

ACSM Risk Factor Identification and Risk Stratification

By

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Table 2-1. Coronary Artery Disease Risk Factor Thresholds for Use With ACSM Risk Stratification (p 24G)

Risk Factors	Defining Criteria
Positive	
Family History	Myocardial Infarction, coronary revascularization, or sudden death before 55 years of age in father or other male first-degree relative (I.e., brother or son), or before 65 years of age in mother or other female first-degree relative (I.e., sister or daughter)
Cigarette Smoking	Current cigarette smoker or those who quit within the previous 6 months

Table 2-1. Coronary Artery Disease Risk Factor Thresholds for Use With ACSM Risk Stratification (p 24G) (Continued)

Risk Factors	Defining Criteria
Hypertension	Systolic blood pressure of ≥140 mmHg or diastolic ≥90 mmHg, confirmed by measurements on at least 2 separate occasions, or on antihypertensive medication
Hypercholesterolemia	Total serum cholesterol of >200mg/dL (5.2 mmol/L) or high-density lipoprotein cholesterol of <35 mg/dL (0.9 mmol/L), or on lipid-lowering medication. If low-density lipoprotein cholesterol is available, use >130 mg/dL (3.4 mmol/L) rather than total cholesterol of >200 mg/dL.

Table 2-1. Coronary Artery Disease Risk Factor Thresholds for Use With ACSM Risk Stratification (p 24G) (Continued)

Risk Factors	Defining Criteria
Impaired Fasting Glucose	Fasting blood glucose of ≥110 mg/dL (6.1 mmol/L) confirmed by measurements on at least 2 separate occasions (7)
Obesity†	Body Mass Index of ≥30 kg.m^2 (8), or waist girth of >100cm (9)

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

Table 2-1. Coronary Artery Disease Risk Factor Thresholds for Use With ACSM Risk Stratification (p 24G) (Continued)

Risk Factors	Defining Criteria
Sedentary lifestyle	Persons not participating in a regular exercise program or meeting the minimal physical activity recommendations‡ from the U.S. Surgeon General's report (10)

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

Table 2-1. Coronary Artery Disease Risk Factor Thresholds for Use With ACSM Risk Stratification (p 24G) (Continued)

Risk Factors	Defining Criteria
Negative	
High serum HDL cholesterol	>60 mg/dL (1.6 mmol/L)

Sum of Positive and Negative Risk Factors

§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
- Syncope – temporary loss of consciousness

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 be due to 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 – 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
  - Younger individuals who are asymptomatic and meet no more than one risk factor threshold from Table 2-1
- 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 2-1
- High Risk
  - Individuals with one or more signs/symptoms listed in Box 2-1 or known cardiovascular, pulmonary, or metabolic disease

Table 2-2. ACSM Recommendations for (A) Current Medical Examination* and Exercise Testing Prior to Participation and (B) Physician Supervision of Exercise Tests (p 27G)

	Low Risk	Moderate Risk	High Risk
B.			
Submaximal test	NN	NN	R
Maximal test	NN	R	R

NN = not necessary

R = recommended medical examination and exercise test

Definitions

- Submaximal test – 85% of maximal predicted HR or **70% of heart rate reserve**
- Maximal test – to volitional fatigue or symptoms-limited test

Other Variables Which May Predict Heart Disease Risk

Not currently used for risk stratification

Homocysteine

- Homocysteine – amino acid produced in body
  - <12-14 umol/L recommended

    ⇧Homocysteine 5umol/L = ⇧ 20 mg/dL LDL Cholesterol
  - 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/d), B_6, B_{12}

Update – C Reactive Protein

- CRP – marker of cardiovascular inflammation
- Persons with high CRP levels are twice as likely as those with high cholesterol to die from heart attacks and strokes
- False positives - caution
  - ≥ 3 mg/L - high risk
  - 1- 2.99 mg/L - moderate risk
  - < 1 mg/L - low risk

Update – C Reactive Protein

- 30% of fatal heart attacks occur in people who have what doctors call a "desirable" cholesterol level.
- Highest CRP levels (4 and higher) were twice as likely to suffer heart problems as those with high LDL (over 154) - women.

