

# Physiology Group Screening Process

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## Introduction

The Exercise Physiology subject group formally decided to adopt the American College of Sports Medicine (ACSM) guidelines regarding exercise preparticipation health screening in 2014. This replaced previous versions of our screening procedures. These guidelines have been used in all of the Exercise Physiology (and related) modules since then. In addition, students conducting Exercise Physiology projects for their Dissertation (Major Independent Study) have also been expected to employ the same procedures to assess the safety of participation in exercise testing.

These procedures were adopted for use in research projects, as part of the ethical approval process, by the Faculty Research Ethics Committee (FREC) in January 2015.

In 2014 a major review of the previous guidelines started with a scientific roundtable sponsored by the ACSM (Riebe et al., 2015) which led to a change in the health screening recommendations in the 2017 edition of the ACSM guidelines book (Riebe, 2017). We updated our guidelines and adopted the new ACSM guidance starting in September 2018 (first implementing these in our annual screening event of all the new students joining our undergraduate Sport and Exercise science course). We studied the impact of the new guidelines on numbers of students referred for clearance and published our results (Price et al., 2019).

We are now proposing that applications for ethical approval for research projects involving exercise should include at least the basic health screening procedures we apply to our Exercise Physiology modules. This paper outlines the proposed process, and the screening tool for collection of appropriate data to support our decision, regarding the suitability of a prospective participant for exercise testing or training as part of a research project.

In reviewing our 2018 procedures, and considering their wider use for research projects, we have identified the need to add a set of questions not based on the ACSM guidance. These address musculoskeletal and other issues which may interfere with safe exercise participation. We decided to modify the screening tool to accommodate these rather than develop a separate tool for use with resistance training projects. We suggest that the proposed screening tool is appropriate for projects which involve exercise (testing or training) whether that is cardiovascular (aerobic, endurance etc.) or resistance (strength, muscular etc.).

## Rationale

Although it is generally accepted that exercise participation is safe for the majority of individuals, it is possible for adverse reactions to be triggered by exercise, especially exercise of unaccustomed intensity to individuals who are not habitually active or who have underlying medical conditions.

Based on observations, the key factors which determine the level of risk that may stem from participation in exercise are (a) current activity levels/exercise history, (b) presence of signs/symptoms or a diagnosis of cardiovascular (CV), metabolic or renal disease, and (c) the intensity of the intended exercise (e.g. maximal exercise testing, moderate intensity exercise training, light exercise participation etc.).

For more details on the scientific rationale underpinning the need for health screening prior to exercise participation, we recommend Chapter 2 of the most recent ACSM guidelines textbook (Riebe, 2017).

## Overview of the proposed process

As a minimum, the questionnaire shown on the following pages should be used to identify individuals who should seek medical clearance prior to participating in any exercise. Sometimes the decision about the necessity of medical clearance depends on the intended exercise intensity. So, for example, an individual with known but asymptomatic CV disease, who is already active<sup>1</sup>, can safely participate in moderate<sup>2</sup> intensity exercise but should seek medical clearance prior to performing any vigorous<sup>3</sup> exercise.

The aim of this health screening process is to identify individuals (a) who should receive medical clearance before initiating an exercise programme or increasing the frequency, intensity, and/or volume of their current programme; (b) with clinically significant disease(s) who may benefit from participating in a medically supervised exercise programme; and (c) with medical conditions that may require exclusion from exercise programmes until those conditions are treated and better controlled.

The proposed questionnaire helps with:

- Determining current PA status (active/not active)
- Identifying signs and symptoms of underlying CV, metabolic, and renal disease
- Identifying individuals with diagnosed CV and metabolic disease
- Using signs and symptoms, disease history, current exercise participation, and desired exercise intensity to guide recommendations for preparticipation medical clearance

The proposed preparticipation screening is appropriate for use with the general, nonclinical population. Alternative recommendations exist for those individuals who are working in a clinical or cardiac rehabilitation (Williams, 2001).

Preparticipation health screening before initiating PA or an exercise program is a two-stage process:

1. The need for medical clearance before initiating or progressing exercise programming is determined using the proposed screening algorithm (based on Riebe, 2017).
2. If indicated during screening, medical clearance should be sought from an appropriate health care provider (e.g. primary care or internal medicine physician or cardiologist). The manner of clearance should be determined by the clinical judgment and discretion of the health care provider.

This screening provides a minimum for exercise trials. Depending on the type of exercise, additional screening processes may be required. If the study was targeting a particular population, the relevant risks should be identified, assessed and followed by appropriate decisions regarding exercise participation within the ethics process.

