

# RELATIVE ENERGY DEFICIENCY IN SPORT (REDs)



UNDERSTANDING  
THE EFFECTS  
OF LOW ENERGY  
AVAILABILITY

**TrueSport**<sup>®</sup>

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## INTRODUCTION AND PURPOSE

*Given the multiple demands on the time and energy of young athletes – from academics, to sport, to social activities – it is not surprising that many are having difficulty making nutrition and training choices that support optimal health and performance. Unfortunately, those challenges can lead to serious medical concerns, including the development of “Relative Energy Deficiency in Sport” (REDs) syndrome, which is common in athletes across many different sports and activity levels. REDs describes changes that occur in health and body function when athletes do not have enough energy available to support optimal health AND optimal sports performance. This guide will provide practical information to help caregivers, athletes, and coaches identify possible risk factors for REDs, determine appropriate strategies for prevention, and provide support for athletes at risk for REDs and the associated health effects.*



## What Is Relative Energy Deficiency In Sport (REDs)?

Relative Energy Deficiency in Sport, or REDs, describes changes in health and body function that occur when athletes do not have enough energy available to support both optimal health and sports performance. For athletes, daily calorie intake must provide enough energy for training and competition while also supporting growth, development, and normal metabolism. **The body uses calories from food and beverages in many different ways and has to work within the limits of the calories athletes eat and drink each day.**

Energy availability is a term used to describe the calories that are left over after accounting for calories expended during athletic activity. These are the calories that the body has available to support healthy daily function and recovery, as well as growth and development in younger athletes. When calories are insufficient to support both optimal health AND sport performance, an athlete is said to have “low energy availability” (LEA). Periods of LEA are common in athletes and LEA exists on a spectrum from “adaptable LEA” to “problematic LEA.”

**Adaptable LEA:** Typically, short-term periods of LEA are often associated with times of increased training intensity and/or temporary reductions in calorie intake. Adaptable LEA may produce short-term changes in athletic performance, but the impacts are typically readily reversible when energy availability is increased without significant long-term impacts on health.

**Problematic LEA:** Longer and/or more severe calorie deficits leading to consequential and potentially long-term impacts on health and performance.

### Several factors are worth emphasizing:

- There is individual variability in the calorie deficits and timing that produce adaptable LEA and problematic LEA. Factors associated with this variability include age, gender/sex, genetics, and overall state of health.
- LEA may be inadvertent (due to lack of time, resources or attention to energy intake) or may be intentional (due to efforts to improve performance or lose weight).
- LEA may occur at any weight and is not necessarily associated with an eating disorder or weight loss.

REDs describes the resulting impact on health and performance that results from problematic LEA and is defined by the International Olympic Committee as:

“A syndrome of impaired physiological and/or psychological functioning experienced by female and male athletes that is caused by exposure to problematic (prolonged and/or severe) low energy availability. The detrimental outcomes include, but are not limited to, decreases in energy metabolism, reproductive function, musculoskeletal health, immunity, glycogen synthesis and cardiovascular and haematological health, which can all individually and synergistically lead to impaired well-being, increased injury risk and decreased sports performance.”

**In short, LEA is the energy imbalance, while REDs is the health and performance consequence that can develop when that imbalance persists.**

**LEA occurs when calorie intake is  
insufficient to support all of the following:**

**GROWTH AND  
DEVELOPMENT**



Throughout childhood and adolescence, calories are needed to build bone, muscles, and other tissues. Calorie needs are higher during periods of growth, particularly during the peak growth spurt in adolescence.

**BODY  
MAINTENANCE**



Calories are needed to support the body's resting metabolism, which includes the many different processes needed for daily function. This includes things like breathing, circulating blood, controlling body temperature, digestion, and function of the brain and nervous system.

