



# Relative Energy Deficiency in Military (RED-M)

## A Multidisciplinary Approach to Awareness & Prevention (MAAP) Concept Map



**RED-M Background**

**RED-M Team**

**Nutrition**

**Strength & Conditioning**

**Physical Therapy**

**Occupational Therapy**

**Cognitive Performance**

**Human Performance Leadership**

**Final Thoughts**



## RED-S vs. RED-M



### Relative Energy Deficiency in Sport (RED-S)

Refers to diminished physiological processes due to relative energy deficiency.

### Relative Energy Deficiency in Military (RED-M)

RED-S equivalent to those serving in the military.

Why distinguish RED-M from RED-S?

Why develop a concept map?

Focus Question & Purpose Statement

Project Goals



## Why distinguish RED-M from RED-S?

### Excessive Energy Expenditure

- Military duty and field training can result in an average of 4,000 kcal daily energy requirements but can also exceed 7,000 kcal/day.
- Daily energy deficits are common up to 50-70% of total needs.

### Inadequate Energy Intake

- Time constraints
- Anorexia related to stress and high cognitive load
- Limited food availability (i.e., field training).
- Task specific training

**RED-S  
Health  
Consequences**

**RED-S  
Performance  
Consequences**

**RED-M Health  
&  
Performance  
Consequences**

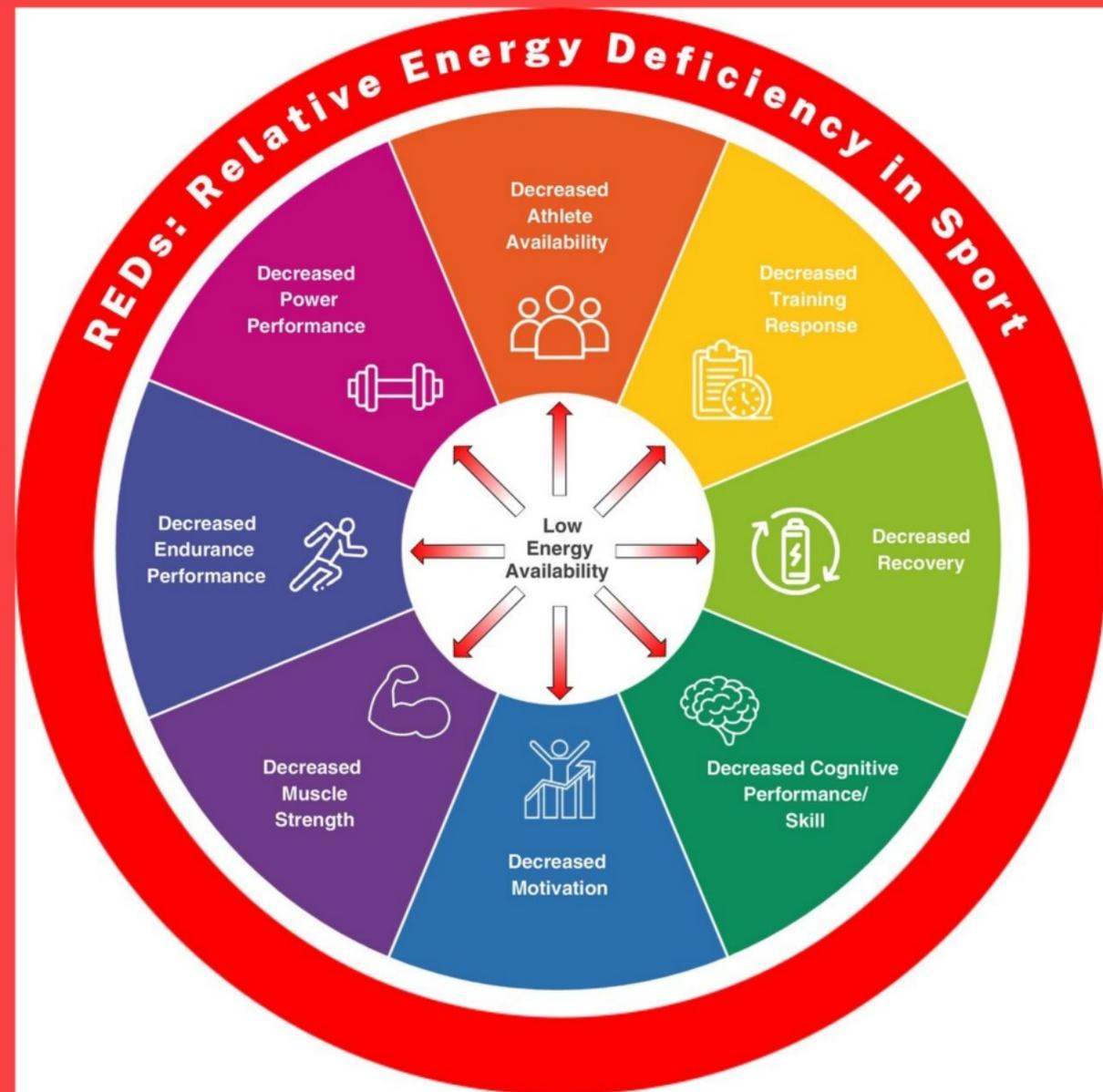
# RED-S Impact on Health



Reference: Mountjoy, M., Ackerman, K. E., Bailey, D. M., Burke, L. M., Constantini, N., Hackney, A. C., Heikura, I. A., Melin, A., Pensgaard, A. M., Stellingwerff, T., Sundgot-Borgen, J. K., Torstveit, M. K., Jacobsen, A. U., Verhagen, E., Budgett, R., Engebretsen, L., & Erdener, U. (2023). 2023 International Olympic Committee's (IOC) consensus statement on Relative Energy Deficiency in Sport (REDs). *British journal of sports medicine*, 57(17), 1073-1097. <https://doi.org/10.1136/bjsports-2023-106994>

