R, Brown GA, Vukovich MD, and DS King. BJSM reviews: A–Z of supplements: dietary supplements, sports nutrition foods and ergogenic aids for health and performance Part 2. Br. J. Sports Med. 43:807-810. 2009
29. Shaw BS, Shaw I, & Brown GA. Resistance Training and its Effect on Total, Central and Abdominal Adiposity. South African Journal for Research in Sport, Physical Education and Recreation. 31: 97-108. 2009
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

33. McWha JA, Horst S, Brown GA, Shaw I, & Shaw BS. Metabolic Changes Associated with Playing an Active Video Game Against a Human and Computer Opponent. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). Supplement: 219-228. 2009

34. Semin K, Stahlnecker IV AC, Heelan KA, Brown GA, Shaw BS, & Shaw I. Discrepancy between Training, Competition and Laboratory Measures of Maximum Heart Rate in NCAA Division 2 Distance Runners. J Sports Sci & Med. 7: 455 – 460, 2008

35. Brown GA, Rebok MP, Scott ML, Harris III J, Colaluca MK, Shaw I, & Shaw BS. Physiological and Biomechanical Responses of Running with and Without a Stroller. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 14: 240-249, 2008

36. Brown GA, McFarland SP, Ray MW, Abbey BM, Shaw I, & Shaw BS. A Single Session of Brisk Walking Does Not Alter Blood Glucose Homeostasis in Overweight Young Men. African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). 14: 250-264, 2008

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

40. Brown, GA. Teaching skeletal muscle adaptations to aerobic exercise using an APS classic paper by Dr. Philip Gollnick and colleagues. Adv Physiol Educ. 30: 113-118, 2006

41. Brown GA, Vukovich MD, & King DS. Testosterone Prohomone Supplements. Med. Sci. Sports Exerc. Med Sci Sports Exerc. 38: 1451-1461, 2006

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

43. Brown GA, Vukovich MD, and King DS. Urinary excretion of steroid metabolites following chronic androstenedione ingestion. J. Clin. Endocrinol. Metab. 12:6235 – 6338, 2004

44. Brown GA, Dewey JC, Brunkhorst J, Vukovich MD, & King DS. Changes in serum testosterone and estradiol concentrations following acute androstenedione ingestion in young women. Horm Metab Res. 1:62-66, 2004

45. Kohut ML, Thompson JR, Campbell J, Brown GA, Vukovich MD, Jackson DA, & King DS. Ingestion of a Dietary Supplement Containing Dehydroepiandrosterone (DHEA) and Androstenedione Has Minimal Effect on Immune Function in Middle-Aged Men. J Am Coll Nutr. 22: 363-71, 2003

46. Brown GA, Martini ER, Roberts BS, Vukovich MD, & King DS. Acute hormonal responses to sublingual androstenediol intake in young men. J Appl Physiol. 92: 142-146, 2002.

47. Brown GA, Vukovich MD, Martini ER, Kohut ML, Franke WL, Jackson DA, & King DS. Effects of androstenedione-herbal supplements on serum sex hormone concentrations in 30-59 year old men. Int J Vitam Nutr Res. 71: 293-301, 2001

48. Brown GA, Vukovich MD, Martini ER, Kohut ML, Franke WL, Jackson DA, & King DS. Endocrine and lipid responses to chronic androstenediol-herbal supplementation in 30 to 58 year old men. J Am Coll Nutr. 20: 520-528, 2001.

49. Brown GA, Vukovich MD, Martini ER, Kohut ML, Franke ML, Jackson DA, & King DS. Endocrine response to chronic androstenedione intake in 30-56 year old men. J Clin Endocrinol Metab. 85: 4074-4080, 2000.

50. Brown GA, Vukovich MD, Reifenrath TA, Uhl NL, Parsons KA, Sharp RL, & King DS. Effects of anabolic precursors on serum testosterone concentrations and adaptations to resistance training in young men. Int J Sport Nutr Exerc Metab. 10: 342-362, 2000.

51. Brown GA, Vukovich MD, Sharp RL, Reifenrath TA, Parsons KA, & King DS. Effect of oral DHEA on serum testosterone and adaptations to resistance training in young men. J Appl Physiol. 87: 2274-2283, 1999.

52. King DS, Sharp RL, Vukovich MD, Brown GA, Reifenrath TA, Uhl NL, & Parsons KA. Effect of oral androstenedione on serum testosterone and adaptations to resistance training in young men: a randomized controlled trial. JAMA. 281: 2020-2028, 1999.

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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Highlights

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In accordance with 39 CFR 601.105 notice of these changes is hereby published in the Federal Register as an amendment to that section and the text of the changes is filed with the Director, Office of the Federal Register. Subscribers to the basic Manual will receive these amendments from the Government Printing Office. (For other availability of the Postal Contracting Manual, see 39 CFR 601.104.)

Description of these amendments to the Postal Contracting Manual follows:

1. The following new, revised, or replacement forms for cleaning services contracts have been included in section 16 and shall be used immediately:

(a) Form 7331, May 1979, Solicitation, Offer, and Award—Cleaning Services.

(b) Form 7335, August 1979, Cleaning Service Requirements.

(c) Form 7356, May 1979, Representations and Certifications—Cleaning Services Contracts.

(d) Form 7360, May 1979, Biweekly Report of Contractor Performance—Cleaning Services Contracts.

(e) Form 7420, May 1979, General Provisions—Cleaning Services Contracts.

Note.—Previous editions of Form 7331 are obsolete and shall be destroyed.

2. Section 22, Part 7, has been revised to establish uniform policy for entering into and administering cleaning services contracts.

In consideration of the foregoing, 39 CFR 601 is amended by adding the following to §601.105:

§ 601.105 Amendments to the Postal Contracting Manual.

Transmittal letter	Dated	FEDERAL REGISTER publication
* * * * * * *		
29	Sept. 28, 1979	44 FR

(5 U.S.C. 552(a), 39 U.S.C. 401, 404, 410, 411, 2008)

Note.—Incorporation by reference provisions approved by the Director of the Federal Register on December 3, 1971, and extended at 42 FR 29488, June 9, 1977, 43 FR 22717, May 26, 1978, and at 44 FR 31976, June 4, 1979 (corrected at 44 FR 32369, June 6, 1979).

Fred Eggleston,

Assistant General Counsel Legislative Division

[FR Doc. 79-37842 Filed 12-10-79; 8:45 am]

BILLING CODE 7710-12-M

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office for Civil Rights

Office of the Secretary

45 CFR Part 86

Title IX of the Education Amendments of 1972; a Policy Interpretation; Title IX and Intercollegiate Athletics

AGENCY: Office for Civil Rights, Office of the Secretary, HEW.

ACTION: Policy Interpretation.

SUMMARY: The following Policy Interpretation represents the Department of Health, Education, and Welfare's interpretation of the intercollegiate athletic provisions of Title IX of the Education Amendments of 1972 and its implementing regulation. Title IX prohibits educational programs and institutions funded or otherwise supported by the Department from discriminating on the basis of sex. The Department published a proposed Policy Interpretation for public comment on December 11, 1978. Over 700 comments reflecting a broad range of opinion were received. In addition, HEW staff visited eight universities during June and July, 1979, to see how the proposed policy and other suggested alternatives would apply in actual practice at individual campuses. The final Policy Interpretation reflects the many comments HEW received and the results of the individual campus visits.

EFFECTIVE DATE: December 11, 1979

FOR FURTHER INFORMATION CONTACT: Colleen O'Connor, 330 Independence Avenue, Washington, D.C. (202) 245-6671

SUPPLEMENTARY INFORMATION:

I. Legal Background

A. The Statute

Section 901(a) of Title IX of the Education Amendments of 1972 provides:

> No person in the United States shall, on the basis of sex, be excluded from participation, in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.

Section 844 of the Education Amendments of 1974 further provides:

> The Secretary of (of HEW) shall prepare and publish * * * proposed regulations implementing the provisions of Title IX of the Education Amendments of 1972 relating to the prohibition of sex discrimination in federally assisted education programs which shall include with respect to intercollegiate athletic activities reasonable provisions considering the nature of particular sports.

Congress passed Section 844 after the Conference Committee deleted a Senate floor amendment that would have exempted revenue-producing athletics from the jurisdiction of Title IX.

B. The Regulation

The regulation implementing Title IX is set forth, in pertinent part, in the Policy Interpretation below. It was signed by President Ford on May 27, 1975, and submitted to the Congress for review pursuant to Section 431(d)(1) of the General Education Provisions Act (GEPA).

