
Personal Fitness Trainer Course
NAFTA TRAINING
DAY 1

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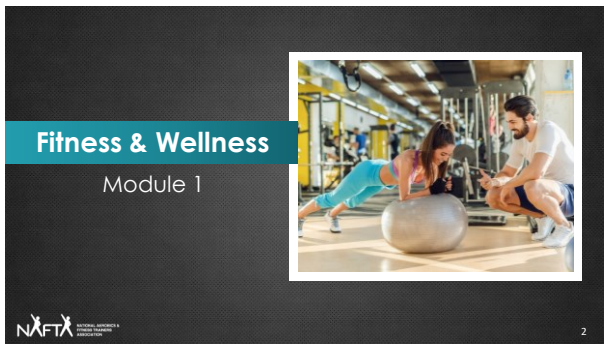
Fitness & Wellness
Module 1
2

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5 Step Process
Medical Screening
Fitness and Nutrition Assessment
Goal Setting
Exercise Rx and Nutrition Guidelines
Adherence
3

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Physical Fitness

- Physical Fitness is defined as the ability to carry out daily tasks with vigor and alertness without undue fatigue and with ample energy to engage in leisure time pursuits and to meet the average physical stresses encountered in emergency situations.

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Six Components of Physical Fitness

- Cardiorespiratory fitness
- Body Composition
- Flexibility
- Absolute Strength
- Dynamic Strength
- Neuromotor Skills

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Secondary Components to Fitness

- Balance
- Agility
- Coordination
- Reaction time
- Speed
- Power Mental Capability

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Definition Wellness

- The state of well being.
- Wellness is the act of practicing healthy habits on a daily basis to attain better physical and mental health outcomes, so that instead of just surviving, you're thriving.
- The National Wellness Institute promotes Six Dimensions of Wellness: emotional, occupational, physical, social, intellectual, and spiritual. Addressing all six dimensions of wellness in our lives builds a holistic sense of wellness and fulfillment.

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Coronary Risk Factors

Module 2

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Causes of Death in the U.S.

Cause	% of Deaths
CV Disease	54%
Cancer	29%
Accidents	5%
Lung Disease	5%
Pneumonia/Flu	4%
AIDS	2%

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of Deaths Due to Various Causes in the U.S.

Cause	% of Deaths
CV Disease	1 million
Cancer	½ million
Accidents	100,000
Lung Disease	100,000
Pneumonia/Flu	100,000
AIDS	40,000

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What is Cardiovascular Disease?

Any disease that affects the heart or blood vessels

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Types of Cardiovascular Disease

CARDIOVASCULAR DISEASE

CORONARY ARTERY DISEASE

CEREBROVASCULAR DISEASE

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Cost of CVD in the US

- Total cost of CVD is US is $151 billion/year
  - $151,000,000,000.00 !!!
  - Hospital/nursing services ~ $95 billion/year
  - Physician services ~ $23 billion/year
  - Medications ~ $11 billion/ year
  - Lost work ~ $22 billion/year
- CVD ranked first in number of hospital admissions

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What about women?

- CVD is the number one killer of women
- Of 100 50-year-old women,
  - 55 will die from CVD
  - only 10 from breast cancer

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What about African Americans?

- CVD death rates are 50% higher in AA men compared to CA men
- CVD death rates are 70% higher in AA women compared to CA women.
- Mainly due to?
  - Hypertension and Strokes

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US compared to other countries?

- Russian Federation, Hungary, Romania, Poland highest rates for men and women
- Switzerland, Japan, France, Spain lowest for men and women
- CVD death rates in lowest countries are ~25% lower than the rates in the highest countries
- US CVD death rate in the middle, ~1/2 that of highest countries and 2x's that of lowest.

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Coronary Heart Disease

- Cardiovascular diseases account for ~1,000,000 deaths annually (54% of total mortality from all causes).
- CHD by itself, accounts for ~ 460,000 deaths annually
  - Coronary arteries become blocked, resulting in a reduction or cessation of blood flow to the heart muscle. This can cause the heart to beat irregularly or stop beating!!!

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Coronary Heart Disease Risk Factors

- **Major**
  - Modifiable
  - Hypertension
  - High Cholesterol
  - Smoking
  - Physical Inactivity
- **Non-Modifiable**
  - Age
  - Genetics
  - Gender
  - Race
- **Contributing**
  - Diabetes (Impaired glucose tolerance)
  - Obesity
  - Stress

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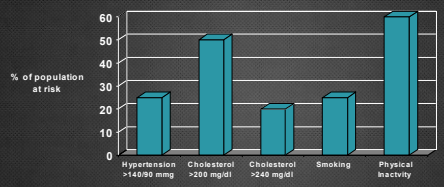
Primary Risk Factors



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Screening

- Every year on the news you hear about the sedentary individual who dropped dead while shoveling snow!
- We don't want these people in a regular exercise program.
- Need to screen in order to ID these individuals

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Purpose of Pre-participation Health Screening

