



Cardiac Rehabilitation

The What, The So What and the Now What?

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WE HAVE NO DISCLOSURES.

Presentation Objectives

- ▶ 1. At the completion of this presentation participants will list the qualifying diagnosis for cardiac rehab attendance as well as contraindications for participation.
- ▶ 2. After engaging in this presentation participants will be able to explain 5 benefits of aerobic exercise for cardiac patients.
- ▶ 3. When paying attention to the end of this presentation participants will be equipped to write an order for cardiac rehab and to write an exercise Rx for their patients.



WHAT

DEFINITION: Cardiac rehabilitation is a medically supervised program that includes exercise training and education on heart-healthy living **to reduce risk factors**. It helps patients recover and improve physical, mental and social function.

GOAL: To stabilize, slow or even reverse the progression of heart disease, reducing the risk of another cardiac event and/or death.



Cardiac Rehabilitation Qualifying Diagnosis

- ▶ MI – NSTEMI or STEMI – within a 3 month period for some insurance plans
- ▶ PCI – Stent, PTCA – within a 3 month period for some insurance plans
- ▶ Heart Surgery: (within a 3 month period for some insurance plans)
 - CABG
 - Heart Valve Replacement or Repair
- ▶ Heart Transplant
- ▶ Left Ventricular Assist Device (LVAD)
- ▶ Stable Angina
- ▶ Stable chronic CHF–
 - Must have EF \leq 35%
 - No hospitalizations within the previous 6 weeks or planned hospitalizations or procedures in the next 6 months

Other Programs within Cardiovascular Pulmonary Rehabilitation Umbrella

PAD – claudication is qualifying diagnosis

Pulmonary - The patient has a diagnosis of chronic pulmonary disease: 1. Emphysema 2. Asthma 3. Chronic Obstructive Pulmonary Disease 4. Cystic Fibrosis 5. Chronic Bronchitis 6. Asbestosis 7. Alpha-1 Antitrypsin Deficiency 8. Pneumoconiosis 9. Radiation Pneumonitis 10. Pulmonary Fibrosis 11. Fibrosing Alveolitis 12. Status Post Lung Resection 13. Ankylosing spondylitis 14. Muscular dystrophy 15. Guillain-Barre' syndrome 16. Amyotrophic lateral sclerosis (ALS) 17. Sarcoidosis

Absolute and Relative Contraindications for Exercise Training

ABSOLUTE:

- ▶ Recent change in resting EKG suggestive of ischemia, recent MI or other acute untreated cardiac event
- ▶ Unstable angina
- ▶ Uncontrolled cardiac arrhythmias
- ▶ Symptomatic severe aortic stenosis or other valvular disease
- ▶ Decompensated symptomatic heart failure
- ▶ Acute pulmonary embolus or pulmonary infarction
- ▶ Acute non-cardiac disorder that may affect exercise performance (ie. Infection)
- ▶ Acute myocarditis or pericarditis
- ▶ Acute thrombophlebitis
- ▶ Physical disability that would preclude safe and adequate exercise performance
- ▶ Accompanying comorbidities that may impede exercise tolerance (severe pulmonary issues, open wound, orthopedic etc.)

RELATIVE:

- ▶ Electrolyte abnormalities
- ▶ Tachy or Brady Arrhythmias
- ▶ High-degree AV block
- ▶ Atrial fibrillation with uncontrolled Ventricular rate
- ▶ Known Aortic dissection
- ▶ Severe resting arterial hypertension (SB > 200 mmHg and diastolic BP > 110 mmHg)
- ▶ Mental impairment leading to inability to cooperate with training



WHAT PATIENTS AND PROVIDERS CAN EXPECT

- Patient Evaluation
- 36 sessions of individually designed exercise with EKG monitoring
 - 3 times per week
 - 40-60 minutes sustained cardio
 - Warm up, Cool down, Resistance training
 - Increase exercise capacity ≥ 5 METS* or improve by ≥ 1 MET*
- Private Consultations
 - Dietitian
 - Health Behavior Specialist
- “Healthy Heart” Class series, Heart Failure Class

(*Metabolic Equivalent of a Task (1 MET = 3.5 ml O₂/Kg/Min) energy required at rest, maximal exercise capacity in METS approximates an individuals VO₂ max.)