During this review, the House Subcommittee on Postsecondary Education held hearings on a resolution disapproving the regulation. The Congress did not disapprove the regulation within the 45 days allowed under GEPA, and it therefore became effective on July 21, 1975.

Subsequent hearings were held in the Senate Subcommittee on Education on a bill to exclude revenues produced by sports to the extent they are used to pay the costs of those sports. The Committee, however, took no action on this bill.

The regulation established a three year transition period to give institutions time to comply with its equal athletic opportunity requirements. That transition period expired on July 21, 1978.

II. Purpose of Policy Interpretation

By the end of July 1978, the Department had received nearly 100 complaints alleging discrimination in athletics against more than 50 institutions of higher education. In attempting to investigate these complaints, and to answer questions from the university community, the Department determined that it should provide further guidance on what constitutes compliance with the law. Accordingly, this Policy Interpretation explains the regulation so as to provide a framework within which the complaints can be resolved, and to provide institutions of higher education with additional guidance on the requirements for compliance with Title IX in intercollegiate athletic programs.

III. Scope of Application

This Policy Interpretation is designed specifically for intercollegiate athletics. However, its general principles will often apply to club, intramural, and interscholastic athletic programs, which are also covered by regulation.[1]

[1] The regulation specifically refers to club sports separately from intercollegiate athletics. Accordingly, under this Policy Interpretation, club

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Accordingly, the Policy Interpretation may be used for guidance by the administrators of such programs when appropriate.

This policy interpretation applies to any public or private institution, person or other entity that operates an educational program or activity which receives or benefits from financial assistance authorized or extended under a law administered by the Department. This includes educational institutions whose students participate in HEW funded or guaranteed student loan or assistance programs. For further information see definition of "recipient" in Section 86.2 of the Title IX regulation.

IV. Summary of Final Policy Interpretation

The final Policy Interpretation clarifies the meaning of "equal opportunity" in intercollegiate athletics. It explains the factors and standards set out in the law and regulation which the Department will consider in determining whether an institution's intercollegiate athletics program complies with the law and regulations. It also provides guidance to assist institutions in determining whether any disparities which may exist between men's and women's programs are justifiable and nondiscriminatory. The Policy Interpretation is divided into three sections:

- *Compliance in Financial Assistance (Scholarships) Based on Athletic Ability:* Pursuant to the regulation, the governing principle in this area is that all such assistance should be available on a substantially proportional basis to the number of male and female participants in the institution's athletic program.
- *Compliance in Other Program Areas (Equipment and supplies; games and practice times; travel and per diem; coaching and academic tutoring; assignment and compensation of coaches and tutors; locker rooms, and practice and competitive facilities; medical and training facilities; housing and dining facilities; publicity; recruitment; and support services):* Pursuant to the regulation, the governing principle is that male and female athletes should receive equivalent treatment, benefits, and opportunities.
- *Compliance in Meeting the Interests and Abilities of Male and Female Students:* Pursuant to the regulation, the governing principle in this area is that the athletic interests and abilities of male and female students must be equally effectively accommodated.

V. Major Changes to Proposed Policy Interpretation

The final Policy Interpretation has been revised from the one published in proposed form on December 11, 1978. The proposed Policy Interpretation was based on a two-part approach. Part I addressed equal opportunity for participants in athletic programs. It required the elimination of discrimination in financial support and other benefits and opportunities in an institution's existing athletic program. Institutions could establish a presumption of compliance if they could demonstrate that:

- "Average per capita" expenditures for male and female athletes were substantially equal in the area of "readily financially measurable" benefits and opportunities or, if not, that any disparities were the result of nondiscriminatory factors, and
- Benefits and opportunities for male and female athletes, in areas which are not financially measurable, "were comparable."

Part II of the proposed Policy Interpretation addressed an institution's obligation to accommodate effectively the athletic interests and abilities of women as well as men on a continuing basis. It required an institution either:

- To follow a policy of development of its women's athletic program to provide the participation and competition opportunities needed to accommodate the growing interests and abilities of women, or
- To demonstrate that it was effectively (and equally) accommodating the athletic interests and abilities of students, particularly as the interests and abilities of women students developed.

While the basic considerations of equal opportunity remain, the final Policy Interpretation sets forth the factors that will be examined to determine an institution's actual, as opposed to presumed, compliance with Title IX in the area of intercollegiate athletics.

The final Policy Interpretation does not contain a separate section on institutions' future responsibilities. However, institutions remain obligated by the Title IX regulation to accommodate effectively the interests and abilities of male and female students with regard to the selection of sports and levels of competition available. In most cases, this will entail development of athletic programs that substantially expand opportunities for women to participate and compete at all levels.

The major reasons for the change in approach are as follows:

(1) Institutions and representatives of athletic program participants expressed a need for more definitive guidance on what constituted compliance than the discussion of a presumption of compliance provided. Consequently the final Policy Interpretation explains the meaning of "equal athletic opportunity" in such a way as to facilities an assessment of compliance.

(2) Many comments reflected a serious misunderstanding of the presumption of compliance. Most institutions based objections to the proposed Policy Interpretation in part on the assumption that failure to provide compelling justifications for disparities in per capita expenditures would have automatically resulted in a finding of noncompliance. In fact, such a failure would only have deprived an institution of the benefit of the presumption that it was in compliance with the law. The Department would still have had the burden of demonstrating that the institution was actually engaged in unlawful discrimination. Since the purpose of issuing a policy interpretation was to clarify the regulation, the Department has determined that the approach of stating actual compliance factors would be more useful to all concerned.

(3) The Department has concluded that purely financial measures such as the per capita test do not in themselves offer conclusive documentation of discrimination, except where the benefit or opportunity under review, like a scholarship, is itself financial in nature. Consequently, in the final Policy Interpretation, the Department has detailed the factors to be considered in assessing actual compliance. While per capita breakdowns and other devices to examine expenditures patterns will be used as tools of analysis in the Department's investigative process, it is achievement of "equal opportunity" for which recipients are responsible and to which the final Policy Interpretation is addressed.

A description of the comments received, and other information obtained through the comment/consultation process, with a description of Departmental action in response to the major points raised, is set forth at Appendix "B" to this document.

VI. Historic Patterns of Intercollegiate Athletics Program Development and Operations

In its proposed Policy Interpretation of December 11, 1978, the Department

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Footnotes continued from last page
teams will not be considered to be intercollegiate teams except in those instances where they regularly participate in varsity competition.

published a summary of historic patterns affecting the relative status of men's and women's athletic programs. The Department has modified that summary to reflect additional information obtained during the comment and consultation process. The summary is set forth at Appendix A to this document.

VII. The Policy Interpretation

This Policy Interpretation clarifies the obligations which recipients of Federal aid have under Title IX to provide equal opportunities in athletic programs. In particular, this Policy Interpretation provides a means to assess an institution's compliance with the equal opportunity requirements of the regulation which are set forth at 45 CFR 86.37(c) and 86.41(c).

A. Athletic Financial Assistance (Scholarships)

1. *The Regulation*—Section 86.37(c) of the regulation provides:

> [Institutions] must provide reasonable opportunities for such award [of financial assistance] for members of each sex in proportion to the number of students of each sex participating in * * * inter-collegiate athletics.[2]

2. *The Policy*—The Department will examine compliance with this provision of the regulation primarily by means of a financial comparison to determine whether proportionately equal amounts of financial assistance (scholarship aid) are available to men's and women's athletic programs. The Department will measure compliance with this standard by dividing the amounts of aid available for the members of each sex by the numbers of male or female participants in the athletic program and comparing the results. Institutions may be found in compliance if this comparison results in substantially equal amounts or if a resulting disparity can be explained by adjustments to take into account legitimate, nondiscriminatory factors. Two such factors are:

a. At public institutions, the higher costs of tuition for students from out-of-state may in some years be unevenly distributed between men's and women's programs. These differences will be considered nondiscriminatory if they are not the result of policies or practices which disproportionately limit the availability of out-of-state scholarships to either men or women.

b. An institution may make reasonable professional decisions concerning the awards most appropriate for program development. For example, team development initially may require spreading scholarships over as much as a full generation (four years) of student athletes. This may result in the award of fewer scholarships in the first few years than would be necessary to create proportionality between male and female athletes.