If medical clearance is needed then we suggest that the proposed Medical Clearance form should be completed by a medical practitioner (GP, physician or cardiologist) to ensure (a) proof of clearance and (b) appropriate details to be communicated (e.g. whether clearance only applies to certain intensity domains of exercise).

The possible outcomes of the screening process are (also see decisions flowchart later on in this document):

- a. Medical clearance not needed
- b. Medical clearance recommended (possibly only for Vigorous exercise)

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<sup>1</sup> "Active" is defined as: performs planned, structured physical activity for at least 30 minutes at moderate intensity on at least 3 days per week for at least the last 3 months (Riebe, 2017).

<sup>2</sup> Moderate Intensity Exercise – 40%-59% Heart Rate Reserve or VO<sub>2</sub>R 3-5.9 METs, RPE 12-13, an intensity that causes noticeable increases in HR and breathing (Riebe, 2017).

<sup>3</sup> Vigorous Intensity Exercise - ≥60% Heart Rate Reserve or VO<sub>2</sub>R ≥6 METS, RPE ≥14, an intensity that causes substantial increases in HR and breathing (Riebe, 2017).

- c. Discontinue exercise and seek medical clearance

When medical clearance is not necessary the recommended exercise intensity depends on current activity levels and is:

- a. Light to moderate; may gradually progress following ACSM guidelines
- b. Continue moderate intensity; may gradually progress following ACSM guidelines
- c. Continue vigorous intensity; may gradually progress following ACSM guidelines

If medical clearance is necessary, **when obtained** the recommendations for training are:

- a. [For currently inactive individuals] Light to moderate intensity exercise recommended. May gradually progress to vigorous intensity exercise following ACSM guidelines.
- b. [For active individuals with asymptomatic CV, metabolic or renal disease] Following medical clearance, may gradually progress as tolerated following ACSM guidelines.
- c. [For currently active, symptomatic individuals] May return to exercise following medical clearance. Gradually progress as tolerated following ACSM guidelines.

If there is a positive answer in any of the questions under step 4 (History of Other Conditions), and unless the project is specifically for such people (i.e. people with musculoskeletal conditions, injuries, or pregnant women) medical clearance is recommended. Following medical clearance, participants should follow ACSM guidelines for return to exercise and progression.

In addition to the medical screening process we recommend a combined consent form/pre-exercise checklist for use immediately before participation in an exercise-based activity (testing or training). This can be modified for each research project but we advise that resting heart rate (HR) and blood pressure (BP) are assessed prior to each episode of exercise to ensure they are below the proposed thresholds of 100bpm for HR and 140/90mmHg for BP. These apply to studies recruiting healthy individuals. Projects attracting clinical populations will have to modify these accordingly (based on clinical guidelines and possibly in discussion with a medical practitioner). An alternative approach is for the consent and checklist to be two separate documents – with the consent only completed once at the start of the study and the checklist applied before each engagement with exercise.

### **Acknowledgements**

We would like to thank Dr Emily Williams and Ms Helen Steel for their invaluable help, proof-reading and suggesting amendments to this paper and the forms on the following pages. Special thanks to Helen for having developed the screening process (and especially the relevant paperwork) in collaboration with Mr Costas Tsakirides since 2014.

### **References**

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- Riebe, D. (senior editor) (2017) ACSM's Guidelines for Exercise Testing and Prescription (10<sup>th</sup> ed.). Wolters Kluwer
- Williams MA. (2001) Exercise testing in cardiac rehabilitation. Exercise prescription and beyond. **Cardiol Clin**, 19(3): 415–31

