Physical Activity, Health and Wellbeing – Session 4

1 – Measurement and Evaluation of PA

2 - FITT Principles of PA

Essay formative feedback

- After Gail spent the start of last week's lecture discussing the essay, some of you have been asking whether we can give you some feedback on your ideas
- I am happy to read over plans for your essay
- You can use bullet points/paragraphs/ideas of evidence, whatever you want but keep them to one page
- Essay deadline 12th May
- With the Easter break and poster presentation before the essay submission, to give me time to feedback please let me have your plans by Thursday 31st March
- NB Essay tutorial session after the lecture on 21st April

Intended learning outcomes

Part 1

- Discuss the methods of measuring physical activity in individuals
- Understand the need for public health surveillance of PA / PIA
- Understand the strengths and weaknesses of assessment methods

Part 2

- Define and describe the FITT principles of PA prescription
- Define and discuss the principles of overload, specificity and reversibility
- Understand and discuss specific amounts of PA required for certain health conditions

Why assess fitness in population health?

- Aerobic fitness is a stronger predictor of mortality than established CVD risk factors (Ross *et al.*, 2016).
- Enables personalised exercise prescription where indicated
- Regular monitoring provides evidence of any changes
- Provides strong motivational feedback
- Can be a health risk indicator

Components of health-related fitness

- Cardio-respiratory (aerobic)
- Strength (anaerobic)
- Body composition
- Flexibility (mobility, posture, muscle co-ordination, reduced injury risk)

The evidence shows us that…

- Low levels of aerobic fitness are strongly associated with premature deaths, particularly related to non-communicable diseases (Blair, 2009; Ross *et al*., 2016)
- Good aerobic fitness is linked to higher levels of habitual (regular) physical activity which in turn is linked to many health benefits
- Low cardiorespiratory fitness = higher mortality than smoking, alcohol and diabetes combined (Blair, 2009)

Heart rate as a measure of fitness

- Lower heart rate = better fitness level
- Heart rate is lower in endurance trained athletes than sedentary healthy individuals
- A trained endurance athlete may have a resting heart rate below 35 bpm
- Endurance training will cause the parasympathetic nervous system to fire more frequently
- An endurance trained athlete will have a lower heart rate than an untrained person when they are running at the same speed

Factors that control and affect heart rate

- Heart rate is controlled by two branches of the nervous system
- The **Sympathetic Nervous System** is like an accelerator in a car and causes the heart rate to increase
- The **Parasympathetic Nervous System** is like the breaks in a car and causes the heart rate to decrease
- Other factors that can affect your HR;
  - Dehydration can increase the heart rate by up to 7.5%
  - Heat and humidity can raise the HR by 10 bpm
  - High altitude can raise the HR by 10 to 20%
    - McArdle, Katch and Katch, 2015

Recovery heart rate

- When exercise stops heart rate drops as less blood is needed to be pumped around the body
- A trained individual will return to resting values quicker than a healthy sedentary person

Aerobic capacity

ALSO CALLED:

- Maximal oxygen uptake
- vO_2 max
- Peak aerobic power
- Maximal aerobic power
- Maximum voluntary oxygen consumption
- Cardio-respiratory aerobic capacity
- Maximal cardio-respiratory fitness
- Maximal functional aerobic capacity

Physiology of aerobic capacity

- Measure of stamina, general endurance or cardio-respiratory fitness
- vO_2 max = maximum amount of oxygen the body can take in, transport & use
- The higher this is, the fitter you are
- A measurement of vO_2 max is an indication of the ability of the lungs, cardiovascular and muscular systems to convert oxygen into energy
  - McArdle, Katch and Katch, 2015

Put simply…

- Cells need oxygen (think of the cell as an engine)
- Waste products of the engine using oxygen are carbon dioxide and water
- For every litre of oxygen consumed by the body, around 5 kilocalories are released
- At rest, a typical male consumes about 0.3 – 0.5 litres of oxygen per minute (1.5 – 2.5 kcals/min)
- In moderate intensity exercise energy expenditure will rise to 8-12 kcals/min, whilst in vigorous exercise this will rise to 20-25 kcals/min with a top class endurance athlete
- Maximum oxygen uptake will increase throughout childhood and usually peaks in mid-20s, and then starts to fall