3. *Application of the Policy*—a. This section does not require a proportionate number of scholarships for men and women or individual scholarships of equal dollar value. It does mean that the total amount of scholarship aid made available to men and women must be substantially proportionate to their participation rates.

b. When financial assistance is provided in forms other than grants, the distribution of non-grant assistance will also be compared to determine whether equivalent benefits are proportionately available to male and female athletes. A disproportionate amount of work-related aid or loans in the assistance made available to the members of one sex, for example, could constitute a violation of Title IX.

4. *Definition*—For purposes of examining compliance with this Section, the participants will be defined as those athletes:

a. Who are receiving the institutionally-sponsored support normally provided to athletes competing at the institution involved, e.g., coaching, equipment, medical and training room services, on a regular basis during a sport's season; and

b. Who are participating in organized practice sessions and other team meetings and activities on a regular basis during a sport's season; and

c. Who are listed on the eligibility or squad lists maintained for each sport, or

d. Who, because of injury, cannot meet a, b, or c above but continue to receive financial aid on the basis of athletic ability.

B. Equivalence in Other Athletic Benefits and Opportunities

1. *The Regulation*—The Regulation requires that recipients that operate or sponsor interscholastic, intercollegiate, club, or intramural athletics, "provide equal athletic opportunities for members of both sexes." In determining whether an institution is providing equal opportunity in intercollegiate athletics, the regulation requires the Department to consider, among others, the following factors:

(1) [3]

(2) Provision and maintenance of equipment and supplies;

(3) Scheduling of games and practice times;

(4) Travel and per diem expenses;

(5) Opportunity to receive coaching and academic tutoring;

(6) Assignment and compensation of coaches and tutors;

(7) Provision of locker rooms, practice and competitive facilities;

(8) Provision of medical and training services and facilities;

(9) Provision of housing and dining services and facilities; and

(10) Publicity

Section 86.41(c) also permits the Director of the Office for Civil Rights to consider other factors in the determination of equal opportunity. Accordingly, this Section also addresses recruitment of student athletes and provision of support services.

This list is not exhaustive. Under the regulation, it may be expanded as necessary at the discretion of the Director of the Office for Civil Rights.[4]

2. *The Policy*—The Department will assess compliance with both the recruitment and the general athletic program requirements of the regulation by comparing the availability, quality and kinds of benefits, opportunities, and treatment afforded members of both sexes. Institutions will be in compliance if the compared program components are equivalent, that is, equal or equal in effect. Under this standard, identical benefits, opportunities, or treatment are not required, provided the overall effect of any differences is negligible.

If comparisons of program components reveal that treatment, benefits, or opportunities are not equivalent in kind, quality or availability, a finding of compliance may still be justified if the differences are the result of nondiscriminatory factors. Some of the factors that may justify these differences are as follows:

a. Some aspects of athletic programs may not be equivalent for men and women because of unique aspects of particular sports or athletic activities. This type of distinction was called for by the "Javits' Amendment"[5] to Title IX, which instructed HEW to make "reasonable [regulatory] provisions considering the nature of particular sports" in intercollegiate athletics.

Generally, these differences will be the result of factors that are inherent to the basic operation of specific sports. Such factors may include rules of play, nature/replacement of equipment, rates of injury resulting from participation,

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[2] See also § 86.37(a) of the regulation.

[3] 86.41(c) (1) on the accommodation of student interests and abilities, is covered in detail in the following Section C of this policy interpretation.

[4] See also § 86.41(a) and (b) of the regulation.

[5] Section 844 of the Education Amendments of 1974, Pub. L. 93-380, Title VIII, (August 21, 1974) 88 Stat. 612.

nature of facilities required for competition, and the maintenance/ upkeep requirements of those facilities. For the most part, differences involving such factors will occur in programs offering football, and consequently these differences will favor men. If sport-specific needs are met equivalently in both men's and women's programs, however, differences in particular program components will be found to be justifiable.

b. Some aspects of athletic programs may not be equivalent for men and women because of legitimately sex-neutral factors related to special circumstances of a temporary nature. For example, large disparities in recruitment activity for any particular year may be the result of annual fluctuations in team needs for first-year athletes. Such diferences are justifiable to the extent that they do not reduce overall equality of opportunity.

c. The activities directly associated with the operation of a competitive event in a single-sex sport may, under some circumstances, create unique demands or imbalances in particular program components. Provided any special demands associated with the activities of sports involving participants of the other sex are met to an equivalent degree, the resulting differences may be found nondiscriminatory. At many schools, for example, certain sports—notably football and men's basketball—traditionally draw large crowds. Since the costs of managing an athletic event increase with crowd size, the overall support made available for event management to men's and women's programs may differ in degree and kind. These differences would not violate Title IX if the recipient does not limit the potential for women's athletic events to rise in spectator appeal and if the levels of event management support available to both programs are based on sex-neutral criteria (e.g., facilities used, projected attendance, and staffing needs).

d. Some aspects of athletic programs may not be equivalent for men and women because institutions are undertaking voluntary affirmative actions to overcome effects of historical conditions that have limited participation in athletics by the members of one sex. This is authorized at § 86.3(b) of the regulation.

3. *Application of the Policy—General Athletic Program Components*—a. *Equipment and Supplies (§ 86.41(c)(2)).* Equipment and supplies include but are not limited to uniforms, other apparel, sport-specific equipment and supplies, general equipment and supplies, instructional devices, and conditioning and weight training equipment.

Compliance will be assessed by examining, among other factors, the equivalence for men and women of:

(1) The quality of equipment and supplies;

(2) The amount of equipment and supplies;

(3) The suitability of equipment and supplies;

(4) The maintenance and replacement of the equipment and supplies; and

(5) The availability of equipment and supplies.

b. *Scheduling of Games and Practice Times (§ 86.41(c)(3)).* Compliance will be assessed by examining, among other factors, the equivalence for men and women of:

(1) The number of competitive events per sport;

(2) The number and length of practice opportunities;

(3) The time of day competitive events are scheduled;

(4) The time of day practice opportunities are scheduled; and

(5) The opportunities to engage in available pre-season and post-season competition.

c. *Travel and Per Diem Allowances (§ 86.41(c)(4)).* Compliance will be assessed by examining, among other factors, the equivalence for men and women of:

(1) Modes of transportation;

(2) Housing furnished during travel;

(3) Length of stay before and after competitive events;

(4) Per diem allowances; and

(5) Dining arrangements.

d. *Opportunity to Receive Coaching and Academic Tutoring (§ 86.41(c)(5)).* (1) Coaching—Compliance will be assessed by examining, among other factors:

(a) Relative availability of full-time coaches;

(b) Relative availability of part-time and assistant coaches; and

(c) Relative availability of graduate assistants.

(2) Academic tutoring—Compliance will be assessed by examining, among other factors, the equivalence for men and women of:

(a) The availability of tutoring; and

(b) Procedures and criteria for obtaining tutorial assistance.

e. *Assignment and Compensation of Coaches and Tutors (§ 86.41(c)(6)).*[6] In general, a violation of Section 86.41(c)(6) will be found only where compensation or assignment policies or practices deny male and female athletes coaching of equivalent quality, nature, or availability.

Nondiscriminatory factors can affect the compensation of coaches. In determining whether differences are caused by permissible factors, the range and nature of duties, the experience of individual coaches, the number of participants for particular sports, the number of assistant coaches supervised, and the level of competition will be considered.

Where these or similar factors represent valid differences in skill, effort, responsibility or working conditions they may, in specific circumstances, justify differences in compensation. Similarly, there may be unique situations in which a particular person may possess such an outstanding record of achievement as to justify an abnormally high salary.

(1) Assignment of Coaches—Compliance will be assessed by examining, among other factors, the equivalence for men's and women's coaches of:

(a) Training, experience, and other professional qualifications;

(b) Professional standing.

(2) Assignment of Tutors—Compliance will be assessed by examining, among other factors, the equivalence for men's and women's tutors of:

(a) Tutor qualifications;

(b) Training, experience, and other qualifications.

(3) Compensation of Coaches—Compliance will be assessed by examining, among other factors, the equivalence for men's and women's coaches of:

(a) Rate of compensation (per sport, per season);

(b) Duration of contracts;

(c) Conditions relating to contract renewal;

(d) Experience;

(e) Nature of coaching duties performed;

(f) Working conditions; and

(g) Other terms and conditions of employment.

(4) Compensation of Tutors—Compliance will be assessed by examining, among other factors, the equivalence for men's and women's tutors of:

[6] The Department's jurisdiction over the employment practices of recipients under Subpart E, §§ 86.51–86.61 of the Title IX regulation has been successfully challenged in several court cases. Accordingly, the Department has suspended enforcement of Subpart E. Section 86.41(c)(6) of the regulation, however, authorizes the Department to consider the compensation of coaches of men and women in the determination of the equality of athletic opportunity provided to male and female athletes. It is on this section of the regulation that this Policy Interpretation is based.