# Physiology Group Screening Questionnaire



Name: \_\_\_\_\_ ID: \_\_\_\_\_

<b>Step 1: Signs or Symptoms of CVD</b>	<b>Yes</b>	<b>No</b>
Have you ever experienced any of the following?		
1. Pain or discomfort in the chest or surrounding areas (neck, jaw, arms or other areas)?		
2. Shortness of breath at rest or with mild exertion?		
3. Shortness of breath when lying flat which is relieved by sitting or standing?		
4. a. Dizziness during or after exercise?		
b. Fainting or blackouts during or after exercise?		
5. Ankle swelling (other than as a result of an injury)?		
6. Unpleasant awareness of a forceful, rapid or irregular heart rate?		
7. Burning or cramping sensations in your lower legs when walking short distances?		
8. Known heart murmurs?		
9. Unusual fatigue or shortness of breath with usual activities?		
<b>Step 2: Current Activity</b>	<b>Yes</b>	<b>No</b>
10. Do you currently perform planned, structured physical activity for at least 30 minutes at moderate intensity on at least 3 days per week for at least the last 3 months?		
<b>Step 3: Medical History (CVD, metabolic, renal disease)</b>	<b>Yes</b>	<b>No</b>
11. Have you ever had a Heart attack?		
12. Have you ever had heart surgery, cardiac catheterization, or coronary angioplasty?		
13. Do you currently have any heart valve disease?		
14. Do you currently have Heart Failure?		
15. Have you ever had a Heart transplant?		
16. Do you currently have congenital heart disease?		
17. Have you ever had a Stroke?		
18. Do you currently have Diabetes?		
19. Do you currently have Renal disease?		
<b>Step 4: History of Other Conditions</b>	<b>Yes</b>	<b>No</b>
20. Do you have any bone or joint problems (such as arthritis, osteoporosis or back problems) or a past injury that might get worse with exercise? <b>(Exercise participation may need delaying or modifying)</b> Please state which conditions: _____		
21. (If you answered Yes to Q20): Do you find it difficult to control these conditions with medication and/or medical therapies? Do you experience pain during exercise? Have you had recent fractures? Have you had a displaced vertebra? Have you had steroid injections or taken steroid tablets regularly for more than 3 months? (Answer YES if any of these apply.)		
22. Are you or have you recently been pregnant? <b>(Certain exercise intensities or types may not be suitable if you answer YES. Participation may be deferred or modified.)</b>		

<b>Outcome of screening questionnaire</b> Please use the screening flowchart to assist you	<b>Yes</b>	<b>No</b>
Is medical clearance required prior to participation in exercise?		
<b>Intensity of exercise recommended (immediately or after medical clearance):</b>		
Moderate to vigorous intensity		
Light to moderate intensity exercise gradually progressing to vigorous intensity		

- I confirm that the above information which I have provided to Leeds Beckett University (LBU) is true and accurate to the best of my knowledge and belief and I understand that I must notify promptly of any changes to the information.
- I understand that the information I have provided above may be used as part of an anonymised dataset by staff or students of the School of Sport for completion of coursework or for research or audit purposes (with the appropriate ethical approval in place).
- By signing below, you are consenting to LBU storing and using your personal medical history data in accordance with the LBU student privacy notice and the Data Protection Act 2018.

