EIM/ACSM Proposed Knowledge, Skills and Abilities for Graduating Medical Students

Performance Domains and Associated Responsibilities

The performance domains are:

- Domain I: Physical Activity and Fitness Assessment
- Domain II: Exercise Prescription, Implementation (and Ongoing Support)
- Domain III: Exercise Counseling and Behavioral Strategies
- Domain IV: Personal Physician Health

Domain I: Physical Activity and Fitness Assessment

Associated Job Tasks

A. Determine participant’s readiness to take part in a health-related physical fitness assessment and exercise program.

1) Knowledge of:

   a. Risk factors, including those that may be favorably modified by physical activity habits.
   b. A simple risk factor assessment (PAR-Q) protocol.
   c. Medical supervision recommendations for cardiorespiratory fitness testing.

2) Skill in:

   a. Reviewing pre-activity screening documents (e.g., PAR-Q) to determine the need for medical clearance prior to exercise and to select appropriate physical fitness assessment protocols.

B. Select and prepare fitness assessments for healthy participants and those with controlled disease.

1) Knowledge of:

   a. The physiological basis of the major components of physical fitness: cardiorespiratory fitness; muscular strength and endurance; flexibility; and body composition.
   b. The physiologic and metabolic responses to exercise testing associated with chronic diseases and conditions (e.g., heart disease, hypertension, diabetes mellitus, obesity, pulmonary disease).
c. The effects of common medications and substances on exercise testing (e.g., antianginals, antihypertensives, antiarrhythmics, bronchodilators, hypoglycemics, psychotropics, alcohol, diet pills, cold tablets, caffeine, nicotine).

d. Being familiar with a very simple, office-based fitness testing protocol for patients who are apparently healthy or who have a chronic disease and with common fitness testing protocols that might be administered by a health fitness or allied health professional that the physician refers the patient to.

e. Any calibration techniques and proper use of fitness testing equipment necessary for administration of protocols identified in "d" above.

f. Test termination criteria and proper procedures to be followed after discontinuing the health fitness tests protocols identified in "d" above.

2) **Skill in:**

a. Analyzing and interpreting information obtained from the protocols described in “1d” above.

b. Modifying protocols and procedures for testing children, adolescents, older adults and individuals with special considerations.

C. **Conduct and interpret cardiorespiratory fitness assessments.**

1) **Knowledge of:**

a. Oxygen consumption dynamics during exercise (e.g., heart rate, stroke volume, cardiac output, ventilation, ventilatory threshold).

b. The blood pressure response to exercise.

c. Cardiorespiratory responses to acute graded exercise of conditioned and unconditioned participants.

d. The effects of myocardial ischemia, myocardial infarction, hypertension, claudication, and dyspnea on cardiorespiratory responses during exercise.

e. Common submaximal and maximal cardiorespiratory assessment protocols.

f. The rating of perceived exertion (RPE).

g. Heart rate, blood pressure and RPE monitoring techniques before, during, and after cardiorespiratory fitness testing.

2) **Skill in:**

a. Measuring heart rate, blood pressure, and RPE at rest and during exercise.
b. Interpreting cardiorespiratory fitness test results from the protocols described in “1d” above.

c. Determining cardiorespiratory fitness based on submaximal exercise test results from the protocols described in “1d” above.

D. Conduct assessments of muscular strength, muscular endurance and flexibility.

1) Knowledge of:


b. Interpreting muscular strength, muscular endurance, and flexibility assessments.

2) Skill in:

a. Interpreting results of muscular strength, muscular endurance and flexibility assessments.

E. Conduct anthropometric and body composition assessments.

1) Knowledge of:

a. The health implications of variation in body fat distribution patterns and the significance of BMI, waist circumference, and waist-to-hip ratio.

b. Procedures for determining BMI and taking circumference measurements.

2) Skill in:

a. Locating anatomic landmarks for skinfold and circumference measurements.

b. Interpreting the results of anthropometric and body composition assessments.

