

PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David

Ageing, Activity and Health

Dr Peter Herbert PhD

Ageing and Physical Activity

1. What do we mean by ‘older people’
2. The benefits of physical activity
3. How active are older people?
4. How active should older people be?
5. How do we improve their health and fitness?
6. Research – Training Intensity/Masters Athlete

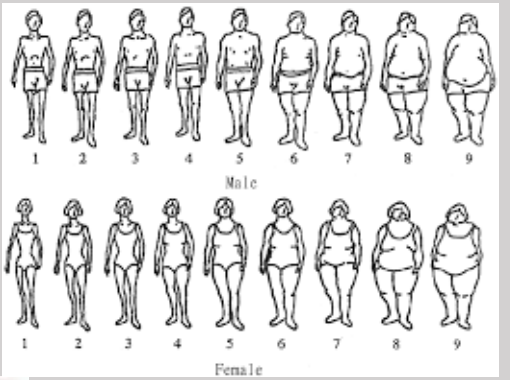
Hierarchy of physical function

	Physically fit	Physically unfit	Physically unfit frail
Healthy	**Group 1**		
Unhealthy independent		**Group 2**	
Unhealthy dependent			**Group 3**

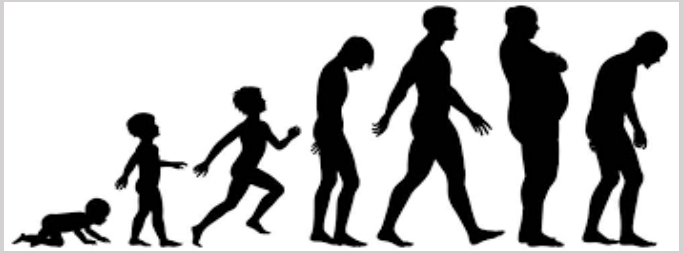
(World Health Organization, 1997)

