EXERCISE PRESCIPTION FOR CHRONIC DISEASE

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I DO NOT have any Financial Affiliations, Endorsements, or Conflicts of Interest to Disclose

INTRODUCTION

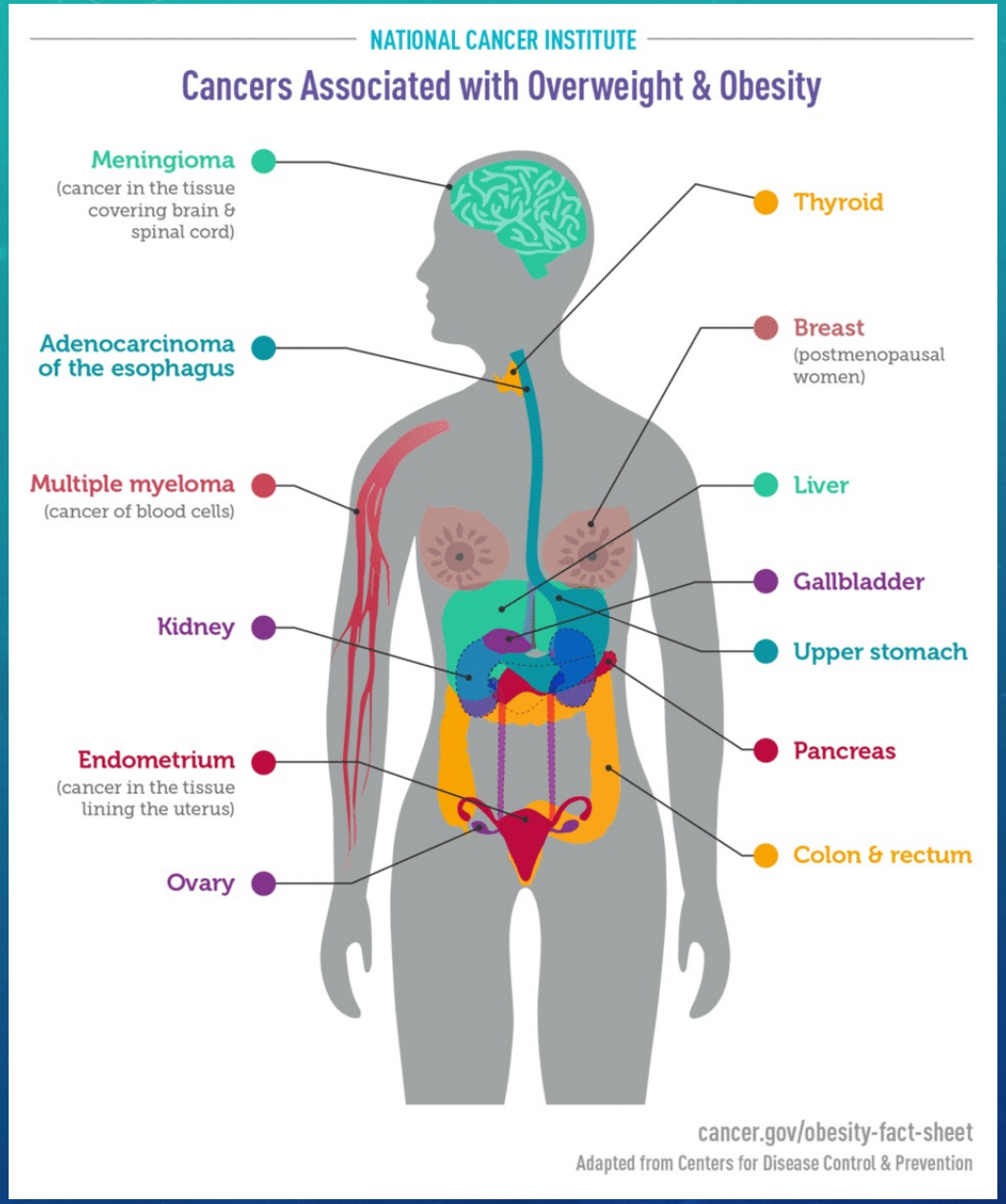
Chronic Disease in the United States

- 6 in 10 Adults in the US have a Chronic Disease
- 4 in 10 Adults in the US have ≥ 2 or More Chronic Disease
- Chronic Disease is the Leading Cause of Death and Disability in the US and is
  The Leading Driver of the Nations $4.1 Trillion in Annual Health Care Cost
- It is Estimated that $117 Billion of the $4.1 Trillion in Annual Health Care Cost is due to Physical Inactivity

Overweight and Obesity in the United States

- CDC (US Pre-pandemic Data):
  2020 Percentage of Adults (>20 yrs) who were Obese (BMI > 30): 41.9%
  2018 Percentage of Adults (>20 yrs) who were Overweight (BMI > 25): 73.6%

- Health Risks for Patients who are Overweight or Obese:
  DM II, HTN, CAD, OSA, CKD, OA, Metabolic Syndrome, Fatty Live Disease (NASH/Cirrhosis) and 13 Types of Cancers.


NATIONAL CANCER INSTITUTE
Cancers Associated with Overweight & Obesity
Meningioma
(cancer in the tissue covering brain & spinal cord)
Adenocarcinoma of the esophagus
Multiple myeloma
(cancer of blood cells)
Kidney
Endometrium
(cancer in the tissue lining the uterus)
Ovary
Thyroid
Breast
(postmenopausal women)
Liver
Gallbladder
Upper stomach
Pancreas
Colon & rectum
cancer.gov/obesity-fact-sheet
Adapted from Centers for Disease Control & Prevention

THE PURPOSE OF THIS LECTURE IS TO:

- Review Current Physical Activity Guidelines and Recommendations
  - ACSM/CDC Physical Activity Guidelines
  - CDD4 Physical Activity Recommendations

- Describe the Components of an Exercise Prescription (FITT) and Progression Guidelines

- Provide Exercise Prescription Guidelines and Recommendations for Patients with Common Chronic Medical Conditions
  - Overweight and Obesity
  - Diabetes II
  - HTN
  - CAD/PAD
  - CHF
  - COPD
  - CKD
  - Osteoarthritis/Osteoporosis
  - Depression/Anxiety/Insomnia

PHYSICAL ACTIVITY GUIDELINES AND RECOMMENDATIONS

Exercise and Physical Activity Guidelines and Recommendations

- The American College of Sports Medicine (ACSM): Promotes and Integrates Scientific Research in Exercise Science for the Application of Sport Medicine (Founded 1954).

