Cardiovascular Disorders

• The leading cause of death in the Western world is cardiovascular disease.

• Atherosclerosis is the underlying cause of cerebral and peripheral vascular diseases. Manifestations of these diseases include heart attack, angina, stroke, and intermittent claudication.

• The results of using exercise to treat Coronary Artery Disease (CAD) are favorable according to research.

• Most individuals recovering from cardiac procedures can benefit from a supervised cardiac rehabilitation program.
Cardiovascular Disorders

Exercise Guidelines for CAD include:

1. Low-risk cardiac clients should have stable cardiovascular and physiological responses to exercise.
2. Clients who have cardiac risk factors must have a physician release and referral to exercise.
3. All clients with documented CAD should have a maximal graded exercise test to determine functional capacity and cardiovascular status.
4. Design the client’s exercise programs according to the guidelines given by their personal physician.
5. Exercise should not continue if abnormal signs or symptoms are observed before, during, or immediately following exercise. If symptoms persist, activate the EMS system immediately.
## Cardiovascular Disorders

<table>
<thead>
<tr>
<th>Sample Exercise Recommendation for Cardiovascular Disorders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
</tr>
<tr>
<td><strong>Time</strong></td>
</tr>
</tbody>
</table>
| **Type** | Low-intensity endurance exercise (low-impact aerobics, walking, swimming, stationary cycling)  
Avoid isometric exercises  
Weight/Resistance training should feature low resistance/high repetition |
Hypertension

- Hypertension is high blood pressure, or the elevation of blood pressure above 140/90 mmHg.

- Exercise is not recognized as an important part of therapy for controlling hypertension.

- Valsalva maneuver - increased pressure in the thoracic cavity caused by forced exhalation with the breath held.

- Orthostatic hypotension - a drop in blood pressure associated with rising to an upright position.
Exercise Guidelines for hypertension include:

1. Do not allow hypertensive clients to hold their breath or strain during exercise (Valsalva maneuver); cue them to exhale on the exertion.

2. Weight training should supplement endurance training; utilize circuit training rather than heavy weight lifting.

3. Use the RPE scale to monitor exercise intensity because medications (e.g., beta blockers) can alter the accuracy of the training heart rate.

4. Be aware of any changes in medications, which should come with written guidelines from your client’s physician.

5. Exercise should not continue if abnormal signs or symptoms are observed before, during, or immediately following exercise. If symptoms persist, activate the EMS system immediately.
Hypertension

Exercise Guidelines for hypertension include (continued):

6. Physicians may instruct their hypertensive patients to record their blood pressure before and after exercise.

7. Instruct hypertensive clients to move slowly when getting up from the floor because they are susceptible to orthostatic hypotension.

8. Both hypertensive and hypotensive responses are possible during and after exercise for individuals with hypertension.

9. Carefully monitor the client’s blood pressure during exercise initially, and possibly long-term.

10. Individuals with hypertension may have multiple CAD risk factors, which should be considered when developing their exercise program.
## Hypertension

| **Sample Exercise Recommendation for Hypertension** |
|-----------------|-----------------------------|
| **Frequency**   | ≥ 4 days per week            |
| **Intensity**   | 40-65% of heart-rate range  |
| **Time**        | Warm-ups and cool-downs of more than 5 minutes are recommended. Gradually increase total exercise duration to as much as 30-60 minutes per session. |
| **Type**        | Endurance exercise (low-impact aerobics, walking, swimming). Avoid isometric exercises. Weight/Resistence training should feature low resistance/high repetition. |
Stroke

- Another term for stroke is cerebrovascular accident (CVA).

- Risk factors for stroke include high blood pressure, heart disease, cigarette smoking, high red blood cell count, and transient ischemic attacks (TIAs).

- There is little data on the role of exercise and stroke, as most studies have yielded mixed results. In general, because the risk factors for stroke include CAD & hypertension, exercise may lessen the risk for a stroke by lessening the risk for CAD or hypertension.
Peripheral Vascular Disease

- Peripheral Vascular Disease (PVD) is caused by atherosclerotic lesions in one or more peripheral arterial and/or venous blood vessels (usually in the legs).