Domain II: Exercise Prescription and Implementation

Associated Job Tasks

A. Review pre-activity screening, exercise history and fitness assessments.

1) Skill in:
a. Synthesizing pre-screening results and reviewing them with patients.

B. Determine safe and effective exercise programs to achieve desired outcomes and goals.

1) **Knowledge of:**

a. The evidence-based citing the myriad of benefits associated with physical activity.

b. The benefits and precautions associated with exercise training in apparently healthy participants and those with controlled disease.

c. The basic biomechanical principles of human movement.

d. The physiologic changes associated with an acute bout of exercise.

e. The physiologic adaptations following chronic exercise training.

f. The physiological principles related to warm-up and cool-down.

g. Federal physical activity guidelines for strength, cardiovascular, and flexibility based exercise for apparently healthy clients, clients with increased risk, and clients with controlled disease.

h. The signs and symptoms of common musculoskeletal injuries associated with exercise (e.g., sprain, strain, bursitis, tendonitis).

i. The physiological and psychological signs and symptoms of overtraining.

1) **Skill in:**

a. Implementing exercise prescription guidelines for apparently healthy patients, patients with increased risk, and patients with controlled disease.

C. Implement cardiorespiratory exercise prescriptions using the FITT framework (frequency, intensity, time, and type) for apparently healthy patients based on current health status, fitness goals and availability of time.

1) **Knowledge of:**

a. The recommended FITT framework for the development of cardiorespiratory fitness.

b. Determining exercise intensity using HRR, VO₂R, peak HR method, peak VO₂ method, peak METs method, and the RPE Scale.

c. The minimal threshold of physical activity required for health benefits and/or fitness development.

d. Methods for establishing and monitoring levels of exercise intensity, including heart rate, RPE, and METs.

e. The benefits, risks and contraindications of a wide variety of cardiovascular training exercises based on client experience, skill level, current fitness level and
goals.

f. Abnormal responses to exercise (e.g., hemodynamic, cardiac, ventilatory).

1) **Skill in:**

   a. Determining appropriate exercise frequency, intensity, time and type for clients with various fitness levels.

   b. Determining the energy cost, absolute and relative oxygen costs (VO₂), and MET levels of various activities and apply the information to an exercise prescription.

   c. Identifying improper technique in the use of cardiovascular equipment.

   d. Teaching and demonstrating the use of a variety of cardiovascular exercise equipment.

D. Prescribe exercise prescriptions using the FITT framework (frequency, intensity, time, and type) for muscular strength, muscular endurance, and flexibility for apparently healthy participants based on current health status, fitness goals and availability of time.

1) **Knowledge of:**

   a. The characteristics of fast-and slow-twitch muscle fibers.

   b. The recommended FITT framework for the development of muscular strength, muscular endurance and flexibility.

   c. Acute (e.g., load, volume, sets, repetitions, rest periods, order of exercises) and chronic training variables (e.g., periodization).

   d. Prescribing exercise using the calculated %1-RM.

   e. The minimal threshold of physical activity required for health benefits and/or fitness development.

   f. Safe and effective exercises designed to enhance muscular strength and/or endurance of major muscle groups.

   g. Safe and effective core stability exercises (e.g., planks, crunches, bridges, cable twists).

   h. Acute and delayed onset muscle soreness (DOMS).

   i. The contraindications and potential risks associated with muscular conditioning activities (e.g., straight-leg sit-ups, double leg raises, squats, hurdler’s stretch, yoga plough, forceful back hyperextension, and standing bent-over toe touch, behind neck press/lat pull-down).
j. How the stretch reflex, proprioceptors, Golgi tendon organ (GTO), and muscle spindles relate to flexibility.

k. Safe and effective stretches that enhance flexibility.

l. Indications for water based exercise (e.g., arthritis, obesity).

