Section 02: Health Appraisal / Risk Stratification

ACSM Guidelines: Chapter 2 – Pre-Participation Health Screening and Risk Stratification

ACSM Manual: Chapter 2 – Pre-Assessment Screening

HPHE 4450
Dr. Cheatham

Purpose

To aid in the development of a safe and effective exercise prescription and optimize safety during exercise testing, it is important to screen potential participants for risk factors and/or symptoms of various cardiovascular, pulmonary, and metabolic diseases, as well as conditions that may be aggravated by exercise.
**Purpose**

- The purpose of preparticipation health screening include the following:
  - Identification of individuals with medical contraindications for exclusion from exercise programs until those conditions have been abated or are under control
  - Recognition of persons with clinically significant disease(s) or conditions who should participate in a medically supervised exercise program
  - Detection of individuals at increased risk for disease because of age, symptoms, and/or risk factors who should undergo a medical evaluation and exercise testing before initiating an exercise program or increasing the frequency, intensity, or duration of their current program
  - Recognition of special needs of individuals that may affect exercise testing and programming

**Pre-Participation Screening**

- **Self-Guided Screening for Physical Activity**
  - Little or no input from health-related professionals.
  - Need for an easy to use screening tool.
  - Surgeon General’s Statement:
    - “previously inactive men over age 40 and women over age 50, and people at high risk for cardiovascular disease (CVD) should first consult a physician before embarking on a program of vigorous physical activity to which they are unaccustomed.”
**Pre-Participation Screening**

- Initial or minimal step:
  - Complete a self-administered questionnaire that serves to alert those with elevated risk to consult their physician prior to participation
  - Examples of questionnaires:
    - AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire
    - Physical Activity Readiness Questionnaire (PAR-Q)

**Pre-Participation Screening**

- The initial screening step is designed to yield information regarding risk stratification and the need for medical clearance (MC) prior to beginning or significantly increasing physical activity
- This process requires identification of the presence of:
  - Coronary artery disease (CAD) risk factors
  - Signs or symptoms of cardiovascular, pulmonary, and/or metabolic disease
  - Known cardiovascular, pulmonary, and/or metabolic disease
### Pre-Participation Screening

#### PAR-Q & YOU

(A Questionnaire for People Aged 19 to 75)

<table>
<thead>
<tr>
<th>Question</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have any of the following conditions that could affect your ability to do physical activity?</td>
<td></td>
</tr>
<tr>
<td>1. A heart attack</td>
<td></td>
</tr>
<tr>
<td>2. Heart surgery</td>
<td></td>
</tr>
<tr>
<td>3. Cardiac catheterization</td>
<td></td>
</tr>
<tr>
<td>4. Coronary angioplasty (PTCA)</td>
<td></td>
</tr>
<tr>
<td>5. Pacemaker/implantable cardioverter-defibrillator/rhythm disturbance</td>
<td></td>
</tr>
<tr>
<td>6. Heart valve disease</td>
<td></td>
</tr>
<tr>
<td>7. Heart failure</td>
<td></td>
</tr>
<tr>
<td>8. Heart transplantation</td>
<td></td>
</tr>
<tr>
<td>9. Congenital heart disease</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you have any of the following symptoms?</td>
<td></td>
</tr>
<tr>
<td>1. You experience chest discomfort with exertion.</td>
<td></td>
</tr>
<tr>
<td>2. You experience unreasonable breathlessness.</td>
<td></td>
</tr>
<tr>
<td>3. You experience dizziness, fainting, blackouts.</td>
<td></td>
</tr>
<tr>
<td>4. You take heart medications.</td>
<td></td>
</tr>
</tbody>
</table>

#### Pre-Participation Screening

**AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire**

Assesses your health needs by marking all true statements.

<table>
<thead>
<tr>
<th>History</th>
<th>Symptons</th>
</tr>
</thead>
<tbody>
<tr>
<td>You have had:</td>
<td></td>
</tr>
<tr>
<td>1. A heart attack</td>
<td></td>
</tr>
<tr>
<td>2. Heart surgery</td>
<td></td>
</tr>
<tr>
<td>3. Cardiac catheterization</td>
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<td></td>
</tr>
</tbody>
</table>

| If you marked any of the statements in this section, consult your physician or other appropriate healthcare provider before engaging in exercise. You may need to use a facility with a medically qualified staff. |

<table>
<thead>
<tr>
<th>Other health issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>You have diabetes</td>
</tr>
<tr>
<td>You have or asthma other lung disease.</td>
</tr>
<tr>
<td>You have burning or cramping in your lower legs when walking short distances.</td>
</tr>
<tr>
<td>You have musculoskeletal problems that limit your physical activity.</td>
</tr>
<tr>
<td>You have concerns about the safety of exercise.</td>
</tr>
<tr>
<td>You take prescription medication(s).</td>
</tr>
<tr>
<td>You are pregnant.</td>
</tr>
</tbody>
</table>