- Claudication - ischemic pain (reduced blood flow induced) usually the result of blockages or spasms

- One of the primary benefits of exercise for individuals with PVD is that it helps to lower the overall CAD risk as well as improve blood flow and overall cardiovascular endurance.
Peripheral Vascular Disease

Exercise Guidelines for PVD include:

1. Encourage daily exercise with frequent rest periods.
2. Initially, recommend low-impact, non-weightbearing activities. Add weightbearing activities as exercise tolerance improves.
3. Avoid exercising in cold air or water to reduce the risk of vasoconstriction.
4. Interval training, which may involve 5-10 minute exercise bouts, 1-3 times per day, may initially be appropriate for some PVD clients.
5. Because many PVD clients are also diabetic, they need to take excellent care of their feet to avoid blisters and other injuries that could lead to infection.
Peripheral Vascular Disease

Exercise Guidelines for PVD include (continued):
6. Individuals with PVD should be closely supervised.
7. Gradually increase the time, duration, and intensity of the PVD client’s programs.
8. Encourage PVD clients to walk as much and as often as they can tolerate.
# Peripheral Vascular Disease

## Sample Exercise Recommendation for PVD

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Daily (initially); can be reduced to 4-6 days per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Choose low-intensity rather than high-intensity exercises; Exercise to the point of moderate-to-intense pain (Grade II-III on the claudication pain scale)</td>
</tr>
<tr>
<td>Time</td>
<td>Warm-ups and cool-downs of more than 10 minutes are recommended Gradually increase total exercise duration to as much as 30-40 minutes per session</td>
</tr>
<tr>
<td>Type</td>
<td>Non-impact endurance exercise (swimming &amp; cycling) Recommended weightbearing activities should be shorter in duration and lower in intensity, with frequent rest periods</td>
</tr>
</tbody>
</table>
Diabetes

- Diabetes - a disease of carbohydrate metabolism in which an absolute or relative deficiency of insulin results in an inability to metabolize carbohydrates normally; formerly known as diabetes mellitus.

- IDDM (Type I) - little or no insulin secretion; requires regular insulin injections; insulin-dependent

- NIDDM (Type II) - reduced sensitivity of the insulin target cells to available insulin; associated commonly with obesity; non-insulin dependent diabetes

- Hypoglycemia - low blood glucose levels

- Hyperglycemia - elevated blood glucose levels
Diabetes

• The primary goal of exercise for Type I diabetes is better glucose regulation and reduced heart disease risk.

• The primary goal of exercise for Type II diabetes is weight loss and control.
Exercise Guidelines for diabetes include:

1. Clients with diabetes should check their blood glucose levels frequently and work closely with their physicians to determine the right insulin dosage.

2. People with diabetes should always carry a rapid-acting carbohydrate (such as juice or candy).

3. Do not inject insulin into the primary muscle groups that will be used during exercise because it will be absorbed too quickly resulting in hypoglycemia.

4. Encourage diabetic clients to exercise at the same time each day for better control.

5. Avoid exercise periods of peak insulin activity.
Diabetes

Exercise Guidelines for diabetes include (continued):

6. A carbohydrate snack should be consumed before and during prolonged exercise.

7. People with diabetes need to take very good care of their feet, which should regularly be checked for any cuts, blisters, or signs of infection. Good exercise shoes are also very important.

8. Physicians will usually instruct their patients to check their blood glucose levels before and after exercise.
Diabetes

Special Precautions for Exercise & Diabetes:

- Lack of insulin may cause hyperglycemia
- Rapid mobilization of insulin may cause hypoglycemia
- IDDM (Type I) clients should reduce insulin intake or increase carbohydrate intake prior to exercise.
- Diabetic clients should exercise 1-2 hours after a meal and before peak insulin activity.
- Insulin dosages generally should be lowered prior to exercise.
- Diabetic clients should check blood glucose levels frequently when starting an exercise program.
- Other potential problems include autonomic neuropathy, peripheral neuropathy, microvascular complication, or peripheral vascular disease.
**Sample Exercise Recommendation for Diabetes**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>4-7 days per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>50-60% of cardiac reserve, gradually progressing to 60-70%</td>
</tr>
</tbody>
</table>
| Time      | Type I - 20-30 minutes per session  
            | Type II - 40-60 minutes per session |
| Type      | Endurance activities such as walking, swimming, and cycling |
Asthma

- Asthma is a reactive airway disease characterized by shortness of breath, coughing & wheezing.