Physical Ageing







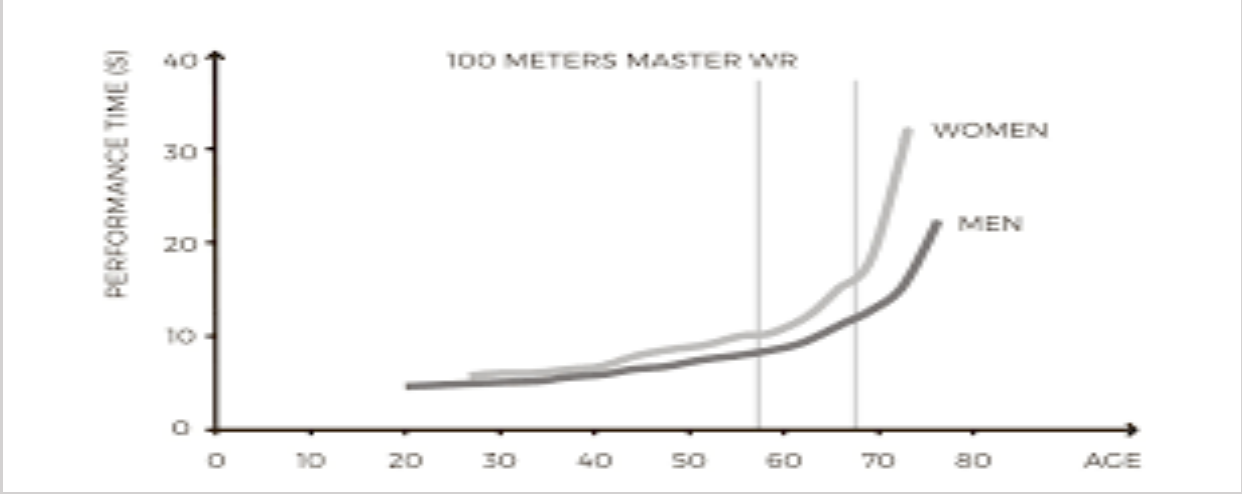




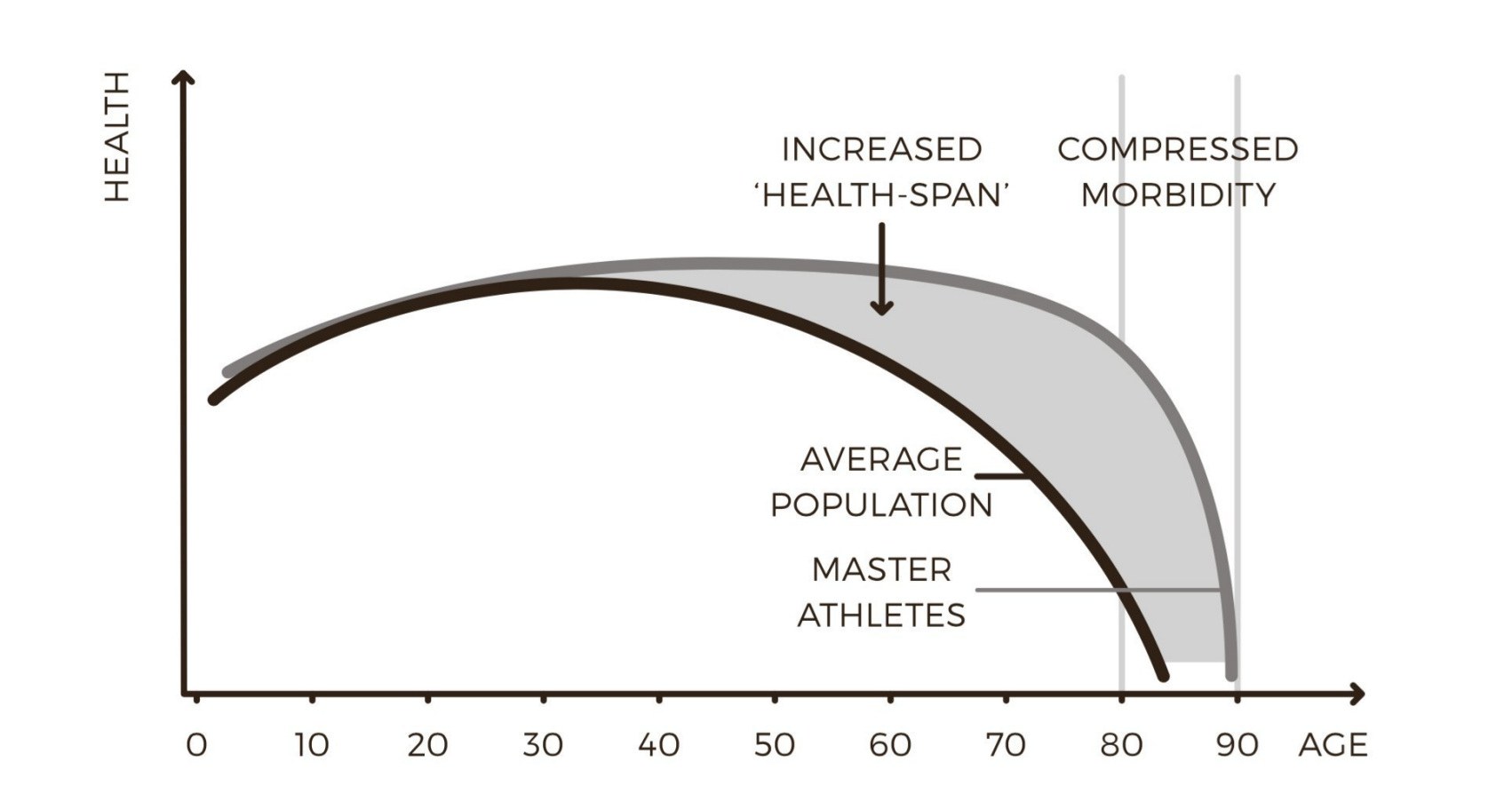
What do we mean by ‘older people’?

- Entering old age **young-old** (approximately 65–74)
- Transitional phase **the middle-old** (ages 75–84)
- Frail older people **old-old** (over age 85)

(Department of Health, 2001a)