- An Expert Panel between the ACSM and CDC Established Physical Activity Guidelines in 1990:

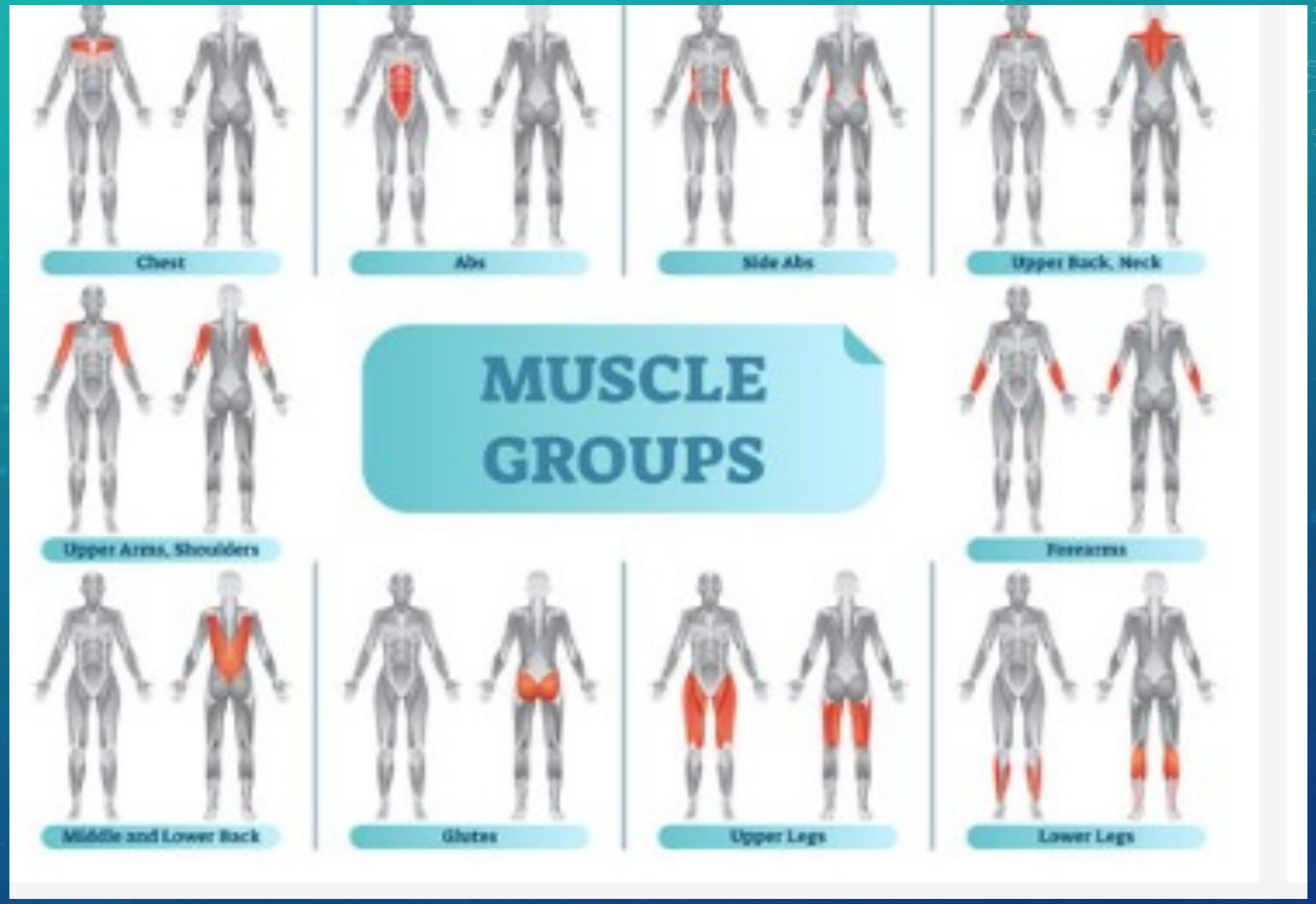
  30 minutes/day of Moderate-intensity Physical Activity on Most Days of the Week (for Health Promotion and Disease Prevention).

Exercise and Physical Activity Guidelines and Recommendations

- The ACSM and CDC Updated the Physical Activity Guidelines in 2008:
  - 150 Minutes/Week of Moderate Intensity Aerobic Physical Activity, or
  - 75 Minutes/Week of Vigorous Intensity Physical Activity, and
  - 2 Days/Week of Muscle Strength Training that Works All Major Muscle Groups

Exercise and Physical Activity Guidelines and Recommendations

- The Chronic Disease and Disability (CDD) Guidelines were Established 1997 and the (CDD4) Guidelines were Up-dated in 2016:
  - 150 Minutes/Week of Moderate Intensity Aerobic Physical Activity → if not possible, then,
  - 150 Minutes/Week of Light Intensity Aerobic Physical Activity
  - 2 Days/Week of Muscle Strength Training and Muscle Stretching Targeting All Major Muscle Groups


MUSCLE GROUPS
Chest
Abs
Side Abs
Upper Back, Neck
Upper Arms, Shoulders
Forearms
Middle and Lower Back
Glutes
Upper Legs
Lower Legs

Exercise and Physical Activity Guidelines and Recommendations

- 10 to 15 Minutes of Warm Up and Cool Down, Before, and After Each Exercise Session
- ROM for Each Major Joint

Physical Inactivity in the United States

- 2008: Physical Activity Guidelines were Presented to Americans.
- 2018: 80% of Americans Did Not Meet the Criteria of at Least 150 Minutes of Moderate-intensity Physical Activity Each Week.
- 60% of Americans were Classified as “Very Inactive”.
- < 40% of Physicians Routinely Counsel Patients on Physical Activity.
  70% of Patients See Their Primary Care Provider at Least Once Per Year.
  - Barriers:
    - Inadequate Knowledge
    - Office Time Constraints
    - Lack of Reimbursement

