

### What are disorders or differences of sex development (DSDs)?

A DSD is a condition which stops a baby's reproductive organs from developing normally before birth. There are around 40 different DSDs, all rare. Some are apparent at birth and some are discovered at puberty. Some result in infertility or cause other health issues. In most cases a baby's sex will be clear at birth (or on a prenatal ultrasound), but some DSDs cause genitals to have an ambiguous appearance, so the baby's sex is not certain without further testing. Where access to medical care is limited, a person's sex may be wrongly identified at birth or as they are growing up. This is the case with 5-ARD, which affects only males. People with this condition may be registered female at birth, but will go through male pubertal development.

### Does male sporting advantage come from testosterone?

Male development, fuelled by testosterone, shapes the body in ways that are more advantageous for sports than female development does. That is why almost all sports have a female-only category, in which exceptional women can compete and win. Without this, young adult men would dominate almost every sport. As well as being larger on average, men have denser bones, stiffer tendons, more muscle, less body fat and more efficient leg drive resulting from pelvis shape. Men's shoulders are broader. Male blood carries more oxygen per litre than female blood. Male hearts and lungs are bigger. The effects of puberty on both male and female bodies are mostly irreversible.

Polycystic ovary syndrome, a medical condition that affects only females, may cause raised testosterone levels, perhaps 3–4 nanomoles per litre, along with other health issues. But this is a small fraction of normal male levels (10–35 nanomoles per litre). Naturally high testosterone is not doping, although it gives some performance advantage. Women with PCOS are over-represented in women's sport. This is not controversial since they have not gone through male puberty.

### Why do DSDs matter in sport?

Most DSDs affect fertility and health, not sporting performance. The main exception is when a DSD leads to a male person being incorrectly registered female at birth. Athletes with 5-ARD are hugely over-represented in women's sports. This is the condition Caster Semenya has, and male sporting advantage is why the Court of Arbitration for Sport has ruled that 5-ARD athletes can be barred from women's competitions. It is inaccurate to refer to such people as female, or as "women with high testosterone". They are male, with testosterone in the normal male range. Their bodies are fully responsive to the male levels of testosterone they produce. Including them in women's sports is unfair, since it allows male sporting advantage into the female category.

### Is testosterone reduction the solution?

No. Suppressing testosterone will not shrink the athlete, or change his skeleton. Muscle mass may decline slightly, but not to female levels. In sport, where winning margins can be fractions of one percent, most of the 10-30% male advantage is retained. The only way to protect fair and safe competition for female athletes is to exclude all athletes who have been through male physical development, even if they were registered female at birth or have changed their documents.