

## Physical Activity in the Prevention and Management of Chronic Disease

### Questions for today

Exercise for the health of it .... or is physical activity good enough?  
 Is it all about calories or does intensity really matter?  
 If it's so good for us why don't we do it?  
 Do I really need to go to the gym?

**"However beautiful the strategy you should occasionally look at the results"**  
*Winston Churchill*

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## Aerobic Fitness and Death

The New England Journal of Medicine

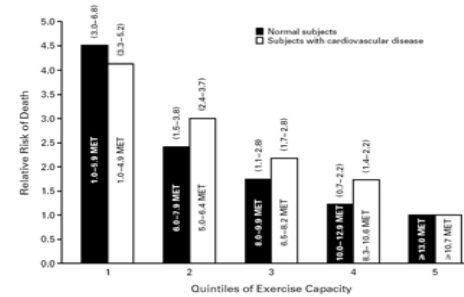


Figure 2. Age-Adjusted Relative Risks of Death from Any Cause According to Quintile of Exercise Capacity among Normal Subjects and Subjects with Cardiovascular Disease. The subgroup of subjects with the highest exercise capacity (quintile 5) was used as the reference category. For each quintile, the range of values for exercise capacity represented appears within each bar; 95 percent confidence intervals for the relative risks appear above each bar.

N Engl J Med, Vol. 346, No. 11 · March 14, 2002 · www.nejm.org

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## Relative Risk for Mortality by Fitness Level in Men with Type 2 Diabetes

Fitness Level	Relative Risk (95% CI)*	
	CVD	All-cause
Low	1.0	1.0
Moderate	0.4 (0.3-0.7)	0.4 (0.3-0.6)
High	0.3 (0.2-0.6)	0.2 (0.1-0.4)

\*Adjusted for age and examination year

Wei M, Ann Int Med 2000;132:605-611.

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## Physical Activity vs. Exercise



### Physical Activity

*"any bodily movement that is produced by the contraction of skeletal muscles and increases energy expenditure."*

### Exercise

*"a subclass of physical activity, planned structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness"*

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## Activity or Exercise?

1990

- 3-5 days/week
- 60-90% of max. HR
- 20-60 min/session

} Volume and Intensity

2002

- 30 minutes, moderate exercise most days of the week

} Volume and Intensity



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## Is it all about calories or does intensity really matter?

### Meta-regression study – Diabetics

#### Inclusion criteria

- Adults with type 2 diabetes
- Controlled clinical trials (> 8 wks) evaluating aerobic exercise intervention
- Detailed prescription with supervised intervention
- A1c and maximal exercise testing at baseline and end of study
- 7 studies, 9 comparisons, 266 subjects

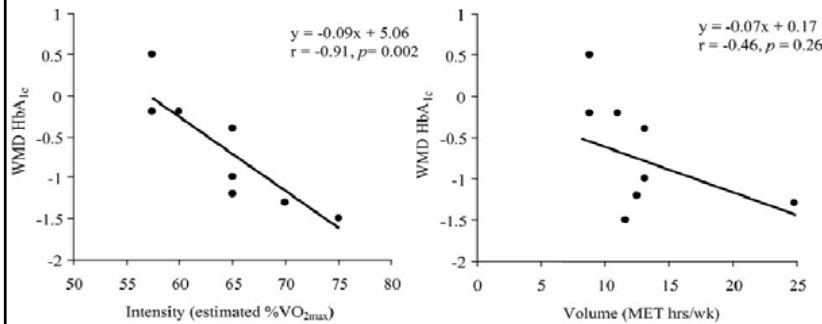
Boulé NG et al, Diabetologia 2003

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## Exercise Intensity vs. Volume as predictors of differences in A1c

Boulé et al (2003) Diabetologia

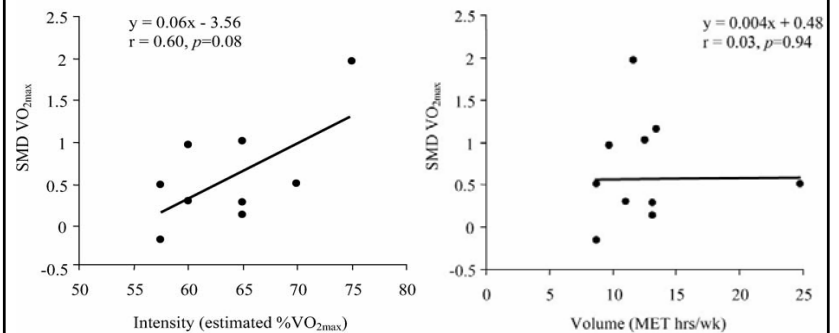


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## Exercise Intensity vs. Volume as predictors of differences in A1c