Exercise and Physical Activity Guidelines and Recommendations

- The ACSM and CDC Up-dated the Physical Activity Guidelines in 2008:
  High Functioning Individuals (Young, Healthy, Mild Disease, and/or Active):

  - 150 Minutes/Week of Moderate Intensity Aerobic Physical Activity, or
  - 75 Minutes/Week of Vigorous Intensity Physical Activity, and
  - 2 Days/Week of Muscle Strength Training that Works all Major Muscle Groups

- The Chronic Disease and Disability (CDD) Guidelines were Established 1997 and the (CDD4) Guidelines were Up-date in 2016:
  Low Functioning Individuals (Elderly, Chronic Conditions and/or Sedentary):

  - 150 Minutes/Week of Moderate Intensity Aerobic Physical Activity → if not possible, then,
  - 150 Minutes/Week of Light Intensity Aerobic Physical Activity
  - 2 Days/Week of Muscle Strength Training and Muscle Stretching Targeting all Major Muscle Groups

COMPONENTS OF AN EXERCISE PRESCRIPTION

Components of an Exercise Prescription (FITT)

- F = Frequency: How Often (2 -7 Days)
- I = Intensity: How Hard (Light, Moderate, Vigorous)
- T = Time: How Long (5-60 Minutes)
- T = Type/Mode: What Kind (Treadmill, Walk, Hike, Bike, Swim, Ski) – *FUN* and *Enjoyable* Activity is Best!
- P = Progression

Monitoring Exercise Intensity

- Gold Standard: Labs Exercise Stress Test (Treadmill or Stationary Bicycle): Measuring Maximal Heart Rate (HR max)
- Cardiologist: Cardiac Stress Test
- Target HR = HR max (220-Age) x % HRmax (Intensity)
  - HR max = (220-age)
  - Moderate Exercise Intensity (65 – 75% HR max)

  Example: (20-year-old)
  - HR max = (220-age) = (220-20) = 200 bpm
  - Minimal Target HR = (200) x 0.65 = 130 bpm
  - Maximal Target HR = (200) x 0.75 = 150 bpm
  - Target HR for Moderate Intensity Aerobic Exercise for a 20-year-old: 130 to 150 bpm

Methods for Monitoring Exercise Intensity			
Method	Light Intensity	Moderate Intensity	Vigorous Intensity
%HR max **Monitor:** **Smart Watch** **Fit Bit** **Chest Strap** **Wrist Watch (how many beats in 6 seconds x 10)**	< 65% HR max	65% - 75% HR max	76 - 96% HR max
RPE: (1-10 scale)	1 - 3	4 - 6	7 - 9
Dyspnea Scale: **(0-10 scale)**	0 - 2	3 - 6	7- 10
Talk Test (Breathing):	Can Exercise and Comfortably Breath Through Nose	Can Exercise and Comfortably Speak in Short Sentences.	Cannot Exercise and Comfortably Speak.
Claudication Scale:	0 - 1	2	3 - 4

RPE Scale	Rate of Perceived Exertion
10	**Max Effort Activity** Feels almost impossible to keep going. Completely out of breath, unable to talk. Cannot maintain for more than a very short time.
9	**Very Hard Activity** Very difficult to maintain exercise intensity. Can barely breath and speak only a few words
7-8	**Vigorous Activity** Borderline uncomfortable. Short of breath, can speak a sentence.
4-6	**Moderate Activity** Breathing heavily, can hold short conversation. Still somewhat comfortable, but becoming noticeably more challenging.
2-3	**Light Activity** Feels like you can maintain for hours. Easy to breathe and carry a conversation
1	**Very Light Activity** Hardly any exertion, but more than sleeping, watching TV, etc

Modified Borg Dyspnea Scale

Rating	Description
0	Nothing at All
0.5	Very, Very Light
1	Very Light
2	Light
3	Moderate
4	Somewhat Hard
5	Hard
6	
7	Very Hard
8	
9	
10	Very, Very, Hard

PAD: Claudication Scale for Exercise Intensity		
Rating	Pain	Description
0	None	During Rest or Early Exercise
1	Mild	First Feeling of Pain
2	Moderate	Level at Which and Exercise Bout Should Cease
3	Intense	Nearly Maximal Pain
4	Unbearable	Maximal, Equivalent to the Most Severe Pain Ever Experienced

EXERCISE PRESCRIPTION PROGRESSION

ACSM/CDC Example: Exercise Prescription Progression

Week	Frequency	Intensity	Time	Type
1	2 Days/Week T TH	Light <65% HRmax RPE: 2-3	20 Minutes ↓	Outdoor Walking
2	2 Days/Week T TH ↓	Light <65% HRmax RPE: 2-3	30 Minutes	Outdoor Walking
3	3 Days/Week M W F	Light <65% HRmax RPE: 2-3 ↓	30 Minutes	Outdoor Walking
4	3 Days/Week M W F ↓	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking
5	4 Days/Week M W F S ↓	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking
6	4 Days/Week M W F S ↓	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking
7	5 Days/Week M T W TH F ↓	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking
8	7 Days/Week M W F S S: Walking T TH: Strength Training	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking Strength Training

CDD4 Example: Exercise Prescription Progression

Week	Frequency	Intensity	Time	Type
1	3 Days/Week M W F	Light Talk and Walk RPE: 2-3	10 Minutes ↓	Treadmill Walking
2	3 Days/Week M W F	Light Talk and Walk RPE: 2-3	20 Minutes ↓	Treadmill Walking
3	3 Days/Week M W F	Light Talk and Walk RPE: 2-3 ↓	30 Minutes	Treadmill Walking
4	3 Days/Week M W F	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Treadmill Walking ↓
5	3 Days/Week M W F ↓	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking
6	4 Days/Week M W F S ↓	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking
7	5 Days/Week M T W TH F ↓	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking ↓
8	7 Days/Week M W F S S: Walking T TH: Strength Training/ Stretching	Moderate 65-75% HRmax RPE: 4-6	30 Minutes	Outdoor Walking Strength & Flexibility

