NEACSM 2015 Annual Meeting

ACSM Scientific Roundtable: Updating Recommendations for Exercise Preparticipation Health Screening

Linda S. Pescatello, Ph.D., FACSM, University of Connecticut
Deborah Riebe, Ph.D., FACSM, University of Rhode Island
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

- 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).
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>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 55 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 (40%–&lt;60% VO2,R) 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>
<tr>
<td>Dyslipidemia</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 ≥200 mg · dL⁻¹ (5.18 mmol · L⁻¹) (21)</td>
</tr>
<tr>
<td>Prediabetes*</td>
<td>Impaired fasting glucose (IFG) = fasting plasma glucose ≥100 mg · dL⁻¹ (5.56 mmol · L⁻¹) and ≤125 mg · dL⁻¹ (6.94 mmol · L⁻¹) or impaired glucose tolerance (IGT) = 2 h values in oral glucose tolerance test (OGTT) ≥140 mg · dL⁻¹ (7.77 mmol · L⁻¹) and ≤189 mg · dL⁻¹ (11.04 mmol · L⁻¹) confirmed by measurements on at least two separate occasions (5)</td>
</tr>
<tr>
<td>Negative Risk Factors</td>
<td>Defining Criteria</td>
</tr>
<tr>
<td>High-density lipoprotein (HDL) cholesterol</td>
<td>≥60 mg · dL⁻¹ (1.55 mmol · L⁻¹)</td>
</tr>
</tbody>
</table>

*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 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 CVD risk factors for prediabetes. The number of positive risk factors is then summed.

*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.

VO2,R, oxygen uptake reserve.
Figure 2.3. Logic model for classification of risk. CV, cardiovascular; CVD, cardiovascular disease.
ACSM GETP 9 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; VO₂ R, 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
Relative Risk of Acute Vigorous Intensity Exercise

<table>
<thead>
<tr>
<th>Study</th>
<th>Effect Period</th>
<th>End Point</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seattle study (5) (1984)</td>
<td>&lt; 1 h</td>
<td>Primary cardiac arrest</td>
<td>56 (23–131)†</td>
</tr>
<tr>
<td>Onset study (32) (1993)</td>
<td>1 h</td>
<td>Nonfatal MI</td>
<td>5.9 (4.6–7.7)</td>
</tr>
<tr>
<td>TRIMM study (31) (1990)</td>
<td>1 h</td>
<td>Nonfatal MI</td>
<td>2.1 (1.1–3.6)</td>
</tr>
<tr>
<td>Hartford Hospital AMI study (6) (1999)</td>
<td>1 h</td>
<td>Nonfatal MI</td>
<td>10.1 (1.8–55.6)</td>
</tr>
<tr>
<td>SHEEP study (40) (2000)</td>
<td>&lt; 15 min</td>
<td>Nonfatal MI</td>
<td>6.1 (4.2–9.0)</td>
</tr>
<tr>
<td>Physicians Health Study (7) (2002)</td>
<td>30 min</td>
<td>SCD</td>
<td>16.9 (10.5–27)</td>
</tr>
</tbody>
</table>

RR indicates relative risk and compares the risk of the cardiac event during exertion with that during sedentary activities; TRIMM, Triggers and Mechanisms of Myocardial Infarction Study; and SHEEP, Stockholm Heart Epidemiology Programme.

* Vigorous exertion is exercise intensity ≥ 6 METs (1 MET = 3.5 mL·kg⁻¹·min⁻¹).
† This RR (56) is the exertion RR for habitually sedentary men. The RR (vs no prior vigorous exercise) for the most active men (≥140 min/wk vigorous exertion) was 5 (95% CI, 2 to 14).

