



American College of Pediatricians®
The Best *for* Children

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March 1, 2021

Vote YES on HB1298

Dear Honorable Legislators,

My name is Dr. Michelle Cretella. I am a pediatrician and the Executive Director of the American College of Pediatricians (ACPed), a national organization of pediatricians and health professionals dedicated to the promoting the optimal health of children from conception to young adulthood. As such, the ACPeds urges you to support HB1298, the "Fairness in Girls Sports Bill".

Long-term research on elite athletes has consistently shown that when matched for training, males outperform females in regard to speed, strength and endurance. Although predominantly related to sex hormones, these differences are also the result of sex-differential gene expression. For example, studies have identified over 3,000 genes that are differentially expressed in male and female skeletal muscle.

Obvious anatomical differences also exist between the sexes. For instance, men's larger and denser bones result in taller stature as well as a larger fulcrum which provides greater leverage for muscular limb power to be exerted in jumping, throwing and other explosive power activities. Even at birth, the average male is heavier and longer (taller) than the average female and this advantage for most athletics continues, when controlled for Tanner Stage of puberty, throughout life. Differences in the bone mass of the axial skeleton are present prior to puberty, with boys having thicker vertebral bodies than girls of the same height, weight, and age.

The predominant influence affecting male versus female athletic performance is hormonal, particularly during puberty. The sex hormone testosterone plays an important role in regulating bone mass, fat distribution, muscle mass and strength, and the production of red blood cells leading to higher circulating hemoglobin. After puberty, male circulating testosterone concentrations are 15 times greater than those of females at any age. The result is a clear male advantage in regard to muscle mass, strength and circulating hemoglobin levels even after adjusting for sex differences in height and weight.

On average, females have 50-60% of male's upper arm muscle cross-sectional area and 65-70% of male's thigh muscle cross-sectional area with a comparable reduction in strength. Young males have on average a skeletal muscle mass over 12kg greater than age-matched females at any given body weight. While numerous genes and environmental factors such as physical activity and diet contribute to muscle mass, the major cause of the sex difference in muscle mass and strength is the difference in circulating testosterone. Taken together, these discrepancies render females, on average, unable to compete effectively against males in power-based or endurance-based sports.

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These sex-based differences also influence the risk for and type of injuries athletes experience. For instance, stress fractures involving the long bones of the legs in runners are more frequent in females. Male athletes are far less susceptible due to their larger and denser bones. Abundant data also demonstrates that female athletes are particularly vulnerable to anterior cruciate ligament (ACL) rupture resulting in the incidence of non-contact ACL injuries being 2 to 8 times higher in females compared with males who participate in basketball, soccer, team handball, netball, and alpine skiing.

Sex differences arise from at least four different genetic mechanisms, in addition to the actions of sex hormones and environmental influences. These biological sex differences impact all organ systems, affect the propensity to develop certain diseases, alter responses to drugs, toxins and pain, and also result in important physical, cognitive, emotional and behavioral differences. **For these reasons, a male who self-identifies as female remains male, and giving estrogen to a male does not transform him into a female.** While it is true that a male who uses estrogen after puberty will lose muscle strength and impair other aspects of his physiology, he does not alter his genetics; he remains male at the cellular level in all body systems. **Similarly, a female who self-identifies as male remains female, and giving her testosterone does not transform her into a male.** In terms of genetics, she remains female at the cellular level. **Just as a female doping testosterone would be prohibited from competing against other females, so too should all males be barred from competing against females.**

Vote YES on HB1298, the “Fairness in Girls Sports Bill”.

Sincerely,

Michelle Cretella, MD

Executive Director

American College of Pediatricians

The Best for Children

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