(a) Hourly rate of payment by nature of subjects tutored;
(b) Pupil loads per tutoring season;
(c) Tutor qualifications;
(d) Experience;
(e) Other terms and conditions of employment.

f. *Provision of Locker Rooms, Practice and Competitive Facilities (§ 86.41(c)(7)).* Compliance will be assessed by examining, among other factors, the equivalence for men and women of:
(1) Quality and availability of the facilities provided for practice and competitive events;
(2) Exclusivity of use of facilities provided for practice and competitive events;
(3) Availability of locker rooms;
(4) Quality of locker rooms;
(5) Maintenance of practice and competitive facilities; and
(6) Preparation of facilities for practice and competitive events.

g. *Provision of Medical and Training Facilities and Services (§ 86.41(c)(8)).* Compliance will be assessed by examining, among other factors, the equivalence for men and women of:
(1) Availability of medical personnel and assistance;
(2) Health, accident and injury insurance coverage;
(3) Availability and quality of weight and training facilities;
(4) Availability and quality of conditioning facilities; and
(5) Availability and qualifications of athletic trainers.

h. *Provision of Housing and Dining Facilities and Services (§ 86.41(c)(9)).* Compliance will be assessed by examining, among other factors, the equivalence for men and women of:
(1) Housing provided;
(2) Special services as part of housing arrangements (e.g., laundry facilities, parking space, maid service).

i. *Publicity (§ 86.41(c)(10)).* Compliance will be assessed by examining, among other factors, the equivalence for men and women of:
(1) Availability and quality of sports information personnel;
(2) Access to other publicity resources for men's and women's programs; and
(3) Quantity and quality of publications and other promotional devices featuring men's and women's programs.

4. *Application of the Policy—Other Factors (§ 86.41(c)).* a. *Recruitment of Student Athletes.*[7] The athletic recruitment practices of institutions often affect the overall provision of opportunity to male and female athletes. Accordingly, where equal athletic opportunities are not present for male and female students, compliance will be assessed by examining the recruitment practices of the athletic programs for both sexes to determine whether the provision of equal opportunity will require modification of those practices.

Such examinations will review the following factors:
(1) Whether coaches or other professional athletic personnel in the programs serving male and female athletes are provided with substantially equal opportunities to recruit;
(2) Whether the financial and other resources made available for recruitment in male and female athletic programs are equivalently adequate to meet the needs of each program; and
(3) Whether the differences in benefits, opportunities, and treatment afforded prospective student athletes of each sex have a disproportionately limiting effect upon the recruitment of students of either sex.

b. *Provision of Support Services.* The administrative and clerical support provided to an athletic program can affect the overall provision of opportunity to male and female athletes, particularly to the extent that the provided services enable coaches to perform better their coaching functions.

In the provision of support services, compliance will be assessed by examining, among other factors, the equivalence of:
(1) The amount of administrative assistance provided to men's and women's programs;
(2) The amount of secretarial and clerical assistance provided to men's and women's programs.

5. *Overall Determination of Compliance.* The Department will base its compliance determination under § 86.41(c) of the regulation upon an examination of the following:
a. Whether the policies of an institution are discriminatory in language or effect; or
b. Whether disparities of a substantial and unjustified nature exist in the benefits, treatment, services, or opportunities afforded male and female athletes in the institution's program as a whole; or
c. Whether disparities in benefits, treatment, services, or opportunities in individual segments of the program are substantial enough in and of themselves to deny equality of athletic opportunity.

C. Effective Accommodation of Student Interests and Abilities.

1. *The Regulation.* The regulation requires institutions to accommodate effectively the interests and abilities of students to the extent necessary to provide equal opportunity in the selection of sports and levels of competition available to members of both sexes.

Specifically, the regulation, at § 86.41(c)(1), requires the Director to consider, when determining whether equal opportunities are available—

Whether the selection of sports and levels of competition effectively accommodate the interests and abilities of members of both sexes.

Section 86.41(c) also permits the Director of the Office for Civil Rights to consider other factors in the determination of equal opportunity. Accordingly, this section also addresses competitive opportunities in terms of the competitive team schedules available to athletes of both sexes.

2. *The Policy.* The Department will assess compliance with the interests and abilities section of the regulation by examining the following factors:
a. The determination of athletic interests and abilities of students;
b. The selection of sports offered; and
c. The levels of competition available including the opportunity for team competition.

3. *Application of the Policy—Determination of Athletic Interests and Abilities.*

Institutions may determine the athletic interests and abilities of students by nondiscriminatory methods of their choosing provided:
a. The processes take into account the nationally increasing levels of women's interests and abilities;
b. The methods of determining interest and ability do not disadvantage the members of an underrepresented sex;
c. The methods of determining ability take into account team performance records; and
d. The methods are responsive to the expressed interests of students capable of intercollegiate competition who are members of an underrepresented sex.

4. *Application of the Policy—Selection of Sports.*

In the selection of sports, the regulation does not require institutions

[7] Public undergraduate institutions are also subject to the general anti-discrimination provision at § 86.23 of the regulation, which reads in part:

"A recipient * * * shall not discriminate on the basis of sex in the recruitment and admission of students. A recipient may be required to undertake additional recruitment efforts for one sex as remedial action * * * and may choose to undertake such efforts as affirmative action * * *"

Accordingly, institutions subject to § 86.23 are required in all cases to maintain equivalently effective recruitment programs for both sexes and, under § 86.41(c), to provide equivalent benefits, opportunities, and treatment to student athletes of both sexes.

to integrate their teams nor to provide exactly the same choice of sports to men and women. However, where an institution sponsors a team in a particular sport for members of one sex, it may be required either to permit the excluded sex to try out for the team or to sponsor a separate team for the previously excluded sex.

a. Contact Sports—Effective accommodation means that if an institution sponsors a team for members of one sex in a contact sport, it must do so for members of the other sex under the following circumstances:

(1) The opportunities for members of the excluded sex have historically been limited; and

(2) There is sufficient interest and ability among the members of the excluded sex to sustain a viable team and a reasonable expectation of intercollegiate competition for that team.

b. Non-Contact Sports—Effective accommodation means that if an institution sponsors a team for members of one sex in a non-contact sport, it must do so for members of the other sex under the following circumstances:

(1) The opportunities for members of the excluded sex have historically been limited;

(2) There is sufficient interest and ability among the members of the excluded sex to sustain a viable team and a reasonable expectation of intercollegiate competition for that team; and

(3) Members of the excluded sex do not possess sufficient skill to be selected for a single integrated team, or to compete actively on such a team if selected.

5. *Application of the Policy—Levels of Competition.*

In effectively accommodating the interests and abilities of male and female athletes, institutions must provide both the opportunity for individuals of each sex to participate in intercollegiate competition, and for athletes of each sex to have competitive team schedules which equally reflect their abilities.

a. Compliance will be assessed in any one of the following ways:

(1) Whether intercollegiate level participation opportunities for male and female students are provided in numbers substantially proportionate to their respective enrollments; or

(2) Where the members of one sex have been and are underrepresented among intercollegiate athletes, whether the institution can show a history and continuing practice of program expansion which is demonstrably responsive to the developing interest and abilities of the members of that sex; or

(3) Where the members of one sex are underrepresented among intercollegiate athletes, and the institution cannot show a continuing practice of program expansion such as that cited above, whether it can be demonstrated that the interests and abilities of the members of that sex have been fully and effectively accommodated by the present program.

b. Compliance with this provision of the regulation will also be assessed by examining the following:

(1) Whether the competitive schedules for men's and women's teams, on a program-wide basis, afford proportionally similar numbers of male and female athletes equivalently advanced competitive opportunities; or

(2) Whether the institution can demonstrate a history and continuing practice of upgrading the competitive opportunities available to the historically disadvantaged sex as warranted by developing abilities among the athletes of that sex.

c. Institutions are not required to upgrade teams to intercollegiate status or otherwise develop intercollegiate sports absent a reasonable expectation that intercollegiate competition in that sport will be available within the institution's normal competitive regions. Institutions may be required by the Title IX regulation to actively encourage the development of such competition, however, when overall athletic opportunities within that region have been historically limited for the members of one sex.