Adapted from Middleman (41), with permission from Blackwell Publishing.
### Absolute Risk of Acute Vigorous Intensity Exercise is Low

<table>
<thead>
<tr>
<th>Study / Population</th>
<th>Prevalence of SCD and/or MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians’ Health Study (men)</td>
<td>1 in every 1.5 million episodes of vigorous activity</td>
</tr>
<tr>
<td>Nurses’ Health Study (women)</td>
<td>1 in every 36.5 million hours of moderate or vigorous exercise</td>
</tr>
<tr>
<td>Joggers in RI</td>
<td>1 death per 396,000 hours of jogging</td>
</tr>
<tr>
<td>YMCA participants</td>
<td>1 death per 2,897,057 person-hours of exercise</td>
</tr>
<tr>
<td>Marathon and half-marathon runners</td>
<td>0.20 cardiac arrests and 0.14 SCD per 100,00 runner-hours</td>
</tr>
<tr>
<td>Supervised Cardiac Rehabilitation Programs</td>
<td>1 cardiac arrest per 116,906 patient-hr, 1 fatality per 752,365 patient-hr, and 1 major complication per 81,670 patient-hr of exercise participation</td>
</tr>
</tbody>
</table>

ACSM GETP 9, Thompson *JAMA* 1982; Siscovick *NEJM* 1984; AHA Scientific Statement *Circulation* 2007
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 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
Figure 2. Relative Risk of Myocardial Infarction (MI) According to the Usual Frequency of Heavy Exertion.
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.

Dahabreh IJ, Paulus JK. JAMA 2011;305(12):1225-1233
Meta-regression Graph of Triggering Relative Risks for Myocardial Infarction and Sudden Cardiac Death Over Habitual Physical Activity Levels

Myocardial infarction

rRR = 0.53 (95% CI, 0.41-0.69)

Sudden cardiac death

rRR = 0.70 (95% CI, 0.50-0.99)

Dahabreh IJ, Paulus JK. JAMA 2011;305(12):1225-1233
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 5. Prodromal symptoms reported by 45 subjects within 1 week of their SCD.

<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 symp.</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).

Franklin Circulation 2014; Thompson Circulation 2007
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.
The high prevalence of CVD risk factors among adults, combined with the extreme rarity of exercise-related SCD and AMI suggests that the ability to predict these rare events by assessing CVD risk factors is low.

- 65 million US adults have hypertension and 71 million have high low density lipoprotein-cholesterol.

- In contrast, 600,000 people die from heart disease each year, and only a small fraction of those are due to exercise-associated SCD and AMI.
The Updated 2015 ACSM Exercise Preparticipation Health Screening Recommendations

The expert panel:

- Continues to encourage preparticipation screening for persons interested in initiating or progressing exercise or other physical activity programs.

- Recognizes that vigorous intensity exercise has a small but measurable acute risk of CVD complications and mitigating this risk in susceptible individuals is important.

- Continues to recommend that exercise professionals consult with health care providers when there are questions about individuals with known disease or signs and symptoms suggestive of disease, or any other concern about an individual’s ability to safely participate in an exercise program.
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

No

No CV, Metabolic or Renal Disease

AND

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

Yes

Known CV, Metabolic or Renal Disease

AND

Any Signs or Symptoms Suggestive of CV, Metabolic or Renal Disease

Medical Clearance Recommended

Following Medical Clearance, Light to Moderate Intensity Exercise Recommended

May Gradually Progress as Tolerated Following ACSM Guidelines

No CV, Metabolic or Renal Disease

AND

Any Signs or Symptoms Suggestive of CV, Metabolic or Renal Disease

Medical Clearance Recommended

Following Medical Clearance, Light to Moderate Intensity Exercise Recommended

May Gradually Progress as Tolerated Following ACSM Guidelines

Known CV, Metabolic or Renal Disease

AND

Asymptomatic

Medical Clearance Not Necessary

Medical Clearance (within the last 12 months if no change in signs/symptoms) Recommended Before Engaging in Vigorous Intensity Exercise

Continue Moderate or Vigorous Intensity Exercise

May Gradually Progress Following ACSM Guidelines

Medical Clearance

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

May Return to Exercise Following Medical Clearance

Gradually Progress as Tolerated Following ACSM Guidelines

Medical Clearance

(Regardless of disease status)
Participants in Regular Exercise§

No

No CV‡, Metabolic‡‡, or Renal Disease AND 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‡