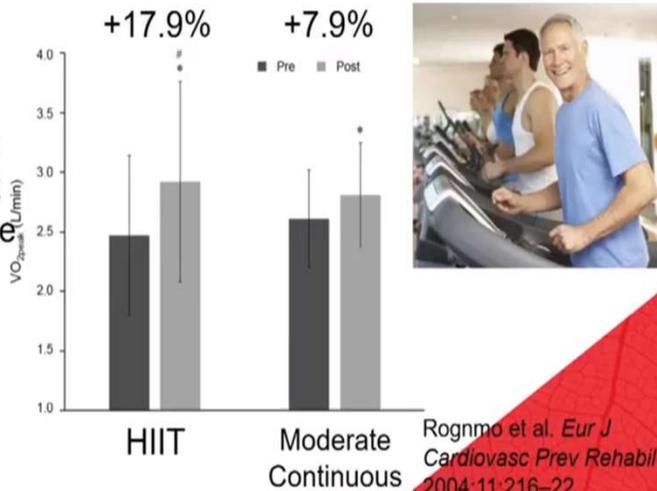


Different Techniques with Benefits

HIIT Benefits

Interval vs. Continuous Exercise in CAD

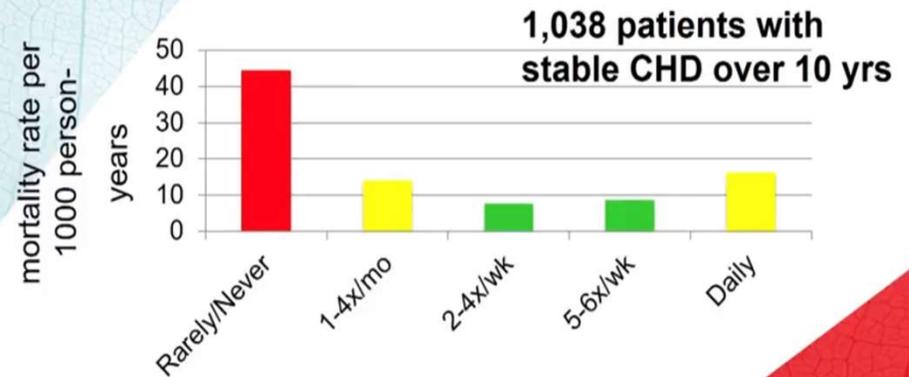
- Higher fitness
- Shorter duration
- More enjoyment
- Better adherence
- Similar safety



Ross et al. *J Sport and Health Science* 5 (2016) 139-144

Exercise Frequency

A reverse J-shaped association of physical activity with mortality



Mons et al. *Heart* 2014;100:13 1043-1049

What We Ask Of Our Patients

- Commitment
 - Regular attendance
 - 36 session participation
 - Attend private consults and education classes
- Implement new healthy living habits
 - Tobacco free
 - Dietary changes
 - Exercise
 - Stress management

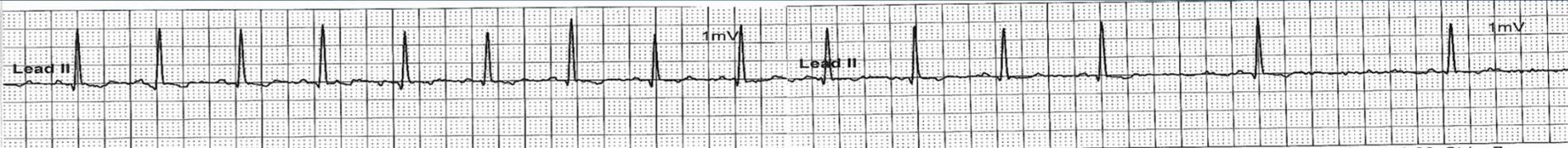


What about the staff?

1. Medical Director
2. RN
3. Exercise Physiologist
4. Dietician
5. MSW

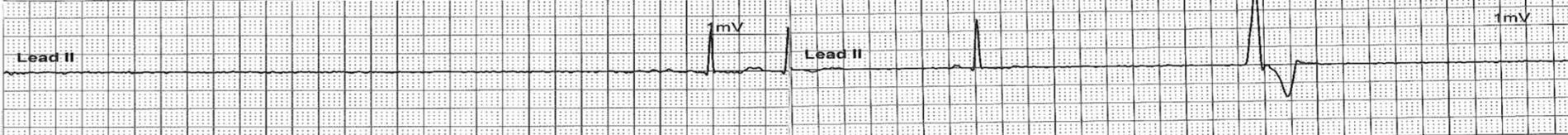
Programs must meet criteria and are urged to obtain AACVPR certification.





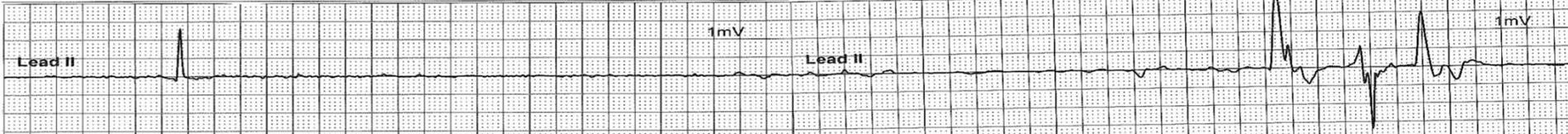
95 Arm Ergometer 2.6 METs 300Load@2 Elapsed Time: 48:03 Strip: 6 BP: 140/74 Session Date 3/11/2019

76 Arm Ergometer 2.6 METs 300Load@2 Elapsed Time: 48:09 Strip: 7 BP: 140/74 Session Date 3/11/2019



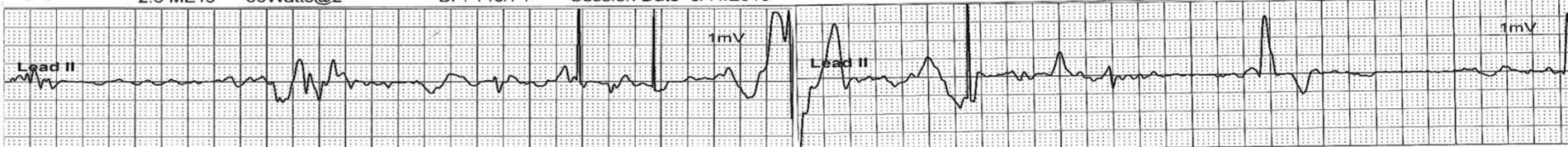
59 Arm Ergometer 2.6 METs 300Load@2 Elapsed Time: 48:15 Strip: 8 BP: 140/74 Session Date 3/11/2019

