

International
Olympic
Committee



Relative Energy Deficiency in Sport (REDs)

Best practices for coaches



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IPT Cycling Academy

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High Performance Dietitian
Canadian Sport Institute Pacific

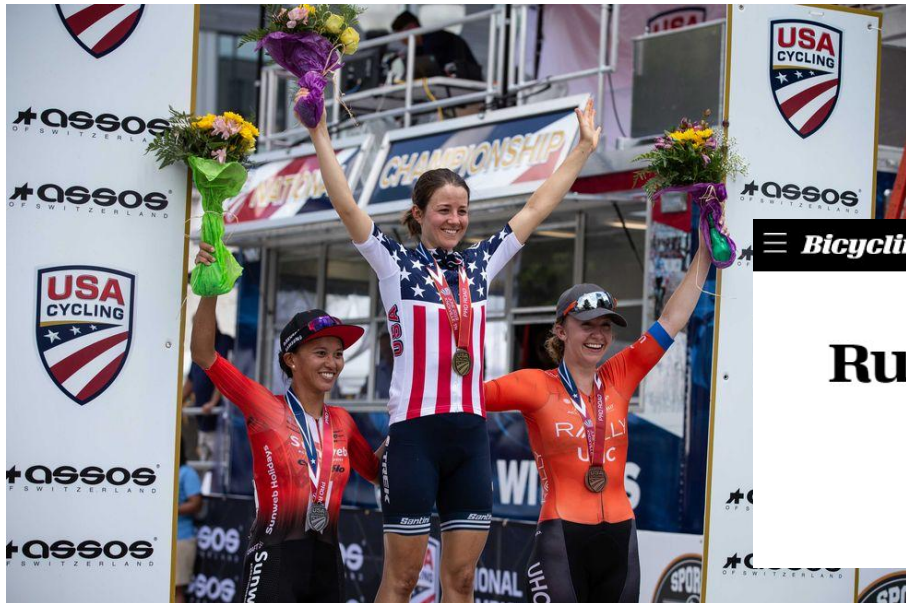


OPINION

I Was the Fastest Girl in America, Until I Joined Nike

Mary Cain's male coaches were convinced she had to get "thinner, and thinner, and thinner." Then her body started breaking down.

Nov. 7, 2019



[Bicycling](#) BIKES & GEAR HEALTH & NUTRITION TRAINING REPAIR MEMBER-ONLY STORIES [SUBSCRIBE](#)

[Racing](#)

Ruth Winder's National Championships Win Almost Didn't Happen

THE TREK-SEGAFREDDO PRO SPEAKS FOR THE FIRST TIME ABOUT THE SERIOUS HEALTH ISSUE THAT NEARLY HELD HER BACK.

BY [DANIELLE KOSECKI](#) Published: Nov 6, 2019



Webinar Overview



What is REDs?



How does REDs affect athlete health and performance?



What can I do as a coach to support my athletes?





What is REDs?

Relative Energy Deficiency in Sport (REDs)

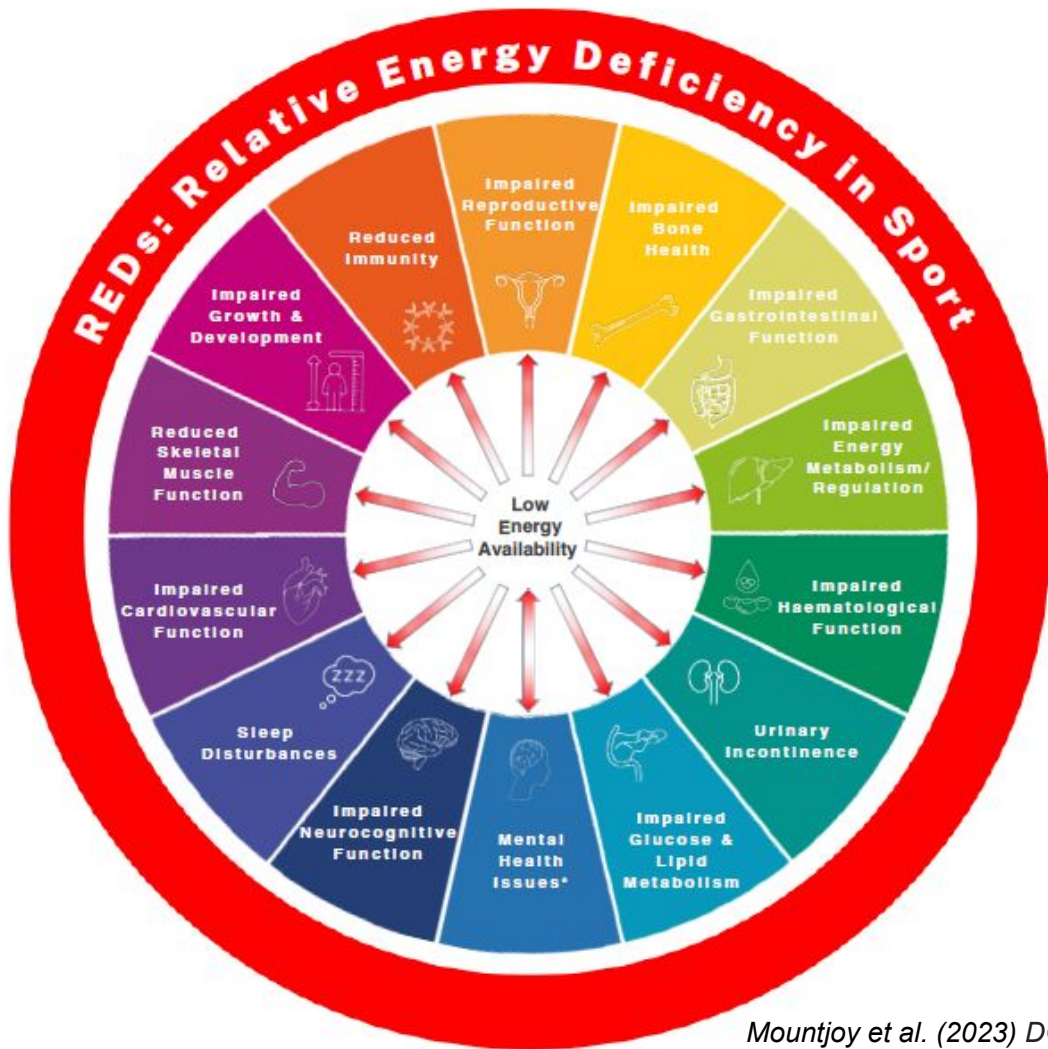
is a clinically diagnosed, multi-factorial syndrome of impaired physiological and/or psychological functioning.