- Screening
- Assessment
- Prescription

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Screening

- ID and exclude individuals with medical contraindication to exercise
- ID individuals with disease risk factors and/or symptoms who need medical evaluation prior to exercise
- ID those who need a medically supervised program (cardiac rehabilitation)
- Other special needs

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Screening Procedures

- Range from simple, self administered to very involved diagnostic tests
- Need to establish pre-participation screening procedures that are appropriate for your clients and/or facility.
- PAR-Q as a minimum

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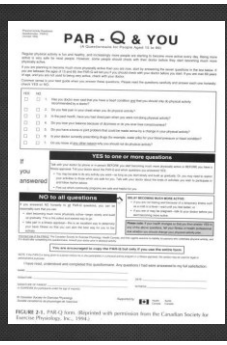
PAR - Q & YOU

YES to one or more questions

NO to all questions

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Risk Factors

- Increase the likelihood of developing a disease
- Extremes "outliers" not the norm!!!
  - Sedentary, smoker who eats a high fat diet and smoking lives to be 100 y.o.
  - Healthy 23 y.o. jogger dies of a heart attack

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Primary Risk Factors

- Abnormal Blood Cholesterol
- Hypertension
- Cigarette Smoking
- Prediabetes
- Family History
- Sedentary Lifestyle
- Obesity
- Age

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1. Family History: Choose your parents well"

- **RISK FACTOR:** Myocardial infarction (MI), coronary revascularization (bypass surgery), or sudden death
  - < 55 years of age in father of other male first-degree relative (brother or son)
  - < 65 years of age in mother or other female first-degree relative (sister or daughter)

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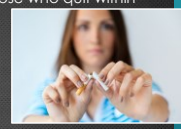
2. Cigarette Smoking

- **RISK FACTOR:** Current cigarette smoker or those who quit within the previous 6 months
- Smoking Risk ≈ Pack Years
  - Smoking ↓ HDL's
  - Estrogen ↑HDL's



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3. Hypertension

RISK FACTOR:

1. Systolic Blood Pressure 140 mmHg
   OR Diastolic Blood Pressure 90 mmHg measured on at least 2 separate occasions

OR

2. On antihypertensive medication

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4. Abnormal Blood Cholesterol

POSITIVE RISK FACTORS:

- Total serum cholesterol (TC) > 200 mg/dl
- If available use Low density lipoprotein (LDL) >130 mg/dl instead of TC

OR

- High density lipoprotein (HDL) < 35 mg/dl

OR

- On lipid lowering medication

NEGATIVE RISK FACTOR:

- High HDL's, >60 mg/dl, subtract 1 risk factor

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5. Diabetes

RISK FACTOR:

- Type I Diabetes – Insulin Dependent (IDDM)
- Type II Diabetes – Non-Insulin Dependent (NIDDM)
- Metabolic Syndrome X

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6. Obesity

RISK FACTOR

- Body mass index of ≥ 30 kg/m2

OR

- Waist girth > 100 cm

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7. Sedentary Lifestyle

- Persons not participating in a regular exercise program or meeting the minimal physical activity recommendations from the
- Surgeon General's report
  - Should accrue at least 30 minutes of moderate intensity physical activity most days of the week

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8. Age

- Major Risk Factor Criteria for Age:
- - Age_____ 45 for males
- - Age _____ 55 for females
- Significant increases in coronary events (heart attack, bypass surgery, etc.) are seen in men
- and women who meet these age criteria. The reason for this age difference between males and
- females is because women typically have a 10-year later onset of CAD than males. A possible
- explanation for this is that because of higher estrogen levels, women have significantly higher
- levels of HDL than men

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Two Contributing Risk Factors for Coronary Artery Disease

ELEVATED BLOOD TRIGLYCERIDE LEVEL

STRESS

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ACSM Risk Stratification

- **Low Risk:**
  - Younger individuals (Men < 45, Women < 55) who are asymptomatic with no more than 1 risk factor
- **Moderate Risk:**
  - Older individuals (Men 45, Women 55)

  OR
  - Those with 2 or more risk factors
- **High Risk:**
  - Individuals with one or more signs/symptoms of CV or pulmonary disease (Table 2-1)

  OR
  - Known CV, Pulmonary or Metabolic Disease

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ACSM Recommendations for pre-participation medical examination and diagnostic exercise testing

* "Not necessary" indicates not essential but should not be viewed as inappropriate

Moderate Exercise:

- ~3-6 MET's (Brisk walk, 3-4 MPH for most)
- Pace that can be comfortably sustained for ~45 minutes
- 40-60% VO2max or HRR (50-70% of HRmax)

Vigorous Exercise

- > 6 MET's
- > 60% of VO2 max or HRR (>70% of HRmax)

	Low Risk	Moderate Risk	High Risk
Moderate Exercise	Not necessary*	Not necessary*	Recommended
Vigorous Exercise	Not necessary*	Recommended	Recommended

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ACSM Recommendations for physician supervision of Exercise Testing

	Low Risk	Moderate Risk	High Risk
Sub-maximal	Not necessary*	Not necessary*	Recommended
Maximal	Not necessary*	Recommended	Recommended

* "Not necessary" indicates that physician supervision is not essential, but should not be viewed as inappropriate.