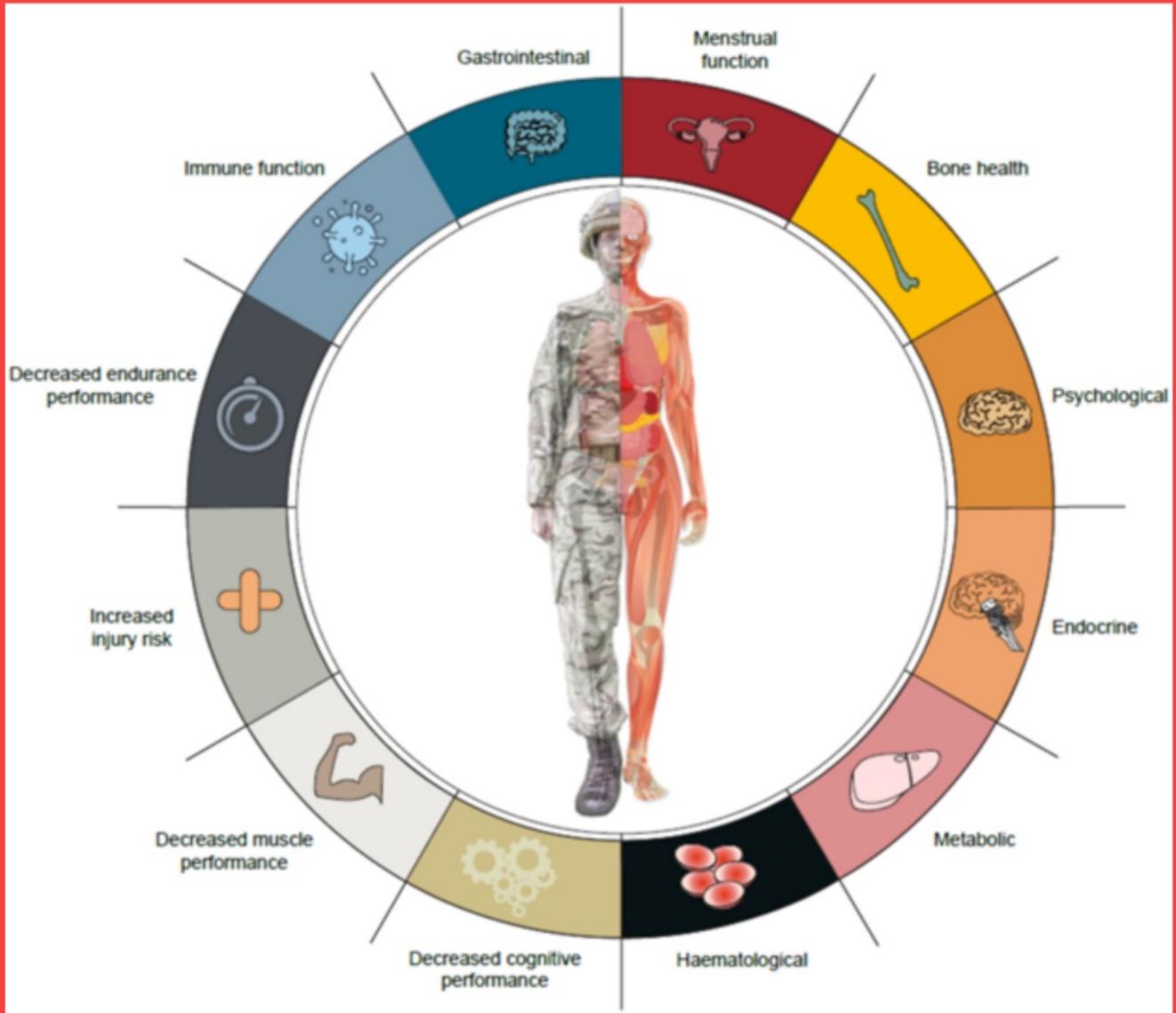
# RED-S

## Impact on Performance



Reference: Mountjoy, M., Ackerman, K. E., Bailey, D. M., Burke, L. M., Constantini, N., Hackney, A. C., Heikura, I. A., Melin, A., Pensgaard, A. M., Stellingwerff, T., Sundgot-Borgen, J. K., Torstveit, M. K., Jacobsen, A. U., Verhagen, E., Budgett, R., Engebretsen, L., & Erdener, U. (2023). 2023 International Olympic Committee's (IOC) consensus statement on Relative Energy Deficiency in Sport (REDs). *British journal of sports medicine*, 57(17), 1073-1097. <https://doi.org/10.1136/bjsports-2023-106994>

# RED-M Impact on Health & Performance



Reference: O'Leary, T. J., Wardle, S. L., & Greeves, J. P. (2020). Energy Deficiency in Soldiers: The Risk of the Athlete Triad and Relative Energy Deficiency in Sport Syndromes in the Military. *Frontiers in nutrition*, 7, 142. <https://doi.org/10.3389/fnut.2020.00142>

# Concept Maps



- Graphic tool for organizing and representing knowledge.
- Excellent for understanding and categorizing new ideas or concepts.

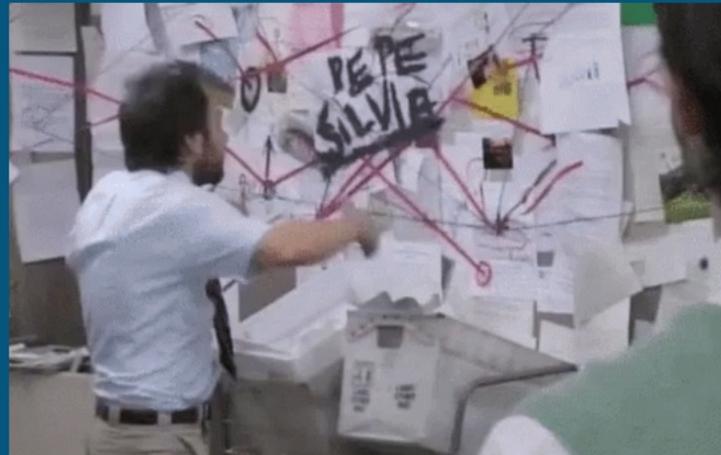


Novak, J. D. & Cañas, A. J. (2008). *The theory underlying concept maps and how to construct and use them*. Institute for Human and Machine Cognition. <http://cmap.ihmc.us/docs/pdf/TheoryUnderlyingConceptMaps.pdf>

