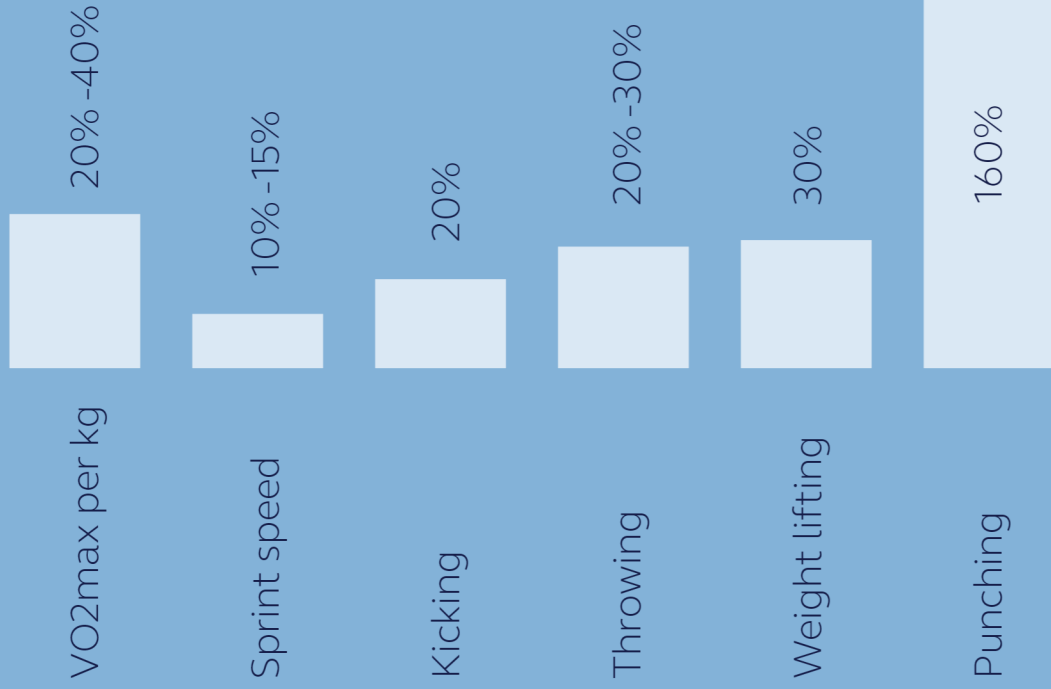




# SUMMARY OF TRANSGENDER BIOLOGY AND PERFORMANCE RESEARCH

For workshop information see: <https://playerwelfare.worldrugby.org/?subsection=84>

## PERFORMANCE RANGE BETWEEN MALES AND FEMALES



The performance differences between biological males and females range from **10% to 160%**.



These differences are the result of biology. Males have **higher muscle mass, larger muscle cross sectional area,** longer levers (different skeleton), less fat mass, higher tendon stiffness and higher cardiovascular capacity (larger heart and lungs, more hemoglobin).



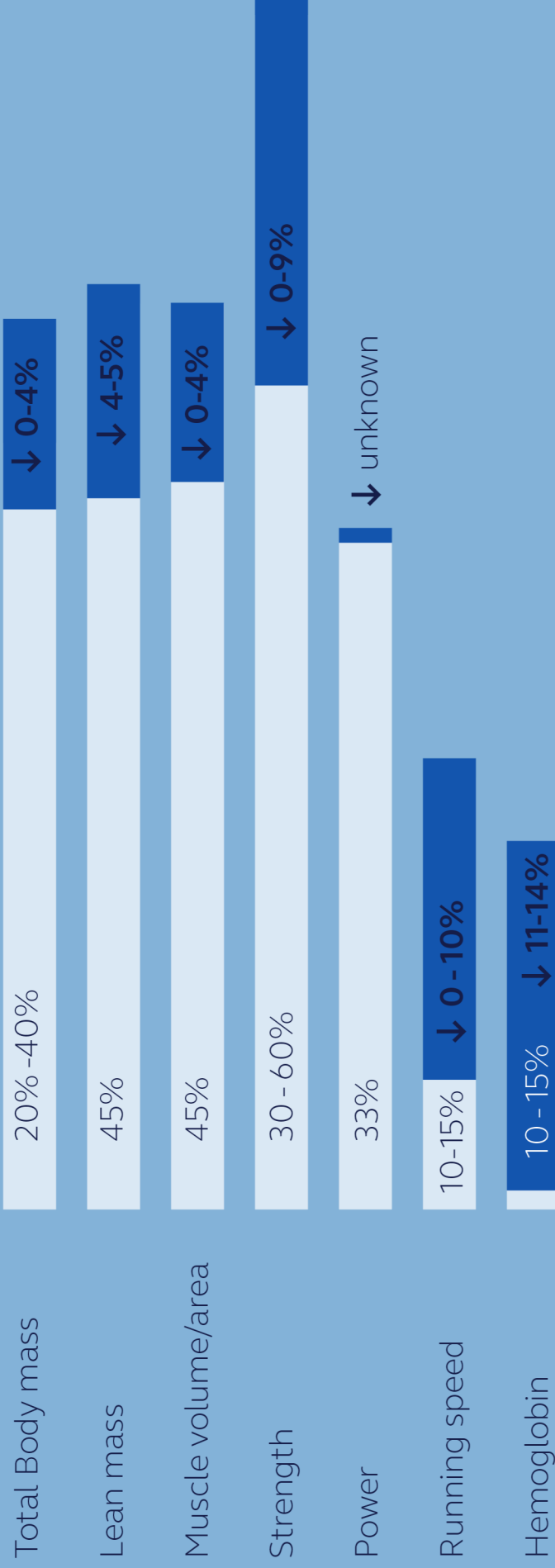
Current policy requires transgender women to reduce testosterone levels below **5 nmol/L for 12 months** in order to be eligible to compete in women's sport.

There is as yet, no direct evidence on how this affects **sports performance outcomes** like speed, throwing, weight-lifting performance.



There is evidence on **physiological changes** including mass, lean mass, and strength measured in laboratory trials.

## PHYSIOLOGY RANGE BETWEEN MALES AND FEMALES \*



\* Light bars show the typical male vs female difference for each attribute, while dark bars show the documented reduction in each attribute with testosterone suppression from laboratory studies.



The reduction of testosterone removes only approximately **one-fifth of muscle** and strength advantages.

Reductions in power are unknown, running speed is reduced by **5% to 10%** and Hemoglobin **is reduced almost entirely**

# THE VARIABLES FROM CONTROLLED STUDIES



Biological differences between male and female are **only slightly reduced**

The reductions range between **0% and 9%** after **12 months** of testosterone reduction



The initial differences in these variables range between **20% and 60%**



For these variables, significant advantages for **biological males remain** after testosterone reduction



# THE IMPLICATIONS FOR MALES-TO-FEMALES TRANSGENDER RUGBY PLAYERS\*

Biomechanical modelling studies suggest that typical male players experience and create:

Head & neck forces **20% to 30% greater** in men's elite rugby than in women's elite rugby as a result of mass differences alone.



Scrum forces in men's elite rugby and community rugby range from **40% to 120% higher** than in women's rugby



\* To date, no direct studies on trans women rugby players. Evidence is drawn from studies on biological differences, effects of testosterone suppression, and known injury and performance factors