

1. Study information

Dear Participant,

You are being asked to be part of a research study. This form is designed to tell you everything you need to think about before you decide to consent (agree) to be in the study or not to be in the study. It is entirely your choice. If you decide to take part, you can change your mind and stop participating at any time during the survey.

Title: Body Composition as Antecedent of RED-S: Exploring Best Practices

Principal Investigator: Nanna L. Meyer, PhD, RD, CSSD

Co-Investigators: Lindsay Macnaughton, PhD and Keston Lindsay, PhD

Funding Source: None

You are being invited to participate in a survey conducted on behalf of an Ad hoc working group established to address issues in body composition, health and performance in competitive sports with focus on the relationships between Relative Energy Deficiency in Sport (RED-s) and Body Composition. The working group is composed of internationally recognized experts who were in part members of working groups under the auspices of the International Olympic Committee Medical Commission working in parallel on issues of body composition in health and performance and REDs.

The aim of the survey is to establish the current practices related to body composition in competitive sport and identify whether these practices have changed in the last decade. These practices include, but are not limited to, understanding which body composition assessment methods are used, how measurements are carried out, how data are communicated and to whom. In addition, the group aims to identify solutions to problems related to unhealthy practices and ethical challenges in sport related to body composition practices as an antecedent of REDs.

You will be presented with survey questions to help us better understand the current state of body composition testing, standardization, and target weight/body fat values used and problems encountered related to body composition and weight reduction. Finally, questions aim at identifying possible solutions that you or your organization may have applied to promote both athlete wellbeing and performance. This survey should take around 20-25 minutes.

Up to 500 people will participate in the survey.

The risks for this study are minimal and include possible inconvenience or annoyance working through questions. There are benefits from this study and your participation is critical in informing next steps in body composition best practices.

We expect the data of this survey will assist the working group in understanding current practices in body composition assessment to evaluate an athlete's body composition and weight goals. In addition, learning of the diverse problems related to body composition in sport and identifying solutions that aim to reduce the health risks associated with current practices used to manipulate body weight and composition will assist the working group in formulating educational programming and developing written consensus for the sporting community. The impact of this project worldwide could change practice and identify further research for improving the health and performance of athletes.

2. Informed Consent Form

University of Colorado, Colorado Springs (UCCS)

Consent to be a Research Subject

If you have decided to participate in this survey, please understand that your participation is voluntary and that you have the right to withdraw your consent or discontinue participation at any time with no penalty. You also have the right to refuse to answer any question(s) for any reason with no penalty.

In addition, your individual privacy will be maintained in all publications or presentations resulting from this study. This study is anonymous and confidential. No identifiers will be made public that could trace the data to your identity.

If you would like to contact the Principal Investigator in the study to discuss this research, please e-mail nmeyer2@uccs.edu. If you would like to contact the UCCS IRB office regarding questions, concerns, or complaints, please email irb@uccs.edu.

By clicking the 'next' button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

3. Demographic Information

1. In which country do you work?

4. Demographic Information

1. What is your current gender identity? (select all that apply)

- Male
- Female
- Transgender female / trans woman (or Male-to-Female (MTF) transgender, transsexual, or on the trans female spectrum)
- Transgender male / trans man (or Female-to-Male (FTM) transgender, transsexual, or on the trans male spectrum)
- Non-binary, genderqueer, or genderfluid
- Gender identity not listed
- Prefer not to reply

5. Demographic Information

1. Which sporting organization(s), university or college do you represent in a professional capacity?

Sporting organization

Sporting organization

University / College

6. Demographic Information

1. At what level do most of your athletes compete? (select all that apply)

- Tier 5 - World Class
- Tier 4 - Elite / International Level
- Tier 3 - Highly Trained / National Level
- Tier 2 - Trained / Developmental
- Tier 1 - Recreationally Active
- High school
- College / University
- Commonwealth / Olympic
- Professional
- Other (please specify)

7. Demographic Information

1. Based on the proportion of your full time employment, please order the top three sports that you work with: (1 being the greatest proportion, 3 the least, if you work with <3 sports leave additional boxes blank)

Sport 1

Sport 2

Sport 3

If you work with more than one sport, for the subsequent questions please select or give the answer that is most representative of the majority of sports. At the end, there will be an opportunity to detail any significant differences between sports.