6. *Overall Determination of Compliance.*

The Department will base its compliance determination under § 86.41(c) of the regulation upon a determination of the following:

a. Whether the policies of an institution are discriminatory in language or effect; or

b. Whether disparities of a substantial and unjustified nature in the benefits, treatment, services, or opportunities afforded male and female athletes exist in the institution's program as a whole; or

c. Whether disparities in individual segments of the program with respect to benefits, treatment, services, or opportunities are substantial enough in and of themselves to deny equality of athletic opportunity.

VIII. The Enforcement Process

The process of Title IX enforcement is set forth in § 86.71 of the Title IX regulation, which incorporates by reference the enforcement procedures applicable to Title VI of the Civil Rights Act of 1964.[8] The enforcement process prescribed by the regulation is supplemented by an order of the Federal District Court, District of Columbia, which establishes time frames for each of the enforcement steps.[9]

According to the regulation, there are two ways in which enforcement is initiated:

- *Compliance Reviews*—Periodically the Department must select a number of recipients (in this case, colleges and universities which operate intercollegiate athletic programs) and conduct investigations to determine whether recipients are complying with Title IX. (45 CFR 80.7(a))
- *Complaints*—The Department must investigate all valid (written and timely) complaints alleging discrimination on the basis of sex in a recipient's programs. (45 CFR 80.7(b))

The Department must inform the recipient (and the complainant, if applicable) of the results of its investigation. If the investigation indicates that a recipient is in compliance, the Department states this, and the case is closed. If the investigation indicates noncompliance, the Department outlines the violations found.

The Department has 90 days to conduct an investigation and inform the recipient of its findings, and an additional 90 days to resolve violations by obtaining a voluntary compliance agreement from the recipient. This is done through negotiations between the Department and the recipient, the goal of which is agreement on steps the recipient will take to achieve compliance. Sometimes the violation is relatively minor and can be corrected immediately. At other times, however, the negotiations result in a plan that will correct the violations within a specified period of time. To be acceptable, a plan must describe the manner in which institutional resources will be used to correct the violation. It also must state acceptable time tables for reaching interim goals and full compliance. When agreement is reached, the Department notifies the institution that its plan is acceptable. The Department then is obligated to review periodically the implementation of the plan.

An institution that is in violation of Title IX may already be implementing a corrective plan. In this case, prior to informing the recipient about the results of its investigation, the Department will determine whether the plan is adequate.

[8] Those procedures may be found at 45 CFR 80.6–80.11 and 45 CFR Part 8.

[9] *WEAL* v. *Harris*, Civil Action No. 74–1720 (D. D.C., December 29, 1977).

If the plan is not adequate to correct the violations (or to correct them within a reasonable period of time) the recipient will be found in noncompliance and voluntary negotiations will begin. However, if the institutional plan is acceptable, the Department will inform the institution that although the institution has violations, it is found to be in compliance because it is implementing a corrective plan. The Department, in this instance also, would monitor the progress of the institutional plan. If the institution subsequently does not completely implement its plan, it will be found in noncompliance.

When a recipient is found in noncompliance and voluntary compliance attempts are unsuccessful, the formal process leading to termination of Federal assistance will be begun. These procedures, which include the opportunity for a hearing before an administrative law judge, are set forth at 45 CFR 80.8–80.11 and 45 CFR Part 81.

IX. Authority

(Secs. 901, 902, Education Amendments of 1972, 86 Stat. 373, 374, 20 U.S.C. 1681, 1682; sec. 844, Education Amendments of 1974, Pub. L. 93–380, 88 Stat. 612; and 45 CFR Part 86)

Dated: December 3, 1979.

Roma Stewart,

Director, Office for Civil Rights, Department of Health, Education, and Welfare.

Dated: December 4, 1979.

Patricia Roberts Harris,

Secretary, Department of Health, Education, and Welfare.

Appendix A—Historic Patterns of Intercollegiate Athletics Program Development

1. Participation in intercollegiate sports has historically been emphasized for men but not women. Partially as a consequence of this, participation rates of women are far below those of men. During the 1977–78 academic year women students accounted for 48 percent of the national undergraduate enrollment (5,496,000 of 11,267,000 students).[1] Yet, only 30 percent of the intercollegiate athletes are women.[2]

The historic emphasis on men's intercollegiate athletic programs has also contributed to existing differences in the number of sports and scope of competition offered men and women. One source indicates that, on the average, colleges and universities are providing twice the number of sports for men as they are for women.[3]

2. Participation by women in sports is growing rapidly. During the period from 1971–1978, for example, the number of female participants in organized high school sports increased from 294,000 to 2,083,000—an increase of over 600 percent.[4] In contrast, between Fall 1971 and Fall 1977, the enrollment of females in high school decreased from approximately 7,600,000 to approximately 7,150,000 a decrease of over 5 percent.[5]

The growth in athletic participation by high school women has been reflected on the campuses of the nation's colleges and universities. During the period from 1971 to 1976 the enrollment of women in the nation's institutions of higher education rose 52 percent, from 3,400,000 to 5,201,000.[6] During this same period, the number of women participating in intramural sports increased 108 percent from 276,167 to 576,167. In club sports, the number of women participants increased from 16,386 to 25,541 or 55 percent. In intercollegiate sports, women's participation increased 102 percent from 31,852 to 64,375.[7] These developments reflect the growing interest of women in competitive athletics, as well as the efforts of colleges and universities to accommodate those interests.

3. The overall growth of women's intercollegiate programs has not been at the expense of men's programs. During the past decade of rapid growth in women's programs, the number of intercollegiate sports available for men has remained stable, and the number of male athletes has increased slightly. Funding for men's programs has increased from $1.2 to $2.2 million between 1970–1977 alone.[8]

4. On most campuses, the primary problem confronting women athletes is the absence of a fair and adequate level of resources, services, and benefits. For example, disproportionately more financial aid has been made available for male athletes than for female athletes. Presently, in institutions that are members of both the National Collegiate Athletic Association (NCAA) and the Association for Intercollegiate Athletics for Women (AIAW), the average annual scholarship budget is $39,000. Male athletes receive $32,000 or 78 percent of this amount, and female athletes receive $7,000 or 22 percent, although women are 30 percent of all the athletes eligible for scholarships.[9]

Likewise, substantial amounts have been provided for the recruitment of male athletes, but little funding has been made available for recruitment of female athletes.

Congressional testimony on Title IX and subsequent surveys indicates that discrepancies also exist in the opportunity to receive coaching and in other benefits and opportunities, such as the quality and amount of equipment, access to facilities and practice times, publicity, medical and training facilities, and housing and dining facilities.[10]

5. At several institutions, intercollegiate football is unique among sports. The size of the teams, the expense of the operation, and the revenue produced distinguish football from other sports, both men's and women's. Title IX requires that "an institution of higher education must comply with the prohibition against sex discrimination imposed by that title and its implementing regulations in the administration of any revenue producing intercollegiate athletic activity."[11] However, the unique size and cost of football programs have been taken into account in developing this Policy Interpretation.

Appendix B—Comments and Responses

The Office for Civil Rights (OCR) received over 700 comments and recommendations in response to the December 11, 1978 publication of the proposed Policy Interpretation. After the formal comment period, representatives of the Department met for additional discussions with many individuals and

[1] *The Condition of Education 1979*, National Center for Education Statistics, p. 112.

[2] Figure obtained from Association for Intercollegiate Athletics for Women (AIAW) member survey, *AIAW Structure Implementation Survey Data Summary*, October 1978, p. 11.

[3] U.S. Commission on Civil Rights, Comments to DHEW on proposed Policy Interpretation; Analysis of data supplied by the National Association of Directors of Collegiate Athletics.

[4] Figures obtained from National Federation of High School Associations (NFHSA) data.

[5] *Digest of Education Statistics 1977–78*, National Center for Education Statistics (1978), Table 40, at 44. Data, by sex, are unavailable for the period from 1971 to 1977; consequently, these figures represent 50 percent of total enrollment for that period. This is the best comparison that could be made based on available data.

[6] Ibid. p. 112.

[7] These figures, which are not precisely comparable to those cited at footnote 2, were obtained from *Sports and Recreational Programs of the Nation's Universities and Colleges*, NCAA Report No. 5, March 1978. It includes figures only from the 722 NCAA member institutions because comparable data was not available from other associations.

[8] Compiled from NCAA *Revenues and Expenses for Intercollegiate Athletic Programs*, 1978.

[9] Figures obtained from *AIAW Structure Implementation Survey Data Summary*, October, 1978, p. 11.

