

## REDs – It Does Exist!

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### Abstract – 495 words

The syndrome of Relative Energy Deficiency in Sport (REDs) was first described by the International Olympic Committee (IOC) in 2014 and updated in 2018. There have been ~200 papers published in the last 6 years on the topics of low energy availability (LEA) and REDs, most of them cross-sectional in nature, demonstrating the global interest in this topic area, but also highlighting some of the challenges and limitations. Indeed, all 10 papers in the 2023 IOC Consensus Update on REDs highlight aspects of these challenges and limitations. According to the Conceptual Models, the underlying cause of REDs is problematic (severe and/or prolonged) LEA, which affects numerous body systems with deleterious health (e.g., injuries and illnesses) and performance outcomes, in both male and female athletes, of all levels and ages. Like numerous other chronic multi-factorial syndromes and diseases, REDs has many diverse risk factors, numerous potential signs and symptoms, and is influenced by the individual’s characteristics and environment.

To appreciate the complexities of REDs, it is important to appreciate Life History Theory, which explains that humans have evolved in environments with finite energy resources [or limited energy procurement (hunting/gathering)], for which various physiological processes, such as activity, reproduction, growth and health, all compete. During situations of energy scarcity (i.e., starvation), energy is likely allocated to various body systems according to what is deemed essential, reducible or expendable, depending on the immediate priorities, as well as dependent upon the phase of life. Modern athletes are frequently exposed to energy mismatches, via alterations to energy intake or exercise energy expenditure, also requiring such energy partitioning. Whether this is short-term and reversible (adaptable LEA) or problematic, and how this effects various outcomes of health and performance, is quite complex, depending on characteristics of the LEA exposure and many moderating factors.

To ascertain if REDs exists, we have to look to the evidence supporting the most current 2023 REDs IOC Clinical Assessment Tool – Version 2 (IOC REDs CAT2). The IOC REDs CAT2 focuses on just 8 key indicators in females and males, that are weighted according to the published evidence and impact; with 4 of the indicators based on sex hormone/HPA axis and bone health – where the vast majority of data exists. Ultimately, the final decision of whether or not an athlete has REDs, is dependent upon an expert physician/clinician who examines these various signs and symptoms, and carefully steps through a diagnosis of exclusion to make a final expert decision. As REDs is multi-factorial, requiring a diverse team for its optimal management, this presentation will represent three different discipline viewpoints across physiology, nutrition and medicine, across 3 different, but linked, presentations:

Presentation 1: A deep dive into the 2023 IOC REDs CAT: the rationale and validation by Trent Stellingwerff, PhD.

Presentation 2: Examining the important nuances and complexities in a new physiological model of LEA and REDs by Louise Burke, RD/PhD.

Presentation 3: The science and art of diagnosing REDs in the real world by Kate Ackerman, MD, MPH.