8. Demographic Information

1. What is your position within the organization?

- Sports Dietitian/Nutritionist
- Physiologist or other Sport Scientist
- Sports Medicine Physician/Doctor
- Athletic Trainer/Strength & Conditioning Coach
- Physiotherapist
- Sport Coach
- Team Manager
- Head of Performance
- Sport Psychologist
- Other (please specify)

9. Demographic Information

1. How long have you worked in this position with the organization?

- Less than 6 months
- 6 - 11 months
- 1-2 years
- 3-4 years
- 5-6 years
- 7-10 years
- >10 years

10. Questionnaire - Body composition assessment

1. Do you assess body composition in athletes?

- Yes
- No - I am not qualified to do such assessments
- No - other people are employed to do these assessments
- No - the sport I work in does not provide body composition assessment for its athletes
- No - the sport I work in discourages body composition assessment for its athletes
- No - Other (please specify)

11. Questionnaire - Accreditation

1. Do you hold formally recognised accreditation or have you completed formally recognised training? (select all that apply)

- ACSM Body Composition Assessment Certification
- ISAK Level 1
- ISAK Level 2
- ISAK Level 3
- ISCD clinical densitometry OR equivalent clinical densitometry certification
- IASMS Ultrasound Basic I
- IASMS Ultrasound Basic II
- IASMS Ultrasound Advanced Level
- Manufacturer accreditation / training
- Other (please specify)

12. Questionnaire - Body composition assessment

1. Does anyone else in your organization assess body composition?

- Yes - please share this survey with the relevant person
- No
- Not sure

13. Questionnaire - Body composition assessment

1. Who measures body composition in your organization? (select all that apply)

- Sports Dietitian/Nutritionist
- Physiologist or other Sport Scientist
- Sports Medicine Physician/Doctor
- Athletic Trainer/Strength & Conditioning Coach
- Physiotherapist
- Sport Coach
- Team Manager
- Head of Performance
- Allied Health Professional
- Sport Psychologist
- Commercial / external operator / tester
- Other (please specify)

14. Questionnaire - Measurements

1. Where do body composition measurements of athletes take place?

- In house - in a private room, with measurer +/- chaperone
- In house - in space that other use / can access freely
- Outsourced/external - commercial
- Outsourced/external - university
- Other (please specify)

2. What methods do you or your organization currently use to assess body composition? (select all that apply)

- Skinfolds
- Dual-Energy X-Ray Absorptiometry (DXA)
- Bioelectrical impedance analysis (BIA)
- Air displacement plethysmography (Bod Pod)
- Water displacement densitometry (hydrostatic/underwater weighing)
- Ultrasound
- Not sure
- Other (please specify)

15. Questionnaire - Measurements

1. What ultrasound mode do you use?

- A-mode
- B-mode

2. Which specific BIA method you use?

- Bioelectrical impedance spectroscopy (BIS)
- Bioelectrical impedance analysis (BIA) single frequency scale
- Bioelectrical impedance analysis (BIA) single frequency (whole body)
- Bioelectrical impedance analysis (BIA) multifrequency
- Not sure

3. How do you use skinfold measurements?

- Skinfolds using ISAK methodology (sum of 7 or 8 skinfold sites)
- Skinfolds using formula to estimate body composition
- Skinfolds with girths and breadths

16. Questionnaire - Academic training

1. If you participated in higher / tertiary education studies, did you receive body composition training? (select all that apply)

- I did not participate in higher / tertiary education studies
- Yes, at diploma level
- Yes, at undergraduate level
- Yes, at postgraduate level
- No
- Other (please specify)