When physician supervision is "recommended", the physician should be in close proximity and readily available should there be an emergent need.

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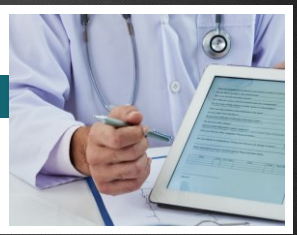
Medical Screening

Module 3



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Exercise Program Design: Steps

1. Medical/health screening
2. Physical-fitness testing
3. Selection of exercise mode based on client's goals, abilities, and interests
4. Designing a comprehensive exercise program for total fitness

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Screening

- Perform health screening and risk assessment to determine client's risk category and if they need to see a doctor prior to fitness testing and/or exercise

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Fitness Testing

- Based on risk assessment, client should be tested prior to writing the exercise program
- The results should be used to formulate
- the exercise program
- Clients should be retested ~ every 3 months
- Based upon results of retesting, fitness goals/objectives can be modified

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Medical Screening

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Medical Screening

1. Medical Screening Techniques
2. Outcome of Medical Screening
3. Medical Screening Approached and Forms

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Medical Screening Defined

- Medical screening is the first step in the five step process
- Medical screening is defined as a systematic method of data gathering prior to administration of a fitness assessment or prior to beginning an exercise program. The objective of medical screening is to determine the risk of exercise. These risks fall into three categories; orthopedic, cardiovascular, and chronological. Medical screening is a necessity when dealing with the adult population. In fact, failure to screen an individual prior to a fitness assessment violates the standard of ordinary care. In other words, we can never assume that it is safe for a client to go through a fitness assessment or begin an exercise program without them having been screened first.

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HIPPA

- The Health Insurance Portability and Accountability Act (HIPAA): the Basics.
- HIPAA legislation was passed in 1996. The main purpose of HIPAA is to protect the individual's privacy with regard to their protected health information (PHI). Examples of PHI include, but are not limited to items such as:

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Medical Screening Forms

- PARQ
- Health History Form
- Waiver of Liability
- Informed Consent

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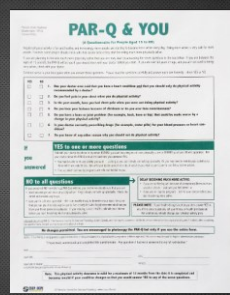
PAR Q

- Physical Activity Readiness Questionnaire



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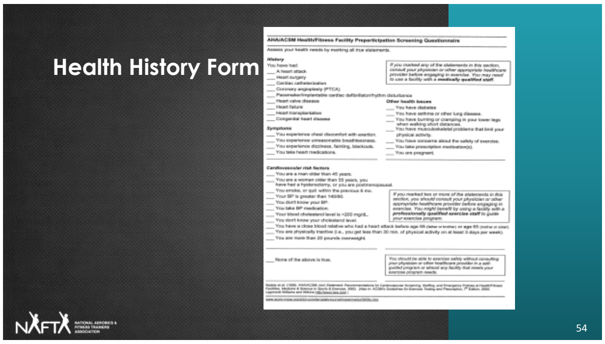

AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire

Assess your health needs by marking all true statements.

History

You have had:

- ___ A heart attack
- ___ Heart surgery
- ___ Cardiac catheterization
- ___ Coronary angioplasty (PTCA)
- ___ Pacemaker/implantable cardiac defibrillator/rhythm disturbance
- ___ Heart valve disease
- ___ Heart failure
- ___ Heart transplantation
- ___ Congenital heart disease

Symptoms

- ___ You experience chest discomfort with exertion.
- ___ You experience unreasonable breathlessness.
- ___ You experience dizziness, fainting, blackouts.
- ___ You take heart medications.

If you marked any of the statements in this section, consult your physician or other appropriate healthcare provider before engaging in exercise. You may need to use a facility with a ***medically qualified staff.***

Other health issues

- ___ You have diabetes
- ___ You have asthma or other lung disease.
- ___ You have burning or cramping in your lower legs when walking short distances.
- ___ You have musculoskeletal problems that limit your physical activity.
- ___ You have concerns about the safety of exercise.
- ___ You take prescription medication(s).
- ___ You are pregnant.

Cardiovascular risk factors

- ___ You are a man older than 45 years.
- ___ You are a woman older than 55 years, you have had a hysterectomy, or you are postmenopausal.
- ___ You smoke, or quit within the previous 6 mo.
- ___ Your BP is greater than 140/90.
- ___ You don't know your BP.
- ___ You take BP medication.
- ___ Your blood cholesterol level is >200 mg/dL.
- ___ You don't know your cholesterol level.
- ___ You have a close blood relative who had a heart attack before age 55 (father or brother) or age 65 (mother or sister).
- ___ You are physically inactive (i.e., you get less than 30 min. of physical activity on at least 3 days per week).
- ___ You are more than 20 pounds overweight.