- It is due to constriction of the smooth muscle around the airways, a swelling of the mucosal cells, and/or increased secretion of mucous.

- Most individuals with controlled asthma will benefit from regular exercise.
Exercise Guidelines for asthma include:

1. Individuals with asthma must have a medication/treatment plan to prevent EIA (exercise-induced asthma) attacks before beginning an exercise program.

2. Asthmatic clients should have a bronchodilating inhaler with them at all times and be instructed to use it at the first sign of wheezing.

3. Keep the exercise intensity low initially and gradually increase it over time since exercise intensity is directly linked to the severity and frequency of EIA.

4. Reduce the intensity if asthma symptoms occur.

5. Using an inhaler several minutes before exercise may reduce the possibility of EIA attacks.
Exercise Guidelines for asthma include (continued):

6. Use the results of pulmonary exercise testing to design an appropriate exercise program.
7. Encourage asthmatic clients to drink plenty of fluids before and during exercise.
8. Asthmatic individuals should extend their warm-up and cool-down periods.
9. Individuals with respiratory disorders will often experience more symptoms of respiratory distress when exercising in extreme environmental conditions.
10. Wearing a face mask during exercise helps keep inhaled air more warm and moist, and may minimize asthmatic responses during exercise.
Asthma

Exercise Guidelines for asthma include (continued):
11. Individuals with respiratory disorders need to be carefully followed by their physician.
12. Only people with stable asthma should exercise.
13. If an asthma attack is not relieved by medication, activate the EMS system immediately.
15. Clients with asthma should avoid extremes in temperature and humidity.
Asthma

<table>
<thead>
<tr>
<th>Sample Exercise Recommendation for Asthma</th>
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</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
</tr>
</tbody>
</table>
| **Time** | Encourage warm-up and cool-down periods longer than 10 minutes  
Gradually increase total exercise duration to 20-45 minutes |
| **Type** | Walking, cycling, swimming  
Upper-body exercises such as arm cranking, rowing, and cross-country skiing may not be appropriate  
Swimming may prove especially beneficial |
Bronchitis & Emphysema

• Bronchitis is a form of obstructive pulmonary disease marked by inflammation of the bronchial tubes.

• Emphysema is another form of chronic pulmonary disease caused by over-inflation of the alveoli, resulting from a breakdown of the walls of the alveoli.

• Together, emphysema and bronchitis are referred to as chronic obstructive pulmonary disease (COPD).
Bronchitis & Emphysema

Exercise Guidelines for COPD include:
1. Individuals with COPD need to complete extensive pulmonary tests before beginning an exercise program.
2. Individuals with unstable COPD should not participate in an exercise program without medical supervision.
3. Carefully choose exercise intensity and type to avoid developing shortness of breath.
4. Apply the exercise guidelines for those with asthma to clients with COPD.
5. Individuals must be fully recovered from an acute bout of bronchitis before exercising.
6. Individuals with COPD should have a bronchodilating inhaler with them at all times and be instructed to use it at the first sign of wheezing.
Bronchitis & Emphysema

Exercise Guidelines for COPD include (continued):

7. Individuals with COPD should perform breathing exercises to help strengthen their respiratory muscles.
8. Initially avoid upper-body exercises such as arm-cranking or rowing because of the increased strain on the pulmonary system. Upper-body resistance training may be gradually added to a comprehensive exercise program.
9. Some individuals with COPD may require supplemental oxygen during exercise as well as continuous ECG and blood pressure monitoring.
10. Clients with COPD must not smoke.
Bronchitis & Emphysema

Exercise Guidelines for COPD include (continued):

11. Review the type and dose of medications of COPD clients with their physician based on the client’s responses to the exercise.

