ACSM Scientific Roundtable: Updating Recommendations for Exercise Preparticipation Health Screening
Updating the ACSM Recommendations for Exercise Preparticipation Health Screening

- Discuss the **current** (2009) American College of Sports Medicine’s (ACSM) exercise preparticipation health screening recommendations
  - American College of Sports Medicine’s (ACSM) Guidelines for Exercise Testing and Prescription the Ninth Edition (GETP 9)
- Discuss the **new** (2015) ACSM exercise preparticipation health screening recommendations
  - Medicine Science Sports & Exercise in November 2015
  - ACSM GETP10 in 2017
- Apply the **new** ACSM exercise preparticipation health screening recommendations to a case study
ACSM’s Exercise Preparticipation Health Screening

➢ To identify individuals who may be at risk for serious acute exercise-related cardiovascular events including sudden cardiac death and myocardial infarction

➢ Vigorous intensity exercise does have a small but measureable acute risk of CVD complications; mitigating this risk in susceptible individuals is important
All people wanting to initiate a physical activity program should be screened at minimum by a self-guided medical history or health risk appraisal questionnaire such as the PAR-Q or modified American Heart Association / ACSM Health/Fitness Facility Preparticipation Screening Questionnaire for the presence of risk factors for cardiovascular, pulmonary, renal, and metabolic diseases as well as other conditions (e.g., pregnancy and orthopedic injury) that require special attention when designing the exercise prescription (Ex Rx).
The 2009 ACSM Exercise Preparticipation Health Screening Recommendations

Individuals are classified as low, moderate, or high risk based on the presence or absence of:

- Cardiovascular disease (CVD) risk factors
- Signs and symptoms of cardiovascular, pulmonary, renal, or metabolic disease
- Known cardiovascular, pulmonary, renal, or metabolic disease
<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Defining Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>Men &gt;=45 y; women &gt;=55 y (12)</td>
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<tr>
<td><strong>Family history</strong></td>
<td>Myocardial infarction, coronary revascularization, or sudden death before 55 y in father or male first-degree relative or before 65 y in mother or other female first-degree relative</td>
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<tr>
<td><strong>Cigarette smoking</strong></td>
<td>Current cigarette smoker or those who quit within the previous 6 mo or exposure to environmental tobacco smoke</td>
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<tr>
<td><strong>Sedentary lifestyle</strong></td>
<td>Not participating in at least 30 min of moderate intensity, physical activity (40%&lt;60% ( \text{VO}_2\text{R} )) on at least 3 d of the week for at least 3 mo (22,30)</td>
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<tr>
<td><strong>Obesity</strong></td>
<td>Body mass index &gt;=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><strong>Hypertension</strong></td>
<td>Systolic blood pressure &gt;=140 mm Hg and/or diastolic &gt;=90 mm Hg, confirmed by measurements on at least two separate occasions, or on antihypertensive medication (9)</td>
</tr>
<tr>
<td><strong>Dyslipidemia</strong></td>
<td>Low-density lipoprotein (LDL) cholesterol =130 mg • dL(^{-1}) (3.37 mmol • L(^{-1})) or high-density lipoprotein (HDL) cholesterol &lt;40 mg • dL(^{-1}) (1.04 mmol • L(^{-1})) or on lipid-lowering medication. If total serum cholesterol is all that is available, use &gt;=200 mg • dL(^{-1}) (5.18 mmol • L(^{-1})) (21)</td>
</tr>
<tr>
<td><strong>Prediabetes</strong></td>
<td>Impaired fasting glucose (IFG) = fasting plasma glucose &gt;=100 mg • dL(^{-1}) (5.55 mmol • L(^{-1})) and &lt;126 mg • dL(^{-1}) (6.94 mmol • L(^{-1})) or impaired glucose tolerance (IGT) = 2 h values in oral glucose tolerance test (OGTT) &gt;=140 mg • dL(^{-1}) (7.77 mmol • L(^{-1})) and &lt;190 mg • dL(^{-1}) (11.04 mmol • L(^{-1})) confirmed by measurements on at least two separate occasions (6)</td>
</tr>
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**Negative Risk Factors**