If you marked two or more of the statements in this section, you should consult your physician or other appropriate healthcare provider before engaging in exercise. You might benefit by using a facility with a ***professionally qualified exercise staff*** *to guide your exercise program.*

___ None of the above is true.

You should be able to exercise safely without consulting your physician or other healthcare provider in a self-guided program or almost any facility that meets your exercise program needs.

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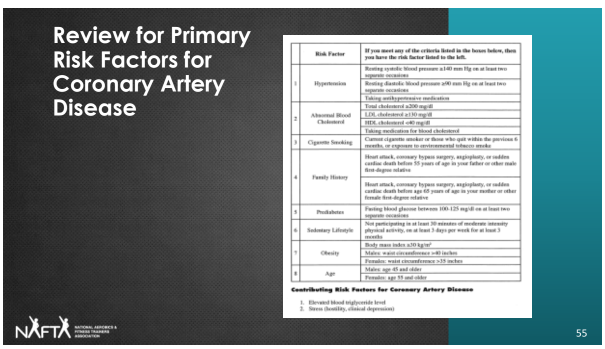

	Risk Factor	If you meet any of the criteria listed in the boxes below, then you have the risk factor listed to the left.
1	Hypertension	Resting systolic blood pressure ≥140 mm Hg on at least two separate occasions
		Resting diastolic blood pressure ≥90 mm Hg on at least two separate occasions
		Taking antihypertensive medication
2	Abnormal Blood Cholesterol	Total cholesterol ≥200 mg/dl
		LDL cholesterol ≥130 mg/dl
		HDL cholesterol <40 mg/dl
		Taking medication for blood cholesterol
3	Cigarette Smoking	Current cigarette smoker or those who quit within the previous 6 months, or exposure to environmental tobacco smoke
4	Family History	Heart attack, coronary bypass surgery, angioplasty, or sudden cardiac death before 55 years of age in your father or other male first-degree relative
		Heart attack, coronary bypass surgery, angioplasty, or sudden cardiac death before age 65 years of age in your mother or other female first-degree relative
5	Prediabetes	Fasting blood glucose between 100-125 mg/dl on at least two separate occasions
6	Sedentary Lifestyle	Not participating in at least 30 minutes of moderate intensity physical activity, on at least 3 days per week for at least 3 months
7	Obesity	Body mass index ≥30 kg/m²
		Males: waist circumference >40 inches
		Females: waist circumference >35 inches
8	Age	Males: age 45 and older
		Females: age 55 and older

Contributing Risk Factors for Coronary Artery Disease

1. Elevated blood triglyceride level
2. Stress (hostility, clinical depression)

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Putting it all together-ACSM Risk Stratification

- **Example #1**
  - Jim Perkins is a sedentary 43-year-old male. He quit smoking 7 years ago, and currently has a consistent resting blood pressure of 148/92 mm Hg. His total cholesterol is 212 mg/dl; with an HDL of 46 mg/dl and an LDL of 145 mg/dl. His fasting blood glucose is consistently 92 mg/ dl; triglycerides are 179 mg/dl. BMI is 24.5 kg/m2 with a waist circumference of 38.5 inches. He has no symptoms or family history and does not report the presence of CVD, pulmonary, or metabolic disease. First, identify and total Jim's major coronary risk factors. Which ACSM Risk Category is he in? Does he need a medical exam and a maximal treadmill exercise test before beginning an exercise program?

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Putting it all together-ACSM Risk Stratification

- **Example#2**
  - Melissa Flynn is a 46-year-old sedentary female. Her total cholesterol is 182 mg/dl; with an LDL value of 104 mg/dl and an HDL value of 59 mg/dl. Her fasting glucose is 88 mg/dl; triglycerides are 143 mg/dl, and resting blood pressure is consistently 118/70 mm Hg. BMI is 28.5 kg/m2 with a waist circumference of 34 inches. She is a non-smoker and has no family history of heart disease. She has no symptoms and does not report the presence of CVD, pulmonary, or metabolic disease. First, identify and total Melissa's major coronary risk factors. Which ACSM Risk Category is she in? Does she need a medical exam and a maximal treadmill exercise test prior to beginning an exercise program?