52 Arm Ergometer 2.6 METs 300Load@2 Elapsed Time: 48:21 Strip: 9 BP: 140/74 Session Date 3/11/2019



44 Recovery 2.6 METs 60Watts@2 Elapsed Time: 48:27 Strip: 10 BP: 140/74 Session Date 3/11/2019

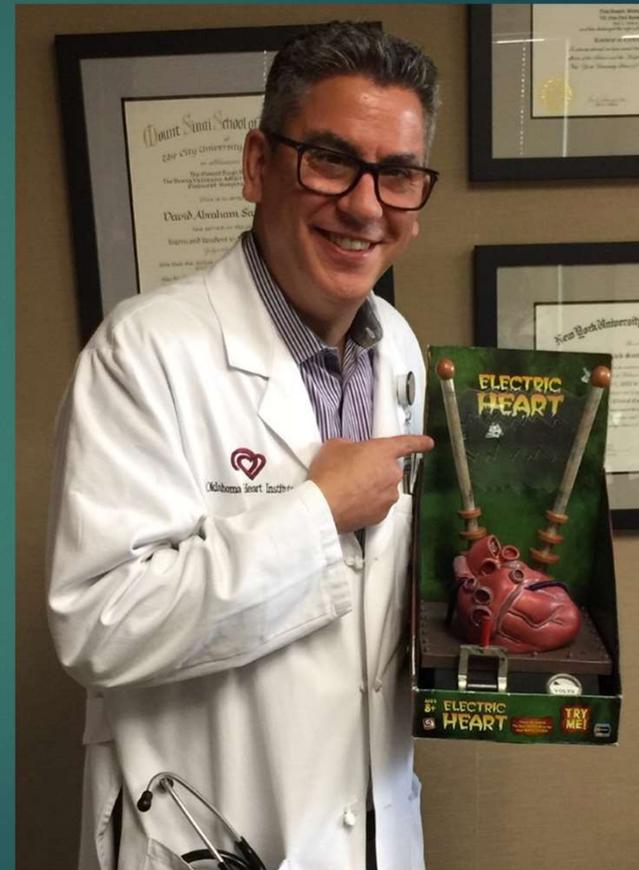
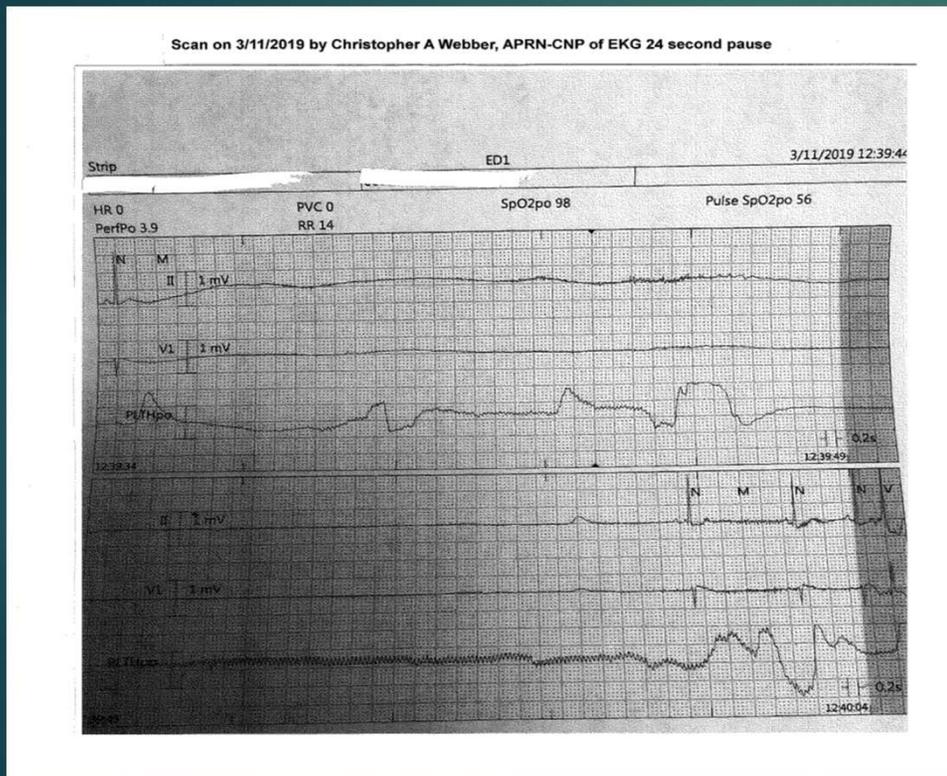
83 Recovery 2.6 METs 60Watts@2 Elapsed Time: 48:33 Strip: 11 BP: 140/74 Session Date 3/11/2019