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Defining Criteria</th>
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</thead>
<tbody>
<tr>
<td><strong>High-density lipoprotein</strong></td>
<td>HDL cholesterol &gt;=60 mg • dL(^{-1}) (1.55 mmol • L(^{-1}))</td>
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</table>

\(^{a}\)If the presence or absence of a CVD risk factor is not disclosed or is not available, that CVD 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 y, especially for those with a body mass index (BMI) >=26 kg • m\(^{-2}\) and those <45 y with a BMI >=26 kg • m\(^{-2}\) and additional CVD risk factors for prediabetes. The number of positive risk factors is then summed.

\(^{b}\)High HDL is considered a negative risk factor. For individuals having high HDL >=60 mg • dL\(^{-1}\) (1.55 mmol • L\(^{-1}\)), for these individuals one positive risk factor is subtracted from the sum of positive risk factors.

\(\text{VO}_2\text{R}\), oxygen uptake reserve.
FIGURE 2.3. Logic model for classification of risk. CV, cardiovascular; CVD, cardiovascular disease.
FIGURE 2.4. Medical examination, exercise testing, and supervision of exercise testing preparticipation recommendations based on classification of risk. Ex Rx, exercise prescription; HR, heart rate; METs, metabolic equivalents; VO2R, oxygen uptake reserve.
The 2009 ACSM Exercise Preparticipation Health Screening Recommendations

- Individuals at moderate risk with ≥2 CVD risk factors should be encouraged to consult with their physician prior to initiating a vigorous intensity, physical activity program
  - While medical evaluation is taking place, the majority of these people can begin light to moderate intensity, physical activity programs such as walking without consulting a physician
- Individuals at high risk with symptoms or diagnosed disease should consult with their physician prior to initiating a physical activity program
### TABLE 2.3. New ACSM Recommendations for Exercise Testing Prior to Exercise-Diagnosed Cardiovascular Disease

Unstable or new or possible symptoms of cardiovascular disease (see Table 2.2)

**Diabetes mellitus and at least one of the following:**
- Age >35 yr OR
- Type 2 diabetes mellitus >10-yr duration OR
- Type 1 diabetes mellitus >15-yr duration OR
- Hypercholesterolemia (total cholesterol ≥240 mg • L⁻¹) (6.62 mmol • L⁻¹) OR
- Hypertension (systolic blood pressure ≥140 or diastolic ≥90 mm Hg) OR
- Smoking OR
- Family history of CAD in first-degree relative <60 yr OR
- Presence of microvascular disease OR
- Peripheral artery disease OR
- Autonomic neuropathy

**End-stage renal disease**

**Patients with symptomatic or diagnosed pulmonary disease including chronic obstructive pulmonary disease (COPD), asthma, interstitial lung disease, or cystic fibrosis.**

ACSM, American College of Sports Medicine; CAD, coronary artery disease.
The Updated 2015 ACSM Exercise Testing Recommendations

- Routine exercise testing before initiating a vigorous intensity, physical activity program is recommended *only* for individuals at high risk of exercise-related complications.
The 2015 ACSM Exercise Preparticipation Health Screening Recommendations

Compared to the previous ACSM recommendations, the updated ACSM exercise preparticipation health screening recommendations:

• More strongly support the public health message that all people should adopt a physically active lifestyle
• Reduce the emphasis on the need for medical evaluation in healthy, asymptomatic persons
• Emphasize identifying those with known disease because they are at greatest risk for an exercise-related cardiac event
• Simplify the exercise preparticipation health screening process
Why Reevaluate the 2009 ACSM Exercise Preparticipation Health Screening Recommendations?