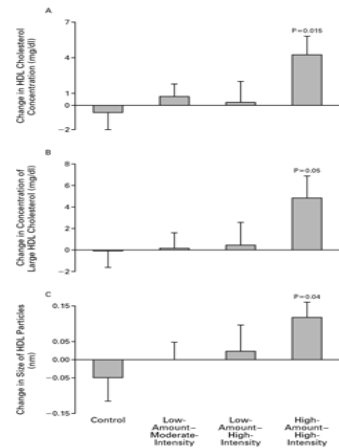
Boulé et al (2003) Diabetologia



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## Effects of exercise Intensity and Volume on lipids: STRRIDE



Kraus WE, N Eng J Med 2002;347:1483-92

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## Italian Diabetes and Exercise Study: Supervised Exercise was superior for

### Intervention group

- HbA1c
- Systolic and diastolic blood pressure
- BMI
- Waist circumference
- Aerobic fitness
- Muscle strength
- HDL cholesterol
- Estimated 10-year cardiac risk



Balducci S et al., Nutrition Metabolism Cardiovascular Disease, 2007

Balducci S et al., Diabetes 2008 (supplement; abstract 1068-P)

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## Cardiac Rehabilitation

Regular Exercise = Fewer events, 20-34% ↓ all cause mortality

Am Heart J 2006; 152:835-84

- ↓ Inflammatory cytokines including C-reactive protein
- ↓ Plasma fibrinogen levels
- ↓ Platelet aggregation
- ↓ glucose intolerance
- ↓ serum LDL
- ↓ Serum triglycerides

CACR Guidelines 2009

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## Benefits of Exercise

Increased VO<sub>2</sub>  
Improved BP Control  
Improved lipid profile  
Decreased Body Fat  
Improved Weight Control  
Improved BS Control  
Improved Strength  
Less Fatigue  
Improved Balance



Heart Disease  
Lung Disease  
Diabetes  
Neuromuscular  
Peripheral Artery Disease  
Hypertension  
Obesity  
Cancer  
Kidney Disease  
Frailty....



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## IF IT'S SO GOOD FOR US WHY DON'T WE DO IT?

### General Healthy Populations

- 63%, falling to 50% @ 12 months *Martin & Sinden 2001*

### Cardiac Populations

Only 15-25% of eligible patients participate!

*Am Heart J 2006; 152:835-841*

CHF = 80% view exercise as important but only 39% do it.

*van der Wal MHL et al., Eur Heart J 2006*

61% of CR patients consider adhering to exercise more difficult relative to other recommendations

*Evangelista LS et al., Am J Cardiol 2001*

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## IF IT'S SO GOOD FOR US WHY DON'T WE DO IT?

- Stable patients → expenditure of 1,000 kcal/week over 3-6 months
- <40% of patients in rehab programs reach these levels
  - Typical cardiac program is <300kcal per session and <200 on non-program days
- Traditional exercise Rx falls short of this goal!

*ACSM Guide to Exercise Rx 7th Edition*

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## Participation in Exercise Rehabilitation Programs

### Australian Pulmonary Programs

- Eligible to participate 648,000
- Referred 58,500
- Commenced Rehab 39,000
- Completed 8-12 weeks 31,000

*From Dr. Ann Holland  
La Trobe University & Alfred Health*

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### Short term improvement in exercise capacity and symptoms following exercise training in interstitial lung disease

*Holland AE et al Thorax 2008*

8 weeks of supervised exercise training or weekly telephone support.

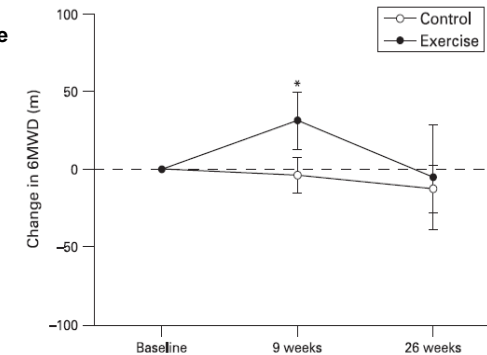


Figure 2 Change in 6 minute walk distance (6MWD) test. Data are means and 95% CI. \*p<0.05, exercise vs control group.