Ageing


HEALTH
INCREASED
'HEALTH-SPAN'
COMPRESSED
MORBIDITY
AVERAGE
POPULATION
MASTER
ATHLETES
0
10
20
30
40
50
60
70
80
90
AGE

FIRSTBEAT



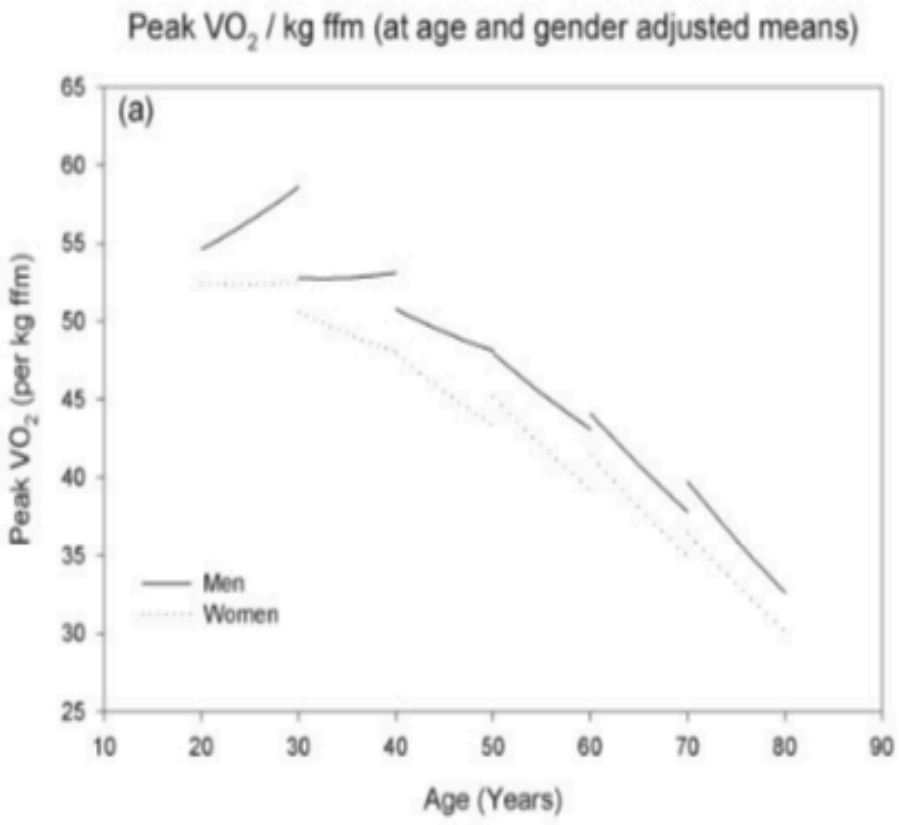
POOR CONDITION

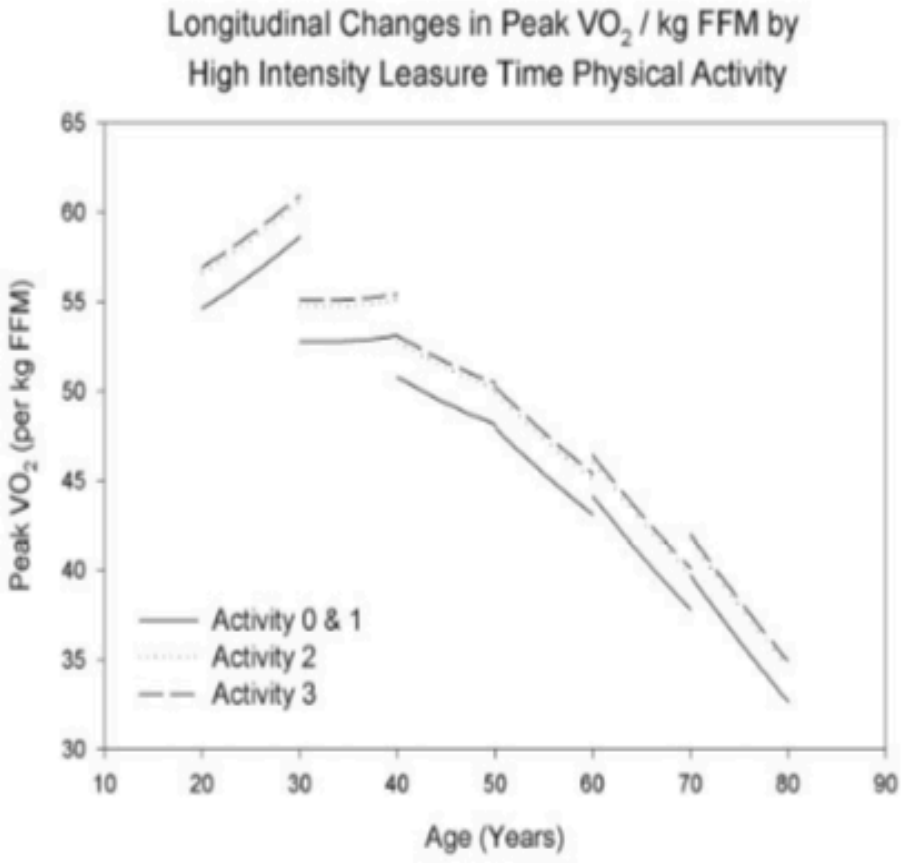


GOOD CONDITION

30 YEARS OLD WOMAN

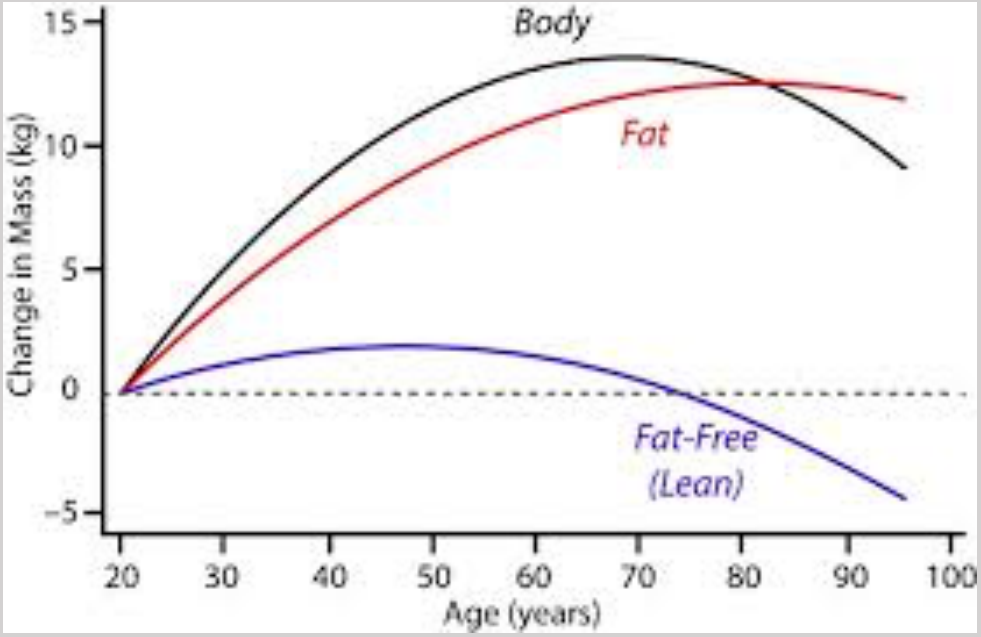
Decline in VO2max

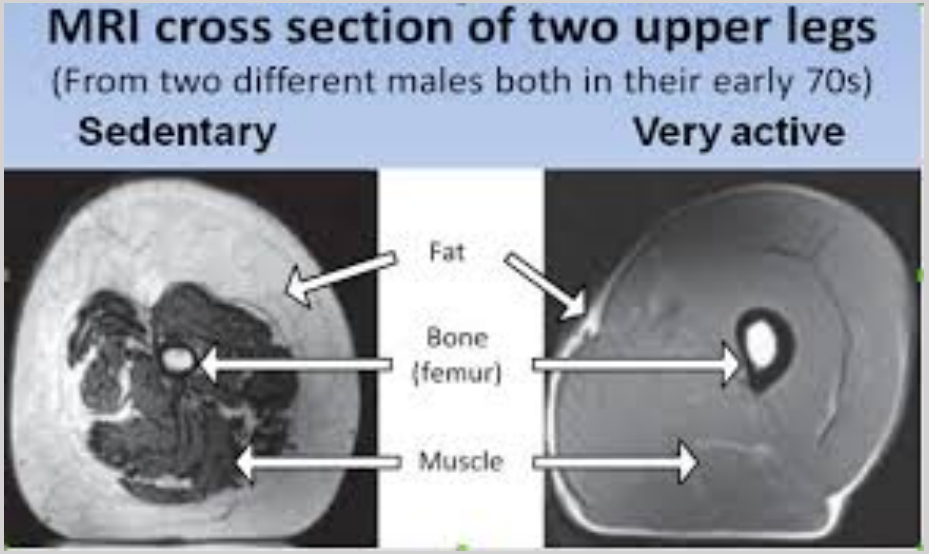




Per Decade Cross-Sectional versus Longitudinal Change

Danger of Weight Loss in the Elderly





Speeding up the Ageing Process

- **Poor diet** *Bauman A, Craig C. The place of physical activity in the WHO Global Strategy on Diet and physical activity. Int J Behav Nutr Phys Act 2005;2:10.*
- **Obesity** *U.S. Department of Health and Human Services. Physical activity guidelines for Americans. In: U.S. Department of Health and Human Services, Division of Nutrition, Physical Activity and Obesity. Atlanta: National Center for Chronic Disease Prevention and Health Promotion, 2008.*