EXERCISE GUIDELINES FOR CHRONIC DISEASE

Table 2.4 Basic *CDD4* Recommendations

Mode	Frequency	Duration	Intensity	Progression
Aerobic • Large-muscle easily accessible activities such as walking as the basic program • Aquatics recommended for those with musculoskeletal problems during weight-bearing activity • Other fun-to-do large-muscle activities such as cycling or gardening are alternatives	4-5 days/week	Start at any duration, as tolerated Goal of 40 min/session 20 min if a combined session with strength training exercises	Start at self-selected walking speed, at an intensity meeting the talk test Gradually increase to an RPE of 3-5/10	From self-selected pace, over 4 weeks gradually increase time to 40 min each session, increasing intensity as tolerated. Persons interested in higher-intensity exercise should obtain guidance before doing it.
Strength • Functional gravity-based exercises recommended as the basic program • Weight training an alternative for those who are interested and motivated to do it	2-3 days/week	For body weight exercises: Functional exercises (see chapter 4), one set during TV commercials For weights: 1 set of 8-12 reps to fatigue	• Sit to stand: 8 reps • Alternative: stair steps (standard is 10 steps) • Arm curls: 8 reps with ~4 kg (can use plastic milk jug filled with water) • 50-70% of 1RM	Build gradually to as many sets a day as tolerated. For curls and weight training: Increase to 2 sets over ~8 weeks.
Flexibility Hips, knees, shoulders, and neck	3 days/week	20 s/stretch	Maintain stretch below discomfort point	Discomfort point should occur at a ROM that does not cause instability. This discomfort point will vary between people and with different joints in each person.
Warm-up and cool-down	Before and after each session	10-15 min	Easy RPE <3/10	Should be maintained as transition phase, especially for those doing higher-intensity physical activity.

RPE = rating of perceived exertion

1 RM = 1 repetition maximum, the amount of weight that can be lifted just 1 time

ROM = range of motion

Joint Injury: Choose Low Impact Modes of Exercise

These Patients Have a Lower Thermal Sensitivity to Heat and May Sweat More than Their Counterparts.

Avoid Heat Exhaustion:
Do Not Exercise Outdoors During Very Hot Temperatures
Exercise Indoors Under Temperature Controlled Conditions

Avoid Dehydration:
Drink Water Before, During and After Exercise

Exercise Prescription Guidelines: BMI > 25 and BMI > 30				
Frequency	Intensity	Time	Type	Warning Signs
Start: 2 - 4 Days/Week	50% HRmax	Novice Start: 5–10 Minutes/Day Intermittent with Rest Experienced Start: 20-60 minutes/Day	Supervised Aerobic Exercise: Stationary Bicycle Stationary Rower Treadmill Walking Water Exercises ↓	STOP: Chest Pain
Goal: 5-7 Days/Week	50-75 % HRmax	Goal: 45-60 Minutes/Day Accumulated or Continuous Exercise ↓	Unsupervised Aerobic Exercise: Outdoor Walking Outdoor Cycling Aerobic Dance Swimming ↓	Consult PCP: Fatigue Joint Pain Muscle Pain
Goal: 2 Days/Week	65-90% HRmax	Then, start Resistance Training: High-Repetition Low-Resistance →	Resistance Training: 2-3 Sets of 10-15 Repetitions for Each Major Muscle Group	

Regular Exercise Improves Blood Glucose Control:
Exercise Regularly 45 to 60 Minutes for 5 to 7 Days/Week

Alternative:
Exercise Every Other Day, or
Exercise for 10 Minutes After Each Meal

Lower Insulin or Add Carbohydrates Before Exercise

Novice: Monitor Blood Glucose Level Before, During, and After Exercise.

Postpone Exercise: Blood Sugars < 70 mg/dl
Postpone Exercise: Blood Sugars > 250 mg/dl

Exercise Prescription Guidelines: Type II Diabetes Mellitus

Frequency	Intensity	Time	Type	Warning Signs
Start: 2 - 4 Days/Week ↓ **Progress:** **4 – 5 Days/Week**	50 – 70% HRmax	Novice Start: 5–10 Minutes/Day Intermittent with Rest Experienced Start: 20-60 minutes/Day	Supervised Aerobic Exercise: Stationary Bicycle Stationary Rower Treadmill Walking Water Exercises ↓	STOP: Chest Pain
Goal: 5 - 7 Days/Week	50-70% HRmax	Goal: 45-60 Minutes/Day Accumulated or Continuous Exercise ↓	Unsupervised Aerobic Exercise: Outdoor Walking Outdoor Cycling Aerobic Dance Swimming ↓	Signs of Hypoglycemia: Dizziness Confusion Headache Sweating Shaking Blurred Vision
Goal: 2 Days/Week	65-90% HRmax	Then, start Resistance Training: High-Repetition Low-Resistance →	Resistance Training: 2-3 Sets of 10-15 Repetitions for Each Major Muscle Group	Optimal Blood Sugar: For Exercise: 100 – 250 mg/dl

Regular Aerobic Exercise:
↓ Lowers Resting SBP by 5-7 mmHg
↓ Decreases Risk of CVD by 20-30%

Regular Resistance Training:
↓ Lowers by 2-3 mmHg

Avoid Hot Showers within 15 Minutes after Exercise:
↑ Increases Risk for Elevated Heart Rate
↑ Increases Risk for Dysrhythmia

Avoid Valsalva During Strength Training

RPE: For Patients on Beta Blockers or Myocardial Selective Calcium Channel Blockers (Diltiazem, Verapamil)

Exercise Prescription Guidelines: HTN

Frequency	Intensity	Time	Type	Warning Signs
Start: 2 – 3 Days/Week	40 – 60% HRmax *RPE: 4-6 (1-10 Scale)	Novice Start: 5–10–15-20-25- 30 Minutes/Day with Intermittent Rest Experienced Start: 30-60 Minutes/Day	Supervised Aerobic Exercise: Treadmill Stationary Bicycle Water Exercise	STOP: Chest Pain Angina
Goal: 5 - 7 Days/Week	40 – 60% HRmax *RPE: 4-6 (1-10 Scale)	Goal: 30 – 60 Minutes Accumulated or Continuous Exercise ↓	Unsupervised Aerobic Exercise: Walk Hike Bicycle Swim Aerobic Dance	Consult PCP: Dizziness Fatigue
2 – 3 Days/Week	60 – 80% HRmax *RPE: 7-8 (1-10 Scale)	Then, start Resistance Training. →	Resistance Training: 2-4 Sets of 8-12 Repetitions for Each Major Muscle Group	DO NOT: Hold breath while lifting weight (VALSALVA): This could dangerously raise BP.