2) **Skill in:**

   a. Teaching and demonstrating safe and effective muscular strength and endurance exercises (e.g., free weights, weight machines, resistive bands, Swiss balls, body weight and all other major fitness equipment).

   b. Teaching and demonstrating appropriate exercises for enhancing musculoskeletal flexibility.

E. Prescribe a weight management program as indicated by personal goals that are supported by pre-activity screening, health history, and body composition/anthropometrics.

1) **Knowledge of:**

   a. The relationship between body composition and health.

   b. The relationship between body fat distribution patterns and health.

   c. Published position statements on obesity and the risks associated with it (e.g., National Institutes of Health, American Dietetic Association, ACSM).

   d. Comorbidities and musculoskeletal conditions associated with overweight and obesity that may require medical clearance and/or modifications to exercise testing and prescription.

   e. Methods for modifying body composition including diet, exercise, and behavior modification.

   f. Exercise prescriptions for achieving weight management, including weight loss, weight maintenance and weight gain goals.

   g. The recommended FITT framework for participants who are overweight or obese.

   h. The importance of maintaining normal hydration before, during and after exercise.

   i. The consequences of inappropriate weight loss methods (e.g., saunas, dietary supplements, vibrating belts, body wraps, over exercising, very low calorie diets, electric stimulators, sweat suits, fad diets)

   j. Common nutritional ergogenic aids, their purported mechanisms of action, and associated risks and benefits (e.g., protein/amino acids, vitamins, minerals, herbal products, creatine, steroids, caffeine.)
2) **Skill in:**

   a. Modifying exercises for individuals limited by body size.
   
   b. Calculating the volume of exercise in terms of kcal/session-1.
   
   c. Applying behavioral strategies (e.g., exercise, diet, behavioral modification strategies) for weight management.

F. Prescribe exercise programs for participants with controlled cardiovascular, pulmonary, and metabolic diseases and other clinical populations with physician clearance for independent exercise.

1) **Knowledge of:**

   a. The recommended FITT principle for the development of cardiorespiratory fitness, muscular fitness and flexibility for participants with cardiac disease, arthritis, diabetes mellitus, dyslipidemia, hypertension, metabolic syndrome, musculoskeletal injuries, overweight and obesity, osteoporosis, peripheral artery disease, and pulmonary disease.
   
   b. ACSM risk stratification and exercise prescription guidelines for participants with cardiovascular, pulmonary, and metabolic diseases and other clinical populations.
   
   c. ACSM relative and absolute contraindications for initiating exercise sessions or exercise testing, and indications for terminating exercise sessions and exercise testing.
   
   d. The effects of exercise on blood glucose levels in diabetics.

2) **Skill in:**

   a. Modifying the exercise prescription and/or exercise choice for individuals with cardiac disease, arthritis, diabetes mellitus, dyslipidemia, hypertension, metabolic syndrome, musculoskeletal injuries, overweight and obesity, osteoporosis, peripheral artery disease, and pulmonary disease.
   
   b. Identifying improper exercise techniques and modifying exercise programs for participants with low back, neck, shoulder, elbow, wrist, hip, and knee and/or ankle pain.

G. Prescribe exercise programs for healthy special populations (i.e., youth, older adults, pregnant women).

1) **Knowledge of:**

   a. Normal maturational changes, from childhood to old age, and their effects on the bone, skeletal muscle, posture, body composition, resting and maximal heart rate, resting and maximal blood pressure, maximal oxygen consumption, strength, flexibility, and heat and cold tolerance.
b. The effects of the aging process on the musculoskeletal and cardiovascular structures and functions during rest, exercise, and recovery.

c. The benefits and precautions associated with exercise training across the lifespan.

d. The recommended FITT framework for the development of cardiorespiratory fitness, muscular fitness and flexibility in apparently healthy children and adolescents.

e. The recommended FITT framework necessary for the development of cardiorespiratory fitness, muscular fitness, balance, and flexibility in apparently healthy, older adults.

f. The recommended FITT framework necessary for the development of cardiorespiratory fitness, muscular fitness and flexibility in apparently healthy pregnant women.

g. The unique adaptations to exercise training in children, adolescents, and older participants with regard to strength, functional capacity, and motor skills.

h. Common orthopedic and cardiovascular exercise considerations for older adults.

i. The relationship between regular physical activity and the successful performance of activities of daily living (ADLs) for older adults.