82 Recovery 2.6 METs 60Watts@2 Elapsed Time: 48:39 Strip: 12 BP: 140/74 Session Date 3/11/2019

72 Recovery 2.6 METs 60Watts@2 Elapsed Time: 48:45 Strip: 13 BP: 140/74 Session Date 3/11/2019

Perfect ER Performance



Because we never know what may happen

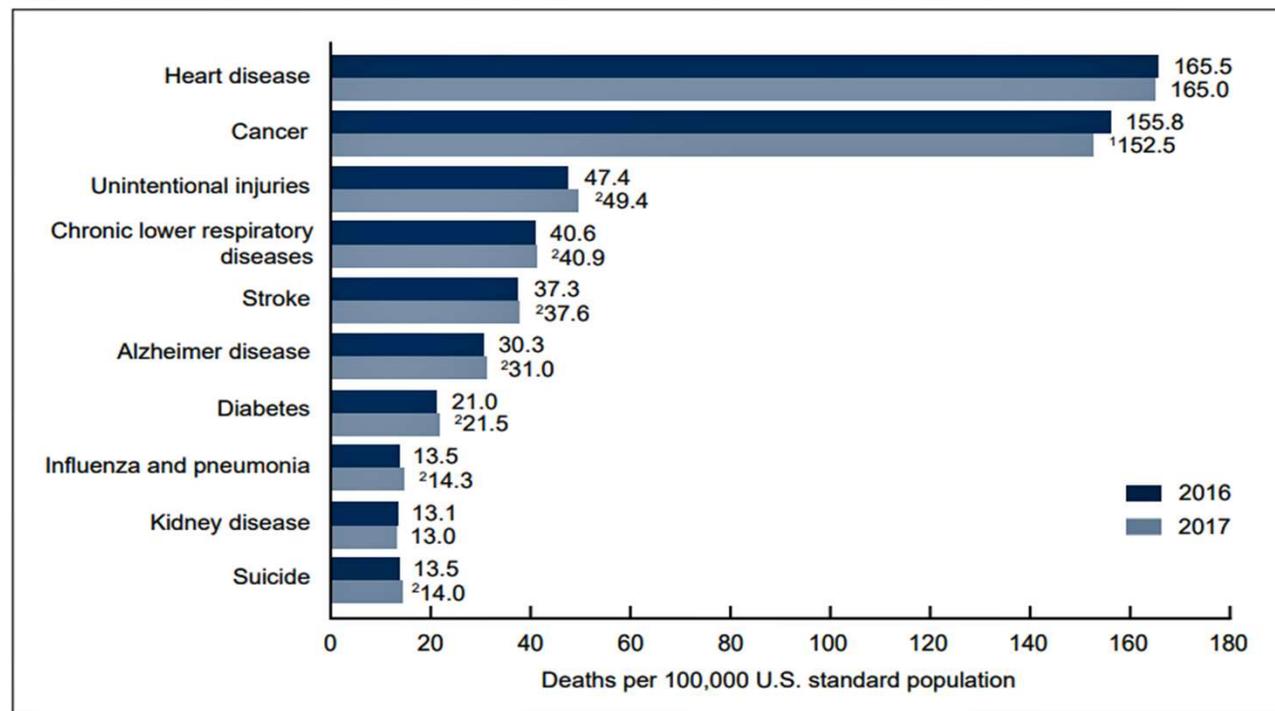


With
Jason
around!

SO WHAT (so what's the big deal with cardiac rehab?)

Heart Disease Kills!

Figure 4. Age-adjusted death rates for the 10 leading causes of death: United States, 2016 and 2017



¹Statistically significant decrease in age-adjusted death rate from 2016 to 2017 ($p < 0.05$).

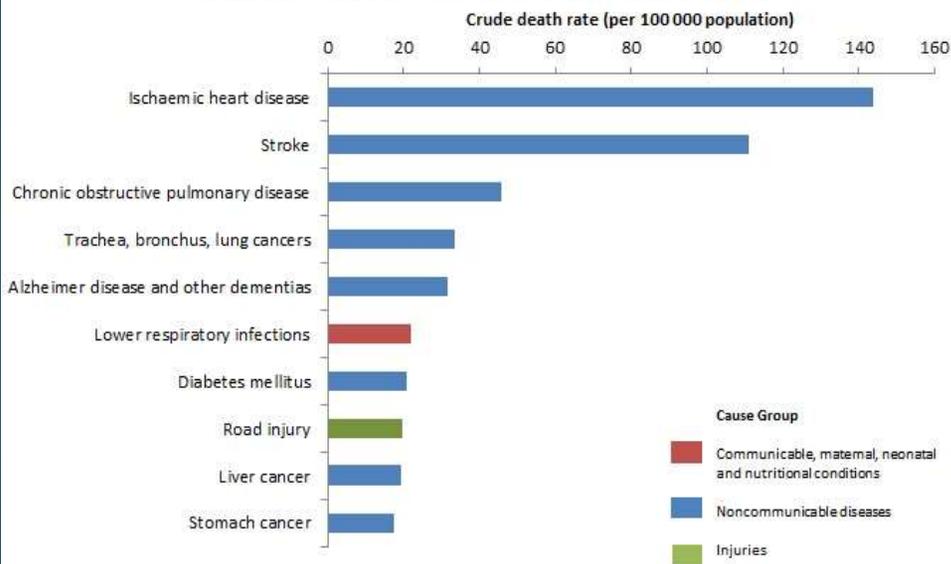
²Statistically significant increase in age-adjusted death rate from 2016 to 2017 ($p < 0.05$).

NOTES: A total of 2,813,503 resident deaths were registered in the United States in 2017. The 10 leading causes accounted for 74.0% of all deaths in the United States in 2017. Causes of death are ranked according to number of deaths. Rankings for 2016 data are not shown. Data table for Figure 4 includes the number of deaths for leading causes. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db328_tables-508.pdf#4.

SOURCE: NCHS, National Vital Statistics System, Mortality.

SO WHAT ...Heart Disease Kills!

Top 10 causes of deaths in upper-middle-income countries in 2016



Source: Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2016. Geneva, World Health Organization, 2018.
World Bank list of economies (June 2017). Washington, DC: The World Bank Group, 2017 (<https://datahelpdesk.worldbank.org/knowledgebase/articles/906315-world-bank-country-and-lending-groups>).