- Exercise is safe for most people and has many health/fitness benefits
- The cardiovascular risks associated with exercise lessen as individuals become more physically active/fit
- Exercise-related cardiovascular events are rare and often are preceded by warning signs and symptoms
- The current prescreening algorithms can result in excessive referrals to physicians for medical clearance
  - Potential barrier to adopting exercise
  - Financial burden on the individual and health care system
ACSM Scientific Roundtable:
Updating Recommendations for Exercise Preparticipation Health Screening

- Expert panel was convened by ACSM in June 2014 to establish best practices in the exercise preparticipation health screening practice

- Experts in risk assessment, preventive cardiology, public health, exercise physiology, and geriatrics

- Practitioners from the field of medicine, clinical exercise physiology, and health fitness/prevention

- David M. Buchner, M.D., M.P.H., FACSM
- Joanne Eickhoff-Schemek, Ph.D.
- Carol Ewing Garber, Ph.D., FACSM
- Barry A. Franklin, Ph.D., FACSM
- Adrian Hutber, Ph.D.
- Elizabeth A. Joy, M.D., M.P.H., FACSM
- Gary Liguori, Ph.D., FACSM
- Meir Magal, Ph.D., FACSM
- Linda S. Pescatello, Ph.D., FACSM
- Deborah Riebe, Ph.D., FACSM
- Thomas Spring, M.S.
- Paul D. Thompson, M.D., FACSM
- Darren E.R. Warburton, Ph.D.
- Geoffrey P. Whitfield, Ph.D.
- Walter R. Thompson, Ph.D., FACSM
Exercise Is Safe!

- The relative risk of a cardiovascular event is increased during vigorous intensity exercise relative to rest, but the absolute risk of a cardiac event is low.
Why Re-evaluate the 2009 ACSM Exercise Preparticipation Health Screening Recommendations?

- Exercise is safe for most people and has many health/fitness benefits
- Cardiovascular risks associated with exercise lessen as individuals become more active/fit
Figure 2. Relative Risk of Myocardial Infarction (MI) According to the Usual Frequency of Heavy Exertion.

Association of Episodic Physical Activity With Triggering of Acute Cardiac Events: Systematic Review and Meta-analysis

Issa J. Dahabreh, MD
Jessica K. Paulus, ScD

Acute cardiac events are a major cause of morbidity and mortality, with as many as 1 million acute myocardial infarctions (MIs) and 300,000 cardiac arrests occurring in the United States each year. Regular physical activity has been identified as strongly associated with a decreased risk of cardiovascular disease and related mortality. Despite the well-established benefits of regular physical activity, anecdotal evidence has suggested that physical activity, as well as other acute exposures, such as sexual activity and psychological stress, can act as triggers of acute cardiac events. In fact, in the original description of MI, Oktniano and Strachanski observed that the acute event is often precipitated by exposure to physical or mental stressors.

Traditional epidemiologic designs, such as case-control and cohort studies, are not particularly suitable for identifying acute triggers (proximal causes) of cardiac events, primarily because short-term exposures close to the time of event occurrence are likely to be confounded by patient-level factors. In the early 1990s, the case-crossover design was developed specifically to address the problem of identifying triggers of acute events. A case-crossover study is based on the identification of patients who have experienced the event of interest and requires the assessment of exposure during a relatively brief period preceding the event of interest (the hazard period) and during periods when the event of interest did not occur.

Context: Evidence has suggested that physical and sexual activity might be triggers of acute cardiac events.

Objective: To assess the effect of episodic physical and sexual activity on acute cardiac events using data from case-crossover studies.

Data Sources: MEDLINE and EMASE (February 2, 2011) and Web of Science (through October 6, 2010).

Study Selection: Case-crossover studies investigating the association between episodic physical or sexual activity and myocardial infarction (MI) or sudden cardiac death (SCD).

Data Extraction: Two reviewers extracted descriptive and quantitative information from each study. We calculated summary relative risks (RRs) using random-effects meta-analysis and absolute event rates based on US data for the incidence of MI and SCD. We used the Fisher P-value synthesis method to test whether habitual physical activity levels modify the triggering effect and meta-regression to quantify the interaction between habitual levels of physical activity and the triggering effect.