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## Adherence to Structured Exercise Programs

### General Populations

#### Predictors

- **\*\* Hx of prior activity \*\***
- High Self Efficacy

#### Drop out predictors

- **lack of time** Godin G., et al 1994
- access to facilities
- illness/ poor health
- pain
- family or work commitments

Barbour and Houston-Miller 2008

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## Barriers to Structured Exercise Programs

### Cardiac Patients

- **Lack of time**
- **Inaccessibility**
- Financial Concerns / Work conflict
- Fatigue, lack of energy
- Lack of motivation
- ↑ # of comorbid conditions

### Specific Barriers– Women / Minorities

- Lack of physician referral
- Inaccessible transportation
- Inability to speak English fluently

Barbour and Houston-Miller 2008

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## Barriers to Structured Exercise Programs

### Systematic review of 9 COPD programs

- |                                    |           |
|------------------------------------|-----------|
| ➤ Travel, transportation, location | 5 Studies |
| ➤ Disruption of routine            | 5 Studies |
| ➤ Influence of patient's physician | 3 Studies |
| ➤ Lack of perceived benefit        | 3 Studies |
| ➤ Inconvenient time                | 3 Studies |

Keating et al 2009

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## Strategies to Improve Adherence

- **Internal Motivation - Stages of Change** Declemente & Prochaska 1982
- **Self Efficacy**- influenced by past experiences/perceived exertion
- **Social Support**
- **Goal Setting / Self monitoring**
- **Positive reinforcement**
- **Variety of exercise training**



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## Improving Adherence

- **Relapse Prevention Model**
  - Identify high risk situations
  - Develop coping strategies
  - Planning ahead to avoid lapses
  - Maintain a rational reaction to relapses
  - Keep daily exercise flexible
- **Focus on want rather than should**

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## Practical Recommendations to Enhance Exercise Adherence

- **Testing and Prescription are often over emphasized in relation to behavioral components.**
- **Specifics:**
  - Recruit doctor to support exercise program
  - Minimize injuries with moderate exercise prescription
  - Advocate exercising with others
  - Emphasize variety
  - Recruit support amongst family members
  - Know your patients Hx of Physical Activity

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## Practical Recommendations to Enhance Exercise Adherence

- **NIH Consensus Conference Statement, 1995**
  - **Perceives a net benefit**
    - Choose enjoyable activity
    - Feels competent doing activity
    - Feels safe doing activity

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## GYM? Lifestyle vs Structured Exercise?

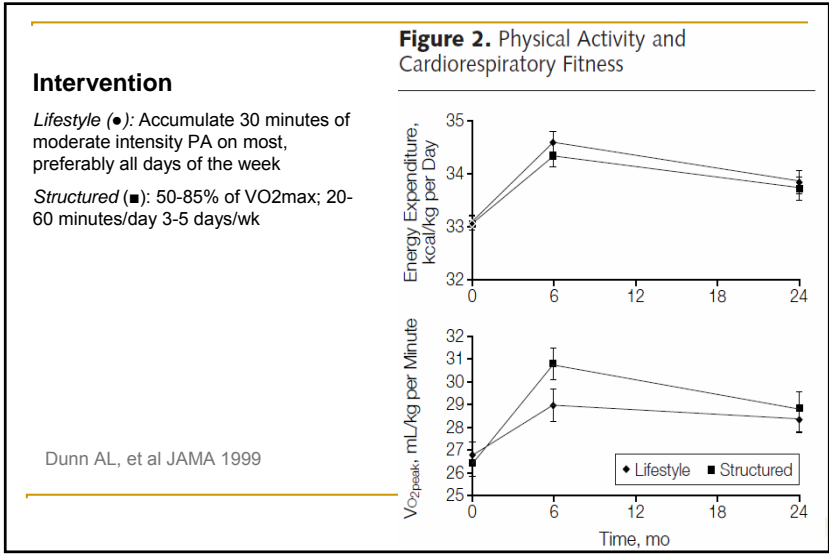
- **Comparison of lifestyle & structured interventions to increase physical activity and cardiorespiratory fitness: a randomized trial**

Dunn AL, et al JAMA 1999

- **Sedentary men (116) & women (119)**
- **6 months intensive intervention**
  - lifestyle physical activity program
  - structured exercise program
- **18 months maintenance intervention**