Contraindications for Exercise in Cardiac Patients:

- Unstable Angina
- Stable Angina with Silent Ischemia
- ↑ Exercise Induced Coronary Events

Avoid Hot Showers within 15 Minutes after Exercise:

↑ Increases Risk for Elevated Heart Rate

↑ Increases Risk for Dysrhythmia

Valsalva During Strength Training

RPE: For Patients on Beta Blockers or Myocardial Selective Calcium Channel Blockers (Diltiazem, Verapamil)

Exercise Prescription Guidelines: CAD/IHD				
Frequency	Intensity	Time	Type	Warning Signs
Start: 3 - 5 Days/Week	40 – 60% HRmax *RPE: 4-6 (1-10 Scale)	<u>Novice Start:</u> 5–10–15-20-25- 30 Minutes/Day with Intermittent Rest <u>Experienced Start:</u> 30-60 Minutes/Day	<u>Supervised:</u> Aerobic Exercise: Treadmill Stationary Bicycle Water Exercise	<u>STOP:</u> CP/Angina Chest Tightness Dysrhythmia Unusual SOB Cyanosis
Goal: 5 - 7 Days/Week	40 – 60% HRmax *RPE: 4-6 (1-10 Scale)	Goal: 30 – 60 Minutes Accumulated or Continuous Exercise ↓	<u>Unsupervised:</u> Aerobic Exercise: Walk Hike Bicycle Aerobic Dance	<u>Consult PCP:</u> Dizziness Fatigue
Goal: 2 Days/Week	60 – 80% HRmax *RPE: 7-8 (1-10 Scale)	Then, start Resistance Training. →	Resistance Training: 2-4 Sets of 8-12 Repetitions for Each Major Muscle Group	<u>DO NOT:</u> Hold breath while lifting weight (VALSALVA): This could dangerously raise BP.

Exercise Prescription for Patients with PAD:

Promotes Collateral Vessel Synthesis

Creates a Natural Bypass Around Atherosclerotic Plaque and

Protects Against Critical Limb Ischemia.

Exercise Prescription Guidelines: PAD

Frequency	Intensity	Time	Type	Warning Signs
Start: 2 - 3 Days/Week ↓ **Then: 4-5 Days/Week** ↓	Claudication Scale: 3-4	<u>Start:</u> 5–10-15-20 Minutes of Interval Training Walk until walking is no longer possible.	<u>Supervised:</u> Aerobic Exercise: Treadmill Indoor Walking Outdoor Walking	<u>STOP:</u> Chest Pain
Goal: 7 Days/Week	Claudication Scale: 3-4	↓ Then, add active rest modalities → Goal: 20 Minutes of Continuous Exercise	Aerobic Exercise: Stationary Cycling Arm Ergometers Rowers	<u>STOP:</u> Sudden Changes: Energy Level Weakness Fatigue Nausea BP Changes
Goal: 2 Days/Week	Claudication Scale: 3-4	Then, start Resistance Training. →	Resistance Training: 2-4 Sets of 8-12 Repetitions for Each Major Muscle Group	<u>DO NOT:</u> Hold breath while lifting weight (VALSALVA): This could dangerously raise BP.

Contraindications for Exercise in Patients with CHF:

- Acute Heart Failure
- Uncontrolled Heart Failure
- Symptomatic Aortic Stenosis
- Unstable or Variable Heart Rate
- New Onset Atrial Fibrillation

Swimming is Contraindicated in Patients with:

- Severe MI
- Uncompensated Left Ventricular Dysfunction
- Severe Chronic Heart Failure

RPE: CHF Patient are Likely to be on Beta Blockers

Exercise Prescription Guidelines: CHF

Frequency	Intensity	Time	Type	Warning Signs
Start: 2 - 3 Days/Week	RPE: 4-6 (1-10 Scale)	Novice Start: 5–10–15-20-25- 30 Minutes/Day with Intermittent Rest Experienced Start: 20-45 Minutes/Day	Supervised: Aerobic Exercise: Treadmill Stationary Bicycle	STOP: CP/Angina Dysrhythmia Unusual SOB Cyanosis
Goal: 3 - 5 Days/Week	RPE: 4-6 (1-10 Scale)	Goal: 20-45 Minutes Accumulated or Continuous Exercise ↓	Unsupervised: Aerobic Exercise: Walk Bicycle Aerobic Dance	*Consult Cardiologist: Dizziness Extreme Fatigue Unusual Cough Fluid Retention of LE and Abdomen. Sudden Weight Gain > 3 lbs.
Goal: 2 Days/Week	RPE: 4-6 (1-10 Scale)	Then, start Resistance Training: High-Repetition → Low-Resistance	Resistance Training: 2-3 Sets of 10-15 Repetitions for Each Major Muscle Group	DO NOT: Hold breath while lifting weight (VALSALVA): This could dangerously raise BP.

Exercise in Warm and Humid Environment:
Cold and Dry Conditions may Result in Lung Constriction.

Chronic Bronchitis:
Exercise in the Afternoon:
Excess Mucous and Sputum Have had a
Better Chance to Clear the Lungs.

Asthma:
Avoid Outdoor Exercise: High Pollen Counts, Poor Air Quality
Avoid Swimming Pools if Sensitive to Pool Chemicals

Monitor Oxygen Saturation Prior and During Exercise:
Maintain $SP0_2 > 88\%$ to Avoid Polycythemia.