2) Skill in:

   a. Modifying exercises based on age, physical condition, and current health status.

   b. Modify exercise prescriptions based on environmental conditions.

3) Knowledge of:

   a. The effects of a hot, cold, or high altitude environment on the physiologic response to exercise.

   b. Special precautions and program modifications for exercise in a hot, cold, or high altitude environment.

   c. Appropriate fluid intake during exercise in a hot, humid environments as well as cold, and altitude.
Domain III: Exercise Counseling and Behavioral Strategies

Associated Job Tasks

A. Optimize adoption and adherence to exercise programs and other healthy behaviors by applying effective communication techniques.

1) **Knowledge of:**
   a. Active listening techniques.
   b. Verbal and non-verbal behaviors that communicate positive reinforcement and encouragement (e.g., eye contact, targeted praise, empathy).
   c. Types of feedback (e.g., evaluative, supportive, descriptive).

2) **Skill in:**
   a. Using active listening techniques.
   b. Applying verbal and non-verbal communications with diverse participant populations.

B. Optimize adoption of and adherence to exercise programs and other healthy behaviors by applying effective behavioral and motivational strategies.

1) **Knowledge of:**
   a. Evidence-based theories of behavior change (e.g., Transtheoretical Model of Change, Motivational Interviewing).
   b. Behavioral strategies for enhancing exercise and health behavior change (e.g., reinforcement, S.M.A.R.T. goal setting, social support).
   c. Behavioral strategies (e.g., exercise, diet, behavioral modification strategies) for weight management.
   d. Common barriers to exercise initiation and compliance (e.g., time management, injury, fear, lack of knowledge, weather).
   e. Techniques that facilitate motivation (e.g., goal setting, incentive programs, achievement recognition, social support).
   f. Relapse prevention strategies and plans of action.
   g. Strategies that increase non-structured physical activity levels (e.g., stair walking, parking farther away, bike to work).

2) **Skill in:**
   a. Evaluating behavioral readiness to optimize exercise adherence.
   b. Applying the theories related to behavior change to diverse populations.
c. Setting effective behavioral goals.

d. Providing support and resources necessary, as well as advice on current technologies (e.g., pedometer, smart phone apps) to reach the behavioral goals.

C. Provide educational resources to support clients in the adoption and maintenance of healthy lifestyle behaviors.

1) **Knowledge of:**

   a. The relationship between physical inactivity and common chronic diseases (e.g., Atherosclerosis, type II diabetes, obesity, dyslipidemia, arthritis, low back pain, hypertension).

   b. Modifications necessary to promote healthy lifestyle behaviors for diverse populations.

   c. The activities of daily living (ADLs) and how they relate to overall health.

   d. Specific, age-appropriate educational methods to increase patient engagement.

2) **Skill in:**

   a. Educating patients about benefits and risks of exercise and the risks of sedentary behavior.

**Domain IV: Personal Physician Health**

**Associated Job Tasks**

A. Serve as a role model for patients to engage in a program of regular physical activity.

1) **Knowledge of:**

   a. Profound impact of personal health and health behaviors on the adoption and adherence to positive health behaviors of patients.

   b. Effective tools for self-monitoring volume and/or intensity of physical activity.

   c. Appropriate methods of communicating personal health behaviors to patients.

2) **Skill in:**

   a. Meeting and maintaining the minimum weekly physical activity requirements for Americans.

   b. Regular physical activity self-monitoring.