**PHYSICAL  
ACTIVITY AND  
ATHLETIC  
PERFORMANCE**



Calories are used to generate the energy needed for body movement. Lower intensity activities, such as daily tasks at school and home primarily use calories from fat, and higher intensity activity associated with most sport training and performance uses more calories from carbohydrates.

**TRAINING,  
RECOVERY, AND  
TISSUE REPAIR**



Calories are needed to repair the breakdown that occurs in bone, muscle, and other tissues and to build backup fuel stores to prepare for the next workout. LEA may cause disruption of sleep, which is an important part of recovery.

**MENTAL  
WELL-BEING**



When calorie needs aren't met, LEA can occur, leading to negative effects on mental well-being, including irritability, increased stress, and reduced concentration and motivation.

## What changes occur with LEA?

When athletes do not take in enough calories to fully support sport-related activity and daily function, certain functions in the body slow down to help conserve energy. Current models describe REDs as affecting three overlapping areas: physical health, sport performance, and psychological well-being. These effects may occur gradually and vary between athletes. Although this is an area of relatively new and ongoing research, current data indicates changes in both health and performance with LEA and REDs.

### Health related effects of LEA include:

- **Endocrine/reproductive:** Changes in the endocrine system that occur with REDs have far-reaching effects throughout the body, including reduced metabolism in both females and males, reduced effects of growth hormone, reduced testosterone levels in males, and reduced estrogen levels in females (which frequently leads to changes in the menstrual cycle).
- **Bone health:** The combination of endocrine dysfunction and low-calorie intake leads to bone loss and a reduction in bone density, which increases risk for osteoporosis and stress fractures.
- **Immune:** Higher rates of illness and seemingly lower levels of antibody production and secretion can occur, reducing the protection athletes have from infection.
- **Gastrointestinal:** REDs produces a general slowing of intestinal function, possibly leading to bloating, constipation, and abdominal pain.
- **Genitourinary:** Athletes are at risk of urinary incontinence, particularly with high impact activity.
- **Cardiovascular:** Endothelial dysfunction leads to difficulties with dilation of the arteries that helps to regulate blood flow in the heart and throughout the body.
- **Hematology:** Impaired protein synthesis, coupled with increased risk of iron deficiency, can lead to a reduction in red blood cell production and the development of anemia.
- **Cognitive:** Reductions in memory, decision-making, and executive function can occur.
- **Psychological/sleep:** Changes in the brain may create or worsen disruptions in sleep and mental well-being.

The relationship between low calorie intake, impaired bone health, and reproductive dysfunction was previously known as the Female or Male Athlete Triad, but it is now recognized that this relationship is part of the broader impacts of REDs on multiple body systems.

## Performance-related effects of LEA include reductions in:

- **Athlete Availability:** Increased risk of illness and injury
- **Training Response and Recovery:** Lack of performance improvements in spite of ongoing or increased training
- **Cognitive Performance:** Impaired focus and reaction time
- **Motivation:** Increased fatigue, irritability, reduced concentration
- **Muscle Strength and Power:** Decreased muscular strength and explosive power
- **Endurance:** Decrease performance and lab assessments of maximal oxygen uptake

For every athlete, there are a range of weights associated with optimal health and long-term athletic performance. In some sports, there are widely held perceptions that athletes perform better at lower weights. It is important to acknowledge that for some “weight sensitive sports” (e.g., distance running, gymnastics, dance, weight-classified sports), short-term performance may be enhanced when competing at a lighter weight. However, bodyweights that are maintained in a state of LEA result in reductions in performance and increased injury risk over time.