- Coined in 2014 by the International Olympic Committee.
- Affects all athletes regardless of age, sex, and sport.
- Wide estimates of REDs prevalence in various female athlete cohorts (23-79.5%).
- Caused by exposure to problematic (prolonged and/or severe) low energy availability (LEA).

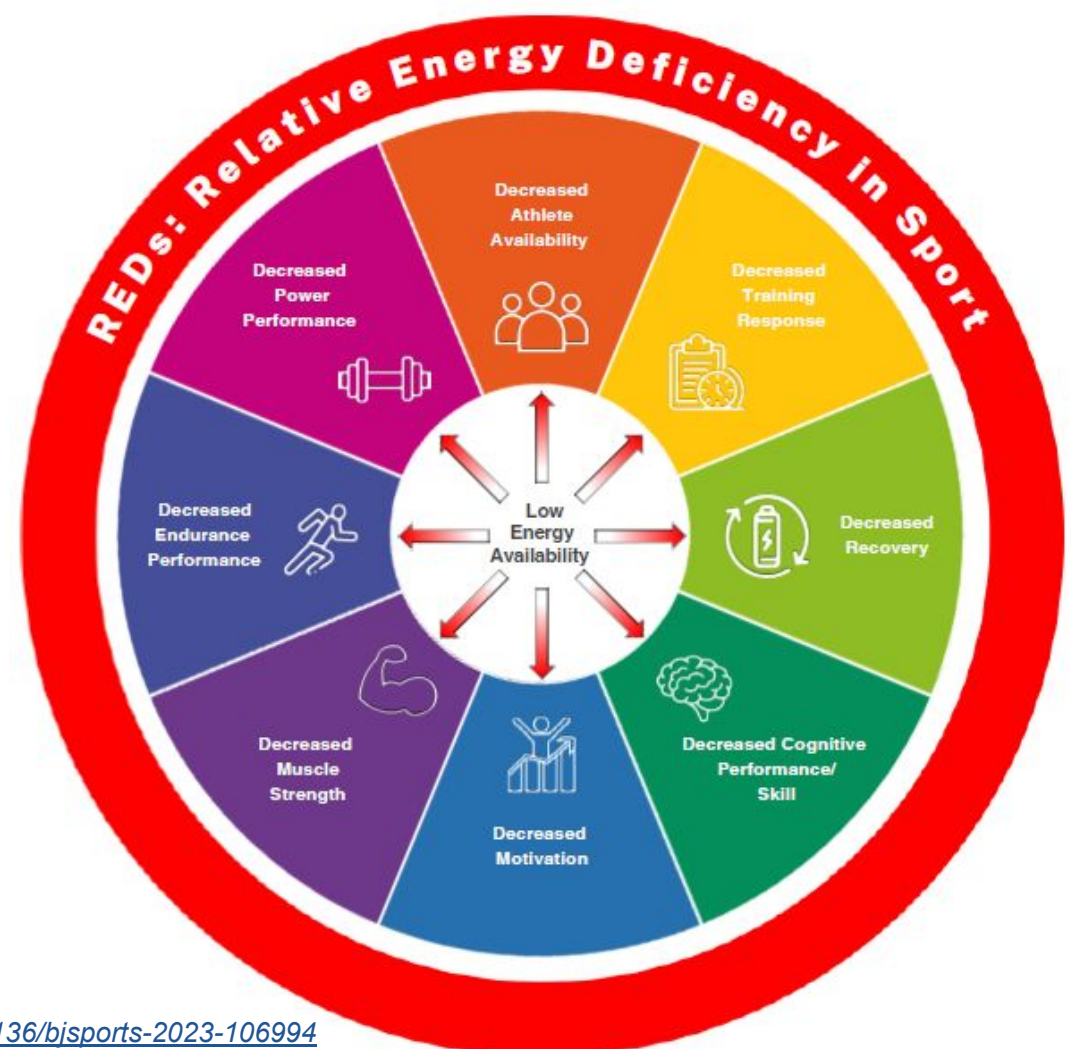


REDs Conceptual Models

HEALTH

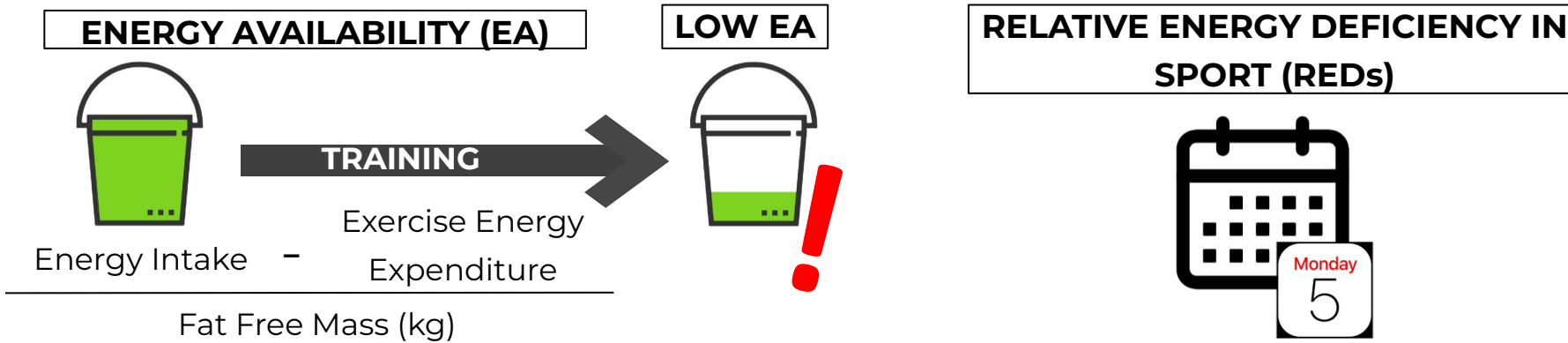


PERFORMANCE

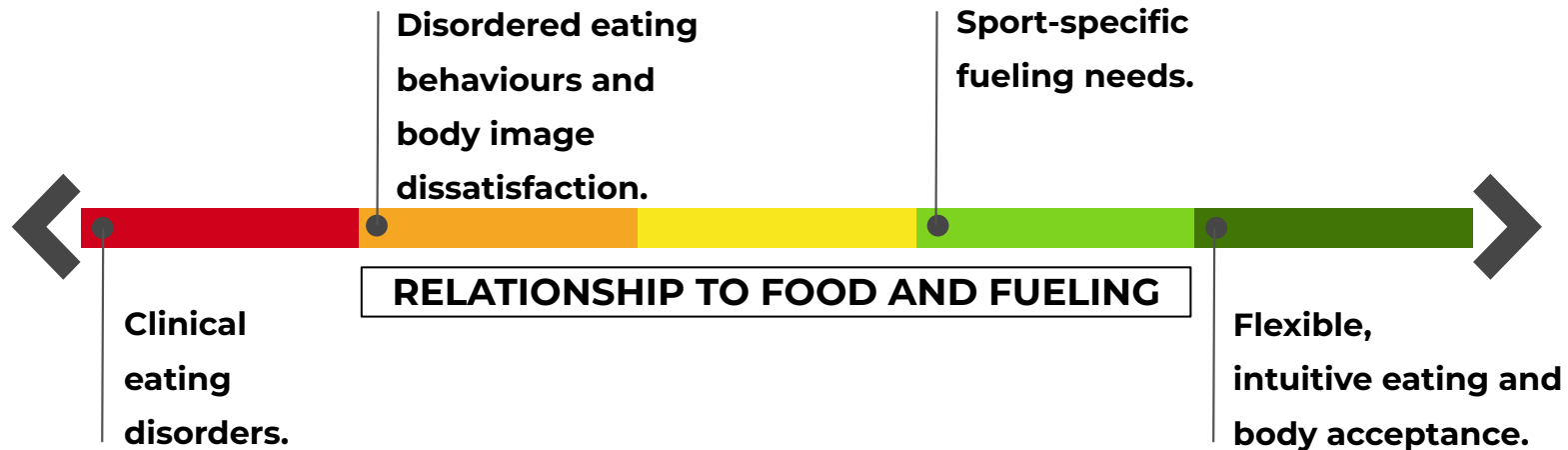




What is Energy Availability?