Modifiable Risk Factors

- World Health Organization (WHO) estimates that over 75% of premature CVD is preventable, and improvement of risk factors can prevent disease.
- These modifications include:
 - Exercise
 - Diet – 7-10 servings of fruits and vegetables per day, high fiber, low sugar and salt
 - Smoking cessation
 - Weight reduction to ideal body weight (BMI 18.5-24.9)
 - Alcohol limitation- 1-2 daily for men, 1 per day for women
 - Lipid lowering therapy
 - Anti-platelet therapy
 - Blood glucose control/ normalization - fasting below 95
 - Blood pressure control
 - Controlling inflammation

SO WHAT (so what's the big deal about cardiac rehab?)

Cardiac Rehab Saves Lives

Costs per year of life saved range from \$4,950 to \$9,200 per person. Cardiac rehab participation also reduces hospital readmissions.

ATTENDERS OF CARDIAC REHAB VS. NON-ATTENDERS

Mortality at 1 year:

Risk reduction **58%**

Mortality at 5 years:

Risk reduction **34%**

Above adjusted for demographic characteristics, comorbid conditions, and subsequent hospitalization

Cardiac Rehabilitation and Survival in Older Coronary Patients. J. Am. Coll. Cardiol. 2009;54:25-33

COMPLETING 36 SESSIONS OF CARDIAC REHAB VS. COMPLETING ONE SESSION

Risk of death **47% lower**

Risk of MI **31% lower**

National 5% sample of MC beneficiaries

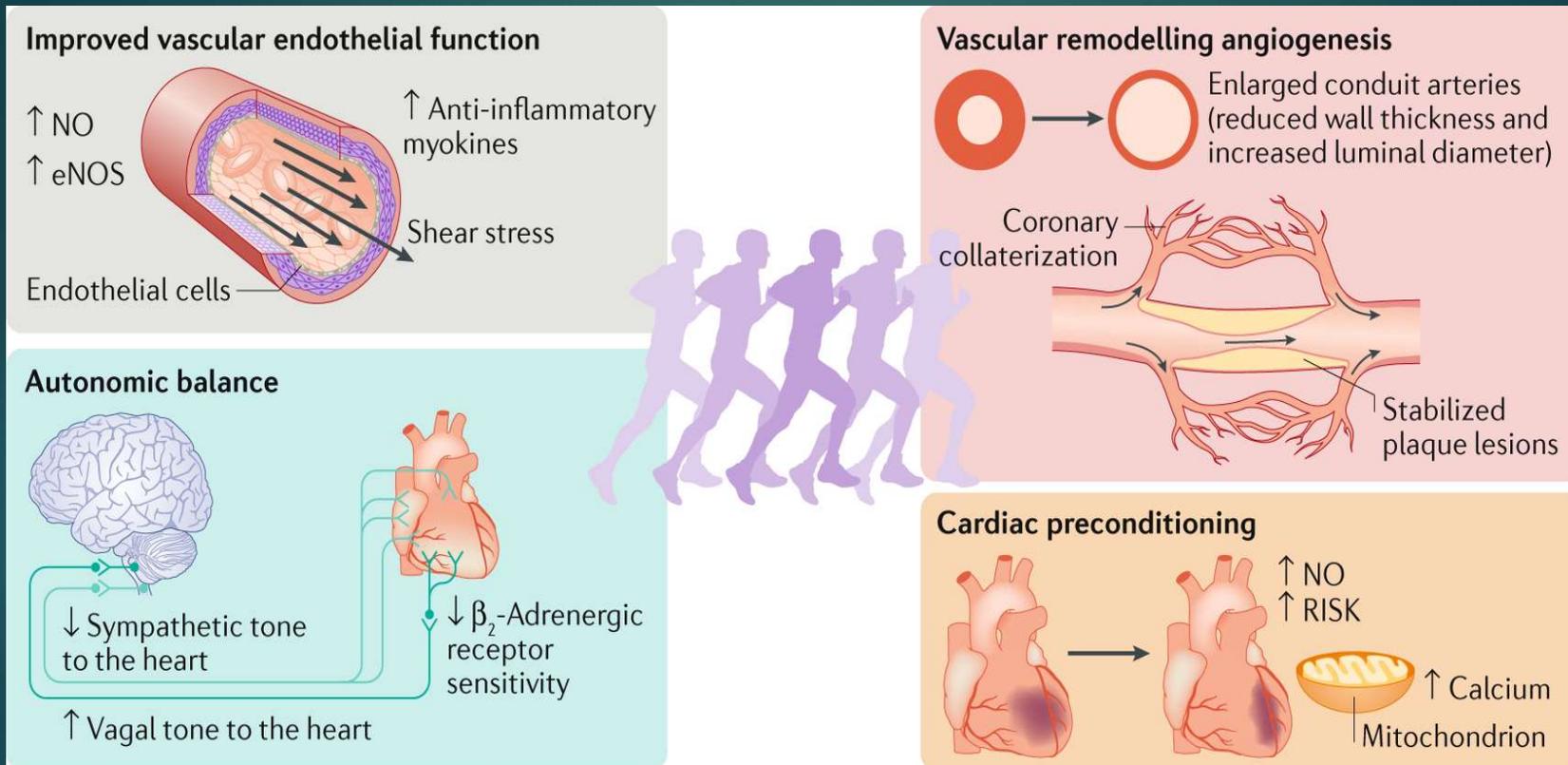
Hammill BG, Curtis LH, Schulman KA, Whellan DJ. Relationship Between Cardiac Rehabilitation and Long-Term Risks of Death and Myocardial Infarction Among Elderly Medicare Beneficiaries. Circulation. 121 (2010)