## Symptoms of LEA

1. Reduced training capacity
  - a. Delayed or prolonged recovery times
  - b. Excessive fatigue
  - c. Concentration difficulties
2. Reduced athletic performance
3. Repeated episodes of, or prolonged recovery from, injury or illness
4. Change in mood (i.e., increased anxiety or depression)
  - a. Preoccupation, or obsessive behavior, regarding diet and training
5. Failure to lose weight despite low calorie intake
6. Reduced or low bone density
  - a. Stress fractures (especially if recurrent or slow to heal)
7. Cessation or changes in menstrual cycle
  - a. Less than nine menstrual cycles/year is an indicator of LEA
8. Low blood count, iron levels, and/or vitamin D

\* Adapted from USOPC: <https://www.teamusa.org/-/media/TeamUSA/Nutrition/LEA-Fact-Sheet.pdf?la=en&hash=4CB27CCC4C1309A5F7BC7ED79EAC7EF83D5A3519>



# RISK FACTORS

## Why Do Some Athletes Develop LEA?

Studies have found that the prevalence of LEA and REDs in athletes ranges from 15-80 percent, depending upon the specific population studied. Initial studies in this area were primarily focused on female athletes, but it is important to recognize that males are at risk for LEA and REDs as well.

The following factors appear to increase the risk for LEA development. Please note that some athletes may belong to two or more of these risk groups.

- Inadvertent low caloric intake due to:
  - Scheduling challenges (i.e., “too busy to eat”)
  - Food insecurity/availability
  - Lack of knowledge regarding appropriate calorie intake for athletes
  - Lifestyle changes (e.g., students moving to college and learning to nourish themselves)
- Diet restrictions:
  - Vegetarian/vegan diets
  - Religious dietary restrictions
  - Weight loss attempts
  - Food preferences (“picky eaters”)
  - Disordered eating
- Sport-specific factors (often related to participation in weight sensitive sports):
  - Endurance athletes (e.g., distance runners, cyclists, triathletes)
  - Weight-classified athletes (e.g., wrestling, lightweight rowing)
  - Aesthetic sports (e.g., gymnastics, figure skating, dance)
- Psychological factors:
  - Perfectionism
  - Body dysmorphia
  - Eating disorders/disordered eating



## THE LEA “WEIGHT CYCLE”

Short-term periods of LEA may result in initial weight loss. Weight is lost as the body breaks down fat and muscle to provide energy for activity as well as daily maintenance and function. In weight-sensitive sports, this initial weight loss may produce short-term improvements in performance. When these short-term improvements occur, athletes may receive positive feedback regarding their appearance and/or performance, which often encourages longer periods of LEA.

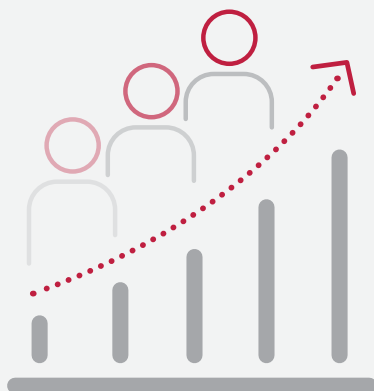
With longer periods of LEA, the body learns to “make do” with this lower calorie intake and adapts to this low level by:

- Reducing the resting metabolic rate (in females this can happen after just four days of LEA).
- Reducing the energy used to refuel and recover from intense training.

If activity levels remain the same, this creates a new “steady state” where the body now needs fewer calories per day, and weight loss ceases.

## HOW DOES ENERGY AVAILABILITY IMPACT GROWTH?

Health care providers use growth charts developed by the U.S. Center for Disease Control to follow changes in height and weight in children and adolescents. As a general rule, growth tends to follow expected percentile lines throughout development and significant deviations away from this rate of expected growth will often prompt further evaluation by health care providers. It’s also worth noting that in younger athletes, LEA may slow down normal weight gain rather than produce weight loss.



At this point, athletes who desire to lose additional weight will need to lower their energy availability further through additional reductions in calorie intake and/or increases in exercise. This produces an even lower metabolic rate, and ultimately the weight plateaus at this lower level of calorie intake. This creates the cycle shown below:



This cycle repeats itself as the body tries to conserve energy when energy availability is reduced, ultimately creating the health and performance changes associated with REDs. In these cases, body weight is maintained at calorie levels that are insufficient to support healthy function, and a number of body functions that are “less essential” for survival slow down. Reproductive function and bone health are the two systems that have been best studied in this field, and there is concern that these cycles of metabolic downregulation are often seen during the development of eating disorders in athletes.