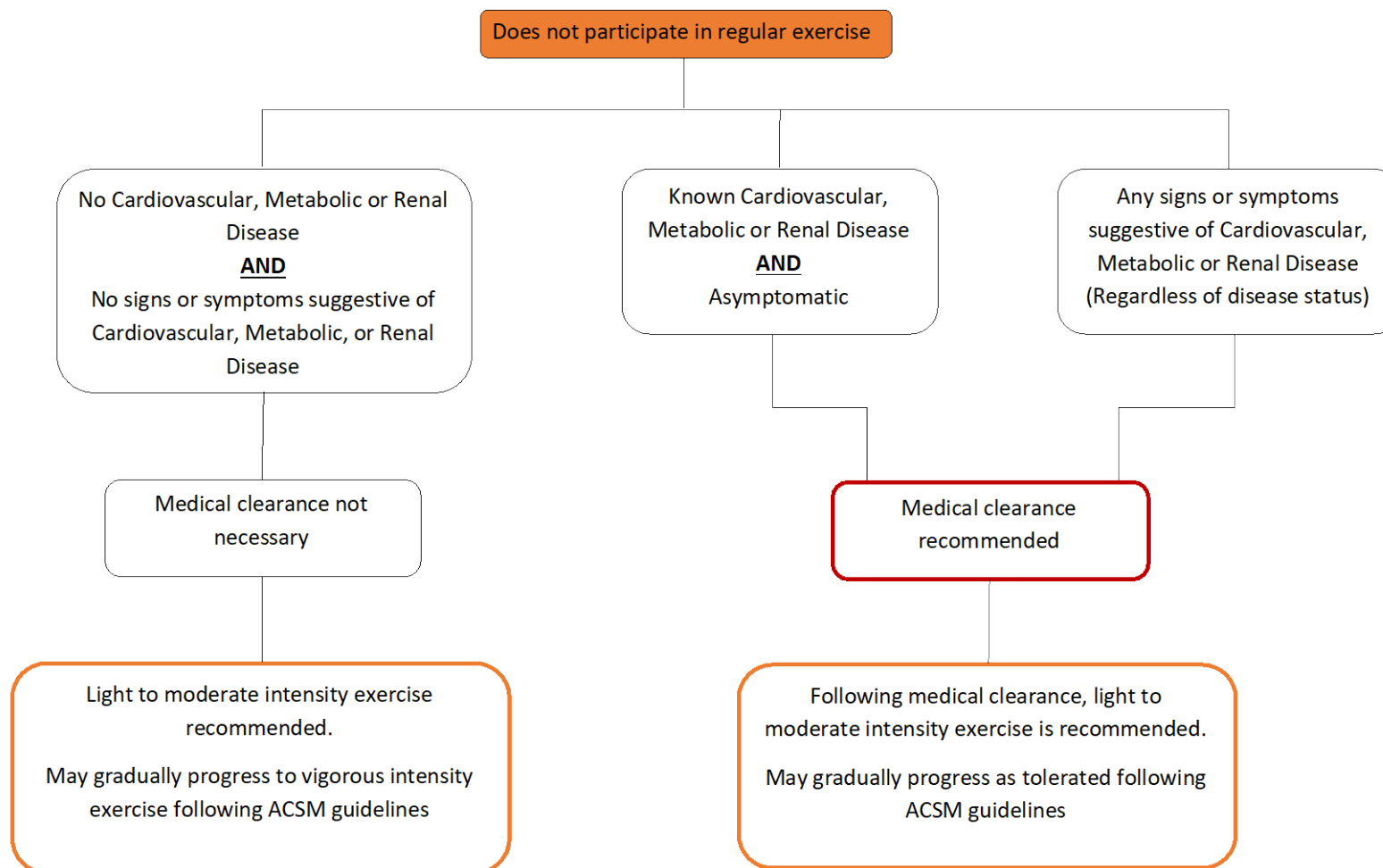
**Participant signature:**

**Assessor signature:**

**Date:**

# LEARNING RESOURCE:

## Exercise Preparticipation Health Screening based on ACSM Guidelines



Participates in regular exercise

No Cardiovascular, Metabolic or Renal Disease  
**AND**  
No signs or symptoms suggestive of Cardiovascular, Metabolic, or Renal Disease

Medical clearance not necessary

Continue moderate or vigorous intensity exercise  
May gradually progress following ACSM guidelines

Known Cardiovascular, Metabolic or Renal Disease  
**AND**  
Asymptomatic

Medical clearance for moderate intensity exercise not necessary

Medical clearance (within the last 12 months if no change in signs/symptoms) recommended before engaging in vigorous intensity exercise

Continue with moderate intensity exercise  
Following medical clearance, may gradually progress as tolerated following ACSM guidelines

Any signs or symptoms suggestive of Cardiovascular, Metabolic or Renal Disease (Regardless of disease status)

Discontinue exercise and seek medical clearance

May return to exercise following medical clearance  
Gradually progress as tolerated following ACSM guidelines

**Light Intensity Exercise** – 30%-39% Heart Rate Reserve or VO2R 2-2.9 METs, RPE 9-11, an intensity that causes slight increases in HR and breathing.

**Moderate Intensity Exercise** – 40%-59% Heart Rate Reserve or VO2R 3-5.9 METs, RPE 12-13, an intensity that causes noticeable increases in HR and breathing.

**Vigorous Intensity Exercise** - ≥60% Heart Rate Reserve or VO2R ≥6 METs, RPE ≥14, an intensity that causes substantial increases in HR and breathing.

Produced By: Sports Science Learning Support

## Sample Medical Clearance Letter and Form

[Date]

Dear Doctor,

Your patient [insert participant name] (DOB: -----), who is a student on the [insert course name] course at Leeds Beckett University, was recently screened as part of our routine risk stratification, aiming to assess safety during exercise participation. Our screening process follows the recommendations of the American College of Sports Medicine (ACSM Guidelines, 10<sup>th</sup> edition, 2017).

In brief, we screen all our Sports Science students to assess their level of risk for participation in exercise – certain individuals need medical clearance prior to participation. This need arises either as a result of diagnosed medical conditions (CV, metabolic or renal) or the presence of signs or symptoms of CV, metabolic and renal disease.

[Name] was identified as needing medical clearance prior to exercise participation due to the following findings:

[enter specifics]

According to our procedures, prior to allowing [Name] to participate in any exercise practical activities we need clearance by a medical practitioner (GP, physician or cardiologist).

Would you be kind enough to complete the attached medical clearance form please? If [Name] cannot return the completed form, we will automatically assume that it is not safe for him/her to take part in practical activities and will therefore exclude him/her from these.

Please feel free to contact me for further information or clarification of my request.

With kind regards,

**Name of appropriate contact (e.g. Research PI, Module Leader etc.)**



**Medical clearance form**

FAO [Title] [Name], Senior Lecturer, Exercise Physiology, Leeds Beckett University

I have reviewed [enter student's name]'s medical records and had the opportunity to assess him/her in relation to your concerns about the safety of his/her participation in exercise/practical activities.