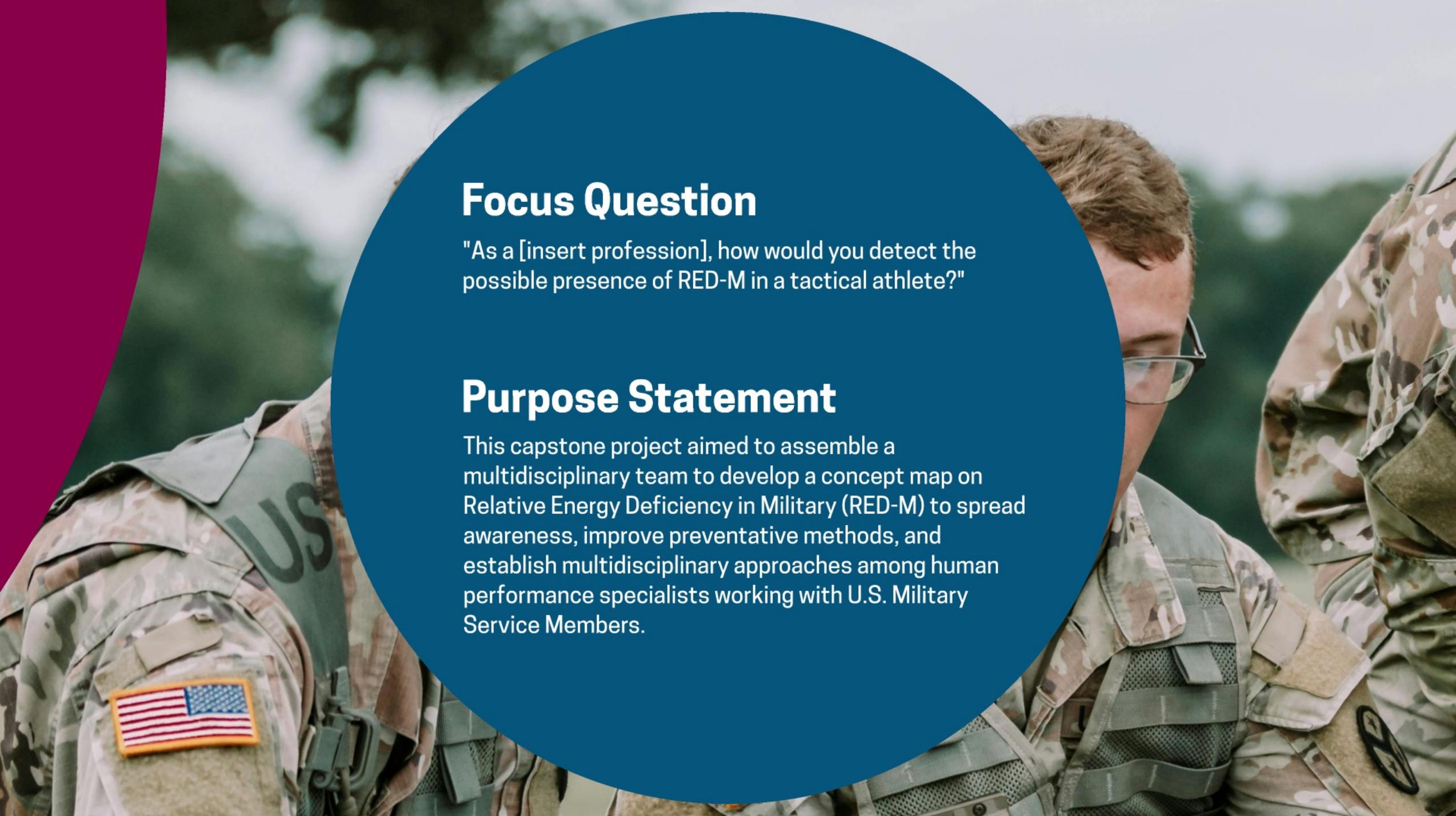
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