Although calorie intake does affect weight, due to the patterns described before, it is important to emphasize that:



1

Low or inadequate calorie intake does not always produce weight loss.

2

Weight cannot be used as a single indicator of adequate calorie intake.

3

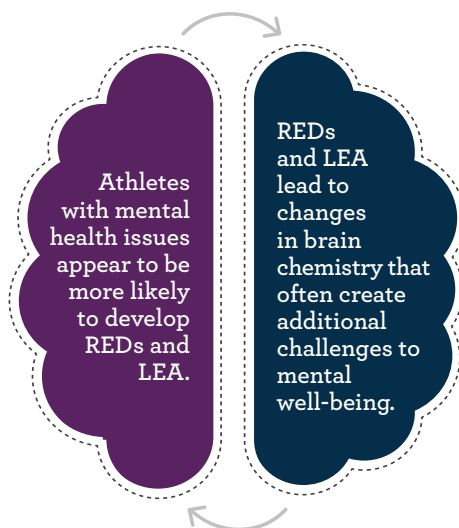
Appropriate restoration of calorie intake does not always result in weight gain.



# MENTAL HEALTH AND LEA

## What Are the Mental Health Effects Associated With REDs and LEA?

The relationships between mental health and REDs/LEA are complex and bidirectional.



Pressure associated with performance and appearance may drive some athletes toward disordered eating behaviors and/or compulsive exercise, which can lead to REDs. Athletes with certain perfectionistic tendencies are at particular risk.

Perfectionism is currently classified as either:

**Adaptive:** Setting high goals that are attainable and flexible, and readily moves on from mistakes.

- Lack of perfection = Opportunity to improve

**Maladaptive:** Setting high goals that are often unattainable and rigid, and typically dwells on mistakes.

- Lack of perfection = Failure

Maladaptive perfectionism is often seen in young athletes who feel the need to simultaneously excel in sports, school, and social environments, and is often magnified by social media. Athletes with maladaptive perfectionism are at a higher risk for eating disorders, compulsive exercise, burnout, anxiety/depression, and even suicide.



A common manifestation of maladaptive perfectionism is **body dissatisfaction**, which includes persistent negative feelings about one's appearance and body shape. Athletes with body dissatisfaction usually believe that they are not "thin enough" or "muscular enough," and spend large amounts of time and energy pursuing a leaner and more muscular appearance. Body image often worsens when athletes compare themselves to idealized images seen on social media.

In many cases, family and friends will try to convince athletes with body dissatisfaction and disordered eating that their self-perception is incorrect. However, it is important to recognize that these beliefs are usually illogical (and firmly entrenched), and care from a mental health expert is often required.



## How Can We Help Athletes With Problematic LEA and Possible REDs?

The approach to helping athletes with LEA and possible REDs depends upon:

1. Underlying factors that predisposed the athlete to REDs/LEA
2. Health-related impacts (physical and mental)

For some athletes, LEA is unintentional and primarily due to a lack of knowledge regarding healthy sports training and nutrition or a lack of access to healthy food choices. In these cases, educating and helping athletes develop healthy eating strategies enables them to make better choices.

These athletes might benefit from:

- Information from reliable sports nutrition sources, such as the *TrueSport Nutrition Guide*.
  - Some athletes may benefit from individualized guidance with a registered dietitian.
- Team-based efforts, such as:
  - Reviewing a daily nutrition tip, or viewing a quick video on the topic, at the beginning or end of practice.
  - Providing appropriate pre- or post-training snacks (either on-site or to go).
- For athletes with food insecurity, *Feeding America* can help families identify local sources for healthy food.