12. If a COPD client’s performance in a program lacking medical supervision worsens, encourage him/her to participate in a pulmonary rehabilitation program until signs and symptoms improve.
# Bronchitis & Emphysema

## Sample Exercise Recommendation for COPD

<table>
<thead>
<tr>
<th>Frequency</th>
<th>4-5 times per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Recommend low-intensity dynamic exercise</td>
</tr>
</tbody>
</table>
| Time        | Encourage warm-up and cool-down periods longer than 10 minutes  
Gradually increase total exercise duration to 20-30 minutes |
| Type        | Walking and stationary cycling  
Upper-body exercises such as arm cranking, rowing, and cross-country skiing may not be appropriate |
Cancer

- Inactive people are more likely to develop cancer.

- Studies show that cancer mortality is higher in those who exercise the least, even after age and risk factors are considered.
Cancer

The following five (5) questions should be asked of your client’s physician before designing an exercise program for someone with cancer:

1. Are there any limitations in activity based on preexisting conditions or medical procedures?
2. Are there any limitations in activity as a result of nutritional and fluid deficits?
3. Are there any limitations in mobility as a result of disease or treatment?
4. Are there any limitations in oxygen delivery as a result of disease or treatment?
5. Are there any limitations based on risk for anemia, bleeding, and/ or infections?
Osteoporosis

- Osteoporosis is a disorder in which bone density decreases and susceptibility to fracture increases; primarily affects post-menopausal women.

- The role of exercise in the prevention and treatment of osteoporosis is not completely understood.

- It is known that physical stress determines the strength of bone. Physical inactivity is a risk factor for osteoporosis, and exercise is recommended for its prevention and treatment because weightbearing exercise either retards the loss of, or increases, bone mass.
Osteoporosis

Exercise Guidelines for osteoporosis include:

1. Weightbearing exercise is recommended.
2. Refer to exercise guidelines and recommendations for older adults.
3. Resistance training is also an important component in the prevention of osteoporosis.
4. Individuals with osteoporosis may need to avoid:
   - Jumping, high-impact aerobics, jogging, and running
   - Spinal flexion, crunches, and rowing
   - Trampolines and step aerobics
   - Wood gym floors that may become slippery from sweat drops
   - Abducting or adducting the legs against resistance
   - Moving the legs sideways or across the body
   - Pulling on the neck with hands behind the head
The four (4) common causes of low-back pain (LBP) are:
1. Herniated disc (rupture of outer layers of fibers that surround the disc)
2. Spondylolisthesis (forward sliding of the body of one vertebra on the vertebra below it)
3. Trauma to the back (accident)
4. Degenerative disc disease (progressive structural degeneration of the intervertebral disc)
Low-Back Pain

• LBP is often associated with an imbalance of strength & flexibility of the lower back & abdominal muscle groups. Poor flexibility in the hamstrings and hip flexor muscles also have been linked to LBP.

• Aerobic training and exercises for the low-back should be performed on a regular basis as part of the treatment and prevention of LBP.
Low-Back Pain

Exercise Guidelines for low-back pain include:
1. Always be aware of proper form and alignment.
2. Always maintain a neutral pelvic alignment and an erect torso during any exercise movements.
3. Avoid head-forward positions in which the chin is tilted up.
4. When leaning forward, lifting or lowering an object, always bend at the knees.
5. Avoid hyperextending the spine in an unsupported position.
6. Adequately warm up and cool down before and after each workout session.
7. Most LBP is caused by muscle weakness and imbalances in the hamstrings, hip flexors, lower-back muscle groups, and abdominals.
Low-Back Pain

Exercise Guidelines for low-back pain include (continued):

8. Advise clients with LBP to consult with a physician and get specific recommendations for exercises.

9. If clients complain of LBP following exercise, have them sit or lie down in a comfortable position and apply ice to the affected area. Encourage clients to take a few days off from exercise if they experience a mild back strain.
Arthritis

• The most common forms of arthritis are rheumatoid arthritis (inflammation of the membrane surrounding the joint) and osteoarthritis (degenerative joint disease).