Figure 2.2, ACSM Guidelines, P. 25
Pre-Participation Screening

Cardiovascular risk factors:
- You are a man older than 45 years.
- You are a woman older than 55 years, you have had a hysterectomy, or you are postmenopausal.
- You smoke, or quite within the previous 6 mo.
- Your BP is greater than 140/90.
- You don’t know your BP.
- You take BP medication.
- Your blood cholesterol level is >200 mg/dL.
- You don’t know your cholesterol level.
- You have a close blood relative who had a heart attack before age 55 (mother or father) or age 65 (mother or sister).
- You are physically inactive (i.e., you get less than 30 min. of physical activity on at least 3 days per week).
- You are more than 20 pounds overweight.

None of the above is true.

If you marked two or more of the statements in this section, you should consult your physician or other appropriate healthcare provider before engaging in exercise. You might benefit by using a facility with a professionally qualified exercise staff to guide your exercise program.

You should be able to exercise safely without consulting your physician or other healthcare provider in a self-guided program or almost any facility that meets your exercise program needs.


Pre-Participation Screening

- Professionally-Guided Screening for PA
  - Professionally guided implies that the health fitness/clinical assessment is conducted by—and the exercise program is designed and supervised by—appropriately trained personnel who possess academic training and practical/clinical knowledge, skills, and abilities commensurate with the credentials defined in Appendix D.
**Pre-Participation Screening**

- A more advanced process administered by professionally trained personnel provides greater detail regarding CVD risk factors and signs/symptoms and identifies a broader scope of chronic diseases and/or conditions that need special consideration before engaging in an exercise program.
- The professionally guided preparticipation screening process involves (a) the review of more detailed health/medical history information and specific risk stratification, and (b) detailed recommendations for physical activity/exercise, medical examination, exercise testing, and physician supervision.

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**Risk Stratification**

- **ACSM Risk Stratification**
  - **Purpose:** To decide appropriate course of action regarding exercise testing before entering an exercise program
  - **Based on:**
    - The presence or absence of known cardiovascular, pulmonary, and/or metabolic disease
    - The presence or absence of signs or symptoms suggestive of cardiovascular, pulmonary, and/or metabolic disease
    - The presence or absence of CVD risk factors
  - **Answers two questions:**
    - Should the client have a medical examination before starting the exercise program?
    - Does the client need a physician present to supervise the GXT?
Risk Stratification

Risk Stratification

TABLE 2.2. Atherosclerotic Cardiovascular Disease (CVD) Risk Factors and Defining Criteria (26, 31)

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Defining Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Men ≥45 yr; women ≥55 yr (12)</td>
</tr>
<tr>
<td>Family history</td>
<td>Myocardial infarction, coronary revascularization, or sudden death before 65 yr in father or other male first-degree relative or before 65 yr in mother or other female first-degree relative</td>
</tr>
<tr>
<td>Cigarette smoking</td>
<td>Current cigarette smoker or those who quit within the previous 6 mo or exposure to environmental tobacco smoke</td>
</tr>
<tr>
<td>Sedentary lifestyle</td>
<td>Not participating in at least 30 min of moderate intensity physical activity (≥60% VO₂) on at least 3 d of the week for at least 3 mo (22, 30)</td>
</tr>
<tr>
<td>Obesity</td>
<td>Body mass index ≥30 kg · m⁻² or waist girth &gt;102 cm (40 in) for men and &gt;88 cm (35 in) for women (10)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Systolic blood pressure ≥140 mm Hg and/or diastolic ≥90 mm Hg, confirmed by measurements on at least two separate occasions, or on antihypertensive medication (9)</td>
</tr>
</tbody>
</table>
Risk Stratification

**Dyslipidemia**
Low-density lipoprotein (LDL) cholesterol ≥130 mg · dl⁻¹ (3.37 mmol · L⁻¹) or high-density lipoprotein (HDL) cholesterol ≤40 mg · dl⁻¹ (1.04 mmol · L⁻¹) or on lipid-lowering medication. If total serum cholesterol is all that is available, use ≤200 mg · dl⁻¹ (5.18 mmol · L⁻¹) (21).

**Prediabetes**
Impaired fasting glucose (IFG) = fasting plasma glucose ≥100 mg · dl⁻¹ (5.55 mmol · L⁻¹) and <125 mg · dl⁻¹ (6.94 mmol · L⁻¹) or impaired glucose tolerance test (IGTT) ≥2 values in oral glucose tolerance test (OGTT) ≥140 mg · dl⁻¹ (7.77 mmol · L⁻¹) and ≤199 mg · dl⁻¹ (11.04 mmol · L⁻¹) confirmed by measurements on at least two separate occasions (5).

