ACSM Risk Factor Identification and Risk Stratification

Readings
- ACSM: Pg 3-30 (Ch 1 & 2)
- NSCA: Pg 163-177 (Ch 9)

Survey
- 40% of facilities do not routinely use a screening interview or questionnaire to evaluate new members for symptoms or history of cardiovascular disease
- 10% never conduct a screening of cardiovascular history
Preparticipation Health Screening

- Valid
- Cost-effective
- Time efficient
- Find screening appropriate for your clients or target population and staff ability to interpret
  - Self or staff administered screening
- If medical evaluation recommended – communication with personal physician recommended (need permission)

PAR - Q & YOU

AHA/ACSM Health/Fitness Preparticipation Screening Questionnaire

- Figure 2-1, pg 25 G
- Provides greater detail CV disease risk factors and symptoms than PAR-Q
- Provides broader scope of chronic diseases that might be aggravated by exercise
3

> 60 mg/dL (1.6 mmol/L) High serum HDL cholesterol

Defining Criteria

Negative

Persons not participating in a regular exercise program or meeting the minimal physical activity recommendations‡ from the U.S. Surgeon General’s report

Sedentary lifestyle

Body Mass Index of $\geq 30$ kg/m², or waist girth of $>100$ cm, or WHR $\geq 0.95$ for men and $\geq 0.86$ for women

Obesity†

Fasting blood glucose of $\geq 100$ mg/dL (5.6 mmol/L) confirmed by measurements on at least 2 separate occasions

Impaired Fasting Glucose

LDL $>130$ mg/dL (3.4 mmol/L) or high-density lipoprotein cholesterol of $<40$ mg/dL (1.03 mmol/L), or on lipid-lowering medication. If total serum cholesterol is all that is available use $>200$ mg/dL (5.2 mmol/L) rather than LDL $>130$ mg/dL

Hypercholesterolemia

Systolic blood pressure of $\geq 140$ mmHg or diastolic $\geq 90$ mmHg, confirmed by measurements on at least 2 separate occasions, or on antihypertensive medication

Hypertension

Current cigarette smoker or those who quit within the previous 6 months

Cigarette Smoking

Myocardial Infarction, coronary revascularization, or sudden death before 55 years of age in father or other male first-degree relative (e.g., brother or son), or before 65 years in mother or other female first-degree relative (e.g., sister or daughter)

Family History

Defining Criteria

Positive

Mycocardial Infarction, coronary revascularization, or sudden death before 55 years of age in father or other male first-degree relative (e.g., brother or son), or before 65 years in mother or other female first-degree relative (e.g., sister or daughter)

Cigarette Smoking

Current cigarette smoker or those who quit within the previous 6 months

Obesity†

Body Mass Index of $\geq 30$ kg/m², or waist girth of $>100$ cm, or WHR $>0.95$ for men and $>0.86$ for women

Sedentary Lifestyle

Factors not participating in a regular exercise program (or meeting the minimal physical activity recommendations) from the U.S. Surgeon General’s report

Negative

Defining Criteria

High serum HDL cholesterol $>60$ mg/dL (1.6 mmol/L)

†Professional opinions vary regarding the most appropriate markers and thresholds for obesity; therefore, exercise professionals should use clinical judgment when evaluating this risk factor.

‡ Accumulating 30 minutes or more of moderate physical activity on most days of the week vs vigorous exercise

§ It is common to sum risk factors in making clinical judgments. If high-density lipoprotein (HDL) cholesterol is high, subtract one risk factor from the sum of positive risk factors because high HDL decreases CAD risk.

Example: 3 Positive Risk Factors

1 Negative Risk Factor

Sum of Risk Factors: 2
What other information is important prior to appropriately stratify risk for CAD?