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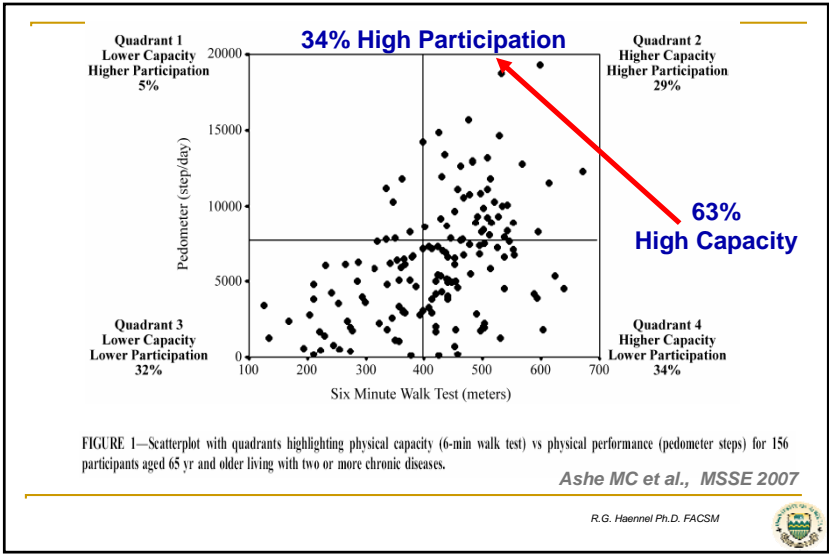
### Lifestyle vs Structured Exercise

	Lifestyle Program	Structured Exercise
change systolic BP (mmHg)	-3.63	-3.26
change diastolic BP (mmHg)	-5.38	-5.14

Dunn AL, et al JAMA 1999

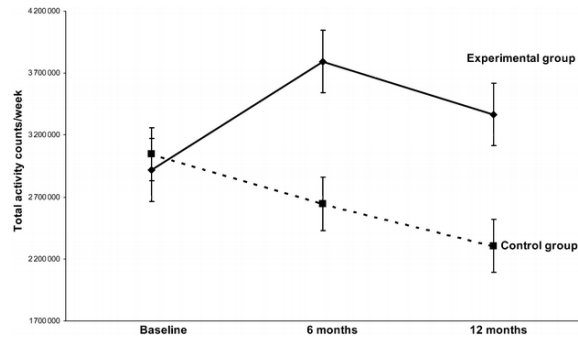
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- ### Quiz: How Many Steps are Enough?
- a. <5,000 / day
  - b. 5,000-7,499 /day
  - c. 7,500-9,999 /day
  - d. 10,000-12,499 /day
  - e. >12,500 /day
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## What about exercise counseling alone?

Kirk PA counseling study results: Measured activity (CSA accelerometer)

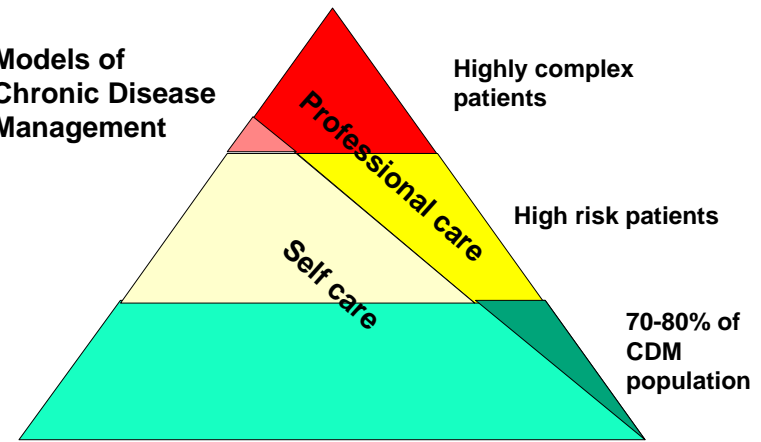


Health Benefits Associated with Exercise

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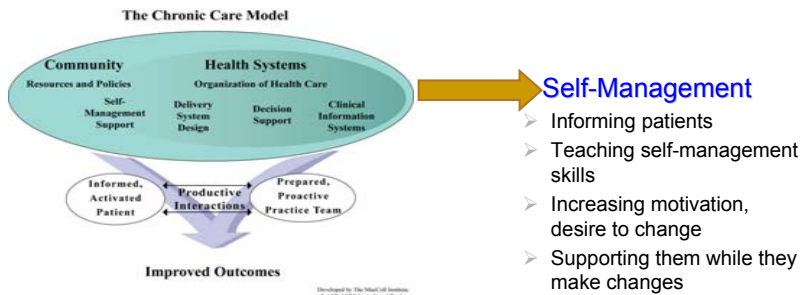
## Models of Chronic Disease Management



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## Chronic Care Model



[http://www.improvingchroniccare.org/index.php?p=The\\_Chronic\\_Care\\_Model&s=2](http://www.improvingchroniccare.org/index.php?p=The_Chronic_Care_Model&s=2)

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## CHRONIC CARE MODEL SELF-MANAGEMENT SKILLS

1. Problem-solving
2. Decision-making
3. Resource utilization
4. Formation of a patient/health care provider partnership
5. Taking action



Tailored to your community

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