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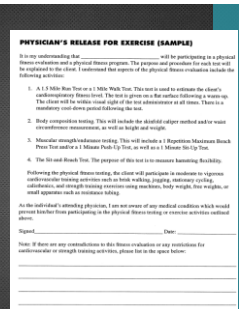
Physician Release



PHYSICIAN'S RELEASE FOR EXERCISE (SAMPLE)

It is my understanding that _____ will be participating in a physical fitness evaluation and a physical fitness program. The purpose and procedure for each test will be explained to the client. I understand that aspects of the physical fitness evaluation include the following activities:

1. A 1.5 Mile Run Test or a 1 Mile Walk Test. This test is used to estimate the client's cardiorespiratory fitness level. The test is given on a flat surface following a warm-up. The client will be within visual sight of the test administrator at all times. There is a mandatory cool-down period following the test.
2. Body composition testing. This will include the skinfold caliper method and/or waist circumference measurement, as well as height and weight.
3. Muscular strength/endurance testing. This will include a 1 Repetition Maximum Bench Press Test and/or a 1 Minute Push-Up Test, as well as a 1 Minute Sit-Up Test.
4. The Sit-and-Reach Test. The purpose of this test is to measure hamstring flexibility.

Following the physical fitness testing, the client will participate in moderate to vigorous cardiovascular training activities such as brisk walking, jogging, stationary cycling, calisthenics, and strength training exercises using machines, body weight, free weights, or small apparatus such as resistance tubing.

As the individual's attending physician, I am not aware of any medical condition which would prevent him/her from participating in the physical fitness testing or exercise activities outlined above.

Signed_____ Date: _____

Note: If there are any contradictions to this fitness evaluation or any restrictions for cardiovascular or strength training activities, please list in the space below:

_____

_____

_____

_____

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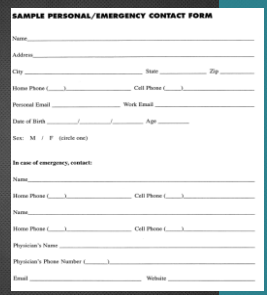
Personal Emergency Contact Form



SAMPLE PERSONAL/EMERGENCY CONTACT FORM

Name_____

Address_____

City _____ State _____ Zip _____

Home Phone (_____)_____ Cell Phone (_____)_____

Personal Email _____ Work Email _____

Date of Birth _____/_____/_____ Age _____

Sex: M / F (circle one)

In case of emergency, contact:

Name_____

Home Phone (_____)_____ Cell Phone (_____)_____

Name_____

Home Phone (_____)_____ Cell Phone (_____)_____

Physician's Name _____

Physician's Phone Number (_____)_____

Email _____ Website _____

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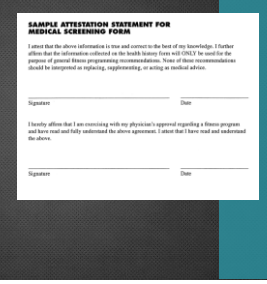
Attestation Statement for Medical Screening Form



SAMPLE ATTESTATION STATEMENT FOR MEDICAL SCREENING FORM

I attest that the above information is true and correct to the best of my knowledge. I further affirm that the information collected on the health history form will ONLY be used for the purpose of general fitness programming recommendations. None of these recommendations should be interpreted as replacing, supplementing, or acting as medical advice.

Signature _____ Date _____

I hereby affirm that I am exercising with my physician's approval regarding a fitness program and have read and fully understand the above agreement. I attest that I have read and understand the above.

Signature _____ Date _____

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Informed Consent Form

SAMPLE INFORMED CONSENT FORM

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

HOME PHONE (_____)_____ CELL PHONE (_____)_____

PERSONAL EMAIL _____ WORK EMAIL _____

"I, (print name) _____, have enrolled in a program of strenuous physical activity including, but not limited to fitness testing, group exercise classes, weight training, stationary bicycling, and various aerobic conditioning machinery offered by *"Your Name here"*. I hereby affirm that I am in good physical condition and do not suffer from any disability which would prevent or limit my participation in this exercise program. In consideration of my participation in *"Your Name Here"* exercise program, I, (please initial) _____, for myself, my heirs and assigns, hereby release *"Your Name Here"* (its employees and owners), from any claims, demands, and causes of action, now or in the future, arising from my participation in the exercise program. I fully understand that I may injure myself as a result of my participation in *"Your Name Here"* exercise programs including, but not limited to miscarriage, heart attack, muscle strains, pulls or tears, broken bones, shin splints, heat prostration, knee-lower back-foot injuries and any other illness, soreness, or injury however caused occurring during or after my participation in the exercise program.

SIGNATURE _____ DATE _____

WITNESS _____ DATE _____

I hereby affirm that I am exercising with my physician's approval regarding this program and have read and fully understand the above agreement.