In other athletes, LEA is the result of intentional dietary restriction, or excessive training, in an effort to lose weight or enhance muscularity. For many of these athletes, LEA reflects underlying issues related to body image, self-esteem, and/or disordered eating, which will need to be addressed as part of the treatment plan. In these cases, involvement of a mental health professional, as well as a registered dietitian is important.

In those cases where LEA has led to the development of health-related consequences and concern regarding the potential development of REDs, a support and treatment team that includes the following is needed:

- A health care provider with knowledge and experience in assessing and treating athletes and REDs: This could include a provider with sports medicine training or a primary care physician in consultation with a sports medicine expert. Ideally, the health care provider will communicate with other members of the health care team, as well as the athlete and their family, to determine the athlete's level of ongoing participation in sport.

- A registered dietitian with sports medicine expertise: The key component of reversing problematic LEA and REDs is restoration of adequate energy intake, which is best done with the assistance of a registered dietitian with experience in this area.
- Mental health practitioner with experience working with athletes and with disordered eating: The bidirectional relationship between problematic LEA/REDs and mental health can be particularly challenging.

In addition, for those athletes with access, a licensed athletic trainer (AT) is a valuable member of the health care team. The AT is often the best resource for potential issues related to athlete behavior, function, and performance, and can help facilitate healthy levels of participation in training and team activity.

## Diagnosing REDs

The diagnosis of REDs is made by a physician after a thorough review of the athlete's history, physical examination, laboratory studies, and potential corroborating information from other members of the health care team (including dietitian, mental health practitioner, and possibly an AT).

Given the impact of LEA and REDs on multiple body symptoms, making the diagnosis can be challenging due to the following:

- The broad spectrum of symptoms and findings often requires laboratory evaluation and input from multiple providers.
- Patterns and severity of symptoms and laboratory findings vary widely.
- Many REDs symptoms may be due to other possible causes (which need to be ruled out before making the diagnosis).

### **Possible Signs and Findings Associated with REDs**

- Findings in an office evaluation:
  - Changes in menstrual cycle in females, or lack of a first menstrual period before the age of 15
  - Changes in growth pattern (in young athletes who are still growing)
  - Prior stress fracture(s)
  - Sleep disturbance
  - Anxiety, depression, disordered eating, or other psychologic symptoms
  - Low blood pressure, which may produce lightheadedness or fainting standing or moving to an upright position
  - Low heart rate (heart rate <50 in adolescents)
  - Reduced morning erections (in males)
- Laboratory/radiographic evaluation:
  - Low testosterone (in males)
  - Low thyroid hormone
  - High total or LDL cholesterol
  - Low bone density





## Treating REDs

Given the process required for the evaluation and diagnosis of REDs, treatment is often a continuation of care and communication with the diagnosing health care team (physician, registered dietitian, mental health practitioner, and AT (if available)).

Treatment principles include:

- Gradual increases in calorie intake to a healthy level of energy availability under the guidance of a registered dietitian
- Dedicated medical treatment for additional REDs-related health concerns
- Mental health support to address issues that contributed to, and/or resulted from, the REDs diagnosis
- Regular monitoring for ongoing improvement and progress toward goals
- Ongoing education of athletes and caregivers regarding healthy nutrition and training

## Sport Participation With REDs

For some athletes with LEA or REDs, continued involvement with training and team activity can be a source of support and helpful for recovery. However, in some cases, removal from training and team activities is necessary due to physical, psychological, and/or social concerns. The IOC consensus statement contains decision-making guidance for physicians regarding sport participation and monitoring for athletes diagnosed with REDs. Symptom severity, clinical judgement of the treatment team, and input from the athlete and family are key factors in determining the ability of the athlete to continue or return to sport participation while undergoing evaluation and treatment for REDs.