Signs and Symptoms of Cardiovascular, Pulmonary or Metabolic Disease

Definitions
- Angina Pectoris - chest pain
- Ischemia - inadequate blood flow which causes insufficient oxygenation
- Dyspnea - difficulty of breathing/labored breathing
- Orthopnea - difficulty breathing except in the upright condition
- Paroxysmal - sudden

Definitions
- Palpate - feeling with the hand
- Palpitations - sensation of rapid or irregular heart beat
- Tachycardia - resting heart rate >100 bpm
- Intermittent - occurring at separated intervals
- Claudication - occlusive arterial disease in limbs
Box 2-1. Major Signs or Symptoms Suggestive of Cardiovascular and Pulmonary Disease (p 25G)

- Pain, discomfort (or other anginal equivalent) in the chest, neck, jaw, arms, or other areas that may result from ischemia
- Shortness of breath at rest or with mild exertion
- Dizziness or syncope
- Orthopnea or paroxysmal nocturnal dyspnea
- Ankle edema
- Palpitations or tachycardia
- Intermittent claudication
- Known heart murmur
- Unusual fatigue or shortness of breath with usual activities

Risk Stratification

- Sum of risk factors
- Signs/symptoms of cardiovascular, pulmonary and metabolic disease
- Known cardiovascular, pulmonary or metabolic disease
  - Cardiovascular disease - cardiac, peripheral vascular, or cerebrovascular
  - Pulmonary disease - COPD (chronic obstructive pulmonary disease - emphysema), asthma, interstitial lung disease or cystic fibrosis
  - Metabolic disease - Type 1 and 2 diabetes, thyroid disorders, renal and liver disease

Box 2-2. Initial ACSM Risk Stratification (page 26G)

- Low risk
  - Men < 45 years of age and women < 55 years of age who are asymptomatic and meet no more than one risk factor threshold from Table 2-2
- Moderate risk
  - Older individuals (men ≥ 45 years of age; women ≥ 55 years of age) or those who meet the threshold for two or more risk factors from Table 2-2
- High Risk
  - Individuals with one or more signs/symptoms listed in Table 2-3 or known cardiovascular, pulmonary, or metabolic disease
Definitions

- **Moderate exercise**
  - Relative - 40-59% HRR, VO2R, 64-76% HRmax
  - Absolute - Depends on fitness level (Table 1-1, p4 G)
  - If not known – activity can be comfortably sustained for a prolonged period of time (@ 45min)

- **Vigorous exercise**
  - Relative - >60-84% HRR, VO2R, 77-93% HRmax
  - Absolute - Depends on fitness level (Table 1-1, p4 G)
  - If not known – activity that represents a substantial cardiovascular challenge leading to fatigue (decrease intensity or stop after 15-20 min of exercise)
Secondary Risk Factors

Homocysteine - amino acid produced in body
• <12-14 umol/L recommended
  • Homocysteine Sumol/L = 20 mg/dL LDL
• Why?
  • Implicated in structural and functional changes in artery wall
  • May affect vessel dilation
  • Increased risk of blood clotting
  • Lower levels – folic acid (400 mcg/dL), B6, B12

Secondary Risk Factors

• Alcohol – 1 drink = 12 oz beer, 1.5 oz hard liquor, 5 oz. wine
  • >1 drink/day women
  • >2 drinks/day men
  • **Risk vs Benefit**

Secondary Risk Factors

• Hypertriglyceridemia - > 200 mg/dL
• Stress
  • Type H Personality – sudden, frequent outbursts of anger
  • Repressed feelings
  • Depression
• High Fat Diet
In-class Assignment

- Page 1-2 in lab manual
- Review answers in class
- Homework assignment for credit

Risk Ratio

- The likelihood that a person with a risk factor will develop coronary artery disease compared to someone without the risk factor.
Exercise for Health

- Moderate intensity activity will yield health benefits (reduce risk of CAD, stroke, certain cancers and reduce death rate) in spite of risk factors
- Reduction in mortality rate ≥ 50% in both men and women with small increases in activity and aerobic capacity (7 METs)
- No additional decrease in mortality rate with aerobic capacities greater than 9-10 METs

Surgeon General’s Report (lab manual)