Known CV‡, Metabolic‡‡, or Renal Disease AND Asymptomatic

Medical Clearance‡‡‡‡ Recommended

Following Medical Clearance, Light* to Moderate** Intensity Exercise Recommended

May Gradually Progress as Tolerated Following ACSM Guidelines‡

Any Signs or Symptoms‡‡‡ Suggestive of CV‡, Metabolic‡‡, or Renal Disease (Regardless of disease status)

Medical Clearance‡‡‡‡ Recommended

Following Medical Clearance, Light* to Moderate** Intensity Exercise Recommended

May Gradually Progress as Tolerated Following ACSM Guidelines‡
Participates in Regular Exercise\textsuperscript{5} 

Yes

- No CV\textsuperscript{\dagger}, Metabolic\textsuperscript{\ddagger\ddagger}, or Renal Disease AND No Signs or Symptoms\textsuperscript{\ddagger\ddagger\ddagger} Suggestive of CV\textsuperscript{\dagger}, Metabolic\textsuperscript{\ddagger\ddagger}, or Renal Disease
  - Medical Clearance\textsuperscript{\ddagger\ddagger\ddagger\ddagger} Not Necessary
    - Continue Moderate\textsuperscript{\ddagger\ddagger} or Vigorous\textsuperscript{\ddagger\ddagger\ddagger} Intensity Exercise
      - May Gradually Progress Following ACSM Guidelines\textsuperscript{\ddagger}

- Known CV\textsuperscript{\dagger}, Metabolic\textsuperscript{\ddagger\ddagger}, or Renal Disease AND Asymptomatic
  - Medical Clearance\textsuperscript{\ddagger\ddagger\ddagger\ddagger} for Moderate Intensity Exercise Not Necessary
    - Medical Clearance (within the last 12 months if no change in signs/symptoms) Recommended Before Engaging in Vigorous\textsuperscript{\ddagger\ddagger\ddagger\ddagger} Intensity Exercise
      - Continue with Moderate\textsuperscript{\ddagger\ddagger} Intensity Exercise
        - Following Medical Clearance, May Gradually Progress as Tolerated Following ACSM Guidelines\textsuperscript{\ddagger}

- Any Signs or Symptoms\textsuperscript{\ddagger\ddagger\ddagger\ddagger} Suggestive of CV\textsuperscript{\dagger}, Metabolic\textsuperscript{\ddagger\ddagger}, 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\textsuperscript{\ddagger}
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.
Current guidelines regarding exercise testing likely are not applicable to the majority of persons ≥75 years who are interested in a program of physical activity/exercise. In addition to being expensive and of unproven benefit, the current policy of routine exercise testing potentially could deter many older persons from participating in an exercise program.

Gill JAMA 2000
The US Preventive Services Task Force found that screening exercise testing had no value in low-risk asymptomatic adults and found insufficient evidence for or against testing in subjects at higher risk.
AHA Scientific Statement

Exercise Testing in Asymptomatic Adults
A Statement for Professionals From the American Heart Association Council on Clinical Cardiology, Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention

Michael Lauer, MD, Chair; Erica Sivarajan Froelicher, RN, PhD; Mark Williams, PhD; Paul Kligfield, MD

Abstract—Along with coronary artery calcium scanning, ankle-brachial index measurement, and carotid artery ultrasound, exercise electrocardiography has been proposed as a screening tool for asymptomatic subjects thought to be at intermediate risk for developing clinical coronary disease. A wealth of data indicate that exercise testing can be used to assess and refine prognosis, particularly when emphasis is placed on nonelectrocardiographic measures such as exercise capacity, chronotropic response, heart rate recovery, and ventricular ectopy. Nevertheless, randomized trial data on the clinical value of exercise testing are absent; that is, it is not known whether a strategy of routine screening exercise testing in selected subjects reduces the risk for premature mortality or major cardiac morbidity. The writing group believes that a large-scale randomized trial of such a strategy should be performed. (Circulation, 2005; 112:771-776.)

Key Words: AHA Scientific Statements | exercise test | imaging | coronary disease | heart rate

Coronary artery disease is the leading cause of death in the developed world and may become the leading cause of death in the entire world; however, many patients with prognostically significant coronary artery disease are asymptomatic. Consequently, there has been enormous interest during the past 10 to 15 years in developing screening techniques by which important but asymptomatic disease can be diagnosed at an early stage.