SIGNATURE _____ DATE _____

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Informed Consent

- Includes:
  - Detailed description of the program or assessment protocol
  - Risks and discomforts
  - Responsibilities of the participant
  - Benefits to be expected
  - Inquiries
  - A confidentiality clause
  - Freedom of consent

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Informed Consent

- Documentation of acknowledgement and acceptance of terms described within the form
  - Signed and dated form

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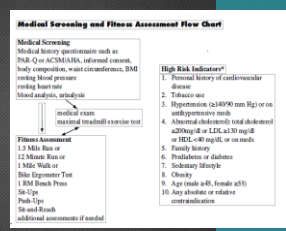
Medical Screening & Fitness Assessment Flow Chart



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Absolute Contraindications

Absolute Contraindications to Exercise Testing

1. unstable angina pectoris
2. uncontrolled cardiac dysrhythmias
3. uncontrolled symptomatic heart failure
4. symptomatic severe aortic stenosis
5. suspected or known dissecting aneurysm
6. acute myocarditis or pericarditis
7. acute pulmonary embolus or pulmonary infarction
8. acute systemic infection accompanied by fever, body aches or swollen lymph glands
9. recent significant change in the resting ECG suggesting significant ischemia, recent MI, or other acute cardiac event

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Relative Contraindications

Relative Contraindications to Exercise Testing

1. resting systolic blood pressure >200 mm Hg and/or resting diastolic blood pressure >110 mmHg*
2. moderate stenotic valvular heart disease
3. known electrolyte abnormalities (hypokalemia, hypomagnesemia)
4. left main coronary stenosis
5. tachyarrhythmias or bradyarrhythmias
6. ventricular aneurysm
7. uncontrolled metabolic disease (diabetes, thyrotoxicosis, or myxedema)
8. chronic infectious disease (mononucleosis, hepatitis, AIDS)
9. neuromuscular, musculoskeletal, or rheumatoid disorders that are exacerbated by exercise
10. hypertrophic cardiomyopathy
11. high degree atrioventricular block
12. mental or physical impairment leading to inability to exercise adequately

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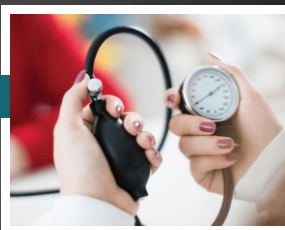
Blood Pressure Screening

Module 4



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Medical Screening Techniques

- Medical screening techniques may be sophisticated or practical, depending on the setting in which they are conducted.

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Outcome of Medical Screening

- Upon Completing medical screening, one of two outcomes is determined.
  1. The client is cleared for a fitness assessment.
  2. The client is not cleared for a fitness assessment.

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Resting Blood Pressure

- Resting blood pressure must be carefully monitored, since hypertension is a major risk factor for coronary artery disease, stroke, chronic heart failure, and kidney disease. Only a licensed physician, physician assistant, or nurse practitioner may diagnose hypertension. Resting blood pressure is a screening tool, not a physical fitness assessment.

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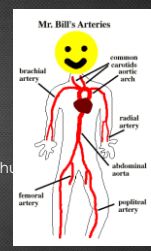
Monitoring Heart Rate

- Arteries for Monitoring Heart Rate
  - Radial – inner wrist
  - Brachial – medial humerus (under bicep)
  - Carotid – either sides of the neck
    - Pressing too hard may cause fainting
- Monitoring Technique
  - Use index and middle finger – do not use thu
  - Press lightly



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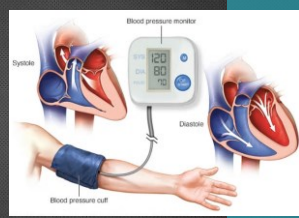
Blood Pressure



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Monitoring Blood Pressure

- Components
  - Systolic: pressure in the arteries during heart contraction (systole)
  - Diastolic: pressure in the arteries during heart relaxation (diastole)
  - Units: millimeters of mercury (mmHg)

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Blood Pressure Guidelines

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

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Classification of BP for Adults Aged 18 Years and Older			
Category	**Systolic BP (mmHg)**	**and/or**	**Diastolic BP (mmHg)**
Optimal	< 120	And	< 80
Normal	120-129	and	80-84
High Normal	130-139	or	85-89
Hypertension			
Stage 1	140-159	or	90-99
Stage 2	160-179	or	100-109
Stage 3	≥ 180	or	≥ 110

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Measuring Blood Pressure

- Equipment:
  - Sphygmomanometer: "Sphy-g"
  - Cuff
  - Stethoscope

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Blood Pressure Video

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Monitoring Blood Pressure

- Pre-Test Instructions
  - Refrain from exercising before testing
    - Aerobic activity will increase systolic pressure
    - Resistance training will increase both systolic and diastolic pressure
  - Refrain from smoking or ingesting caffeine 30 min prior to testing
  - Subjects should be seated with arm supported at heart level prior to testing
  - Sit with both feet on the floor
  - No talking!

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Resting Heart Rate

- The purpose of measuring resting heart rate is to measure the rate and rhythm of the pulse. This is a medical screening tool, not a physical fitness assessment. Measurement of the resting heart rate prior to fitness testing helps ensure the safety of the client. Knowing a client's resting heart rate is very useful when calculating their target heart rate zone.

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Body Composition Screening

Module 5

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Fitness Assessment

Body Composition

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Assessing Body Composition

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Obesity

- 1980: 25% of U.S. adult population overweight
- 1990: 33%
- 2000: With new standard of BMI (25 vs 27)~50%
- Risk associated
  - Hypertension
  - Elevated Cholesterol
  - CV Disease
  - Glucose intolerance Type II Diabetes
  - Osteoarthritis
  - Certain cancers

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How is Obesity Defined and Measured?