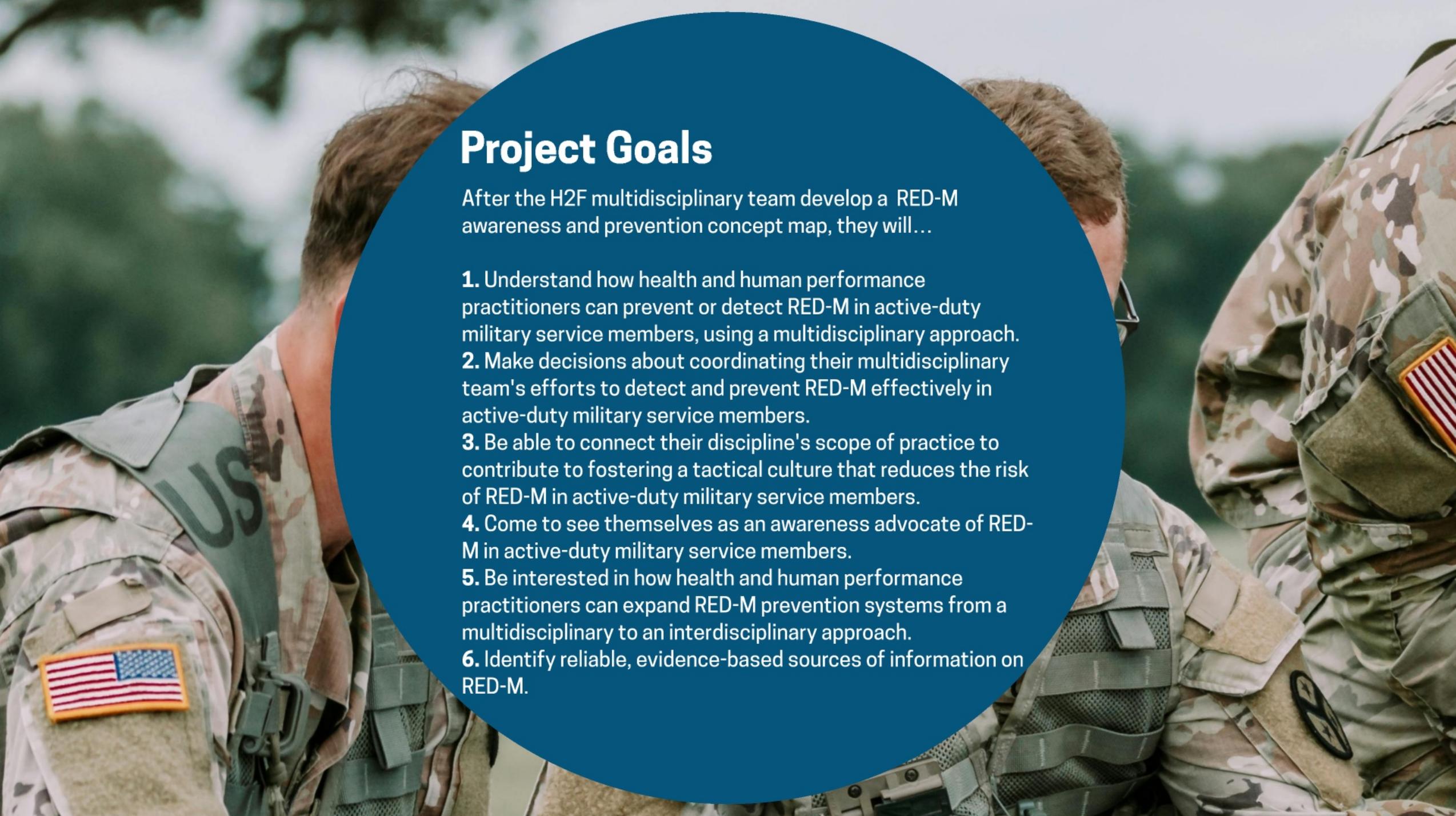