[10] 121 Cong. REc. 29791–95 (1975) (remarks of Senator Williams); Comments by Senator Bayh. Hearings on S. 2106 Before the Subcommittee on Education of the Senate Committee on Labor and Public Welfare, 94th Congress, 1st Session 48 (1975); "Survey of Women's Athletic Directors," AIAW Workshop (January 1978).

[11] See April 18, 1979, Opinion of General Counsel, Department of Health, Education, and Welfare, page 1.

groups including college and university officials, athletic associations, athletic directors, women's rights organizations and other interested parties. HEW representatives also visited eight universities in order to assess the potential of the proposed Policy Interpretation and of suggested alternative approaches for effective enforcement of Title IX.

The Department carefully considered all information before preparing the final policy. Some changes in the structure and substance of the Policy Interpretation have been made as a result of concerns that were identified in the comment and consultation process.

Persons who responded to the request for public comment were asked to comment generally and also to respond specifically to eight questions that focused on different aspects of the proposed Policy Interpretation.

Question No. 1: Is the description of the current status and development of intercollegiate athletics for men and women accurate? What other factors should be considered?

Comment A: Some commentors noted that the description implied the presence of intent on the part of all universities to discriminate against women. Many of these same commentors noted an absence of concern in the proposed Policy Interpretation for those universities that have in good faith attempted to meet what they felt to be a vague compliance standard in the regulation.

Response: The description of the current status and development of intercollegiate athletics for men and women was designed to be a factual, historical overview. There was no intent to imply the universal presence of discrimination. The Department recognizes that there are many colleges and universities that have been and are making good faith efforts, in the midst of increasing financial pressures, to provide equal athletic opportunities to their male and female athletes.

Comment B: Commentors stated that the statistics used were outdated in some areas, incomplete in some areas, and inaccurate in some areas.

Response: Comment accepted. The statistics have been updated and corrected where necessary.

Question No. 2: Is the proposed two-stage approach to compliance practical? Should it be modified? Are there other approaches to be considered?

Comment: Some commentors stated that Part II of the proposed Policy Interpretation "Equally Accommodating the Interests and Abilities of Women" represented an extension of the July 1978, compliance deadline established in § 86.41(d) of the Title IX regulation.

Response: Part II of the proposed Policy Interpretation was not intended to extend the compliance deadline. The format of the two stage approach, however, seems to have encouraged that perception; therefore, the elements of both stages have been unified in this Policy Interpretation.

Question No. 3: Is the equal average per capita standard based on participation rates practical? Are there alternatives or modifications that should be considered?

Comment A: Some commentors stated it was unfair or illegal to find noncompliance solely on the basis of a financial test when more valid indicators of equality of opportunity exist.

Response: The equal average per capita standard was not a standard by which noncompliance could be found. It was offered as a standard of presumptive compliance. In order to prove noncompliance, HEW would have been required to show that the unexplained disparities in expenditures were discriminatory in effect. The standard, in part, was offered as a means of simplifying proof of compliance for universities. The widespread confusion concerning the significance of failure to satisfy the equal average per capita expenditure standard, however, is one of the reasons it was withdrawn.

Comment B: Many commentors stated that the equal average per capita standard penalizes those institutions that have increased participation opportunities for women and rewards institutions that have limited women's participation.

Response: Since equality of average per capita expenditures has been dropped as a standard of presumptive compliance, the question of its effect is no longer relevant. However, the Department agrees that universities that had increased participation opportunities for women and wished to take advantage of the presumptive compliance standard, would have had a bigger financial burden than universities that had done little to increase participation opportunities for women.

Question No. 4: Is there a basis for treating part of the expenses of a particular revenue producing sport differently because the sport produces income used by the university for non-athletic operating expenses on a non-discriminatory basis? If, so, how should such funds be identified and treated?

Comment: Commentors stated that this question was largely irrelevant because there were so few universities at which revenue from the athletic program was used in the university operating budget.

Response: Since equality of average per capita expenditures has been dropped as a standard of presumed compliance, a decision is no longer necessary on this issue.

Question No. 5: Is the grouping of financially measurable benefits into three categories practical? Are there alternatives that should be considered? Specifically, should recruiting expenses be considered together with all other financially measurable benefits?

Comment A: Most commentors stated that, if measured solely on a financial standard, recruiting should be grouped with the other financially measurable items. Some of these commentors held that at the current stage of development of women's intercollegiate athletics, the amount of money that would flow into the women's recruitment budget as a result of separate application of the equal average per capita standard to recruiting expenses, would make recruitment a disproportionately large percentage of the entire women's budget. Women's athletic directors, particularly, wanted the flexibility to have the money available for other uses, and they generally agreed on including recruitment expenses with the other financially measurable items.

Comment B: Some commentors stated that it was particularly inappropriate to base any measure of compliance in recruitment solely on financial expenditures. They stated that even if proportionate amounts of money were allocated to recruitment, major inequities could remain in the benefits to athletes. For instance, universities could maintain a policy of subsidizing visits to their campuses of prospective students of one sex but not the other. Commentors suggested that including an examination of differences in benefits to prospective athletes that result from recruiting methods would be appropriate.

Response: In the final Policy Interpretation, recruitment has been moved to the group of program areas to be examined under § 86.41(c) to determine whether overall equal athletic opportunity exists. The Department accepts the comment that a financial measure is not sufficient to determine whether equal opportunity is being provided. Therefore, in examining athletic recruitment, the Department will primarily review the opportunity to recruit, the resources provided for recruiting, and methods of recruiting.

Question No. 6: Are the factors used to justify differences in equal average per capita expenditures for financially

measurable benefits and opportunities fair? Are there other factors that should be considered?

Comment: Most commentors indicated that the factors named in the proposed Policy Interpretion (the "scope of competition" and the "nature of the sport") as justifications for differences in equal average per capita expenditures were so vague and ambiguous as to be meaningless. Some stated that it would be impossible to define the phrase "scope of competition", given the greatly differing competitive structure of men's and women's programs. Other commentors were concerned that the "scope of competition" factor that may currently be designated as "non-discriminatory" was, in reality, the result of many years of inequitable treatment of women's athletic programs.

Response: The Department agrees that it would have been difficult to define clearly and then to quantify the "scope of competition" factor. Since equal average per capita expenditures has been dropped as a standard of presumed compliance, such financial justifications are no longer necessary. Under the equivalency standard, however, the "nature of the sport" remains an important concept. As explained within the Policy Interpretation, the unique nature of a sport may account for perceived inequities in some program areas.

Question No 7: Is the comparability standard for benefits and opportunities that are not financially measurably fair and realistic? Should other factors controlling comparability be included? Should the comparability standard be revised? Is there a different standard which should be considered?

Comment: Many commentors stated that the comparability standard was fair and realistic. Some commentors were concerned, however, that the standard was vague and subjective and could lead to uneven enforcement.

Response: The concept of comparing the non-financially measurable benefits and opportunities provided to male and female athletes has been preserved and expanded in the final Policy Interpretation to include all areas of examination except scholarships and accommodation of the interests and abilities of both sexes. The standard is that equivalent benefits and opportunities must be provided. To avoid vagueness and subjectivity, further guidance is given about what elements will be considered in each program area to determine the equivalency of benefits and opportunities.

Question No. 8: Is the proposal for increasing the opportunity for women to participate in competitive athletics appropriate and effective? Are there other procedures that should be considered? Is there a more effective way to ensure that the interest and abilities of both men and women are equally accommodated?

Comment: Several commentors indicated that the proposal to allow a university to gain the status of presumed compliance by having policies and procedures to encourage the growth of women's athletics was appropriate and effective for future students, but ignored students presently enrolled. They indicated that nowhere in the proposed Policy Interpretation was concern shown that the current selection of sports and levels of competition effectively accommodate the interests and abilities of women as well as men.

Response: Comment accepted. The requirement that universities equally accommodate the interests and abilities of their male and female athletes (Part II of the proposed Policy Interpretation) has been directly addressed and is now a part of the unified final Policy Interpretation.

Additional Comments

The following comments were not responses to questions raised in the proposed Policy Interpretation. They represent additional concerns expressed by a large number of commentors.

(1) *Comment:* Football and other "revenue producing" sports should be totally exempted or should receive special treatment under Title IX.

Response: The April 18, 1978, opinion of the General Counsel, HEW, concludes that "an institution of higher education must comply with the prohibition against sex discrimination imposed by that title and its implementing regulation in the administration of any revenue producing activity". Therefore, football or other "revenue producing" sports cannot be exempted from coverage of Title IX.