It's challenging to measure energy availability accurately.



Burke et al. (2018)

DOI: [10.1123/ijsnem.2018-0142](https://doi.org/10.1123/ijsnem.2018-0142)



IOC REDs CAT2

International Olympic Committee (IOC) Relative Energy Deficiency in Sport (REDs) Clinical Assessment Tool Version 2 (IOC REDs CAT2)

REDs DIAGNOSIS WITH ↑ SEVERITY AND/OR RISK CATEGORISATION †

GREEN †

Severity/Risk
None to very low

Clinical Criteria

No primary indicators
A maximum of 1 secondary indicator

Treatment, Training & Competition Recommendations

- No treatment required
- Full training and competition clearance

YELLOW †

Severity/Risk
Mild

Clinical Criteria

1 or 2 primary indicators
± max 1 secondary indicator OR
≥2 secondary indicators

Treatment, Training & Competition Recommendations

- Treatment, monitoring and regular follow-up at appropriate intervals.
- Full training and competition.

ORANGE †

Severity/Risk
Moderate to High

Clinical Criteria

3 primary indicators
± max 1 secondary indicator
OR
2 primary and ≥2 secondary indicators

Treatment, Training & Competition Recommendations

- Treatment, close monitoring and follow-up required (e.g., ~monthly).
- Some aspects of training and/or competition may need to be modified.

RED †

Severity/Risk
Very High/Extreme

Clinical Criteria

≥4 primary
OR
3 primary and ≥2 secondary indicators

Treatment, Training & Competition Recommendations

- Immediate treatment (± hospitalisation) required by frequent monitoring at ~daily to monthly intervals depending on severity.
- Significant training and competition modifications required, and in the majority of cases, removal from all training and competition is indicated.

† Serious medical indicators of REDs and/or EDs requiring immediate medical attention, potential hospitalization and removal from training and competition (please see table 3), include: ≤ 75% median BMI for age and sex; Electrolyte disturbances; ECG abnormalities [(e.g., prolonged QTc interval or severe bradycardia (Adult: HR ≤ 30 bpm; Adolescent: HR ≤ 45 bpm)); Severe hypotension: ≤90/45 mmHg; Orthostatic intolerance (Adult & Adolescent a supine to standing systolic BP drop > 20 mmHg and a diastolic drop > 10 mmHg); Failure of outpatient ED treatment program; Acute medical complications of malnutrition; Any condition that inhibits medical treatment and monitoring while training and/or competing.



An athlete in REDs is like your phone on low power mode.

Their body is forced to compensate for the lack of energy by slowing or stopping various energetic processes.



Symptoms & consequences of REDs:

Physical Health



Increased risk of stress fractures due to low bone mineral density



Changes in blood markers



Slowed metabolism and low blood pressure



Impaired reproductive function including low sex drive, lowered testosterone, and menstrual dysfunction



Poor digestive health (e.g. cramping, bloating, diarrhea) and urinary incontinence



More frequent illness related to reduced immune function



Impaired growth and development

Mental Health



Low mood, feeling irritable



Mental health concerns including anxiety and depression



Challenging relationship to food (e.g. disordered eating thoughts and behaviours, clinical eating disorders)



Body image dissatisfaction



Sleep disturbances



Symptoms & consequences of REDs:

...which can individually and synergistically lead to impaired well-being, increased injury risk & decreased sports performance.”

Performance



Impaired muscle function, decreased strength and power



Fatigue, low motivation



Impaired cardiovascular function, decreased endurance performance



Decreased cognitive performance and skill, low focus and concentration



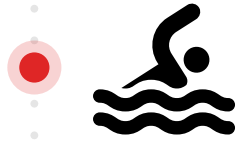
Slowed recovery and decreased response to training



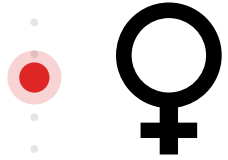
Decreased availability for training (e.g. time away from training due to injury, illness, under-recovery)



REDs hurts performance



Elite female swimmers. Same 12 week training block.



Grouped based on hormone profile.

GROUP #1
No changes to hormones or menstruation

8.2%
FASTER

GROUP #2
Hormone & menstrual changes

9.8%
SLOWER

Vanheest et al, 2014.
DOI: [10.1249/MSS.0b013e3182a32b72](https://doi.org/10.1249/MSS.0b013e3182a32b72)



The only difference between the athlete groups was how much food they ate. By getting enough energy, group #1 responded to the training block and group #2 did not.



Coach strategies to help prevent/manage REDs

PROVIDE REDs

EDUCATION

OPPORTUNITIES



Short-term education programs have been shown to improve nutritional knowledge and reduce signs of dieting and body image concerns.