## What Should Athletes Expect During REDs/LEA Treatment?

The goal for REDs treatment is NOT as simple as just advising athletes to eat more. Sudden increases in calorie intake when the body has a down-regulated metabolism can have significant and unpleasant effects on the athlete, including:

- Nausea/vomiting/upset stomach
- Constipation/diarrhea
- Bloating

Appropriate dietary strategies developed by licensed professionals generally focus on:

- Slowly increasing daily calorie intake with small, frequent meals
- Assuring adequate carbohydrate intake, with low levels of fiber
- Addressing nutrient deficiencies (including iron, calcium, and vitamin D)

Athletes with REDs may be in a relative state of dehydration and when normal carbohydrate and fluid intake are restored, they may note a several pound gain in water weight and feel bloated. Although this feeling is temporary, it may be very discouraging to the athlete, and they may benefit from added support during this time.

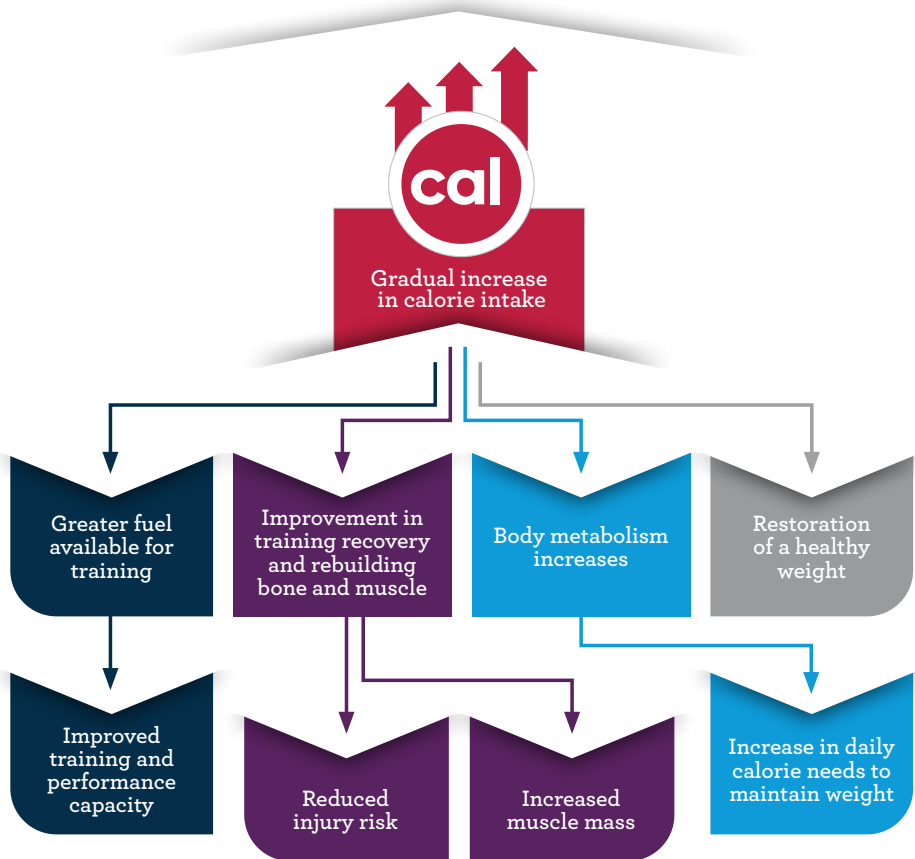
It's important for athletes and parents to be aware that increasing energy availability will often result in restoration or commencement of healthy menstrual function. For some athletes, this will be a significant change in their life that they may not be expecting.



For athletes who are underweight, or experiencing poor growth, correction of LEA and REDs usually results in restoration of healthy weight and growth. However, it is important to remember for athletes with LEA that:

- Reducing calorie intake does not always produce weight loss
- Increasing calorie intake does not necessarily create weight gain

Athletes at (or above) a healthy weight often fear that correction of LEA will automatically produce significant weight gain. They should be reassured that this is NOT necessarily the case. The goal in athletes who are at a healthy weight, or overweight, is to gradually restore adequate amounts of available energy, so that the body has an opportunity to “up-regulate” metabolism with the added calories used to restore function, rather than increase fat mass. This process is shown below.