Results: We identified 10 studies investigating episodic physical activity, 3 studies investigating sexual activity, and 1 study investigating both exposures. The outcomes of interest were MI (10 studies), acute coronary syndrome (1 study), and SCD (3 studies). Episodic physical and sexual activity were associated with an increase in the risk of MI (OR = 3.49, 95% confidence interval [CI], 2.23-5.23, and RR = 2.10; 95% CI, 1.48-4.91, respectively). The effect of triggers on the absolute rate of events was limited because exposure to physical and sexual activity is infrequent and their effect is transient; the absolute risk increase associated with 1 hour of additional physical or sexual activity per week was estimated as 2 to 3 per 10,000 person-years for MI and 1 to 7 per 10,000 person-years for SCD. Habitual activity levels significantly affected the association of episodic physical activity and MI (P < .001), episodic physical activity and SCD (P < .001), and sexual activity and MI (P = .04). In all cases, individuals with lower habitual activity levels had an increased RR for the triggering effect. For every additional time period per week an individual was habitually exposed to physical activity, the RR for MI decreased by approximately 45%, and the RR for SCD decreased by 30%.

Conclusion: Acute cardiac events were significantly associated with episodic physical and sexual activity; this association was attenuated among persons with high levels of habitual physical activity.

Dahabreh IJ, Paulus JK. JAMA 2011;305(12):1225-1233

Conclusion: Acute cardiac events were significantly associated with episodic physical activity; this association was significantly attenuated among persons with high levels of habitual physical activity.
Why Reevaluate the 2009 ACSM Exercise Preparticipation Health Screening Recommendations?

- Exercise is safe for most people and has many health/fitness benefits
- Cardiovascular risks associated with exercise lessen as individuals become more active/fit
- Exercise-related cardiovascular events are rare and often preceded by warning signs and symptoms
Signs and Symptoms

- Individuals who experience cardiovascular complications during or soon after exercise often have prodromal symptoms in the days and weeks before the event.

- Exercise professionals should promote education about exertion-related symptoms in the persons they counsel.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Reports, n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain/angina</td>
<td>15</td>
</tr>
<tr>
<td>Increasing fatigue</td>
<td>12</td>
</tr>
<tr>
<td>Indigestion/heartburn/gastrointestinal symptoms</td>
<td>10</td>
</tr>
<tr>
<td>Excessive breathlessness</td>
<td>6</td>
</tr>
<tr>
<td>Ear or neck pain</td>
<td>5</td>
</tr>
<tr>
<td>Vague malaise</td>
<td>5</td>
</tr>
<tr>
<td>Upper respiratory tract infection</td>
<td>4</td>
</tr>
<tr>
<td>Dizziness/palpitations</td>
<td>3</td>
</tr>
<tr>
<td>Severe headache</td>
<td>2</td>
</tr>
</tbody>
</table>

Adapted from Northcote et al. (57).
Why Reevaluate the 2009 ACSM Exercise Preparticipation Health Screening Recommendations?

- Exercise is safe for most people and has many health/fitness benefits
- Cardiovascular risks associated with exercise lessen as individuals become more active/fit
- Exercise-related cardiovascular events are rare and often preceded by warning signs and symptoms
- The current prescreening algorithms can result in excessive referrals to physicians for medical clearance
  - Potential barrier to adopting exercise
  - Financial burden on the individual and health care system
Conclusion: > 90% of US adults aged ≥ 40 years would receive a recommendation for physician consultation by the AAPQ. Excessive referral may present an unnecessary barrier to exercise adoption and stress the healthcare infrastructure.

Whitefield *Circulation* 2014
The 2015 ACSM Exercise Preparticipation Health Screening Recommendations

The new exercise preparticipation health screening recommendations are not a replacement for sound clinical judgment, and decisions about referral to a health care provider for medical clearance prior to the initiation of an exercise program should continue to be made on an individual basis.
What’s New?