- Significant health benefits can be obtained by including a moderate amount of physical activity (e.g., 30 minutes of brisk walking or raking leaves, 15 minutes of running or 45 minutes of playing volleyball) on most, if not all, days of the week. Through a modest increase in daily activity, most Americans can improve their health and quality of life.
- Additional health benefits can be gained through greater amounts of physical activity. People who can maintain a regular regimen of activity that is of longer duration or of more vigorous intensity are likely to derive the greater benefit.
- Physical activity reduces the risk of premature mortality in general and of coronary heart disease, hypertension, colon cancer, and diabetes mellitus, in particular. Physical activity also improves mental health and is important for the health of muscles, bones, and joints.
- More than 60 percent of American adults are not physically active. In fact, 25 percent of all adults are not active at all.
- Nearly half of American youths 12-21 years of age are not vigorously active on a regular basis. Moreover, physical activity declines dramatically during adolescence.
Risks Associated with Exercise (p 10-12G)

- **Young Adults (< 35 years)** - Sudden death within 1 hour of sports participation is 1 in every 133,000 men and 1 in every 769,000 women
- **Sickle Cell** - Relative Risk of sudden death is much higher (27 x)
- **Apparently Healthy Adults** - Sudden cardiac death during or after vigorous exercise in 1 of every 15,000 to 18,000

Risks Associated with Exercise Testing (p 12-13G)

- Six cardiac events in every 10,000 stress tests (1 per 1650; mixed subject population)
  - Higher in high risk patients
  - Lower in healthy individuals

Risks of Cardiac Events During Cardiac Rehab (p 13 G)

- 1 in every 81,669 patients
  - Surprisingly not higher than other populations
- **Bottom line**: Regular vigorous exercise decreases risk of cardiac arrest and acute MI during low and high intensity activity.
- **Overall risk of cardiac arrest in habitually active men is 40% that of sedentary men**.

### Table 1-1. Results of Studies Investigating the Relationship Between Physical Activity and Incidences of Selected Chronic Diseases (p G7)

<table>
<thead>
<tr>
<th>Disease or Condition</th>
<th>Number of Studies</th>
<th>Trends Across Activity or Fitness Categories and Strength of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-cause mortality</td>
<td>***</td>
<td>↓↓↓</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
<td>***</td>
<td>↓↓↓</td>
</tr>
<tr>
<td>Hypertension</td>
<td>**</td>
<td>↓↓</td>
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<tr>
<td>Obesity</td>
<td>***</td>
<td>↓↓</td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
<td>↓</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>*</td>
<td>→</td>
</tr>
<tr>
<td>Type II diabetes mellitus</td>
<td>**</td>
<td>↓↓</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>*</td>
<td>→</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>**</td>
<td>↓↓</td>
</tr>
</tbody>
</table>

### Table 1-1. Results of Studies Investigating the Relationship Between Physical Activity and Incidences of Selected Chronic Diseases Continued (p G7)

<table>
<thead>
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<th>Disease or Condition</th>
<th>Number of Studies</th>
<th>Trends Across Activity or Fitness Categories and Strength of Evidence</th>
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</thead>
<tbody>
<tr>
<td>Cancer</td>
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<tr>
<td>Colon</td>
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<td>Rectal</td>
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<tr>
<td>Prostate</td>
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<td>↓</td>
</tr>
<tr>
<td>Lung</td>
<td>*</td>
<td>↓</td>
</tr>
<tr>
<td>Pancreatic</td>
<td>*</td>
<td>→</td>
</tr>
</tbody>
</table>
Persons with known cardiovascular disease who do not obtain recommended medical evaluations and those who fail to complete the health appraisal questionnaire upon request may be excluded from participation in a health/fitness facility exercise program to the extent permitted by law.”

Persons without symptoms or a known history of cardiovascular disease who do not obtain the medical evaluation after completing a health appraisal should be required to sign an assumption of risk or release/waiver. ... may be excluded from participation in a health/fitness facility exercise program to the extent permitted by law.”

**Informed Consent (NSCA pg 190)**
- Should be conveyed both verbally and written
- Explanation of procedure/program
- Risks & Benefits
- Responsibilities of participant
- Confidentiality (lock and key)
- Documentation of questions and answers
- Documentation of acceptance
- Freedom of consent (sign and initial)
Other Forms
- Assumption of Risk form (NCSA pg 191)
  - Potential client declines to complete screening forms but still want to participate
- Physician’s approval form (NSCA pg 192)
- Emergency Medical Authorization - minors

Documentation
- Results of screening
- Document communication with healthcare professionals
- Physician referral form
- Exercise prescription
- Emergency procedures