Relation of Fitness or Exercise Tolerance to All-Cause or Cardiovascular Mortality in Secondary Prevention

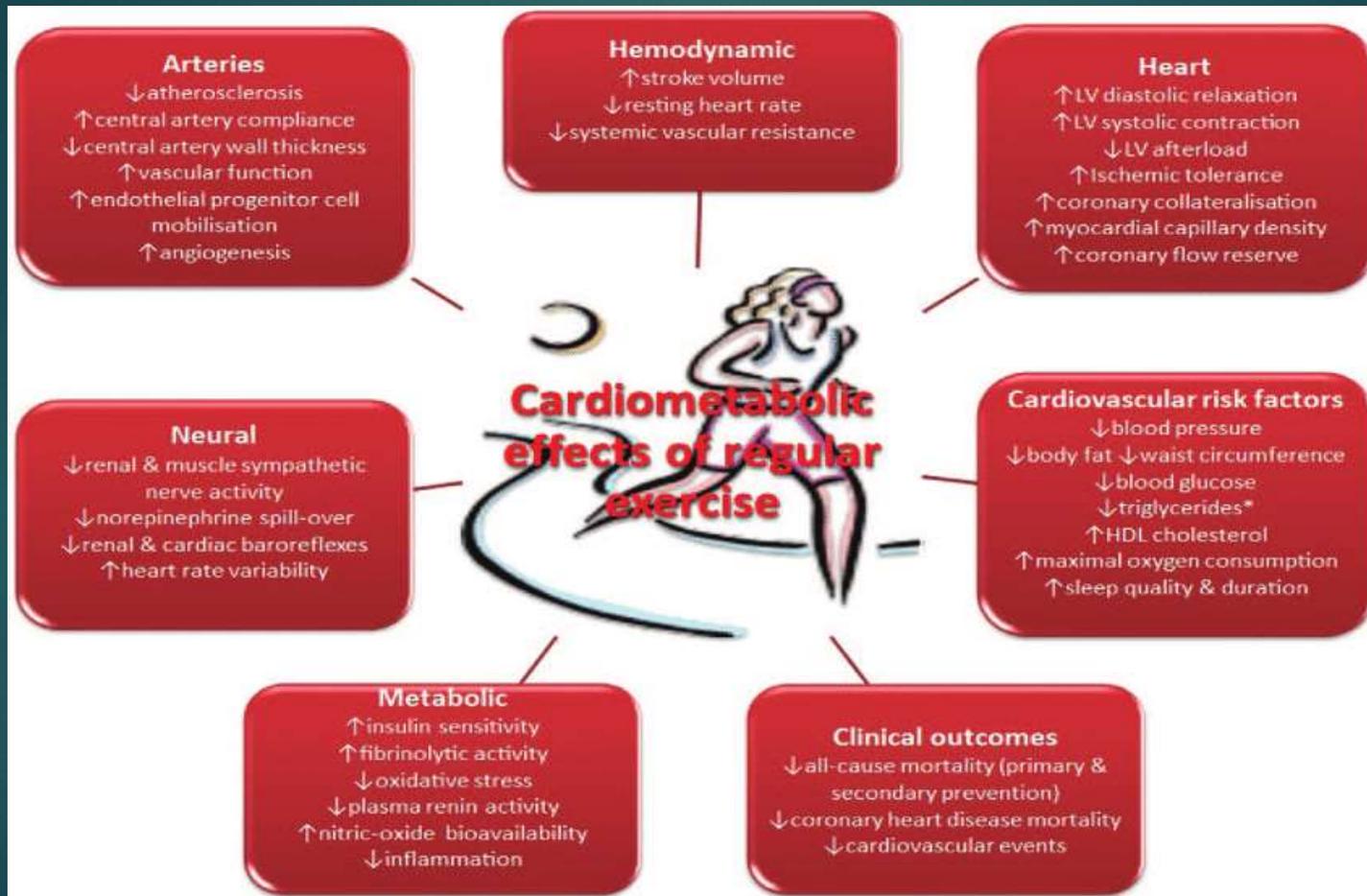


Reference	Population/follow-up period	Fitness measurement	All-cause or cardiovascular mortality
Vanhees et al, ⁶ 1994	Male patients ≥4 wk after MI (n=312) or CABG (n=215) for 6.1 y	Peak O ₂	71% Decrease per 1-L/min increase
Dorn et al, ⁷ 1999	315 Post-MI men randomized to a 6-mo exercise program; patients were followed up for 19 y	Peak METs	8%-14% Decrease per 1-MET increase
Kavanagh et al, ⁸ 2002	12,169 Men with CVD referred for exercise-based CR; median follow-up was 7.9 y	Peak O ₂	9% Decrease per 1-mL/kg/min increase
Kavanagh et al, ⁹ 2003	2380 Women with CVD referred for exercise-based CR; mean follow-up was 6.1 y	Peak O ₂	10% Decrease per 1-mL/kg/min increase
Kavanagh et al, ¹⁰ 2008	6956 Men with CVD completing a 12-mo walking-based training regimen; median follow-up was 9.0 y	Walking distance	20% Decrease per 1-mile improvement
O'Connor et al, ¹² 2009	2331 Medically stable outpatients with heart failure and reduced EF (≤35%) , randomized to exercise training or usual care; median follow-up was 30 mo	Peak O ₂	11% Decrease per 0.7-mL/kg/min increase
Feuerstadt et al, ¹³ 2007	600 Men and women with CVD who were referred to a 12-wk exercise-based CR program; mean follow-up was 4.4 y	Exit training MET level	34% Decrease per 1-MET increase;
Beatty et al, ¹¹ 2012	556 Outpatients with stable CHD; median follow-up was 8.0 y for cardiovascular events (heart failure, MI, and death)	6MWT	Each SD decrease in 6MWT distance (104 m) was associated with a 30% ⁻ to 55% ⁺ higher rate of cardiovascular events
Martin et al, ⁵ 2013	5641 Patients with CHD who participated in a 12-wk exercise-based CR program; ≥1 y follow-up for all patients	Peak METs	22% Decrease per MET increase (entire cohort) and a 30% decrease per MET increase in those with low baseline fitness (<5 METs)
Vanhees et al, ⁶ 1994	Male patients ≥4 wk after MI (n=312) or CABG (n=215) for 6.1 y	Peak O ₂	71% Decrease per 1-L/min increase