## Focus Question

"As a [insert profession], how would you detect the possible presence of RED-M in a tactical athlete?"

## Purpose Statement

This capstone project aimed to assemble a multidisciplinary team to develop a concept map on Relative Energy Deficiency in Military (RED-M) to spread awareness, improve preventative methods, and establish multidisciplinary approaches among human performance specialists working with U.S. Military Service Members.



## Project Goals

After the H2F multidisciplinary team develop a RED-M awareness and prevention concept map, they will...

- 1.** Understand how health and human performance practitioners can prevent or detect RED-M in active-duty military service members, using a multidisciplinary approach.
- 2.** Make decisions about coordinating their multidisciplinary team's efforts to detect and prevent RED-M effectively in active-duty military service members.
- 3.** Be able to connect their discipline's scope of practice to contribute to fostering a tactical culture that reduces the risk of RED-M in active-duty military service members.
- 4.** Come to see themselves as an awareness advocate of RED-M in active-duty military service members.
- 5.** Be interested in how health and human performance practitioners can expand RED-M prevention systems from a multidisciplinary to an interdisciplinary approach.
- 6.** Identify reliable, evidence-based sources of information on RED-M.



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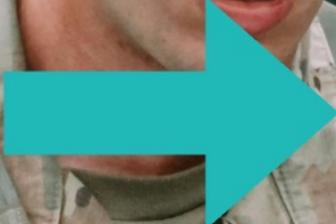