17. Questionnaire - Athlete Demographics

1. Please select all of the characteristics that best describe the athletes that you predominately work with:

- Under 16 years of age
- Under 18 years of age
- Over 50 years of age
- Male
- Female
- Transgender female / trans woman (or Male-to-Female (MTF) transgender, transsexual, or on the trans female spectrum)
- Transgender male / trans man (or Female-to-Male (FTM) transgender, transsexual, or on the trans male spectrum)
- Non-binary, genderqueer, or genderfluid
- Athletes with a disability
- Athletes with diverse ethnic backgrounds

18. Questionnaire - Athlete Demographics

1. At what age do you or your organisation consider monitoring body weight and composition of athletes?

- <12 years
- 13-15 years
- 16-18 years
- >18 years

19. Athlete Demographics

1. For athletes <18 years of age do you seek parental / guardian consent?

- Yes - prior to the first body composition assessment ONLY
- Yes - prior to EACH body composition assessment
- No
- Other (please specify)

20. Questionnaire - Norms/standards and comparative values

1. Do you or your organization use norms/standards or comparative values when evaluating or interpreting an athlete's body composition data?

- Yes - normative data are used
- Yes - normative data are used alongside individual longitudinal data
- No - only individual longitudinal data are used
- Not sure


Other (please specify)

21. Questionnaire - Norms/standards and comparative values

For this set of questions (20-23) please be specific to the athletes you work with and provide information in the context of disability, gender, ethnicity, age and sport.

1. What norms/standards or comparative values do you or your organization use when evaluating an athlete's body composition data?

Please include citations or references to scientific literature where appropriate:



22. Questionnaire - Norms/standards and comparative values

1. How well do you feel the norms or standards you use align with the athlete population that you measure?

Not at all Very well

2. Please explain your previous answer:

23. Questionnaire - Norms/standards and comparative values

For this set of questions please be specific to the athletes you work with and provide information in the context of disability, gender, ethnicity, age and sport.

1. Do you use minimum / maximum, optimal or target benchmark values for specific body composition measures? (e.g., weight, BMI, %fat, sum of subcutaneous adipose tissue thickness)

Yes

No

24. Questionnaire - Norms/standards and comparative values

For this set of questions please be specific to the athletes you work with and provide information in the context of disability, gender, ethnicity, age and sport.

1. Please detail what minimum, maximum and target benchmark values you or your organization use. (e.g., weight, BMI, %fat, sum of subcutaneous adipose tissue thickness)

Minimum

Maximum

Optimal

Target benchmark

2. Please explain why you or your organization use these values that you have detailed in the previous question?

25. Questionnaire - Body composition assessment

1. Why do you or your organization measure body composition of athletes?

26. Questionnaire - Body composition assessment

1. Who initiates the measurement of athlete body composition? (select all that apply)

- Requested by Sport Coach
- Requested by Athlete
- Requested by Sport Dietitian/Nutritionist
- Requested by Athletic Trainer/Strength & Conditioning Coach
- Requested by Sports Physician/Doctor
- Requested by Head of Performance
- Requested by Physiotherapist
- Requested by Sport Scientist/Physiologist
- Requested by Psychologist
- Part of repeat/routine testing
- Other (please specify)

27. Questionnaire - Standardisation / Controls

1. How are procedures standardised for the most common body composition method used? Please outline or detail any protocols you use and include any citations or scientific references:



2. Please upload any written protocols or procedures for measuring body composition in your organisation here:

No file chosen

28. Questionnaire - Standardisation / Controls

1. Do you or your organisation control for any of the following prior to body composition testing? (select all that apply)

- Hydration status
- Fed / fasted state
- Overnight rested
- Time of day
- Measurer / technician
- Phase of menstrual Cycle
- Equipment
- None of the above
- Other (please specify)

2. Please outline below how you control for the factors outlined above:

29. Questionnaire - Body composition assessment

1. How often do you or your organization assess body composition during the annual training/competition season?

- Every 2 weeks
- Every 4 weeks
- Every 6-8 weeks
- 4 times per year
- 2 times per year
- 1 time per year
- Other (please specify)

30. Questionnaire - Body composition assessment

1. Are other parameters/variables assessed or captured at the same time as body composition data? (e.g., performance, immune status, nutritional status)