## REDs and LEA Prevention

Education and early recognition are key to preventing and minimizing the effects of LEA and REDs. Athletes, coaches, and caregivers benefit from acquiring and implementing knowledge regarding:

- The role of nutrition and its contribution to athlete health and performance, and the potential impacts of LEA on both health and performance.
- Recognition that optimal athlete performance can occur at a variety of body weights.
- Early recognition of symptoms associated with adaptable LEA, before it progresses to problematic LEA and possible REDs.
- Cultural pressures on young athletes to achieve a lean, muscular physique.
- Effective and ongoing communication with athletes regarding nutrition, body image, and mental health, even before problems develop!



# GUIDANCE FOR COACHES



For many athletes, coaches exert significant influence over their training and dietary choices, and even casual comments regarding an athlete's weight or body size can have profound and lasting effects on the athlete. As such, coaches shouldn't comment on weight, appearance, and food-related behaviors.

Here's how coaches can help prevent and address LEA and REDs:

1. Role model healthy eating and training.
2. Maintain open lines of communication and establish a team culture of healthy behaviors, care, compassion, and shared goals.
3. Shift emphasis away from short-term performance goals and toward longer-term development of athletic skill, performance, and athlete health.
4. Focus on high quality training AND high quality recovery.
  - a. Although bouts of high training volume and intensity can be an important part of a periodic training program, athletes respond best when training volume and intensity are variable, with at least 36-48 hours between high intensity sessions.
  - b. During times of high training demands, athletes should be directed to:
    - Increase energy/calorie intake accordingly.
    - Focus on appropriate recovery, including adequate sleep, physical rest, and overall stress reduction.
5. Do not promote weight loss. Direction around weight-related goals should come from a registered dietitian or other health care professional and not from coaching staff.
6. If you suspect LEA or REDs in an athlete, the appropriate caregivers and/or medical staff should be informed. Any conversation about REDs and LEA should focus on overall athlete well-being rather than weight and food.
  - These conversations should be handled in a discreet way that's comfortable for the athlete. If the conversation is with an athlete who is a minor, the interaction should always be observable and interruptible.
  - Share your observations and reason for concern (e.g., "I have noticed that..." or "I wanted to check in with you about...").
  - Don't be surprised by denial and defensiveness.





GUIDANCE  
FOR  
PARENTS AND  
CAREGIVERS

Young athletes often face multiple pressures that may predispose them to LEA and REDs. This may include influence from social media, peers, coaches, and even themselves. Athletes benefit from a culture of open communication regarding these pressures and the importance of life balance, training recovery, and the maintenance of physical and mental well-being. Don't wait until there is a potential issue to start these conversations. Your words and behaviors have greater influence than you may realize!

Here are some ways to help if you're concerned about LEA and REDs:

1. Role model open and healthy conversations and behaviors regarding eating and training, and consider sharing personal struggles with eating, diet, and training.
2. Seek opportunities to learn about LEA and REDs, both on your own and with your child. News stories about athlete mental well-being, eating disorders, or struggles with performance provide opportunities for discussion.
3. Concerns regarding possible LEA or REDs should be addressed "sooner rather than later." When discussing, keep the following in mind:
  - a. Timing and location are important
  - b. Give the athlete a heads up that you have something you would like to discuss.
  - c. Choose a time and location that is comfortable and free of distraction.
  - d. Use "I" statements to express your concerns and observations and ask open-ended questions to encourage further discussion (i.e., "I've noticed that you don't seem to have as much energy lately. How are things going for you at school and with soccer?").
  - e. Be prepared to listen.
  - f. Initial conversation attempts may be met with resistance or denial, but let the athlete know you are there to provide support and to help locate resources for them.
4. Enlist health care professionals to help address LEA and REDs concerns.
  - a. Preparticipation evaluations and "well-child checks" provide good opportunities for conversation between providers and the athlete.
    - Inform the provider ahead of time of your concern.
  - b. Offer to set up an appointment with a registered sport dietitian to discuss nutrition strategies for optimal performance.