Lower Exercise Intensity for Hypoxia $SP0_2 < 88\%$.

Exercise Prescription Guidelines: COPD

Frequency	Intensity	Time	Type	Warning Signs
Start: 3 – 5 Days/Week	50-70% HRmax RPE: 4-6 (1-10 Scale) Dyspnea Scale: 3-6 (1-10 Scale)	Novice Start: 5–10–15-20-25- 30 Minutes/Day with Intermittent Rest Experienced Start: 30-60 minutes/Day	Supervised Aerobic Exercise: Treadmill Stationary Bicycle Stationary Rower ↓	STOP: Chest Pain Cyanosis Sudden Change in Breathing Pattern
Goal: 5 – 7 Days/Week	50-70% HRmax RPE: 4-6 (1-10 Scale) Dyspnea Scale: 3-6 (1-10 Scale)	Goal: 30-60 Minutes/Day Accumulated or Continuous Exercise ↓	Unsupervised Aerobic Exercise: Walk Bicycle Aerobic Dance	Consult PCP: Fatigue Dizziness Weakness Blood Pressure Changes Nausea/Vomiting
Goal: 2 Days/Week	0_2 Saturation > 88%	Then, start Resistance Training: →	Resistance Training: 2-4 Sets of 8-12 Repetitions for Each Major Muscle Group	USE: Pursed Lip Breathing During Exercise: ↓Air Trapped in Lungs ↓SOB During Exercise

CKD: Common to have DM II and/or HTN
These patients can follow Exercise Prescriptions for HTN or DM II.

CKD IV, CKD V and ESRD: Common to have Renal Osteodystrophy and Subsequent Fractures are Common.

- Select Any Continuous Rhythmic Activity With Low Joint Impact Stress (Swimming, Cycling)

Exercise Prescription Guidelines: CKD

Frequency	Intensity	Time	Type	Warning Signs
Start: 2 – 3 Days/Week	40 – 60% HRmax RPE: 4-6 (1-10 Scale)	Novice Start: 5–10–15-20-25- 30 Minutes/Day with Intermittent Rest Experienced Start: 30-60 Minutes/Day	Supervised Aerobic Exercise: Treadmill Stationary Bicycle Water Exercise	STOP: Chest Pain Angina
Goal: 5 - 7 Days/Week	40 – 60% HRmax RPE: 4-6 (1-10 Scale)	Goal: 30 – 60 Minutes Accumulated or Continuous Exercise ↓	Unsupervised Aerobic Exercise: Walk Hike Bicycle Swim Aerobic Dance	Consult PCP: Signs of Anemia: Dizziness Fatigue
2 – 3 Days/Week	60 – 80% HRmax RPE: 7-8 (1-10 Scale)	Then, start Resistance Training. →	Resistance Training: 2-4 Sets of 8-12 Repetitions for Each Major Muscle Group	DO NOT: Hold breath while lifting weight (VALSALVA): This could dangerously raise BP.

Patients with ESRD on HD

Do not Exercise Before Dialysis (Suboptimal Blood Chemistry)

Do not Exercise After Dialysis (Fatigue)

May Exercise During Dialysis in Centers That Offer Stationary Cycling During Treatments

Otherwise: Exercise on Days After Dialysis

Exercise Prescription Guidelines: ESRD on HD				
Frequency	Intensity	Time	Type	Warning Signs
3 Day/Week: **During Dialysis Days**	RPE: 4-6 (1-10 Scale)	<u>Novice Start:</u> 5–10–15-20 Minutes/Day with Intermittent Rest Experienced Start: 20 Minutes/Day ↓	<u>Supervised</u> Aerobic Exercise: During Dialysis Stationary Bicycle	<u>STOP:</u> Chest Pain Heart Palpitations Nausea Weakness Paresthesia
3-4 Days/Week: **Day After Dialysis**	RPE: 4-6 (1-10 Scale)	Goal: 20 – 60 Minutes Accumulated or Continuous Exercise →	<u>Unsupervised</u> Aerobic Exercise: Treadmill Walk Stationary Bicycle Walking Bicycling Aerobic Dance	<u>Consult PCP or Nephrologist:</u> Muscle Cramps (Phosphate, Calcium, Potassium Changes)

Exercise Type (Mode):

Any Continuous Rhythmic Activity With Low Joint Impact Stress (Swimming, Cycling)

Flexibility: Consider: Stretching, Yoga, Tai-Chi or Pilates.

Exercise Prescription: Osteoarthritis				
Frequency	Intensity	Time	Type	Warning Signs
Start: 3-5 Days/Week	40 – 50 % HRmax RPE: 1-4 (1-10 Scale) ↓	<u>Novice Start</u>: 5–10–15-20-25- 30 Minutes/Day with Intermittent Rest <u>Experienced Start</u>: 30 Minutes/Day ↓	<u>Supervised</u> Aerobic Exercise: Treadmill Stationary Bicycle Water Exercise ↓	<u>STOP:</u> Chest Pain Sudden Joint Pain
Goal: 5 - 7 Days/Week	40 – 60% HRmax RPE: 5-6 (1-10 Scale)	Goal: 30 Minutes/Day Accumulated or Continuous Exercise ↓	<u>Unsupervised</u> Aerobic Exercise: Walk Bicycle Swim Hike with Hiking Stick	<u>Consult PCP:</u> Knees Give Away: Obtain Knee Brace Switch to: Stationary Cycling Swimming
2 Days//Week	65% HRmax PRE: 7-10	Then, start Resistance Training. →	Resistance Training: 2-4 Sets of 10-15 Repetitions for Each Major Muscle Group	<u>Add:</u> + Flexibility: 3 sets of 10 Seconds of Stretching for Each Muscle Group +ROM Exercises

Exercise Type (Mode):

Any Continuous Rhythmic Full Weight Bearing Activity.