ENCOURAGE

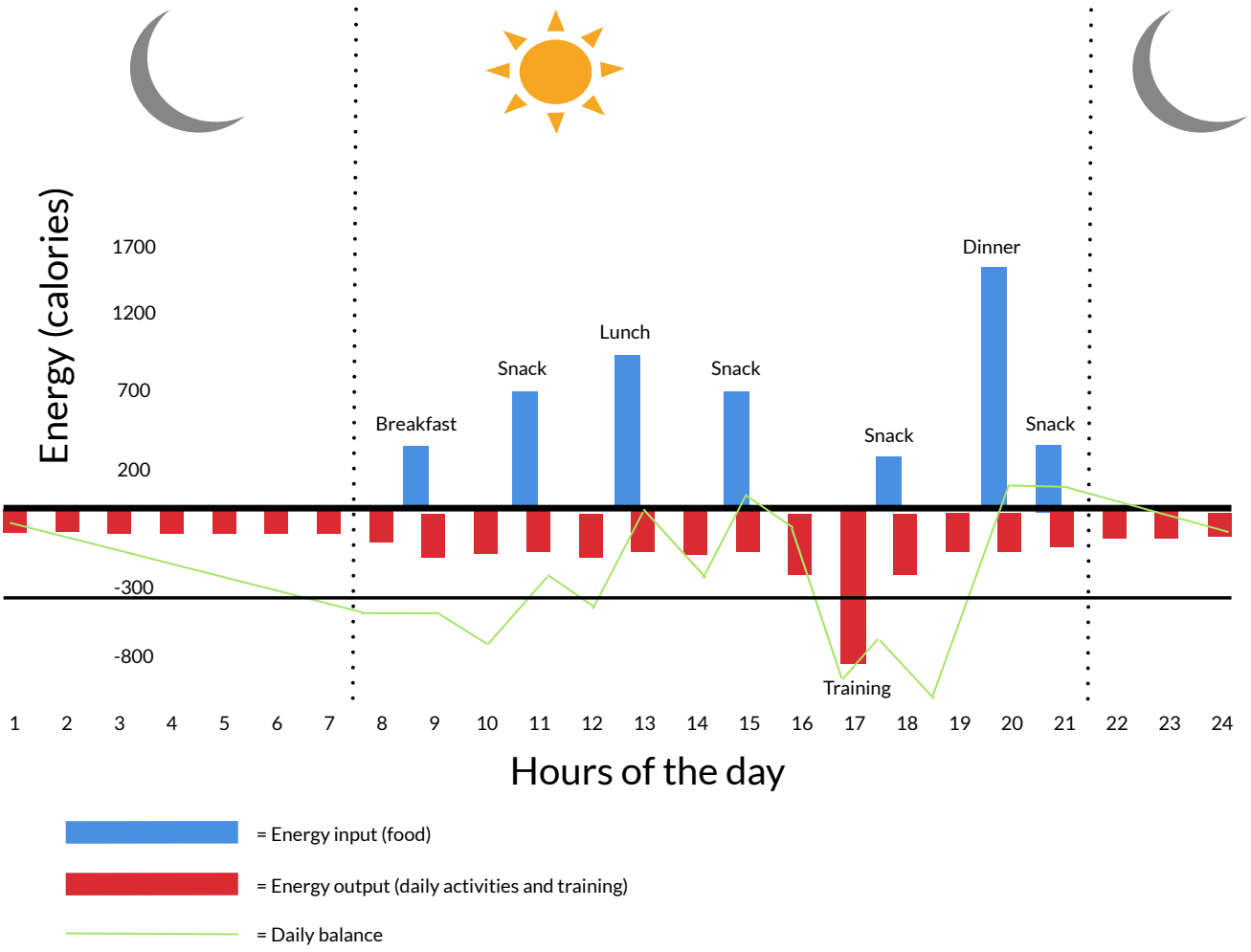
FUELING DURING

SESSIONS



Encourage athletes to fuel up before training, top up energy with carbohydrate during longer sessions, and eat a recovery meal or snack right after training.

Timing of intake matters



Even if an athlete eats "enough" calories through the day, they can still experience symptoms of REDs if they're not intentional with their nutrition through the day.