- Yes
- No
- Not sure

31. Questionnaire - Body composition assessment

1. Please list the parameters/variables:

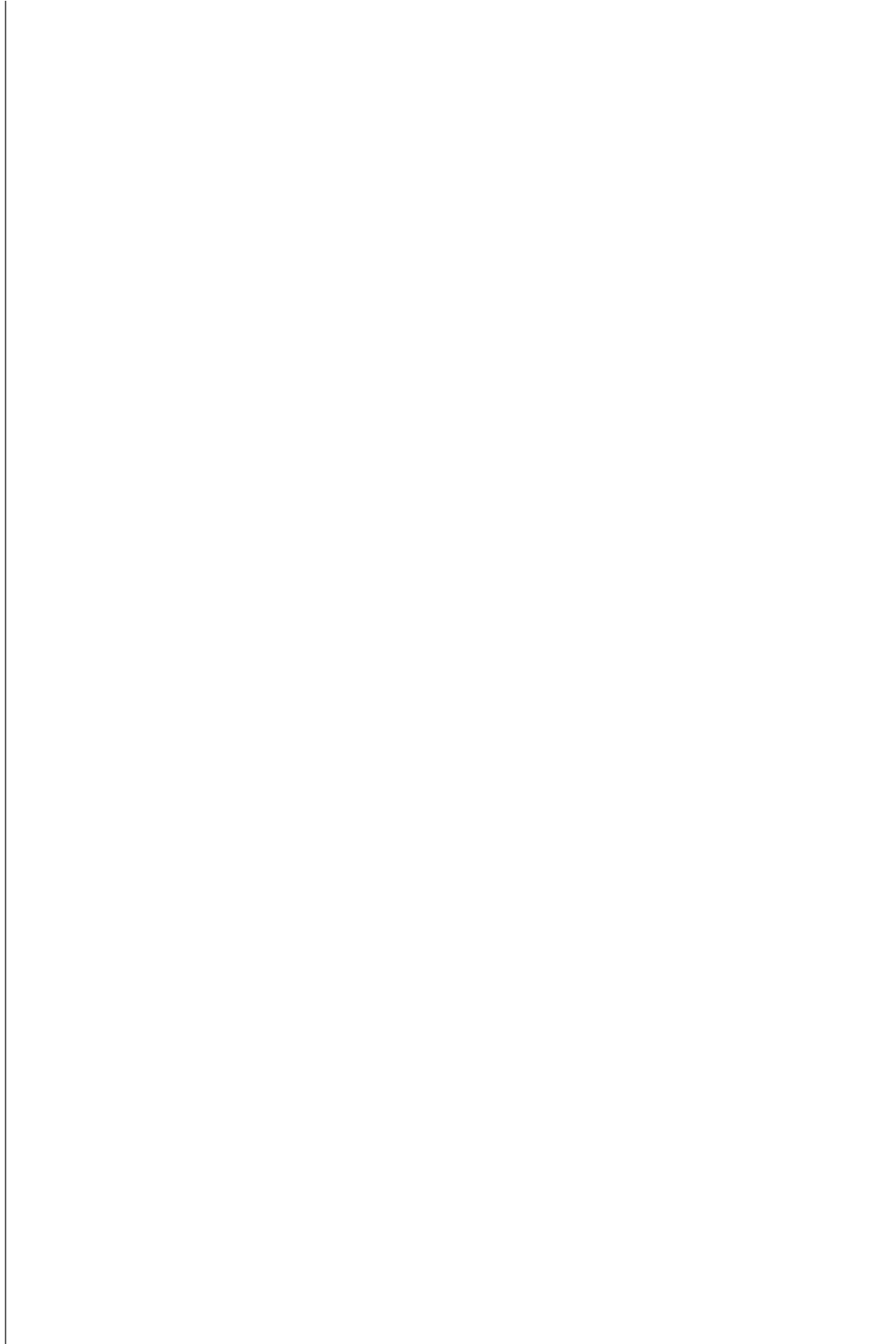
A large empty rectangular box with a thin black border, intended for the user to list parameters and variables. A small diagonal line is visible in the bottom right corner of the box.