From: [Exercise benefits in cardiovascular disease: beyond attenuation of traditional risk factors](#)

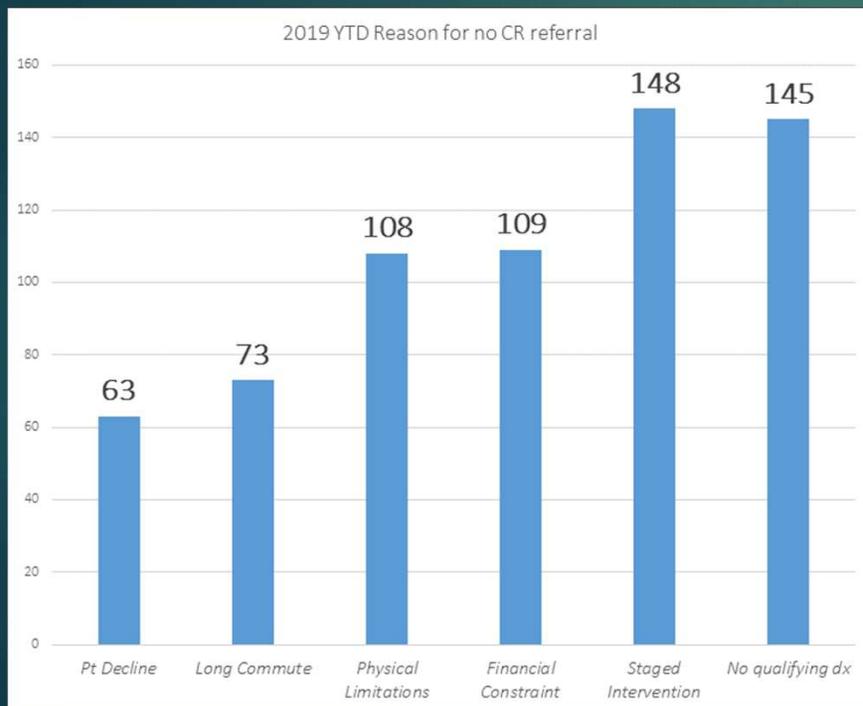


Cardiometabolic Effects of Aerobic Exercise



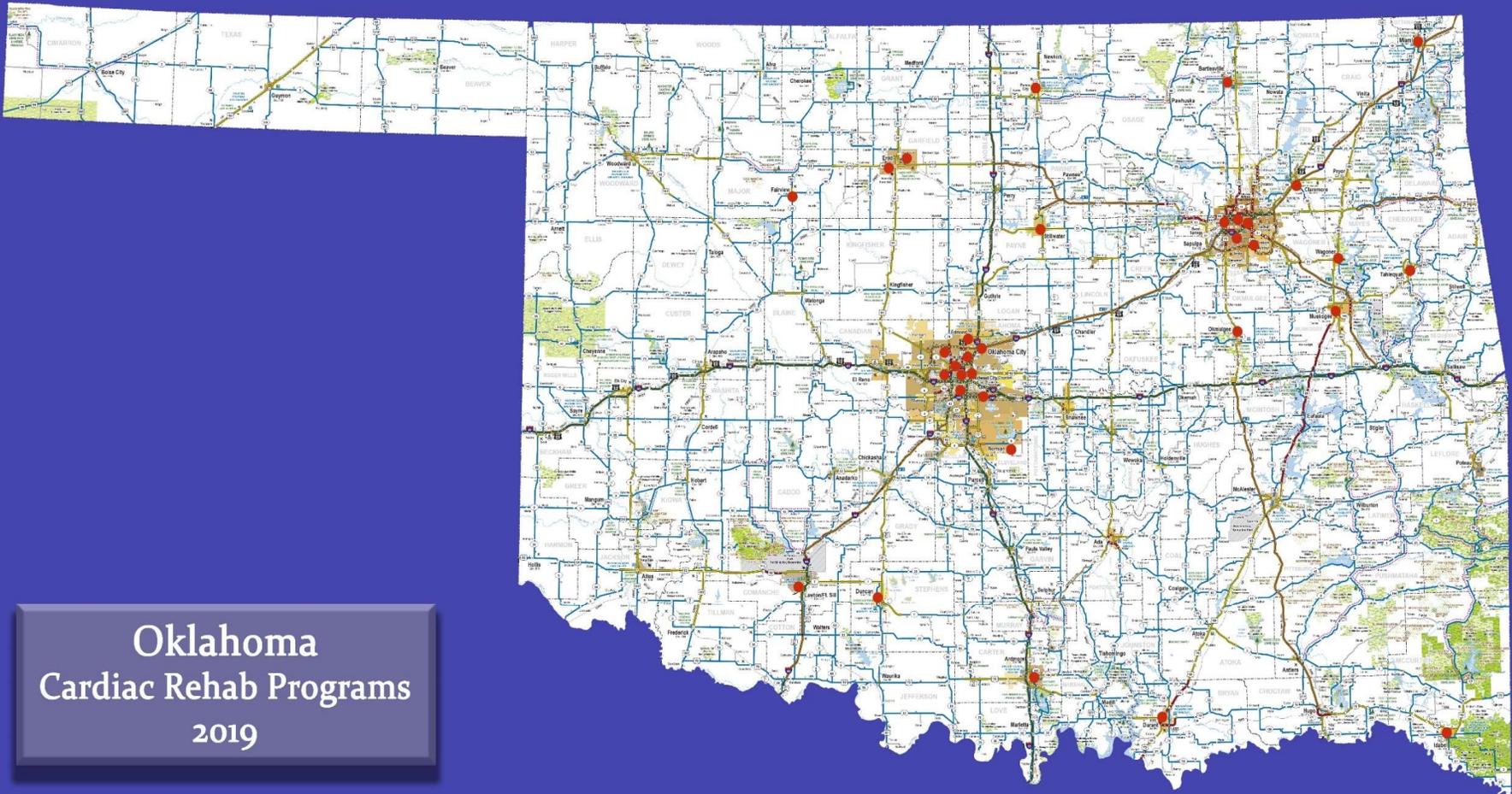
Cardiac Rehabilitation Participation Hindrances at Hillcrest Exercise and Life Style Program