In developing the proposed Policy Interpretation the Department concluded that although the fact of revenue production could not justify disparity in average per capita expenditure between men and women, there were characteristics common to most revenue producing sports that could result in legitimate non-discriminatory differences in per capita expenditures. For instance, some "revenue producing" sports require expensive protective equipment and most require high expenditures for the management of events attended by large numbers of people. These characteristics and others described in the proposed Policy Interpretation were considered acceptable, non-discriminatory reasons for differences in per capita average expenditures.

In the final Policy Interpretation, under the equivalent benefits and opportunities standard of compliance, some of these non-discriminatory factors are still relevant and applicable.

(2) *Comment:* Commentors stated that since the equal average per capita standard of presumed compliance was based on participation rates, the word should be explicitly defined.

Response: Although the final Policy Interpretation does not use the equal average per capita standard of presumed compliance, a clear understanding of the word "participant" is still necessary, particularly in the determination of compliance where scholarships are involved. The word "participant" is defined in the final Policy Interpretation.

(3) *Comment:* Many commentors were concerned that the proposed Policy Interpretation neglected the rights of individuals.

Response: The proposed Policy Interpretation was intended to further clarify what colleges and universities must do within their intercollegiate athletic programs to avoid discrimination against individuals on the basis of sex. The Interpretation, therefore, spoke to institutions in terms of their male and female athletes. It spoke specifically in terms of equal, average per capita expenditures and in terms of comparability of other opportunities and benefits for male and female participating athletes.

The Department believes that under this approach the rights of individuals were protected. If women athletes, as a class, are receiving opportunities and benefits equal to those of male athletes, individuals within the class should be protected thereby. Under the proposed Policy Interpretation, for example, if female athletes as a whole were receiving their proportional share of athletic financial assistance, a university would have been presumed in compliance with that section of the regulation. The Department does not want and does not have the authority to force universities to offer identical programs to men and women. Therefore, to allow flexibility within women's programs and within men's programs, the proposed Policy Interpretation stated that an institution would be presumed in compliance if the average per capita expenditures on athletic scholarships for men and women, were equal. This same flexibility (in scholarships and in other areas) remains in the final Policy Interpretation.

(4) *Comment:* Several commentors stated that the provision of a separate dormitory to athletes of only one sex, even where no other special benefits were involved, is inherently discriminatory. They felt such separation indicated the different degrees of importance attached to athletes on the basis of sex.

Response: Comment accepted. The provision of a separate dormitory to athletes of one sex but not the other will be considered a failure to provide equivalent benefits as required by the regulation.

(5) *Comment:* Commentors, particularly colleges and universities, expressed concern that the differences in the rules of intercollegiate athletic associations could result in unequal distribution of benefits and opportunities to men's and women's athletic programs, thus placing the institutions in a posture of noncompliance with Title IX.

Response: Commentors made this point with regard to § 86.6(c) of the Title IX regulation, which reads in part:

"The obligation to comply with [Title IX] is not obviated or alleviated by any rule or regulation of any * * * athletic or other * * * association * * *"

Since the penalties for violation of intercollegiate athletic association rules can have a severe effect on the athletic opportunities within an affected program, the Department has re-examined this regulatory requirement to determine whether it should be modified. Our conclusion is that modification would not have a beneficial effect, and that the present requirement will stand.

Several factors enter into this decision. First, the differences between rules affecting men's and women's programs are numerous and change constantly. Despite this, the Department has been unable to discover a single case in which those differences require members to act in a discriminatory manner. Second, some rule differences may permit decisions resulting in discriminatory distribution of benefits and opportunities to men's and women's programs. The fact that institutions respond to differences in rules by choosing to deny equal opportunities, however, does not mean that the rules themselves are at fault; the rules do not prohibit choices that would result in compliance with Title IX. Finally, the rules in question are all established and subject to change by the membership of the association. Since all (or virtually all) association member institutions are subject to Title IX, the opportunity exists for these institutions to resolve collectively any wide-spread Title IX compliance problems resulting from association rules. To the extent that this has not taken place, Federal intervention on behalf of statutory beneficiaries is both warranted and required by the law. Consequently, the Department can follow no course other than to continue to disallow any defenses against findings of noncompliance with Title IX that are based on intercollegiate athletic association rules.

(6) *Comment:* Some commentors suggested that the equal average per capita test was unfairly skewed by the high cost of some "major" men's sports, particularly football, that have no equivalently expensive counterpart among women's sports. They suggested that a certain percentage of those costs (e.g., 50% of football scholarships) should be excluded from the expenditures on male athletes prior to application of the equal average per capita test.

Response: Since equality of average per capita expenditures has been eliminated as a standard of presumed compliance, the suggestion is no longer relevant. However, it was possible under that standard to exclude expenditures that were due to the nature of the sport, or the scope of competition and thus were not discriminatory in effect. Given the diversity of intercollegiate athletic programs, determinations as to whether disparities in expenditures were nondiscriminatory would have been made on a case-by-case basis. There was no legal support for the proposition that an arbitrary percentage of expenditures should be excluded from the calculations.

(7) *Comment:* Some commentors urged the Department to adopt various forms of team-based comparisons in assessing equality of opportunity between men's and women's athletic programs. They stated that well-developed men's programs are frequently characterized by a few "major" teams that have the greatest spectator appeal, earn the greatest income, cost the most to operate, and dominate the program in other ways. They suggested that women's programs should be similarly constructed and that comparability should then be required only between "men's major" and "women's major" teams, and between "men's minor" and "women's minor" teams. The men's teams most often cited as appropriate for "major" designation have been football and basketball, with women's basketball and volleyball being frequently selected as the counterparts.

Response: There are two problems with this approach to assessing equal opportunity. First, neither the statute nor the regulation calls for identical programs for male and female athletes. Absent such a requirement, the Department cannot base noncompliance upon a failure to provide arbitrarily identical programs, either in whole or in part.

Second, no subgrouping of male or female students (such as a team) may be used in such a way as to diminish the protection of the larger class of males and females in their rights to equal participation in educational benefits or opportunities. Use of the "major/minor" classification does not meet this test where large participation sports (e.g., football) are compared to smaller ones (e.g., women's volleyball) in such a manner as to have the effect of disproportionately providing benefits or opportunities to the members of one sex.

(8) *Comment:* Some commenters suggest that equality of opportunity should be measured by a "sport-specific" comparison. Under this approach, institutions offering the same sports to men and women would have an obligation to provide equal opportunity within each of those sports. For example, the men's basketball team and the women's basketball team would have to receive equal opportunities and benefits.

Response: As noted above, there is no provision for the requirement of identical programs for men and women, and no such requirement will be made by the Department. Moreover, a sport-specific comparison could actually create unequal opportunity. For example, the sports available for men at an institution might include most or all of those available for women; but the men's program might concentrate resources on sports not available to women (e.g., football, ice hockey). In addition, the sport-specific concept overlooks two key elements of the Title IX regulation.

First, the regulation states that the selection of sports is to be representative of student interests and abilities (86.41(c)(1)). A requirement that sports for the members of one sex be available or developed solely on the basis of their existence or development in the program for members of the other sex could conflict with the regulation where the interests and abilities of male and female students diverge.

Second, the regulation frames the general compliance obligations of recipients in terms of program-wide benefits and opportunities (86.41(c)). As implied above, Title IX protects the individual as a student-athlete, not as a basketball player, or swimmer.

(9) *Comment:* A coalition of many colleges and universities urged that there are no objective standards against which compliance with Title IX in intecollegiate athletics could be measured. They felt that diversity is so great among colleges and universities that no single standard or set of standards could practicably apply to all affected institutions. They concluded that it would be best for individual institutions to determine the policies and procedures by which to ensure nondiscrimination in intercollegiate athletic programs.

Specifically, this coalition suggested that each institution should create a group representative of all affected parties on campus.

This group would then assess existing athletic opportunities for men and women, and, on the basis of the assessment, develop a plan to ensure nondiscrimination. This plan would then be recommended to the Board of Trustees or other appropriate governing body.

The role foreseen for the Department under this concept is:

(a) The Department would use the plan as a framework for evaluating complaints and assessing compliance;

(b) The Department would determine whether the plan satisfies the interests of the involved parties; and

(c) The Department would determine whether the institution is adhering to the plan.

These commenters felt that this approach to Title IX enforcement would ensure an environment of equal opportunity.