32. Questionnaire - Information Flow

1. What is the flow of communication from tester to athlete to coach to other individuals (i.e., who gets involved and in which order) once body composition measurements have been performed? Please provide as much detail as possible:

2. Please rank individuals in the order they are involved in information flow following body composition testing, starting with 1 as the tester. If any individuals listed are not involved, please select N/A.

<input type="checkbox"/>	<input type="checkbox"/>	Athlete	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Tester / measurer	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Sports Dietitian/Nutritionist	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Physiologist or other Sport Scientist	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Sports Medicine Physician/Doctor	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Athletic Trainer/Strength & Conditioning Coach	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Physiotherapist	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Sport Coach	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Sport Psychologist	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Team Manager	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Head of Performance	<input type="checkbox"/> N/A
<input type="checkbox"/>	<input type="checkbox"/>	Allied Health Professional	<input type="checkbox"/> N/A



33. Questionnaire - Information to the athlete

1. Who provides feedback to the athlete regarding their body composition measurements?

- Sports Dietitian/Nutritionist
- Physiologist or other Sport Scientist
- Sports Medicine Physician/Doctor
- Athletic Trainer/Strength & Conditioning Coach
- Physiotherapist
- Sport Coach
- Team Manager
- Head of Performance
- Technician
- No feedback is provided
- Other (please specify)

2. What specific data are given to the athlete when results are communicated? (please select all that apply)

- Sum of skinfolds
- Sum of subcutaneous adipose tissue thickness (mm)
- % body fat
- Fat mass
- Fat free mass / Lean body mass / Muscle mass
- Other (please specify)

3. Which of the following are integrated with, and used in the interpretation of the results that are communicated to the athlete? (select all that apply)

- Absolute values
- Data ranges
- Normative data
- Maximum / minimum values
- Equipment precision error
- Intratester variability
- Prior results
- Other (please specify)

4. In which format are body composition data presented to the athlete? (please select all that apply)

- Organization standardised report
- In an email or similar message format
- Report generated automatically by body composition method/software
- Verbally
- Presentation format
- Displayed in facility
- Report created by measurer / technician
- Group feedback
- Individual feedback
- Other (please specify)

5. If you are able please share an anonymised example of the format used to communicate body composition data to the athlete:

No file chosen

34. Questionnaire - Body composition data

1. Who has access to athletes' body composition data? (select all that apply)

- Sports Dietitian/Nutritionist
- Physiologist or other Sport Scientist
- Sports Medicine Physician/Doctor
- Athletic Trainer/Strength & Conditioning Coach
- Physiotherapist
- Sport Coach
- Team Manager
- Head of Performance
- Technician
- Other athletes
- Other (please specify)

2. What factors influence or processes occur regarding decisions about an athlete's body composition?

3. Who is involved in making decisions about managing an athlete's body composition ? (select all that apply)

- Sports Dietitian/Nutritionist
- Physiologist or other Sport Scientist
- Sports Medicine Physician/Doctor
- Athletic Trainer/Strength & Conditioning Coach
- Physiotherapist
- Sport Coach
- Team Manager
- Head of Performance
- Athlete
- Psychologist
- Other (please specify)

35. Questionnaire - Body composition support

1. Are athletes provided with support following body composition measurements?

- Yes
 No
 Not sure

2. Please explain your previous answer in relation to support following body composition measurements, including details regarding who provides the support:

3. How clear is it to the athletes with whom you work that accurate body composition measurements are important for health, as well as performance in sports where body weight is a performance factor?

Very unclear Very clear

36. Questionnaire - Challenges

1. Are there challenges or unhealthy practices you or your organization encounter that may be associated with the choice of methodologies or protocols used to measure body weight/composition in sports?