Torstveit et al, 2018. DOI: [10.1123/ijsnem.2017-0337](https://doi.org/10.1123/ijsnem.2017-0337)
 Fahrenholtz et al, 2018. DOI: [10.1111/sms.13030](https://doi.org/10.1111/sms.13030)

Coach strategies to help prevent/manage REDs

PROVIDE REDs EDUCATION OPPORTUNITIES



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ENCOURAGE FUELING DURING SESSIONS



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MIND YOUR FOOD COMMENTS



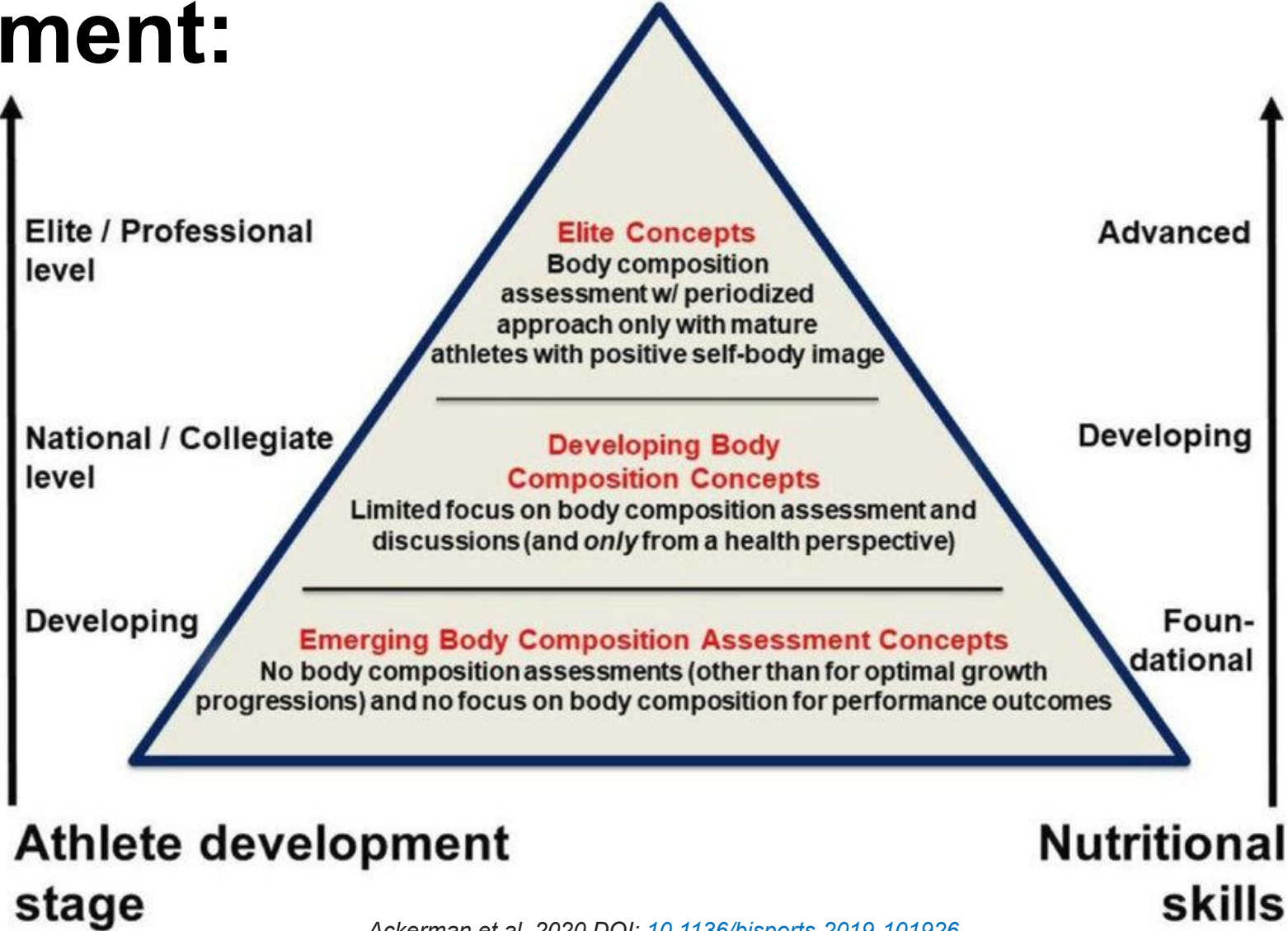
Athletes are influenced by what you say, so don't make judgmental or negative comments about specific foods or suggest fasting or fad diets.

FOCUS ON BODY FUNCTION



Commenting on an athletes' appearance can place unnecessary focus on how their body looks instead of how it performs. If you are concerned or would like to discuss body composition, consult a sport dietitian.

Appropriate body composition assessment:



Ackerman et al. 2020 DOI: [10.1136/bjsports-2019-101926](https://doi.org/10.1136/bjsports-2019-101926)

Coach strategies to help prevent/manage REDs

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CONSULT A PERFORMANCE DIETITIAN



Dietitians are trained to help athletes manage their energy and nutrient needs to meet performance goals and to navigate eating disorders and disordered eating behaviours.



What athletes may say...

- "I'm finding it tough to dig deep in training and I don't feel like my body is ready for the next session."
- "I'm struggling to put the pieces together and I just don't quite feel like myself."

What athletes may not share...

- Low mood or mental health concerns.
- Disordered eating thoughts or behaviours.
- Body image dissatisfaction.
- Digestive symptoms.
- Changes in menstruation or sex drive.
- Poor food skills.
- Lack of money to purchase adequate food.