# RED-M Team



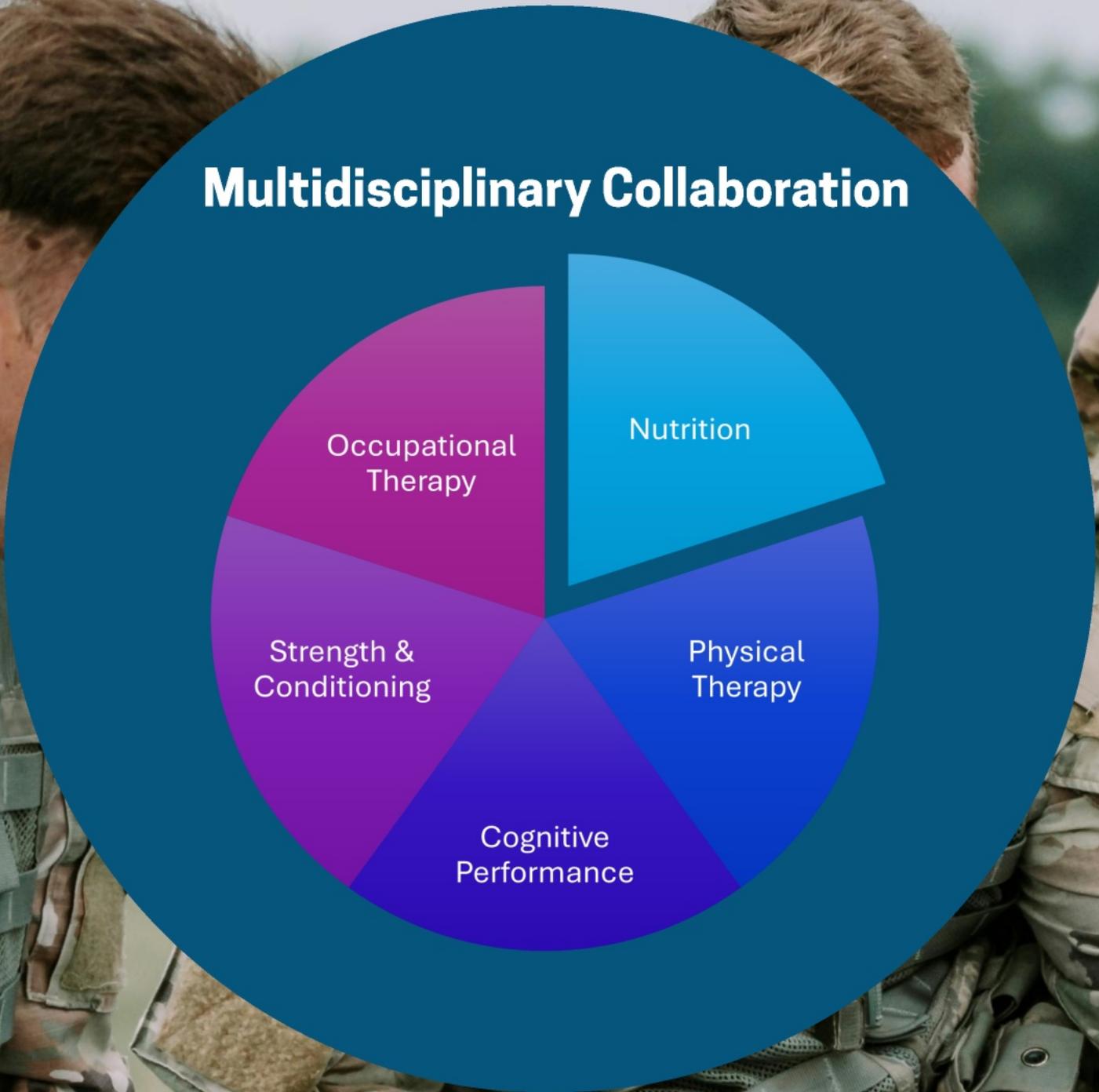
## Multidisciplinary Team:

- Brandon Lee, MS, RD, CSSD, CCRP
- CPT Emily Clark, MS, RD, CSSD
- CPT James Contessa Dsc, OTR/L
- 1LT Christian Shave PT, DPT
- Alëc Herbert, M.Ed
- Nicholas Arrigo, CSCS



**Multidisciplinary Approach**

# Multidisciplinary Collaboration



Occupational  
Therapy

Nutrition

Physical  
Therapy

Cognitive  
Performance

Strength &  
Conditioning



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# Nutrition

- Anthropometrics
  - Body composition analysis
- Biomarkers
- Energy Availability
  - Excessive energy expenditure
  - Inadequate energy intake
- Medical Status
  - Reproductive function
  - Immunological function
  - Gastrointestinal health
  - Hematological health
- Dietary Behaviors
  - Disordered eating and eating disorders