I confirm that I am happy for [enter name] to take part in physical activity/exercise up to:

- Moderate intensity (HR up to 60% Heart Rate Reserve\*)
- Vigorous intensity (HR up to 90% Heart Rate Reserve)
- Maximal intensity (exercise to volitional fatigue)

OR

I cannot confirm at this time that it is safe for [Enter name] to take part in any form of exercise or physical exertion.

***(Please cross out clearly – or delete – any of the statements above which don't apply to this patient.)***

Please provide any additional information you consider relevant to this individual's exercise participation:

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Date: \_\_\_\_\_

Doctor's Signature: \_\_\_\_\_

Surgery stamp:

# Physiology Group Pre-Exercise Checklist and Consent Form



Name (PRINT) \_\_\_\_\_

I hereby give my consent to participate in the following test/activity *[please delete as appropriate]*. **[Insert details]**

**Any responses in the shaded boxes may need to be investigated further.**

Please tick Yes/No (or NA) to ALL of the following questions	Yes	No	N/A
<b>Pre-exercise Checklist</b>			
Exercise preparticipation health screening has been conducted prior to completing this consent.			
I confirm that my health status has not changed since I last completed the exercise preparticipation health screening			
Have you consumed alcohol in the past 24 hours? How many units? ..... How long ago? .....			
Have you taken any recreational drugs in the past 24 hours?			
If you have asthma, do you have your reliever asthma inhaler with you?			
Are there any factors that might affect your performance today? E.g. illness, injury, smoking, excessive exercise etc. If so, please give details:			
<b>Consent Form</b>			
To the best of my knowledge, I can safely take part in this test/activity/project.			
The purpose of the test/activity/project has been explained to me			
I am satisfied that I understand the procedures involved			
The possible benefits and risks of the test/activity/project have been explained to me			
Any questions which I have asked about the test/activity/project have been answered to my satisfaction			
I understand that, during the test/activity, I have the right to ask further questions about it			
I understand that my participation in the test/activity/project is voluntary and I am therefore at liberty to withdraw my involvement at any stage			
I understand that, if there is any concern about the appropriateness of my continuing in the test/activity/project, I may be asked to withdraw my involvement at any stage			
I confirm that I have been duly informed that any supplements used in this project are: *Batch-tested/**From a certified supplier/**Not from a certified supplier <i>[please delete as appropriate]</i> . There is information about supplements classification overleaf			
I confirm I am not allergic to any supplements or food (incl. anything on the ingredients list) used in this experiment.			
I understand that once the test/activity/project has been completed, the information gained as a result may be used as part of an anonymised dataset by staff or students of the School of Sport for completion of coursework or for research or audit purposes (with the appropriate ethical approval in place)			
The information which I have supplied to Leeds Beckett University prior to taking part in the test/activity/project is true and accurate to the best of my knowledge and belief and I understand that I must notify promptly of any changes to this information			

Blood pressure \_\_\_\_\_/\_\_\_\_\_ mmHg (Must be below 140/90 mmHg)

Resting heart rate is \_\_\_\_\_ bpm (Must be below 100 b.min<sup>-1</sup>)

**SIGNATURE OF THE PARTICIPANT**

**DATE**

\_\_\_\_\_

\_\_\_\_\_

**NAME/SIGNATURE OF THE WITNESS**

**DATE**

\_\_\_\_\_

\_\_\_\_\_

### **Further information on supplements**

**If the supplements in this study are batch tested\*** - Consuming the supplements provided during this experiment does not pose any greater risk than purchasing and consuming these supplements in everyday life. Furthermore, the supplements provided during this experiment have been batch-tested to screen for prohibited substances. This significantly reduces the risk of any contamination, but extremely small levels of impurities may still be present which are below the detection threshold of the test. Subsequently along with the manufacturers, we cannot provide a 100% guarantee that the supplement is completely free of prohibited substances. Please consider this information if you are a competitive athlete subject to drug testing.

**Non-batch tested products but from a certified manufacturer\*\*** - Consuming the supplements provided during this experiment does not pose any greater risk than purchasing and consuming these supplements in everyday life. Furthermore, the supplements provided during this experiment have been purchased from certified manufacturers who have passed appropriate quality control standards. This significantly reduces the risk of any contamination, but we cannot guarantee that the supplement is free of prohibited substances. Please consider this information if you are a competitive athlete subject to drug testing.

**Non-batch tested and not from a certified manufacturer\*\*\*** - Consuming the supplements provided during this experiment does not pose any greater risk than purchasing and consuming these supplements in everyday life. However, we cannot guarantee that the supplement is free of prohibited substances. Please consider this information if you are a competitive athlete subject to drug testing.