What to do if you suspect REDs



1. Consult a sport medicine physician with adequate knowledge of REDs to complete screening and assessment.
2. Consider individualized support from a sport dietitian and/or mental health practitioner.
3. Consider reducing training load to lower energy expenditure.
4. Ensure the training program includes exercise to prevent some REDs outcomes (e.g. weight bearing for bone density).



Isabelle Weidemann

3X OLYMPIC MEDALLIST
SPEED SKATING



My unyielding pursuit of peak performance has always been my driving force - I've never settled for anything less than pushing myself to the limit. For years, I walked the tightrope of under-fueling and overtraining. I thought I was doing what was needed to be the best in the world. Gradually, this relentless pursuit led me down the path to developing REDs.

I learned firsthand how REDs could disrupt hormones, weaken immunity, and compromise bone health, decreasing both immediate performance and my overall well-being. I struggled to engage in demanding training and rigorous schooling, battling constant fatigue and irritability. I didn't have the energy for world class performance, and I watched as I fell off the pace of the top women in the world.

With the help from a dietitian who specialized in REDs and support from my team, I was able to commit to proper fueling and adequate rest and I experienced a transformative shift in my ability to push my limits in training. Those grueling training sessions no longer demanded weeks of recovery and I saw breakthroughs in performance.

I found my way back to peak performance, picking up three medals at the 2022 Olympics, and proving that with the right care, dedication, and balance, the potential for greatness is not only achievable but also sustainable.



RESOURCES

IOC consensus statements



Consensus statement



Editor's choice
Scan to access more
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The IOC consensus statement: beyond the Female Athlete Triad—Relative Energy Deficiency in Sport (RED-S)

Margo Mountjoy,¹ Jorunn Sundgot-Borgen,² Naama Constantini,⁵ Constance Lehmann,⁹ Kathrin Steffen,^{2,9} Richard Budgett,¹⁷

Br J Sports Med

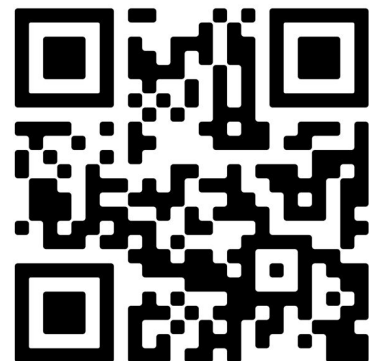


Consensus statement

IOC consensus statement on relative energy deficiency in sport (RED-S): 2018 update

Margo Mountjoy,¹ Jorunn Kaiander Sundgot-Borgen,² Louise M Burke,^{3,4} Kathryn E Ackerman,^{5,6} Cheri Blauwet,⁷ Naama Constantini,⁸ Constance Lehmann,⁹ Bronwen Lundy,³ Anna Katarina Melin,¹⁰ Naama Constantini,⁸ Adam S Te

Br J Sports Med: f



Consensus statement

2023 International Olympic Committee's (IOC) consensus statement on Relative Energy Deficiency in Sport (REDs)

Margo Mountjoy,^{1,2} Kathryn E Ackerman,³ David M Bailey,⁴ Louise M Burke,⁵ Naama Constantini,⁶ Anthony C Hackney,⁷ Ida Aliisa Heikura,^{8,9} Anna Melin,¹⁰ Anne Marte Pensgaard,¹¹ Trent Stellingwerff,^{8,12} Jorunn Kaiander Sundgot-Borgen,¹³ Monica Klungland Torstveit,¹⁴ Astrid Uhrenholdt Jacobsen,¹⁵ Evert Verhagen,¹⁶ Richard Budgett,¹⁷ Lars Engebretsen,¹⁷ Uğur Erdener,^{18,19}

COACHING applications

Body Composition

Erroneous body composition practices  allegations of physical and psychological abuse



Ackerman K et al. #REDs: time for a revolution in sports culture and systems to improve athlete health and performance. *BJSM* 2020

Mary Cain 'emotionally and physically abused' by Alberto Salazar's system

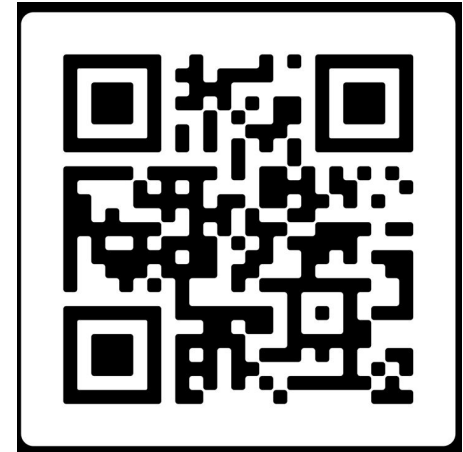
- Nike Oregon Project staff pressured athlete into weight loss
- Cain suffered osteoporosis and period stopped for three years