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## Strength & Conditioning

- Physical Performance
- Cognitive Performance
- Physical Recovery Impairments





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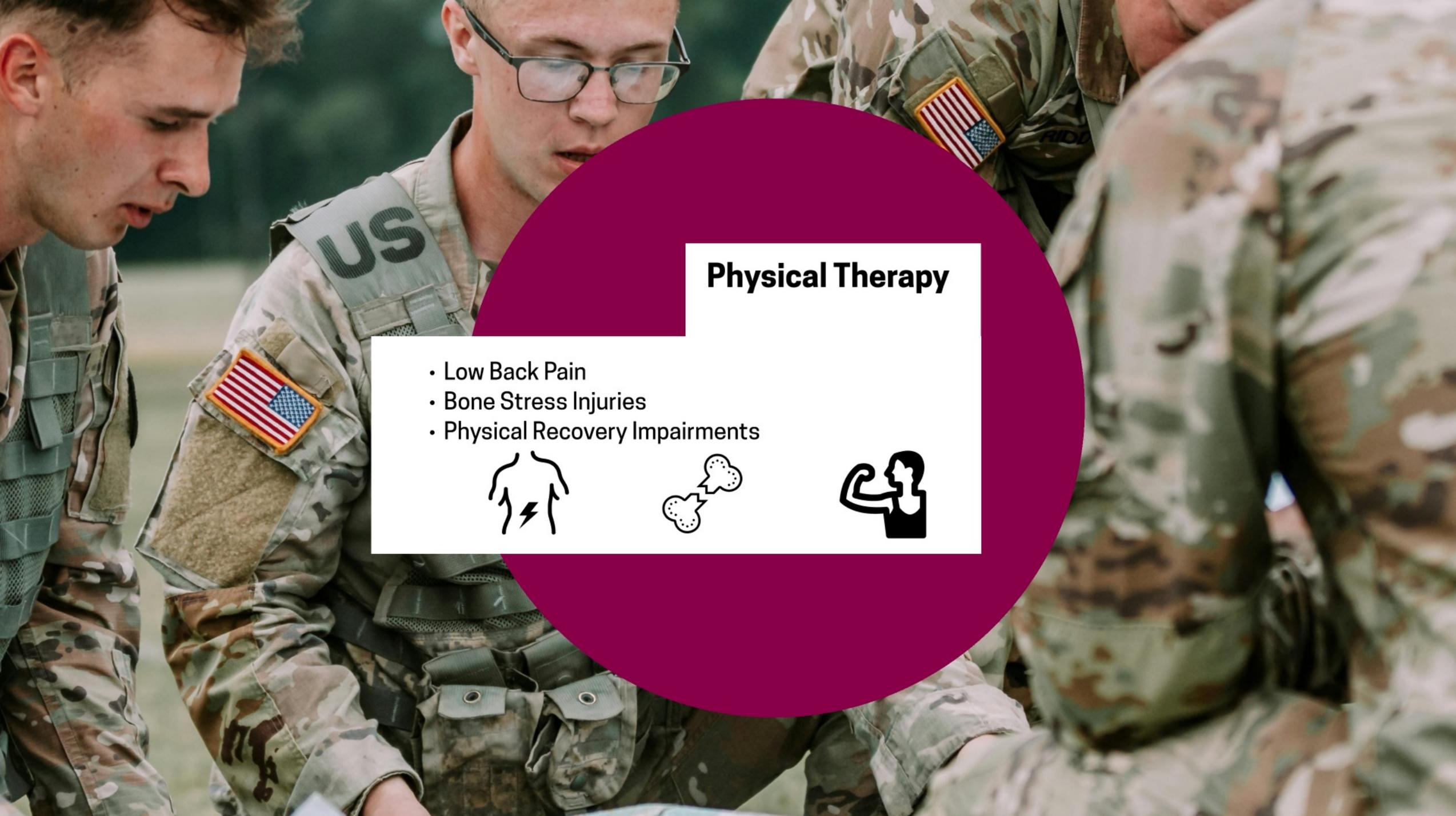
**Occupational Therapy**

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## Physical Therapy

- Low Back Pain
- Bone Stress Injuries
- Physical Recovery Impairments





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## Occupational Therapy

- Mental Functions
- Neuromusculoskeletal Movement-Related Functions
- Performance Skills
  - Social interaction skills
  - Process skills
  - Gross and fine motor skills





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## Cognitive Performance

- Disordered Eating and Eating Disorders
- Mental Decline





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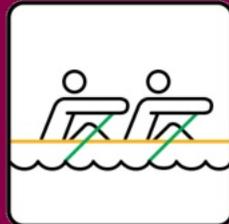


## Leadership

*“If you could get all the people in an organization rowing the same direction, you could dominate any industry, in any market, against any competition, at any time.”*

-Patrick Lencioni

Author of *The Five Dysfunctions of a Team*



**Laissez-faire  
Leadership**

**Coaching  
Leadership**



## Laissez-faire Leadership

- A leadership style that focuses on task delegation and minimum supervision.
- Laissez-faire leaders value autonomy and task delegation, offer constructive criticism, enjoy fostering leadership qualities, and provide sufficient support (e.g., resources and tools).
- Helps create a relaxed and creative work environment for the team.