- **Smoking** *Townsend N, Bhatnagar P, Wickramasinghe K, et al. Physical activity statistics 2012. London: British Heart Foundation, 2012.*
- **Less than adequate amounts of sleep** *Ministry of Health. Guidelines on physical activity for older people (aged 65 years and over). Wellington: Ministry of Health, 2013*
- **Lack of exercise** *Ministry of Health. Guidelines on physical activity for older people (aged 65 years and over). Wellington: Ministry of Health, 2013.*

Which is exercise?





























Physical Activity and Exercise

Physical Activity

Physical activity is **defined** as any bodily movement produced by skeletal muscles that requires energy expenditure. **Physical inactivity** (lack of **physical activity**) has been identified as the fourth leading risk factor for global mortality.

Exercise

Exercise is **physical activity** that is planned, structured, and repetitive for the purpose of conditioning any part of the body. **Exercise** is used to improve health, maintain fitness and is important as a **means** of physical rehabilitation.

The benefits of physical activity for older people

Increasing evidence in relation to:

- Disease prevention, psychosocial benefits and complications of immobility
- Maintaining independence, improving the quality of life, and 'successful ageing'
- Opportunities for significant savings to health and social care services

Benefits can be achieved by healthy older people as well as the frail and very old.

Reduction in health and social care costs

- Accidental fractures among women (£1.8 billion)
- CHD and stroke (£1.6 billion for health care alone)
- Diabetes (5% of NHS resources)
- Obesity (£2.5 billion)
- Poor mental health (£32 billion)

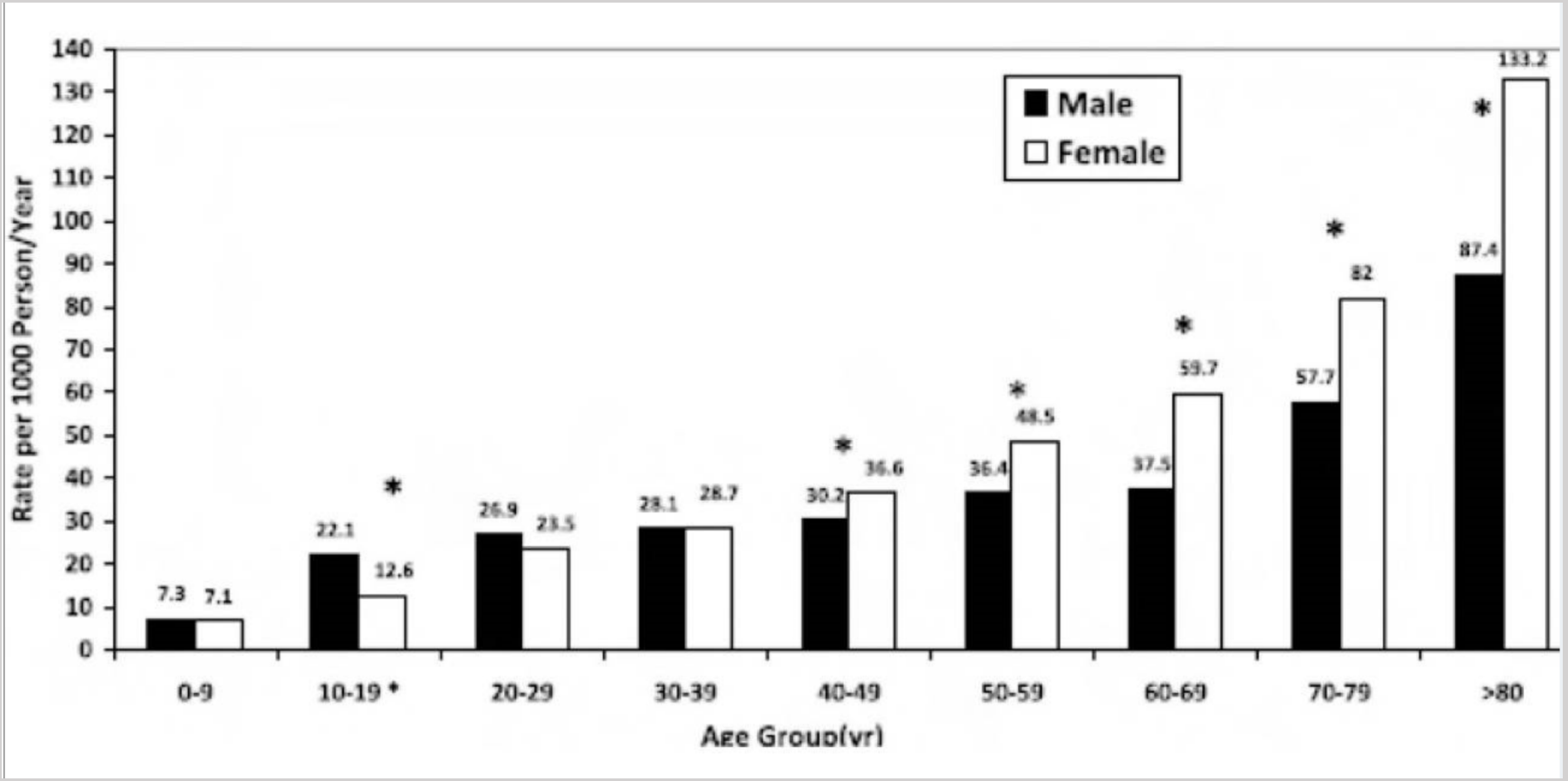
Inactivity increases the risk of illness!!