In-class Assignment

- Page 8 in lab manual
- Review answers in class
- Homework assignment for credit

Risks Associated with GXT (G p 6-10)

- Maximal Tests in a Medical Center – mortality rate 1/10,000 patients
  Mortality and morbidity rate – 4/10,000
- Submaximal Tests – no reported deaths, MIs, or lasting morbid events, pretest screening and tests performed by nurses or ACSM ETT

Risk Ratio

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

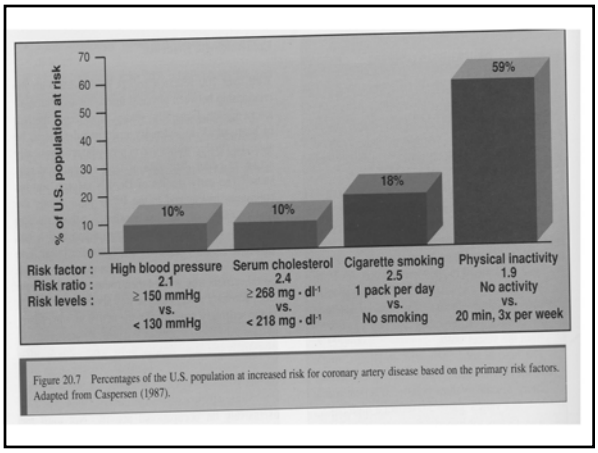


Figure 20.7 Percentages of the U.S. population at increased risk for coronary artery disease based on the primary risk factors. Adapted from Caspersen (1987).

Cooper Institute for Aerobics Research

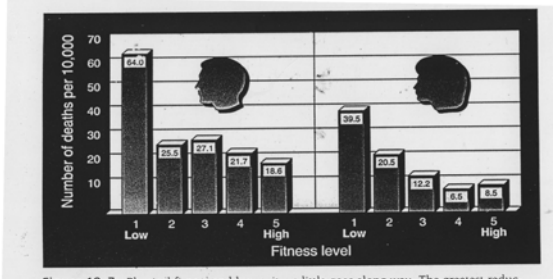


Figure 18–7. Physical fitness and longevity: a little goes along way. The greatest reduction in death rate risk occurs when going from the most sedentary category to a moderate level of fitness. (From Blair, S.N., et al.: Physical fitness and all-cause mortality: a prospective study of healthy men and women. *JAMA*, 262: 2395, 1989.)

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

Disease or Condition	Number of Studies	Trends Across Activity or Fitness Categories and Strength of Evidence
All-cause mortality	***	↓↓↓
Coronary Artery Disease	***	↓↓↓
Hypertension	**	↓↓
Obesity	***	↓↓
Stroke	***	↓
Peripheral vascular disease	*	→
Type II diabetes mellitus	**	↓↓
Osteoarthritis	*	→
Osteoporosis	**	↓↓

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

Disease or Condition	Number of Studies	Trends Across Activity or Fitness Categories and Strength of Evidence
Cancer		
Colon	***	↓↓↓
Rectal	***	→
Stomach	*	→
Breast	**	↓
Prostate	***	↓
Lung	*	↓
Pancreatic	*	→



PAR - Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1.	Has you doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?
☐	☐	2.	Do you feel pain in your chest when you do physical activity?
☐	☐	3.	In the past month, have you had chest pain when you were not doing physical activity?
☐	☐	4.	Do you lose your balance because of dizziness or do you ever lose consciousness?
☐	☐	5.	Do you have a bone or joint problem that could be made worse by a change in your physical activity?
☐	☐	6.	Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?
☐	☐	7.	Do you know of any other reason why you should not do physical activity?

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want—as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active—begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal—this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever—wait until you feel better; or
- if you are or may be pregnant—talk to your doctor before you start becoming more active.

Please note: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Screening (G p 23)

- PAR-Q recommended as minimal standard for entry into moderate intensity exercise programs
- If goal of screening is exercise testing, ACSM screening procedure recommended

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)

Documentation

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

Emergency Policies and Procedures (p283G)

- All staff CPR/AED certified (copies on file), ACLS preferred
- Plan posted with emergency number
- Emergency communication devices working
- Plan practiced quarterly (document)
- Plan reviewed and changed if necessary (document)
- Training for new staff
- Accident report and follow-up
- Maintenance of emergency equipment

Informed Consent vs Waiver

- Full disclosure of relevant facts
- Alternative procedures/options
- Benefits
- Risks
- Documentation of questions and answers
- Valid informed consent – meet conditions

Negligence (p 261-262 G)

- Failure to conform one's conduct to a generally accepted standard of duty/care (ACSM – way service should be delivered – current standards)
- Liability insurance – protect against financial loss in event of claim or suit