Reference: International Institute for Management Development. (2024, April). *Top 6 use cases for laissez-faire leadership*. <https://www.imd.org/blog/leadership/top-6-use-cases-for-laissez-faire-leadership/>



## Coaching Leadership

- A leadership style that emphasizes support, guidance, learning facilitation, and curiosity (i.e., asking guided questions).
- A coaching leader can recognize the strengths and weaknesses of the team to help them improve.
- Coaching leaders usually can set clear expectations and create positive, motivating environments.

Reference: *What is the coaching leadership style?* The National Society of Leadership and Success. (2022, July 28). <https://www.nsls.org/blog/what-is-the-coaching-leadership-style>



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# Human Performance Evolution

Multidisciplinary  
to  
Interdisciplinary  
Approaches

Next Steps

Conclusion

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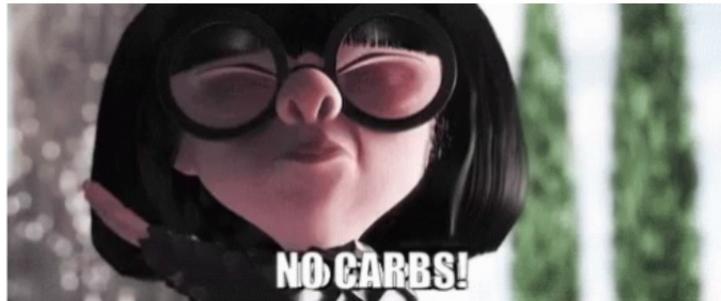


Multidisciplinary  
to  
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## Healthcare Example

### Interdisciplinary Approaches

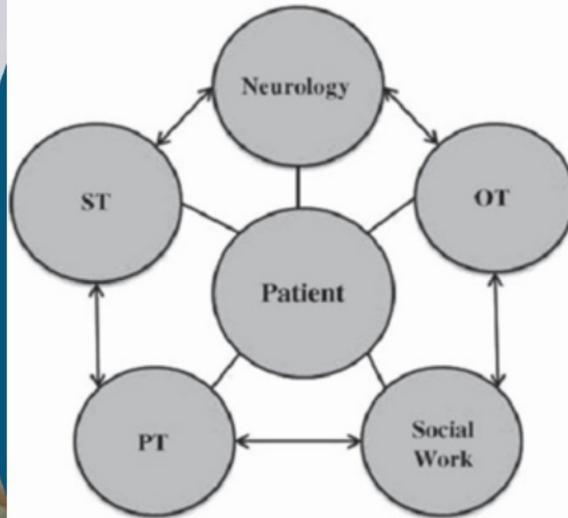
**Multidisciplinary-** The aggregation of many different technical disciplines together.

**Interdisciplinary-** The *cross-collaboration* of individual disciplines, the integration of knowledge and methods, and the synthesis of unified approaches.

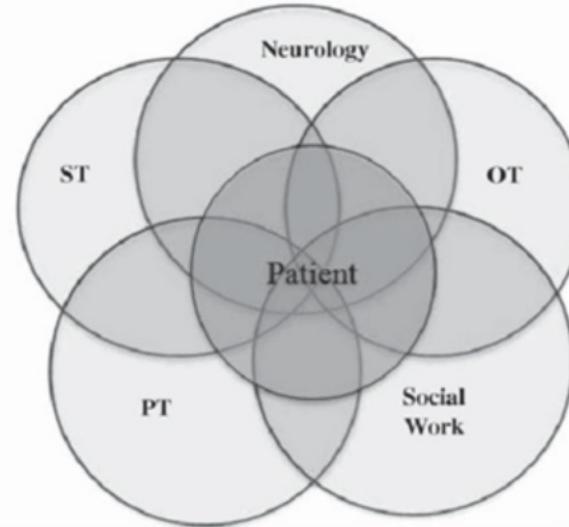


*"...a multidisciplinary structure does not guarantee that integrated knowledge sharing, collaborative workflow, and alignment of unified goals will occur."*  
- Duncan French, PhD

Multidisciplinary Model



Interdisciplinary Model



Prizer, Lindsay & Browner, Nina. (2012). The Integrative Care of Parkinson's Disease: A Systematic Review. *Journal of Parkinson's disease*. 2. 79-86. 10.3233/JPD-2012-12075.

## Next Steps

- Poster presentations
- Journal submissions
- Webinars or public speaking events (e.g., conferences)
- Q&A sessions via special interest groups
- Podcast interviews
- Future application for...
  - Screening protocols
  - "Return to play" protocols



**Thank you!**

**Brandon Lee, MS, RD, CSSD, CCRP**  
Holistic Health and Fitness (H2F) Dietitian  
U.S. Army Forces Command, Fort Drum, NY

Doctor of Health Science (DHSc) Student  
Pennsylvania Western University





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