Exercise Prescription: Osteoporosis				
Frequency	Intensity	Time	Type	Warning Signs
Start: 3-5 Days/Week	40 – 50 % HRmax RPE: 1-4 (1-10 Scale) ↓	Novice Start: 5–10–15-20-25- 30 Minutes/Day with Intermittent Rest Experienced Start: 30 Minutes/Day ↓	Supervised Aerobic Exercise: Treadmill Stair Climber ↓	STOP: Chest Pain
Goal: 5 - 7 Days/Week	40 – 60% HRmax RPE: 5-6 (1-10 Scale)	Goal: 30 Minutes/Day Accumulated or Continuous Exercise ↓	Unsupervised Aerobic Exercise: Walking Hiking Dancing Gardening Pilates Yoga	Consult PCP: Sudden Bone/Joint Pain
2 Days//Week	65% HRmax PRE: 7-10	Then, start Resistance Training. →	Resistance Training: 2-4 Sets of 10-15 Repetitions for Each Major Muscle Group	Add: + Flexibility: 3 sets of 10 Seconds of Stretching for Each Muscle Group +ROM Exercises

Exercise Prescription for Depression, Anxiety, Stress, and Insomnia

Exercise has been Shown to Improve Symptoms of Depression, Anxiety, Stress, and Insomnia.
Exercise is the First-line Treatment for Young Patients with Depression as SSRIs and SRNIs can ↑ Risk of Suicidal Ideation and can be as Effective as Medication for Mild Depression (↑ Serotonin, Dopamine, and Endorphins).

Patient's without Comorbid Chronic Disease: Follow the ACSM Guidelines/CDC Recommendations:

- **150 Minutes/Week of Moderate Intensity Aerobic Activity Every Week, or**
- **75 Minutes/Week of Vigorous Intensity Aerobic Activity Every Week, and**
- **2 Days/Week of Muscle Strengthening that Work All Major Muscle Groups**

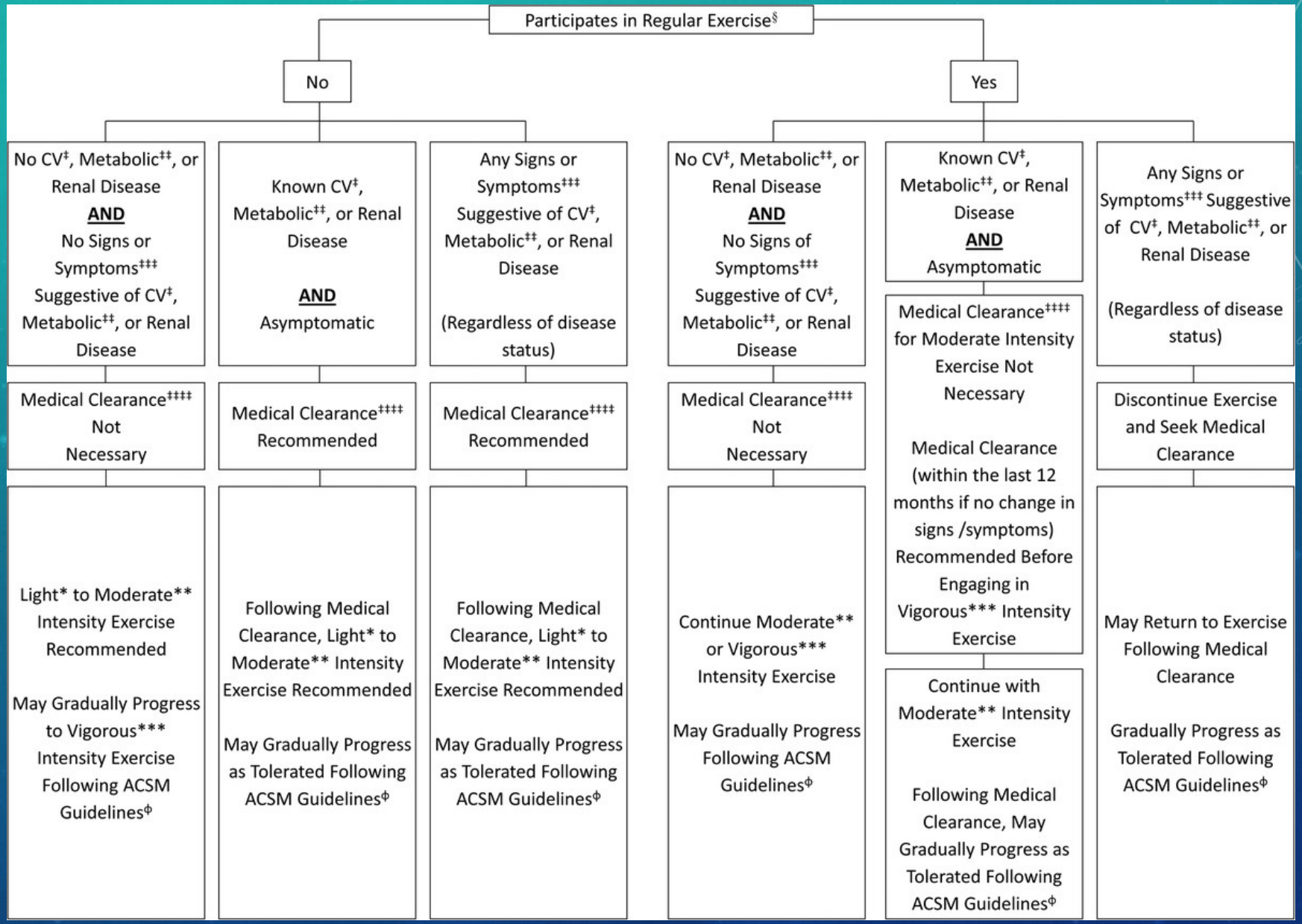
Patient's with Comorbid Chronic Disease: Follow the CDD4 Recommendations:

- **150 Minutes/Week of Moderate Intensity Aerobic Activity Every Week, or**
- **150 Minutes/Week of Light Intensity Aerobic Activity Every Week, then add**
- **2 Days/Week of Flexibility and Muscle Strengthening**