- Coronary heart disease
- Stroke
- Increased blood pressure
- Late onset (Type 2) diabetes
- Osteoporosis
- Colon cancer
- Weight control
- **Reduction in accidental falls**

Effects apparent even among those taking up activity at a later age.

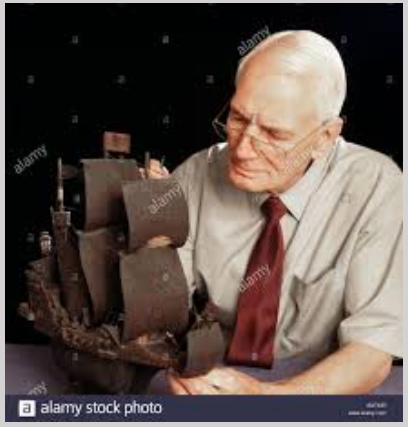
Balance - Falls?





Psychological benefits

- Reduction in stress and anxiety
- Reduction in depression
- Improvement in overall psychological well-being
- **Improvements in cognitive function**
- Improvements in self-esteem and self-worth
- Reduction in isolation and loneliness
- **Effects apparent even among those taking up activity at a later age.**





How active are older people?

Levels of physical activity,
fitness and functional capacity

‘The Times’

12th November 2019



Hit the gym in middle age to boost heart

Pumping iron in middle age could help men to reduce their risk of heart attack and stroke, according to a study.

Those in the top third for muscle mass were about a fifth as likely to develop heart disease as those in the bottom third, it found.

Researchers in Spain recruited 2,020 Greek adults without heart disease, including just over 1,000 aged 45 and older, and tracked them over ten years. They took lifestyle information including their diets and how much they exercised, as well as medical measures such as blood pressure, body mass index and how much skeletal muscle they had.

Among those who were 45 or older at the start of the study 272 people developed cardiovascular disease, with men four times more likely to fall victim.

The study, reported in the *Journal of Epidemiology & Community Health*, could not establish cause but suggests that resistance training and a protein-rich diet could improve health in old age. The researchers said: "Prevention of skeletal muscle mass decline, increasingly prevalent among middle-aged and older populations, may [promote] cardiovascular health."

Functional capacity

Even healthy older people lose functional capacity.

- Muscle strength 'lost' at 1%-2% per year
- Muscle power 'lost' at 3%-4% per year
- Aerobic capacity 'lost' at 1% per year
- Bone density 'lost' at 1% in men and 2%-3% in women after menopause
- Flexibility and balance
- **Co-ordination and reaction**

Inactivity-related disease?

Disuse rather than disease?