Screening for chronic diseases is a complex topic. Outside the realm of large randomized trials, it is arguably impossible to definitively determine whether screening has any real benefit. Although it makes intuitive sense to diagnose disease at a stage before it causes major clinical events, screening may actually be harmful. Thus, new screening techniques that have become available during the past 5 to 10 years have engendered a great deal of controversy, given the absence of randomized trial data demonstrating that the use of screening results in improved clinical outcomes. The purpose of this scientific statement is to consider, on the basis of existing evidence, what role—if any—exercise testing plays in risk stratification in asymptomatic subjects. We pay particular attention to the value of non-ST-segment measures, including functional capacity, chronotropic response, heart rate (HR) recovery, and ventricular ectopy.

Appropriateness of Exercise Testing in Asymptomatic Subjects
The exercise test historically has been considered a potential useful modality for coronary disease screening. It is simple to administer, inexpensive, and safe. Nonetheless, the relatively poor accuracy of exercise electrocardiography for diagnosing hemodynamically significant coronary disease, even in symptomatic subjects, has led to recommendations against the use of exercise testing as a screening tool, as is well documented by a recent report from the US Preventive Services Task Force. These recommendations have been largely based on an extensive body of literature documenting the limitations of the ST segment for diagnosing coronary disease in asymptomatic subjects. Indeed, when used as a purely diagnostic test, it must be realized that false-positive tests are common among asymptomatic adults, especially

Lauer M et al. Circulation 2005
Case Study

Louise is 55 yr old corporate executive who is 5’6” tall and weighs 145 lb (BMI 24.3 kg•m\(^{-2}\)). She is a nonsmoker. Her father had a heart attack at 74 yr, her mother and one of her sisters have type 2 diabetes. Her blood pressure is 128/84 mmHg, total cholesterol is 218 mg•dL\(^{-1}\), LDL cholesterol is 141 mg•dL\(^{-1}\), HDL cholesterol 52 mg•dL\(^{-1}\), and fasting glucose is 122 mg•dL\(^{-1}\). She reports no signs/symptoms of chronic disease and no diagnosed cardiovascular, metabolic or renal disease. Louise has walked 4-5 d•wk\(^{-1}\) for years. She has recently received a job promotion and is having difficulty finding time to walk. Louise would like to join her fitness center at work so she can start walking at lunch or as her schedule permits.
The 2009 ACSM Exercise Preparticipation Health Screening Recommendations

<table>
<thead>
<tr>
<th># of Risk Factors</th>
<th>3 (age, dyslipidemia, prediabetes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs and Symptoms</td>
<td>No</td>
</tr>
<tr>
<td>Known Disease</td>
<td>No</td>
</tr>
<tr>
<td>Risk Classification</td>
<td>Moderate</td>
</tr>
<tr>
<td>Medical Exam Needed?</td>
<td>Moderate Exercise - No</td>
</tr>
<tr>
<td></td>
<td>Vigorous Exercise - Yes</td>
</tr>
<tr>
<td>Exercise Test Needed?</td>
<td>Moderate Exercise - No</td>
</tr>
<tr>
<td></td>
<td>Vigorous Exercise - No</td>
</tr>
</tbody>
</table>
### The 2015 ACSM Exercise Preparticipation Health Screening Recommendations

<table>
<thead>
<tr>
<th>Part</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participates in Regular Exercise</td>
<td>Yes</td>
</tr>
<tr>
<td>Signs and Symptoms</td>
<td>No</td>
</tr>
<tr>
<td>Known Disease</td>
<td>No</td>
</tr>
<tr>
<td>Medical Clearance Needed?</td>
<td>Moderate Exercise - No, Vigorous Exercise - No</td>
</tr>
</tbody>
</table>
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.
Upcoming Publications


Acknowledgements

The Exercise Preparticipation Health Screening Scientific Roundtable was generously supported by ACSM.

Several ACSM staff played key advisory, leadership, and administrative roles including:

- Jim Whitehead
- Richard Cotton
- Katie Feltman
- Jane Gleason-Senior