• The treatment of arthritis depends on the severity and specific form of arthritis:
  - Medicine
  - Physical therapy
  - Physiotherapy
  - Occupational therapy
  - Surgery
Arthritis

Exercise Guidelines for arthritis include:
1. Encourage low-impact activities such as stationary cycling, rowing, and water fitness classes.
2. Begin with low-intensity, frequent sessions.
3. Reduce exercise intensity and duration during periods of inflammation or pain.
4. Extend the warm-up and cool-down periods.
5. Modify the intensity and duration of exercise according to how well the client responds, any changes in medication, and the level of pain.
6. Put all joints through their full range of motion at least once a day to maintain mobility.
Arthritis

Exercise Guidelines for arthritis include (continued):

7. Have the individual take a day or two of rest if he/she continues to complain about pain during or following an exercise session.

8. Emphasize proper body alignment at all times. Poor posture and decreased joint mobility and strength disrupt the performance of efficient, controlled, and integrated movement.

9. While pain is quite normal in people with arthritis, instructor the client to work just up to the point of pain, but not past it.

10. Use isometric exercises, which strengthen the joint structures and surrounding muscles while placing the least amount of stress on the joint itself.
Exercise Guidelines for arthritis include (continued):

11. If severe pain persists following exercise, clients should consult with their physician.

12. Individuals with rheumatoid arthritis should not exercise during periods of inflammation, and regular rest periods should be stressed during exercise sessions.

13. Keep in mind that clients with arthritis may be more limited by joint pain than cardiovascular function.
## Arthritis

### Sample Exercise Recommendation for Arthritis

<table>
<thead>
<tr>
<th>Frequency</th>
<th>4-5 times per week</th>
</tr>
</thead>
</table>
| Intensity | Recommend low-intensity dynamic exercise  
The exercise intensity should be based on the client’s comfort level |
| Time      | Encourage warm-up and cool-down periods longer than 10 minutes  
Initial exercise sessions should not last longer than 10-15 minutes |
| Type      | Non-weightbearing activities such as cycling, warm-water aquatic programs, and swimming are preferred |
Older Adults

• One measure of the quality of life of older adults is an individual’s ability to perform activities of daily living (ADLs) such as bathing, dressing, and eating.

• The physiological challenges of aging include:
  - Loss of height
  - Reduced lean body mass
  - Gray hair
  - More wrinkles
  - Changes in eyesight
  - Less coordination
Older Adults

- There are noticeable changes in the functioning of the cardiovascular, endocrine, respiratory, and musculoskeletal systems:
  - Heart rate - declines with age
  - Blood pressure - higher blood pressure
  - Cardiac output and stroke volume - lower
  - Maximal oxygen uptake - declines 8-10% per decade after age 30
  - Bones - more fragile
  - Skeletal muscle - muscle mass declines with age
  - Body composition - lean body weight declines and fat increases
Older Adults

Exercise Guidelines for older adults include:

1. Before beginning an exercise program, older adults should see their physician.
2. A pre-exercise evaluation may need to include medical history, physical, and a treadmill test.
3. Exercise program should include endurance, flexibility, and balance training – as well as muscle strength and joint mobilization.
4. Low-impact exercise is advisable.
5. Older individuals should be encouraged to become more physically active in their daily activities and to bend, move, and stretch to keep joints flexible.
## Older Adults

<table>
<thead>
<tr>
<th>Sample Exercise Recommendation for Older Adults</th>
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</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td><strong>Intensity</strong></td>
</tr>
</tbody>
</table>
| **Time**      | Encourage warm-up and cool-down periods longer than 5 minutes  
Gradually increase total exercise duration to 30-60 minutes per session |
| **Type**      | Endurance exercises such as low-impact aerobics, walking, using cardiovascular equipment, swimming  
Recommend a program of weight training that features low resistance and high repetitions |
Older Adults

Special Precautions for the older adult:

• Individuals with high blood pressure, heart disease, or arthritis should take particular care when performing weight-training exercises.