**Negative Risk Factors Defining Criteria**
- HDL cholesterol ≥60 mg · dl⁻¹ (1.55 mmol · L⁻¹)
- Age ≥45 years for men and ≥55 years for women, or other risk factors that may affect risk from diabetes

*If the presence or absence of a CV drug risk factor is not disclosed or is not available, that CV drug risk factor should be counted as a risk factor except for prediabetes. If the prediabetes criteria are missing or unknown, prediabetes should be counted as a risk factor for those ≥45 yr, especially for those with a body mass index (BMI) ≥25 kg · m⁻², and those <45 yr with a BMI ≥25 kg · m⁻² and additional CV drug risk factors for prediabetes.

High HDL is considered a negative risk factor. For individuals having high HDL ≥40 mg · dl⁻¹ (1.05 mmol · L⁻¹), for these individuals one positive risk factor is subtracted from the sum of positive risk factors.

**VO₂ max, oxygen uptake reserve**
**Risk Stratification**

![Risk Stratification Flowchart]

**Exercise Test Considerations**

- Once the risk category has been established for an individual as low, medium, or high, appropriate recommendations may be made regarding:
  - The necessity for medical examination and clearance before initiating a physical activity/exercise program or substantially changing the FITT framework of an existing physical activity/exercise program
  - The necessity for an exercise test before initiating a physical activity/exercise program or substantially changing the FITT framework of an existing activity program
  - The necessity for physician supervision when participating in a maximal or submaximal exercise test
**Exercise Test Considerations**

**ACSM Risk Stratification Case Study**

• Read the case study example on P. 28 of the ACSM Manual.
• Do the following:
  – Go through each ACSM Risk factor for CAD and decide if the person does or does not have each risk factor.
  – Decide if the person exhibits any “Major Signs or Symptoms Suggestive of CPM Disease”.
  – Risk stratify the person (low, moderate, high).
  – Decide if the person needs a medical exam and exercise test prior to moderate or vigorous exercise.
  – Decide if the person needs physician supervision of a submaximal or maximal exercise test.
ACSM Risk Stratification Case Study

Todd is a 44-year-old electrical engineer who works 50-60 hours per week. He is 5’9”, 233 pounds, with total cholesterol of 192 mg · dl⁻¹, low-density lipoprotein (LDL) of 138 mg · dl⁻¹, high-density lipoprotein (HDL) of 41 mg · dl⁻¹, triglycerides of 200 mg · dl⁻¹, and blood glucose of 120 mg · dl⁻¹. Todd’s resting heart rate is 81 bpm and blood pressure is 144/86 mmHg. His waist and hip circumference measures are 42 inches and 40 inches, respectively. Todd has never smoked, but usually has one to two glasses of wine with dinner. He reports no leisure-time physical activity and does not exercise on a regular basis (less than two sessions per month). Todd denies all complaints of chest discomfort and shortness of breath at rest or with exertion; however, he has gained 20 pounds over the last 2 years. Todd’s wife reports he snores frequently and has difficulty waking up in the mornings. Further testing reveals that Todd has obstructive sleep apnea and is being treated with continuous positive airway pressure (CPAP). A review of his family history reveals that Todd’s father had double-bypass surgery at age 53 and suffered a fatal myocardial infarction at age 62. Todd’s brother (42 years old) also is hypertensive and was recently diagnosed with type 2 diabetes, which is being treated with diet and physical activity recommendations. Todd has been referred to your facility for coronary artery disease risk factor reduction and physical activity counseling.

Determine the presence or absence of each CVD risk factor, any signs or symptoms, the ACSM risk stratification, the recommendations for a medical exam and exercise test, and the recommendation for physician supervision of the exercise test.

• Answers:
  – Risk Factors:
    • Positive Risk Factors
      – Family History: YES (Father had CABG at 53 yrs (< 55 yrs))
      – Smoking: NO
      – Sedentary Lifestyle: YES
      – Obesity: YES; BMI = 34.5 (≥ 30)
      – Hypertension = YES (SBP = 144 (≥ 140))
      – Dyslipidemia = YES (LDL = 138 (≥ 130))
      – Pre-Diabetes = YES (Blood glucose = 120 (≥ 100))
    • Negative Risk Factors
      – HDL: No; 41 < 60
  – “Major Signs or Symptoms Suggestive of CPM Disease”: None Noted
  – ACSM Risk Level: Moderate Risk (More than 1 RF)
    • Positive RF = 5, Negative RF = 0, Total = 5
ACSM Risk Stratification Case Study

- Answers (cont’d):
  - Need for Medical Exam and Exercise Test
    - Moderate Exercise: Not necessary
    - Vigorous Exercise: Recommended
  - Physician Supervision of Exercise Tests
    - Submaximal: Not necessary
    - Maximal: Recommended

ACSM Risk Stratification Assignment