- One week's bed rest reduces:
  – strength by up to 20%
  – spine bone mineral content by 1%.
- Aerobic Capacity by 30%
- Nursing home residents spend 80%-90% of their time seated or lying down – leading to inactivity-related disability.
- Those who are less active and weaker will enter nursing homes earlier than those who maintain their fitness.

Physical activity is disappearing from everyday life

- Labour-saving devices
- Transport patterns
- Concerns over safety in public spaces
- Sport as entertainment
- The impact of information technology

Leading to an increase in sedentary and physically less demanding lifestyles

Active for Later Life – Summary

- **Physical activity can contribute significantly towards successful ageing.**
- **Although physical activity can confer a wide range of benefits, the majority of older people remain inactive.**
- **Even modest amounts of activity can be beneficial.**

Physical activity for the older person should also include:

- muscle strength and endurance (resistance) exercises for all major muscle groups
- balance exercises
- flexibility (stretching)

(American College of Sports Medicine, 1998)

Active for Later Life – Summary

- **Physical activity can contribute significantly towards successful ageing.**
- **Although physical activity can confer a wide range of benefits, the majority of older people remain inactive.**
- **Even modest amounts of activity can be beneficial.**











Making Friends

Enjoyment

Cardiovascular Fitness

Centre for Health, Ageing & Research

Leisure Activities



Strength



Competition and Performance

Health Related Quality of Life

Testing/Research



Measurement of Fitness and Health

- **Blood Pressure**
- **BMI** = Height/Weight
- **Body Composition = Muscle Mass/Bodyfat (segmented)**
- **Lung Efficiency** = Lung Volume/Lung Power
- **Flexibility** = hips/shoulders
- **Leg Power/Leg strength** (1RM)
- **Upper Body Strength** (Push/Pull)
- **Aerobic Capacity** (VO2max)

Increasing Exercise Participation









Enjoyment, a ‘nice’ instructor, health improvements, more energy, knowledge, new friends, lost weight

Measurement of Aerobic Fitness and Muscle Strength/Power

VO2max

- Anaerobic Threshold (VT)
- Maximal Tests
- Sub Maximal Tests

Power/Strength

- Bi-lateral
- Muscle weaknesses





Physical Activity	MET
Light Intensity Activities	**< 3**
sleeping	0.9
watching television	1.0
writing, desk work, typing	1.8
walking, 1.7 mph (2.7 km/h), level ground, strolling, very slow	2.3
walking, 2.5 mph	2.9
Moderate Intensity Activities	**3 to 6**
bicycling, stationary, 50 watts, very light effort	3.0
walking 3.0 mph	3.3
calisthenics, home exercise, light or moderate effort, general	3.5
walking 3.4 mph	3.6
bicycling, <10 mph (16 km/h), leisure, to work or for pleasure	4.0
bicycling, stationary, 100 watts, light effort	5.5
Vigorous Intensity Activities	**> 6**
jogging, general	7.0
calisthenics (e.g. pushups, situps, pullups,jumping jacks), heavy, vigorous effort	8.0
running jogging, in place	8.0
rope jumping	10.0

Cardiopulmonary Exercise Testing (CPET)



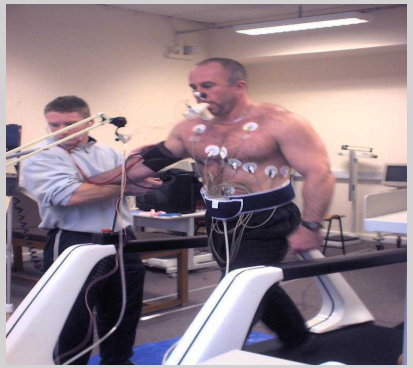
COMPETITIV E SPORT



- graded exercise test to measure aerobic capacity (VO_{2max})

16.4 METS

RESEARCH



42 year old former Mr Universe competitor having functional stress test with late-potential analysis

9.8 METS

CLINICAL



Integrated approach to assess physical fitness to inform perioperative risk stratification

? METS

1 Metabolic Equivalent (MET) = Energy at Rest

Functional Independance







Improving Health



- Coronary heart disease
- Stroke
- Increased blood pressure
- Late onset (Type 2) diabetes
- Osteoporosis
- Colon cancer
- Weight control
- Reduction in accidental falls
- Stress

Be healthy enough to enjoy a long life!!