The expert panel proposed a new evidence-informed model for exercise preparticipation health screening based on three factors:

- The individual’s current level of physical activity
- Presence of signs or symptoms and/or known cardiovascular, metabolic, or renal disease
- Desired exercise intensity
What’s New?

➢ No longer includes the CVD risk factor profile as part of the decision making for referral to a health care provider prior to the initiating a moderate-to-vigorous intensity exercise program

➢ No longer recommends a low/moderate/high risk classification scheme

➢ Makes general recommendations for *medical clearance* versus specific recommendations for *medical exams* or *exercise tests*, leaving the manner of clearance to the discretion of the healthcare provider.

➢ Does not automatically refer individuals with pulmonary disease for medical clearance prior to the initiation of an exercise program
Participates in Regular Exercise:

If No:

- No CV* or Renal Disease
  - If No Signs or Symptoms** suggestive of CV*, Metabolic**, or Renal Disease
    - Medical Clearance*** Not Necessary
      - Light to Moderate* Intensity Exercise Recommended
        - May Gradually Progress to Vigorous*** Intensity Exercise Following ACSM Guidelines
      - Following Medical Clearance, Light*** to Moderate* Intensity Exercise Recommended
        - May Gradually Progress as Tolerated Following ACSM Guidelines

If Yes:

- Known CV*, Metabolic**, or Renal Disease
  - Any Signs or Symptoms*** suggestive of CV*, Metabolic**, or Renal Disease
    - 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
  - No CV*, Metabolic**, or Renal Disease
    - No Signs or Symptoms*** suggestive of CV*, Metabolic**, or Renal Disease
      - Medical Clearance**** Not Necessary
      - Continue Moderate* Intensity Exercise Following Medical Clearance
        - May Gradually Progress as Tolerated Following ACSM Guidelines

- Known CV*, Metabolic**, or Renal Disease
  - Asymptomatic
    - Medical Clearance**** Recommended
      - Continue with Moderate* Intensity Exercise Following Medical Clearance
        - Gradually Progress as Tolerated Following ACSM Guidelines
Participates in Regular Exercise

Yes

No CV‡, Metabolic‡, or Renal Disease

AND

No Signs or Symptoms‡‡
Suggestive of CV‡, Metabolic‡, or Renal Disease

Medical Clearance‡‡‡ Not Necessary

Continue Moderate** or Vigorous*** Intensity Exercise

May Gradually Progress Following ACSM Guidelines♂

Known CV‡, 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 CV‡, 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♂

Participates in Regular Exercise§
Medical Clearance vs. Medical Exam and Exercise Test

- Medical clearance has replaced specific recommendations for a medical exam or exercise test because it should be the health care provider that decides what evaluation, if any, is appropriate prior to the initiation of exercise.

- There is a lack of evidence that medical clearance and exercise testing are effective in mitigating the risk of exercise-related cardiovascular deaths.
The 2015 ACSM Exercise Preparticipation Health Screening Recommendations

- Emphasizes the important public health message of regular physical activity for all
- Simplifies the prescreening process by eliminating the need for medical clearance and/or exercise testing in many individuals, especially when low to moderate intensity exercise is contemplated
The 2015 ACSM Exercise Preparticipation Health Screening Recommendations

- Recognize that the hazards of exercise-related cardiovascular events may more likely be reduced by careful attention to a safe and effective exercise prescription that:
  - Addresses FITT-VP (frequency, intensity, time, type, volume, progression) that incorporates a progressive transitional phase during which exercise duration and intensity are gradually increased
  - Advocates appropriate warm-up and cool-down
  - Promotes education of warning signs/symptoms
  - Encourages sedentary people to engage in regular, brisk walking to move them out of the least physically fit, least physically active cohort
  - Counsels physically inactive individuals to avoid unaccustomed vigorous intensity physical activity.
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FIFA PRE-COMPETITION MEDICAL ASSESSMENT