- Height Weight Charts
- Body Mass Index
- Waist/Hip Ratio
- Hydrodensitometry
- Imaging Techniques
- Field Techniques
  - Skinfold
  - BIA

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Height Weight Charts

- Obesity generally defined as >120% of "desirable"
- Metropolitan Life Ht & Wt Tables
- Pros?
- Cons?

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Body Mass Index

BMI = Wt (kg)/ Ht2 (meters)
Wt (kg) = Wt (lbs) / 2.2
Ht (m) = Ht (in) * .0254

Example: 130 lbs, 5'3"
130/2.2 = 59 kg
63 * .0254 = 1.60 m
1.602 = 2.56

So: 59/2.56 = 23

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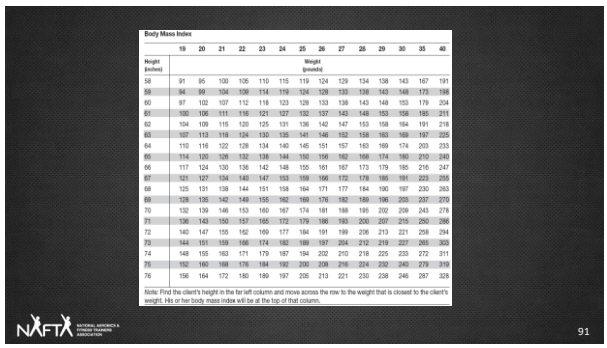

Body Mass Index

Height (inches)	Weight (pounds)														
	19	20	21	22	23	24	25	26	27	28	29	30	35	40
58	91	95	100	105	110	115	119	124	129	134	138	143	167	191
59	94	99	104	109	114	119	124	128	133	138	143	148	173	198
60	97	102	107	112	118	123	128	133	138	143	148	153	179	204
61	100	106	111	116	121	127	132	137	143	148	153	158	185	211
62	104	109	115	120	125	131	136	142	147	153	158	164	191	218
63	107	113	118	124	130	135	141	146	152	158	163	169	197	225
64	110	116	122	128	134	140	145	151	157	163	169	174	203	233
65	114	120	126	132	138	144	150	156	162	168	174	180	210	240
66	117	124	130	136	142	148	155	161	167	173	179	185	216	247
67	121	127	134	140	147	153	159	166	172	178	185	191	223	255
68	125	131	138	144	151	158	164	171	177	184	190	197	230	263
69	128	135	142	149	155	162	169	176	182	189	196	203	237	270
70	132	139	146	153	160	167	174	181	188	195	202	209	243	278
71	136	143	150	157	165	172	179	186	193	200	207	215	250	286
72	140	147	155	162	169	177	184	191	199	206	213	221	258	294
73	144	151	159	166	174	182	188	197	204	212	219	227	265	303
74	148	155	163	171	179	187	194	202	210	218	225	233	272	311
75	152	160	168	176	184	192	200	208	216	224	232	240	279	319
76	156	164	172	180	189	197	205	213	221	230	238	246	287	328

Note: Find the client's height in the far left column and move across the row to the weight that is closest to the client's weight. His or her body mass index will be at the top of that column.

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BMI Reference Chart

Weight Category	BMI Range
Underweight	<18.5
Normal weight	18.5–24.9
Overweight	25.0–29.9
Grade I Obesity	30.0–34.9
Grade II Obesity	35.0–39.9
Grade III Obesity	>40

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% Body Fat Norms for Men and Women

Essential fat	10–13%	2–5%
Athletes	14–20%	6–13%
Fitness	21–24%	14–17%
Acceptable	25–31%	18–24%
Obesity	>32%	>25%

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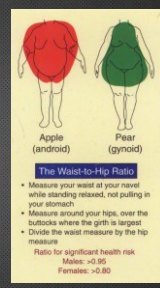
FAT FACTS

- Location
  - Location
    - Location
  - Android Obesity "apple"
  - Gynoid Obesity "pear"
- Can be determined
  - Waist / Hip Ratio
  - Waist Circumference



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Other Methods

- Bioelectrical Impedance Analysis (BIA)
  - Measures resistance to electric current flow
  - FFM (water) good conductor
  - Resistance is inversely related to FFM
  - Dehydration can cause a false high; over- hydration a false low
  - Population variation: gender, age, activity level
    - Some devices account for these

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Skinfolds

- Most widely used
- Assumes that total body fat is proportional to subcutaneous fat
  - i.e. that ~50% of body fat is subcutaneous.
  - What happens with age?
- Limitations:
  - validity at best ± 6 % compared to hydrodensitometry
  - Skin fold caliper inaccuracy
  - Inter-technician variation The error of estimate between technicians has been reported to be ± 8%.
  - Problems assessing obese population

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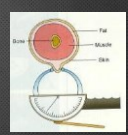
General Procedures