• Incorporate an extended warm-up & cool-down period (10-15 minutes) for some older adults.

• Older adults may have a more difficult time exercising in extreme environmental conditions.

• Some elderly individuals with arthritis or poor joint mobility should participate in non-weightbearing activities such as cycling, swimming, and chair/floor exercises.
Weight Management

- Excess body weight is associated with numerous health-related problems including CAD, diabetes, and hyperlipidemia.

- Hyperlipidemia is an excess of lipids in the blood.

- Exercise in combination with a sensible eating plan produces the best long-term weight-loss results.

- Exercise can contribute up to a 300- to 400-kcal deficit per exercise bout.
Weight Management

- Exercise is important because it helps maintain resting metabolic rate and fat-free mass.
# Obese Clients

<table>
<thead>
<tr>
<th>Sample Exercise Recommendation for Obese Clients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
</tr>
</tbody>
</table>
| **Intensity** | Initially, low-intensity (40-50% of maximal heart rate)  
As fitness improves, increase the intensity level.  
Use RPE to monitor heart rate and intensity level |
| **Time** | Varies  
Generally, the longer the duration, the greater the caloric expenditure |
| **Type** | Walking, cycling, aerobic dance  
Promote variety |
Weight Management

• The key to healthy weight management is consistency in both activity and healthy eating.

• Do not over-focus on “weight loss”; instead, encourage the client to make healthy lifestyle changes.
Children

- Research has shown that children respond to exercise in much the same way as adults do.

- Millions of youth in the United States are currently at risk for developing degenerative diseases in their adult years because they are not active enough.

- The percentage of overweight boys and girls has more than doubled during the past two decades.
Children

Sample Exercise Recommendation for Children

<table>
<thead>
<tr>
<th>Frequency</th>
<th>2-3 days of endurance training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensity</td>
<td>Initially, low-intensity</td>
</tr>
<tr>
<td></td>
<td>No universal recommendations for the use of training heart rate for children</td>
</tr>
<tr>
<td></td>
<td>Use the RPE scale to monitor intensity</td>
</tr>
<tr>
<td>Time</td>
<td>30-40 minutes per session</td>
</tr>
<tr>
<td>Type</td>
<td>Sustained activities that use large-muscle groups (swimming, jogging, aerobic dance)</td>
</tr>
<tr>
<td></td>
<td>Incorporate other activities such as recreational sports and fun activities</td>
</tr>
</tbody>
</table>
Pregnancy

• Numerous studies of the cardiovascular responses of pregnant women have demonstrated that women can maintain and even improve their cardiovascular, respiratory, and aerobic capacities during pregnancy.
Pregnancy

Exercise Guidelines for pregnant women include:

1. Exercise goals during pregnancy should be discussed with a physician.
2. Do not begin a vigorous exercise program shortly before or during pregnancy.
3. Gradually reduce the intensity, duration, and frequency of exercise during the second and third trimesters.
4. Avoid exercise when the temperature and/or humidity is high.
5. Try to run or walk on flat, even surfaces.
6. Wear supportive shoes while walking or running during pregnancy.
7. If running becomes uncomfortable during the second and third trimesters, try other forms of aerobic exercise such as swimming, running in the water, and bicycling.
Exercise Guidelines for pregnant women include (continued):

8. Extend warm-up and cool-down periods.
9. Body temperature should not exceed 100°F (38°C) and should be taken immediately after exercise.
10. Use the RPE scale rather than heart rate to monitor intensity.
11. Eat a small snack before exercise to avoid hypoglycemia.
12. Drink plenty of water before, during, and after exercise.
13. Avoid overstretching or going beyond a normal range of motion.
14. Any unusual physical changes, such as vaginal bleeding, severe fatigue, joint pain, or irregular heart beats, should immediately be reported to her physician.