► Hindrances



► Financial Constraints

Insurance Type	Description of Charge	Cost for Patient	What HELP Sees
Medicare A & B	20% of allowable charges	\$22/session \$66/week	Few able to afford over \$20/session
Medicare Replacement Policies	Co-Pay (applies to max out of pocket until met)	\$5 - \$50/session	Few able to afford over \$20/session
Commercial Insurance	Required deductible of \$200-\$3000. Once met individual is responsible for co-insurance, usually 20% until the maximum out of pocket is met range from \$500-\$6000, once met insurance will pay 100%	Once deductible is met: \$22/session \$66/week	A few individuals have met their deductible and can afford copay until max out of pocket is met.



Oklahoma
Cardiac Rehab Programs
2019

NOW WHAT?

Table 2. Twelve Strategies to Facilitate Increased Referral to, Enrollment in, and Long-Term Participation in CR Programs

1. Achieve strong endorsement of outpatient CR by referring physicians and hospital administration by incorporating it into the hospital discharge plan
2. Automatically refer all eligible patients to outpatient CR at the time of hospital discharge
3. Use hospital-based liaisons to provide CR information and education to inpatients before discharge
4. Develop a brief (5–10 min) promotional video about the value of outpatient CR that can be shown to all inpatients during hospital convalescence
5. Provide patients with contact information for outpatient CR programs in close proximity to their home
6. Schedule CR enrollment appointments via the patient's preferred communication mode (telephone call, text message, email, or regular mail)
7. Provide the option of an HBCR program at the time of hospital discharge for low- to moderate-risk patients
8. Consider system-, provider-, and patient-level financial incentives for referral to, enrollment in, and completion of early outpatient exercise-based CR sessions
9. Target specific patient subsets least likely to enroll in and complete CR (eg, racial/ethnic minorities, women, older adults, rural residents, and economically disadvantaged individuals) via a network of diversity liaisons
10. Develop a series of integrated practice units, staffed by allied health professionals, that can provide counseling via in-person visits or through web-based and mobile applications, telephonic coaching, handheld computer technologies, or the internet
11. Establish medication dosing and adherence as a quality assurance initiative in CR
12. Offer serial assessments to track ongoing efforts for cardiovascular risk reduction, including physical activity/fitness



CR indicates cardiac rehabilitation/secondary prevention programs; and HBCR, home-based cardiac rehabilitation.

Adapted and reproduced from Higgins et al⁷⁵ with permission. Copyright © 2008, *The Medical Journal of Australia*. Adapted from Ades et al⁷⁶ with permission from Mayo Foundation for Medical Education and Research. Copyright © 2016, Mayo Foundation for Medical Education and Research.

NOW WHAT

- Start with writing an order
- Inpatient or Outpatient with electronic medical records –Simply order “Ambulatory Referral for Cardiac Rehab” in EPIC
- Outpatient
 - Written Physician's order – please include diagnosis
 - Patient demographic sheet
 - Fax the above to 918-579-4969 (Hillcrest Exercise and Lifestyle Programs – HELP) if the patient does not live in our area they are referred to the most convenient program for them.
- Give every patient an 'EXERCISE RX', say something like this: “I am ordering cardiac rehab for you and giving you a RX for home exercise. I want you to start this exercise tomorrow. I will be asking you on your next visit if you are keeping this up. This is a treatment you will be on the rest of your life.”

Write A Simple Exercise Prescription

Medication: Exercise

Amount: 5 minutes

Route: walk, bike etc.

Frequency: 4 x day

Duration: 1 week

Instructions: Follow this plan the first week and continue with the charted course.

You are almost there!

Refills: life long!

WEEK	#1	#2	#3	#4	#5	#6
MINUTES	5	7	10	12	15	20-30
TIMES A DAY	4	4	3	3	2	1
DAYS PER WEEK	5	5	5	5	5	5