📷 Mary Cain (pictured in 2014) says Alberto Salazar 'was constantly trying to get me to lose weight ... He wanted to give me birth control pills and diuretics to lose weight.' Photograph: Kevin Morris/Corbis via Getty Images

COACHING applications

IOC REDs
CAT2



*There is no single diagnostic test for REDs
How to diagnose REDs in clinical practice?*

IOC REDs CAT2

International Olympic Committee (IOC) Relative Energy Deficiency in Sport (REDs) Clinical Assessment Tool Version 2 (IOC REDs CAT2)



For use by medical professional only

Name: _____ Date: _____ Examiner: _____



COACHING applications


IOC REDs CAT2 Calculator Tool

REDS CAT2 Scoring Tool	Severe primary indicators (scores as double points)		Primary indicators (scores as single point)							Secondary indicators						
Athlete name	Females: Primary amenorrhea or prolonged secondary amenorrhea due to functional hypothalamic amenorrhea *	Males: Clinically low free or total testosterone**	Bone stress injuries (1 high risk or ≥2 low risk *** <u>in the past 2 yrs</u>)	Absence from training due to bone stress injury (>6mo training missed <u>in the past 2 yrs</u>)	Females: Secondary amenorrhea (absence of 3 to 11 consecutive menstrual cycles) caused by functional hypothalamic amenorrhea	Males: Sub-clinically low total or free testosterone #	Bone mineral density Z-score < -1.0 ##	Sub-clinically # or clinically ** low total or free T3 (triiodothyronine)	An elevated global score for Eating Disorder Examination Questionnaire (>2.30 in females; >1.68 in males) <u>and/or</u> clinically diagnosed DSM-5-TR-defined Eating Disorder	A deviation of a pediatric or adolescent athlete's previous growth trajectory (height and/or weight)	Elevated total cholesterol (above reference range)	Elevated LDL (low-density lipoprotein) cholesterol (above reference range)	History of 1 low-risk *** bone stress injury <u>within the previous 2 yrs</u>	Absence of <6 months from training due to BSI <u>in the previous 2 years</u>	Females: Oligomenorrhea caused by functional hypothalamic amenorrhea (>35 days between periods or only ~6 to 8 periods/year)	Clinically diagnosed depression <u>and/or</u> anxiety
athlete1																
Instructions: Select yes or no for each indicator. Where you do not have information, leave blank. For females on contraception, do NOT answer questions on menstruation.																

IOC REDs
CAT2

IOC REDs CAT2 Calculator Tool

In order to assist with the scoring of the IOC REDs CAT2, please find below an Online Calculator Tool.



COACHING applications

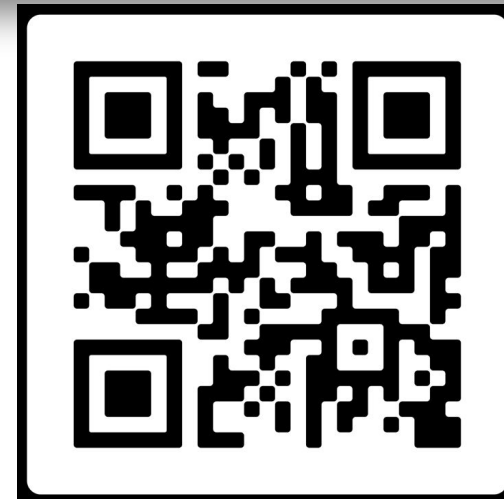
IOC REDs
CAT2



Review

Review of the scientific rationale, development and validation of the International Olympic Committee Relative Energy Deficiency in Sport Clinical Assessment Tool: V.2 (IOC REDs CAT2)—by a subgroup of the IOC consensus on REDs

Trent Stellingwerff ^{1,2} Margo Mountjoy ^{3,4} Walter TP McCluskey,¹
Kathryn E Ackerman ⁵ Evert Verhagen ⁶ Ida A Heikura ^{1,2}



COACHING applications

Prevention / Treatment



Review

Primary, secondary and tertiary prevention of Relative Energy Deficiency in Sport (REDs): a narrative review by a subgroup of the IOC consensus on REDs

Monica Klungland Torstveit ¹, Kathryn E Ackerman ², Naama Constantini ³,
Bryan Holtzman,² Karsten Koehler ⁴, Margo L Mountjoy ⁵,
Jorunn Sundgot-Borgen ⁶, Anna Melin ⁷



COACHING applications

Body Composition



Systematic review

Best practice recommendations for body composition considerations in sport to reduce health and performance risks: a critical review, original survey and expert opinion by a subgroup of the IOC consensus on Relative Energy Deficiency in Sport (REDs)

Therese Fostervold Mathisen ¹, Timothy Ackland ², Louise M Burke ³, Naama Constantini ⁴, Judith Haudum ⁵, Lindsay S Macnaughton ⁶, Nanna L Meyer ⁷, Margo Mountjoy ^{8,9}, Gary Slater ¹⁰, Jorunn Kaiander Sundgot-Borgen ¹¹