Response: Title IX is an anti-discrimination law. It prohibits discrimination based on sex in educational institutions that are recipients of Federal assistance. The legislative history of Title IX clearly shows that it was enacted because of discrimination that currently was being practiced against women in educational institutions. The Department accepts that colleges and universities are sincere in their intention to ensure equal opportunity in intercollegiate athletics to their male and female students. It cannot, however, turn over its reponsibility for interpreting and enforcing the law. In this case, its responsibility includes articulating the standards by which compliance with the Title IX statute will be evaluated.

The Department agrees with this group of commenters that the proposed self-assessment and institutional plan is an excellent idea. Any institution that engages in the assessment/planning process, particularly with the full participation of interested parties as envisioned in the proposal, would clearly reach or move well toward compliance. In addition, as explained in Section VIII of this Policy Interpretation, any college or university that has compliance problems but is implementing a plan that the Department determines will correct those problems within a reasonable period of time, will be found in compliance.

[FR Doc. 79-37965 Filed 12-10-79; 8:45 am]
BILLING CODE 4110-12-M

UNITED STATES DISTRICT COURT
District of Connecticut

SELINA SOULE, a minor, by Bianca Stanescu, her mother; CHELSEA MITCHELL, a minor, by Christina Mitchell, her mother; ALANNA SMITH, a minor, by Cheryl Radachowsky, her mother, *Plaintiffs*, v. CONNECTICUT ASSOCIATION OF SCHOOLS, INC. d/b/a CONNECTICUT INTERSCHOLASTIC ATHLETIC CONFERENCE; BLOOMFIELD PUBLIC SCHOOLS BOARD OF EDUCATION; CROMWELL PUBLIC SCHOOLS BOARD OF EDUCATION; GLASTONBURY PUBLIC SCHOOLS BOARD OF EDUCATION; CANTON PUBLIC SCHOOLS BOARD OF EDUCATION; DANBURY PUBLIC SCHOOLS BOARD OF EDUCATION, *Defendants.*	Case No. 3:20-cv-00201-RNC **DECLARATION OF CHELSEA MITCHELL** Dated: February 12, 2020

DECLARATION OF CHELSEA MITCHELL IN SUPPORT OF MOTION FOR PRELIMINARY INJUNCTION

I, Chelsea Mitchell, declare as follows:

1. I am a seventeen-year-old senior at Canton High School in Canton, Connecticut.

2. I am an elite female athlete and compete in Connecticut Interscholastic Athletic Conference (CIAC) track and field events.

3. In the indoor track season, I compete in the 55m dash, the 300m, the long jump, and occasionally various relays.

4. In the outdoor track season, I compete in the 100m, 200m, long jump, triple jump, occasionally the 400m, and occasionally various relays.

5. During the school year, I usually train two hours per day, six days per week. In the summer, I still train one or two hours per day, three to four days per week.

6. From the Spring 2017 outdoor track season to present—six track seasons and counting—I have competed against biological males in my track and field athletic events due to the CIAC policy.

7. 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

8. 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.

9. 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.

10. 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 a male:

Table 1: 2017 CIAC State Open Women's Outdoor Track 100m Results (June 5, 2017)[1]

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

11. 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.

12. This news was frustrating for me, because I felt that an indoor Class S championship in sprints was now out of my reach as I would be racing against a male competitor.

13. 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.

14. On April 27, 2018, at the first invitational race of the Spring 2018 outdoor season, I was seeded in the 100m in a lane between not just one, but two male athletes: Terry Miller and Andraya Yearwood.

[1] AthleticNet, https://www.athletic.net/TrackAndField/meet/306453/results/f/1/100m, last visited February 8, 2020.

15. 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.

16. 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.

17. Similarly, at the Spring 2018 outdoor State Open Championship, Terry won the women's 100m event by a wide margin, while Andraya finished second.

18. 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)[2]

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.

19. 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.

[2] AthleticNet, https://www.athletic.net/TrackAndField/meet/334210/results/f/1/100m, last visited February 8, 2020.

20. 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.

21. 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.

2018-2019 Junior Year

22. In the fall of my junior year, I learned that Terry Miller transferred to Bloomfield, another Class S school.

23. 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.

24. 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.

25. But it was not enough. And my fears of losing championship after championship were realized in the Winter and Spring 2019 seasons.

26. 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.

27. 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.

28. 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)[3]

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)[4]

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.

[3] AthleticNet, https://www.athletic.net/TrackAndField/meet/352707/results/f/1/55m, last visited February 8, 2020.
[4] *Id.*

29. 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.

30. 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.

31. State Open Champions are recognized as All-State Athletes, an award listed on college applications, scholarship applications, and college recruiting profiles. State Open 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.

32. After the State Open Championship, I was repeatedly referred to in the press as the "third-place competitor, who is not transgender." It felt like a gut punch. 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 erased.

33. At the March 2, 2019, indoor New England Regional Championship, Terry took first and Andraya took second 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.

34. 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 a slap in the face to female athletes.

35. 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.

36. 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.

37. 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)[5]

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.

38. 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.

39. 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.

40. 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).

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[5] AthleticNet, https://www.athletic.net/TrackAndField/MeetResults.aspx?Meet=364088&show=all, last visited February 8, 2020.

41. 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

42. I am now in my senior year of high school and competing in the final indoor track season of my high school athletic career. I am currently ranked second in the state in the women's 55m behind a biological male. The Connecticut State Championship for Class S will be held on February 14, 2020, the Connecticut State Open Championship will be held on February 22, 2020, and the New England Regionals Championship will be held on February 29, 2020.

43. I plan to compete in the 2020 Spring Outdoor Season. The official first practice date is March 21, 2020, and the first meet is April 4, 2020. Key end-of-season meets include the Connecticut State Open Championship and the New England Regional Championship.

44. These final two track seasons are my last opportunities to win championships, titles, set personal high school records, and win All New England awards.

45. These are opportunities that once lost, cannot be recovered. I will never be a high school athlete again.

46. 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.

47. Competing against males makes me feel anxious and stressed. And stress has a direct, negative impact on my athletic performance.

48. 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.

49. I look forward to competing next year in college where I will be working towards a professional career in the sports industry.

Chelsea Mitchell

Chelsea Mitchell

Subscribed and sworn before me this 11 day of February, 2020.

Susan M Davies

Commissioner of Superior Court

Notary Public, my commission expires November 30, 2022

SUSAN M DAVIES
Notary Public
Connecticut
My Commission Expires Nov 30, 2022

UNITED STATES DISTRICT COURT
DISTRICT OF CONNECTICUT

SELINA SOULE, a minor, by Bianca Stanescu, her mother; CHELSEA MITCHELL, a minor, by Christina Mitchell, her mother; ALANNA SMITH, a minor, by Cheryl Radachowsky, her mother,

Plaintiffs,

v.

CONNECTICUT ASSOCIATION OF SCHOOLS, INC. d/b/a CONNECTICUT INTERSCHOLASTIC ATHLETIC CONFERENCE; BLOOMFIELD PUBLIC SCHOOLS BOARD OF EDUCATION; CROMWELL PUBLIC SCHOOLS BOARD OF EDUCATION; GLASTONBURY PUBLIC SCHOOLS BOARD OF EDUCATION; CANTON PUBLIC SCHOOLS BOARD OF EDUCATION; DANBURY PUBLIC SCHOOLS BOARD OF EDUCATION,

Defendants.

Case No. 3:20-cv-00201-RNC

[PROPOSED] ORDER GRANTING PRELIMINARY INJUNCTION

Dated: February 12, 2020

Upon consideration and review of Plaintiffs' Motion for Preliminary Injunction and the parties' respective arguments in support and in opposition to that motion, the Court finds Plaintiffs' motion to be well-taken, and therefore, in accordance with Federal Rule of Civil Procedure 65, grants Plaintiffs' petition for injunction. The reasons therefore are set forth in the separate opinion of this Court.

IT IS ORDERED THAT:

All named Defendants, along with their officers, agents, servants, employees, attorneys, and those persons in active concert or participation with Defendants who

receive actual notice of this Order, are temporarily enjoined from directly or indirectly

- Applying, enforcing, or facilitating the Policy set forth in Article IX, Section B. of the Bylaws of the Connecticut Interscholastic Athletic Conference that authorizes biological males to participate in girls' interscholastic track and field events in Connecticut in which Plaintiffs participate.
- Applying, enforcing, or facilitating any other policy or initiative, written or unwritten, that would permit biological males to participate in girls' interscholastic track and field events in Connecticut in which Plaintiffs participate.

Dated: _____

_____
U.S. District Judge