- Measure right side of body
  - Grasp a fold of skin and fat away from muscle
  - Using a caliper to measure skinfold thickness to the nearest 0.5 mm
- Place caliper
  - Below fingers
  - 1 cm (½ ") from thumb and finger
  - Perpendicular to skinfold
  - ½ way between crest and base of



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General Procedures (2)

- Maintain "pinch" while reading (1-2 sec)
- Acceptable measures
  - If the difference between same site measure is > 2 mm, re-measure
  - Rotate through measurement sites
  - Record measure when 2 consecutive measurements are within 1-2 mm. Record the average
- Calculate the sum of the averages and refer to table

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Skinfold Sites

- **Women**
  - Triceps
  - Suprailiac
  - Thigh
- **Men**
  - Chest
  - Abdomen
  - Thigh

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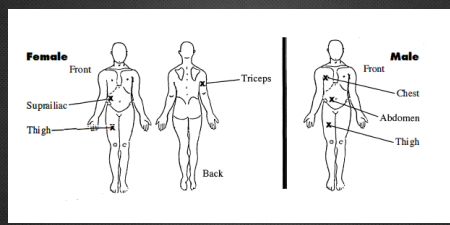
Skin Fold Locations



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Skinfold Measurements

- **Abdomen (Male):** Vertical fold taken 1" to the right of the umbilicus.
- **Chest (Male):** Diagonal fold ½ way between shoulder crease and nipple. Arms are relaxed at the side of the body.
- **Thigh(Male & Female):** Vertical fold on the anterior midline of the thigh, midway between the inguinal crease and proximal border of the patella. Body weight is shifted to left foot.
- **Suprailiac (Female):** Diagonal fold taken approximately 1" above iliac crest; slightly anterior to the middle of the side. Have subject ID top of hip bone)
- **Triceps (Female):** Vertical fold over the belly of the triceps measured half way between the olecranon (elbow) and acromion (a bony prominence at the top of the shoulder blade) processes

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Skinfold 3 Sites

- **Women**
  - Triceps
  - Suprailiac
  - Thigh
- **Men**
  - Chest
  - Abdomen
  - Thigh

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Skinfold Measurement: Men

Chest | Thigh | Abdomen

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Skinfold Measurements: Women

Triceps | Suprailiac | Thigh

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Computing Body Composition

- Sum the values from the 3 sites
  - Example: 30 year old woman
    - Tricep skin fold = 8 mm
    - Suprailiac skin fold = 10 mm
    - Thigh skin fold = 30 mm
    - Sum: 8 + 10 + 30 = 48 mm
- Refer to the Percent Fat Estimates for Men or Women.
  - Example: From the table,
    - 48 mm corresponds to 20% body fat for a 30 year old woman

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Calculating Desired Body Weight

- Once body composition has been estimated, the fitness professional can assist the client in setting goals using the desired body weight (BW) equation.
- This equation assumes there is no loss in lean body weight.

$$\text{Desired Weight} = \frac{\text{LBW}}{1 - \%\ \text{Fat Desired (as a decimal)}}$$

- Example: Joe weighs 180 lbs and is 20% bodyfat. How much weight will he need to lose to reach 15% bodyfat?
  - LBW: .80 * 180 = 144 lbs
  - 144 / .85 = ~170 lbs
  - So he would need to lose ~10 lbs

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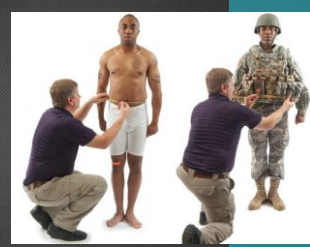
Waist Circumference



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Waist Measurement: Women

Waist Measurement Chart Women (in feet and inches)			
Height	Ideal	Overweight	Obese
5'-1"	24"	28.4"-31.5"	>31.5"
5'-2"	24.5"	29.1"-32.2"	>32.2"
5'-3"	25"	29.9"-33.0"	>33.0"
5'-4"	26"	30.7"-33.8"	>33.8"
5'-5"	26"	31.5"-34.6"	>34.6"
5'-6"	26.5"	32.3"-35.4"	>35.4"
5'-7"	27"	33.1"-36.2"	>36.2"
5'-10"	27.5"	35.5"-38.6"	>38.6"
6'-0"	28"	37.1"-40.2"	>40.2"

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Waist Measurement: Men

Waist Measurement Chart Men (in feet and inches)			
Height	Ideal	Overweight	Obese
5'-6"	29"	33"-36"	>36"
5'-7"	31"	34"-37"	>37"
5'-8"	31.2"	35"-38"	>38"
5'-9"	31.7"	36"-39"	>39"
5'-10"	32"	37"-40"	>40"
5'-11"	32.6"	38"-41"	>41"
6'-0"	33.1"	39"-42"	>42"
6'-2"	34"	41"-44"	>44"
6'-4"	35"	43"-46"	>46"

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