Yes

No

37. Questionnaire - Challenges

1. Please describe the challenges that may be associated with the choice of methodologies or protocols used to measure body weight/composition in sports:



2. How do you or your organization deal with these challenges you have outlined above?



38. Questionnaire - Challenges

1. Are there challenges or unhealthy practices you or your organization encounter that may be associated with a general focus on body weight/composition in sports?

Yes

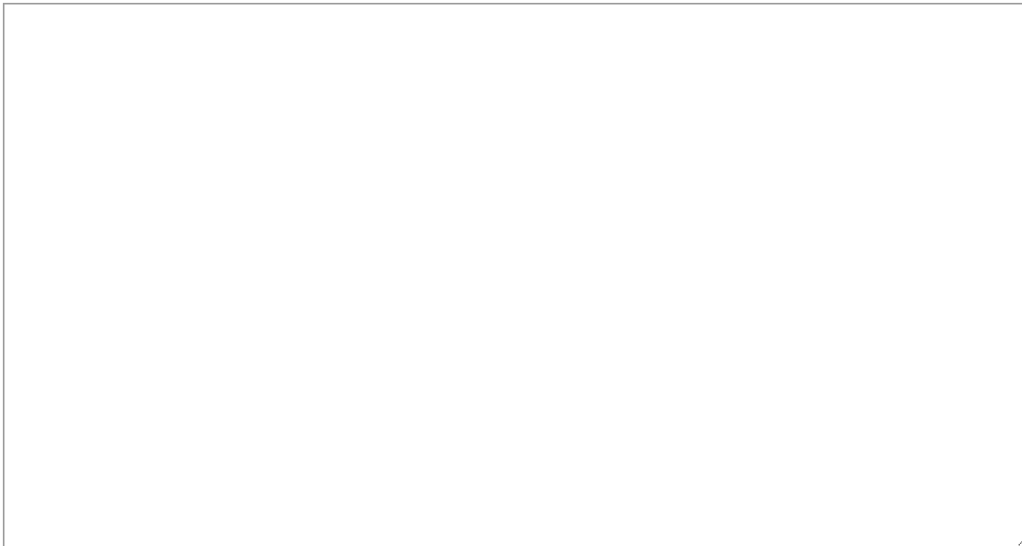
No

39. Questionnaire - Challenges

1. Please describe the challenges associated with the focus on body weight/composition in sports:

A large empty rectangular box with a thin black border, intended for the respondent to describe the challenges associated with the focus on body weight/composition in sports. A small diagonal slash icon is visible in the bottom right corner of the box.

2. How do you or your organization deal with these challenges that you have outlined above?

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40. Questionnaire - Challenges

1. Have solutions been identified to reduce the risks associated with the methodologies, protocols and general focus on body weight/composition in your organization?

Yes

No

41. Questionnaire - Strategies

1. Please describe the strategies identified as possible solutions to reduce the risk related to the methodologies, protocols and general focus on body weight/composition in your organization:



42. Questionnaire - Strategies

1. How well do you feel these strategies have been implemented in your organization?

Not at all Very successfully

2. Please explain your previous answer relating to implementation of strategies:

43. Questionnaire - Ethical challenges

1. Do you think the methodologies, protocols and general focus on body weight/composition in sport present ethical dilemmas/challenges for practitioners?