# GUIDANCE FOR ATHLETES



It is important to remember that teammates cannot “fix” each other, but they can help each other by listening, showing compassion, and providing support. Becoming knowledgeable about REDs, LEA, and disordered eating is a good first step.

Here are other ways to help:

1. Team captains and senior members can be role models for healthy eating, training, and recovery, and can help establish a team culture of trust, support, and healthy behavior.
2. Raising possible concerns about physical and mental health can be sensitive and difficult, and making a successful connection depends upon the following:
  - a. Right place
    - The setting should be comfortable for all participants.
    - Discussions during a walk or light training may be more comfortable and open than sitting in a quiet space.
  - b. Right time
    - Avoid times of high stress or distraction.
    - Ask permission to have a discussion (e.g., “Can we talk soon? Is now good?”).
  - c. Right person
    - Someone with a close, established relationship with the athlete who is prepared to listen and willing to provide ongoing support.
  - d. Use “I” statements to share observations and reason for concern (e.g., “I’ve noticed that…”).
  - e. Focus on feelings and emotions rather than food and weight.
  - f. Do not be discouraged or surprised by initial denial and defensiveness (e.g., “I’m fine.” “Nothing’s wrong.”).
3. Seek advice from trusted adult professionals who can provide guidance on how to help the athlete get further assistance, such as a:
  - a. Team athletic trainer
  - b. Team physician
  - c. School nurse or guidance counselor



## Acknowledgement:

*A very special thanks to Dr. Michele LaBotz for contributing the content for this publication.*

Michele LaBotz, MD, FAAP, CAQSM is a sports medicine physician with experience caring for athletes at all levels of sport. She is particularly interested in the principles of nutrition and supplement use, injury prevention, physical literacy, and mental health in young athletes. LaBotz writes and speaks nationally on these topics and was the co-author of the American Academy of Pediatrics' (AAP) clinical report on the use of performance-enhancing substances in young athletes. She serves on the board of directors for the Maine Chapter of the AAP and the Taylor Hooton Foundation and chairs the Health and Safety Advisory Council for the National Council of Youth Sports.

After completing premedical training at the University of Michigan and University of California, Irvine, LaBotz graduated from Dartmouth Medical School. She trained in pediatrics at University of Wisconsin at Madison and Maine Medical Center, as well as in sports medicine at the University of North Carolina at Chapel Hill. LaBotz subsequently served as a team physician at the University of Hawai'i. She and her family then returned to Maine, where she currently serves as the medical director the athletic training program at the University of New England and is an Associate Professor of Pediatrics at Tufts University School of Medicine. LaBotz and her husband reside on Cousins Island in Yarmouth, Maine.



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## Resources:

International Olympic Committee 2023 Consensus Statement on Relative Energy Deficiency in Sport (REDs)

<https://bjsm.bmj.com/content/bjsports/57/17/1073.full.pdf>

USOPC Sports Nutrition Fact Sheet on Low Energy Availability

[https://assets.contentstack.io/v3/assets/blt9e58afd92a18a0fc/bltaa7a0653bc475a00/6470c42af0d737510db117f0/LEA\\_Fact\\_Sheet.pdf](https://assets.contentstack.io/v3/assets/blt9e58afd92a18a0fc/bltaa7a0653bc475a00/6470c42af0d737510db117f0/LEA_Fact_Sheet.pdf)

## TrueSport

Nutrition Guide

<https://truesport.org/wp-content/uploads/TSNutritionGuide.pdf>

Other nutrition resources

<https://truesport.org/teach-learn/truesport-topics/nutrition/>

*Find more at the TrueSport website:*

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