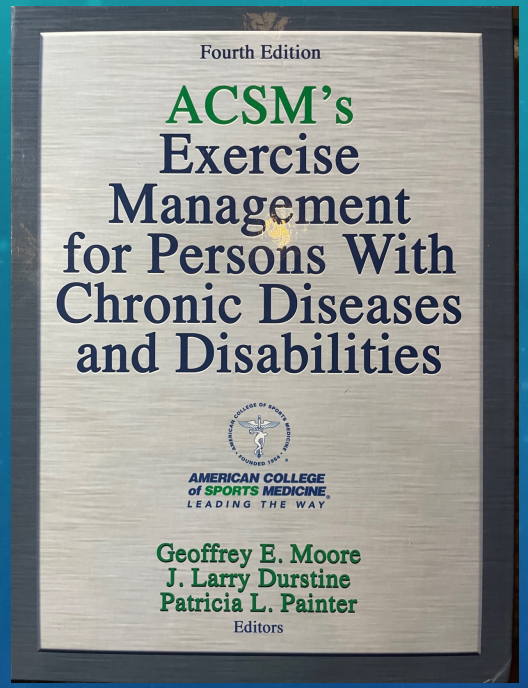
HIIT (High Intensity Interval Training). Any Modality/Type of Exercise can be Used:
Has Been Shown to Improve Symptoms of Depression, Anxiety, and Stress (but not Insomnia):

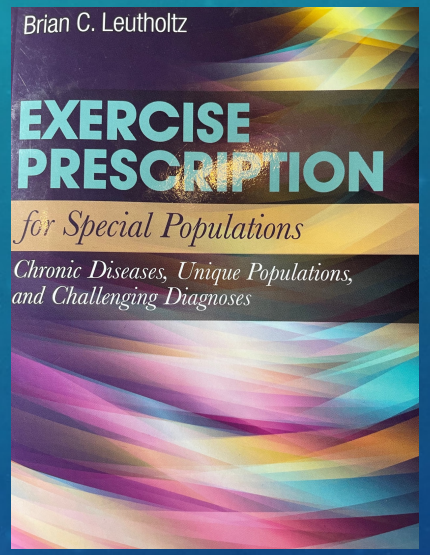
- **Short Bursts of High Intensity Exercise, Alternating with Low Intensity Recovery, 2 – 3 Days/Week**
- **Example: 1 Minute of Vigorous Intensity Exercise, Followed by 1 to 2 Minutes of Low or Moderate Intensity Exercise and Repeat for 15, 20 or 30 minutes.**
- **Example: Start HIIT at the Last 5 minutes of a 30-Minute, Moderate Intensity Workout Session: 30 Seconds of Vigorous Intensity Followed by 30 Seconds of Light Intensity for Each of The Last 5 Minutes.**

APPENDIX


Participates in Regular Exercise§
No
Yes
No CV‡, Metabolic‡‡, or Renal Disease AND No Signs or Symptoms‡‡‡ Suggestive of CV‡, Metabolic‡‡, or Renal Disease
Known CV‡, Metabolic‡‡, or Renal Disease AND Asymptomatic
Any Signs or Symptoms‡‡‡ Suggestive of CV‡, Metabolic‡‡, or Renal Disease (Regardless of disease status)
No CV‡, Metabolic‡‡, or Renal Disease AND No Signs of Symptoms‡‡‡ Suggestive of CV‡, Metabolic‡‡, or Renal Disease
Known CV‡, Metabolic‡‡, or Renal Disease AND Asymptomatic
Any Signs or Symptoms‡‡‡ Suggestive of CV‡, Metabolic‡‡, or Renal Disease (Regardless of disease status)
Medical Clearance‡‡‡‡ Not Necessary
Medical Clearance‡‡‡‡ Recommended
Medical Clearance‡‡‡‡ Recommended
Medical Clearance‡‡‡‡ Not Necessary
Medical Clearance‡‡‡‡ for Moderate Intensity Exercise Not Necessary
Medical Clearance (within the last 12 months if no change in signs /symptoms) Recommended Before Engaging in Vigorous*** Intensity Exercise
Discontinue Exercise and Seek Medical Clearance
Light* to Moderate** Intensity Exercise Recommended
May Gradually Progress to Vigorous*** Intensity Exercise Following ACSM Guidelinesϕ
Following Medical Clearance, Light* to Moderate** Intensity Exercise Recommended
May Gradually Progress as Tolerated Following ACSM Guidelinesϕ
Following Medical Clearance, Light* to Moderate** Intensity Exercise Recommended
May Gradually Progress as Tolerated Following ACSM Guidelinesϕ
Continue Moderate** or Vigorous*** Intensity Exercise
May Gradually Progress Following ACSM Guidelinesϕ
Continue with Moderate** Intensity Exercise
Following Medical Clearance, May Gradually Progress as Tolerated Following ACSM Guidelinesϕ
May Return to Exercise Following Medical Clearance
Gradually Progress as Tolerated Following ACSM Guidelinesϕ

TEXTBOOK RESOURCES





*Some of the Tables in this Presentation were Modified from Tables in Leutholtz's Textbook.

ON-LINE RESOURCES

The American College of Sports Medicine (ACSM): https://www.acsm.org

The American College of Lifestyle Medicine (ACLM): http://www.lifestylemedicine.org

Exercise is Medicine (ACSM): http://exerciseismedicine.org

The Centers for Disease Control (CDC): https://www.cdc.gov

Healthy People 2020: https://www.healthypeople.gov

The National Institute of Health: Heart, Lung, and Blood Institute (NHLBI): http://www.nhlbi.nih.gov

EXERCISE RESOURCES

University of New Mexico Exercise Physiology Lab
Johnson Center
200 Cornell Drive
Albuquerque, New Mexico 87131
Web: https://exphyslab.unm.edu
Email: exphyslab@unm.edu
Phone: 505-277-2658

EXERCISE RESOURCES

New Heart Fitness and Health
601 Lomas Blvd. NE
Albuquerque, New Mexico 87102
Web: https://newheartnm.com
Email: referrals@newheart.com
Phone: 505-881-8195
Fax Referrals: 505-830-4975

EXERCISE RESOURCES

Presbyterian Healthplex
6301 Forest Hills Dr NE
Albuquerque, New Mexico 87109
Web: https://healthplex.xom
Phone: 505-823-8399
Fax: 505-823-8324