Yes

No

44. Questionnaire - Ethical challenges

1. What do you think these ethical dilemmas / challenges are?

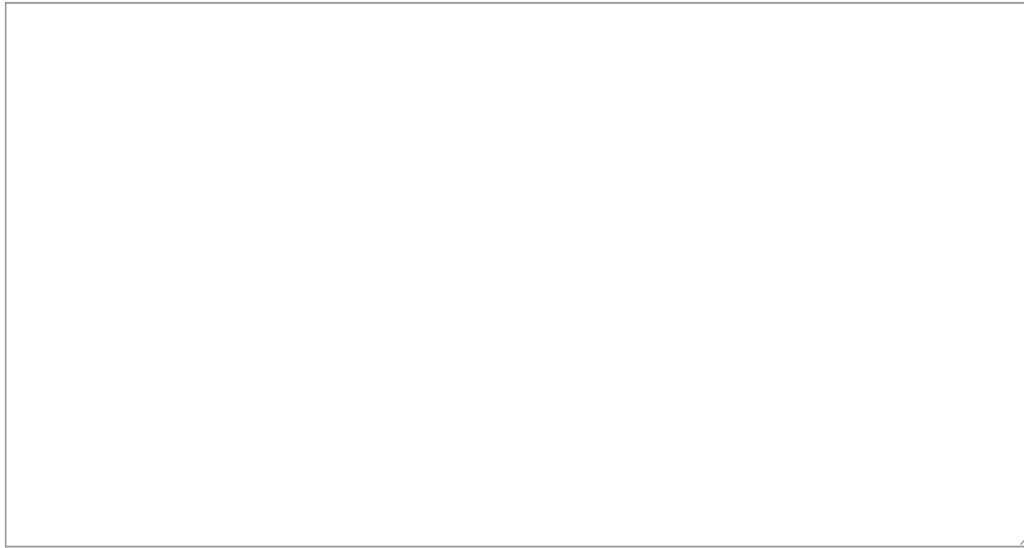
45. Questionnaire - Ethical challenges

1. What strategies would you propose as possible solutions to overcome these ethical challenges?



46. Questionnaire - Raising concerns

1. Describe the process within your organisation that identifies and supports athletes suspected to present with an unhealthy weight/body composition or related issues? Please be specific, how are concerns raised and what process follows initial concerns being raised?



47. Questionnaire - Considerations

1. Regarding body composition assessment and monitoring how often are the following considerations made or steps taken?

	Never	Occasionally	Mostly	Always
Gender compatibility between athlete & technician/ practitioner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Number of support staff present during data capture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Data security regarding storage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pre-testing requirements being communicated to the athlete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Athletes are given the opportunity to opt out of body composition assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consent being sought prior to each assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Consent sought for data sharing with relevant personnel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Athletes are advised of testing processes in advance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Screening for or awareness of present (or history of) disordered eating, poor body image etc	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. How much emphasis do each of the following place on body composition?

	None	Small	Moderate	Large
Athletes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coaches	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Please describe any situations when you would not assess the body composition of athletes you work with?

48. Questionnaire - Training

1. Within your organisation, do you have access to training on Relative Energy Deficiency in Sport (RED-S), low energy availability, female athlete triad, body image, physique anxiety or other related topics?

- Yes
- No
- Not sure

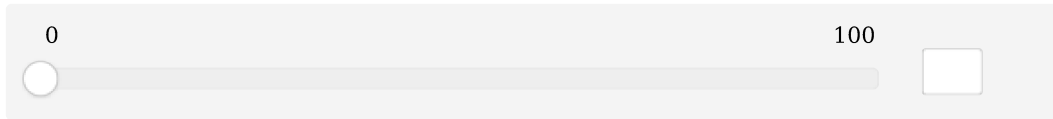
49. Questionnaire - Training

1. Can you describe the access to training in body composition, RED-s, low energy availability, female athlete triad, body image, physique anxiety or other related areas within your organisation, including who can access it?

50. Questionnaire - Resources

1. What proportion of your role is spent managing and assessing athletes' body composition/weight?

0 100



2. Do you think your organization invests enough financial resources for you to optimize body composition/body weight management through the use of appropriate methods and required training?

- Yes
- No
- Unsure

3. Please explain your previous answer:

51. Questionnaire - Sport differences

1. If you work with multiple sports, please detail below any significant differences in practice that you have not been able to express so far in this questionnaire.

52. Questionnaire - Information sources

1. Where do you go for information relating to body composition?

- Peer reviewed literature
- Governing body website
- Regulatory body website
- Manuals from formal recognised training
- Consensus or position statements of governing bodies
- Peers
- Social media
- Commercial body composition / physique assessment organisations
- Other (please specify)

53. Questionnaire - Additional concerns

1. If you have any other concerns you would like to share regarding this topic please detail them below:

A large, empty rectangular box with a thin black border, intended for the respondent to provide additional concerns. The box is currently blank.