Factors affecting aerobic capacity

- Heredity
- Age
- Gender
- Body size and composition
- Recent physical activity levels
- Types of muscle fibres used during the exercise
- Altitude
- Temperature

Field tests of aerobic capacity

- Incremental Shuttle Walk Test (ISWT)
- 6 minute walk test
- Chester Step Test
- 3 minute step test
- Bleep Test

Energy Expenditure (EE)

- Total energy expenditure is the amount of energy that is need to;
  - Breathe, circulate blood, digest food, to be physically active
- Basal metabolic energy expenditure;
  - Energy expended to breathe and for circulation at rest
- Thermic effect of food;
  - Amount of energy required to digest and metabolize food and drink
- Physical activity expenditure;
  - EE as a result of physical activity
  - This is the only component that is subject to much change (20-30% of total EE)
  - Therefore, it is important to know how to measure this accurately

Assessment of physical activity energy expenditure

- Indirect Calorimetry
- Doubly labelled water
- Direct observation
- Job classification
- Self report
- Dietary questionnaires
- Monitoring

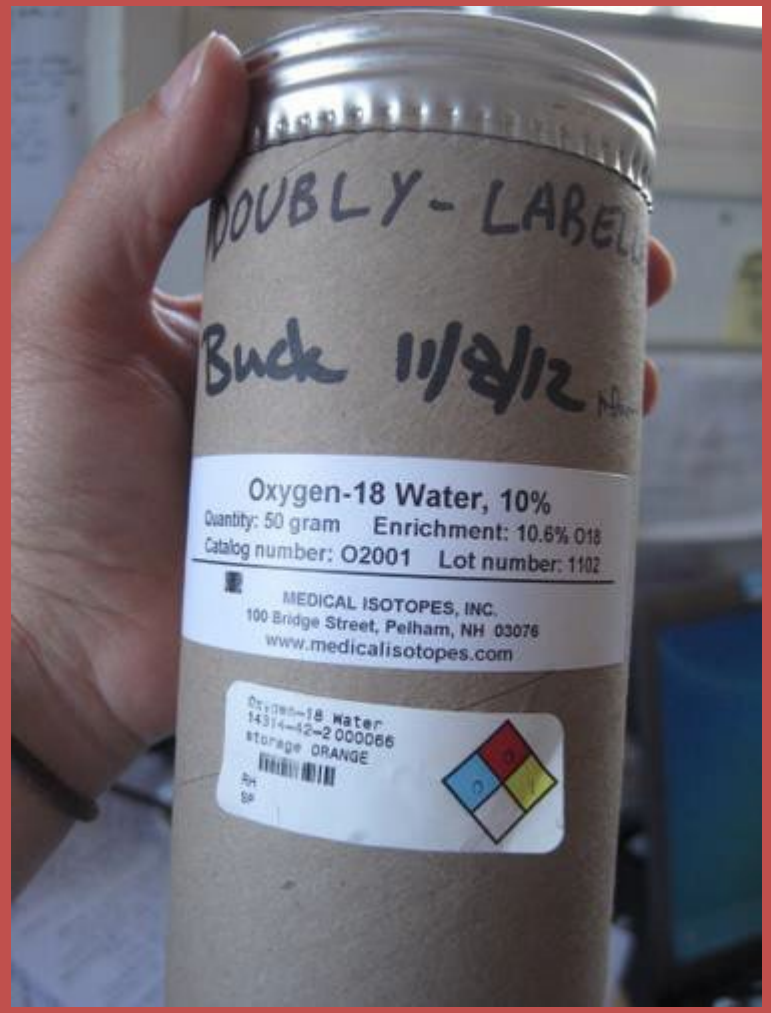
Ideal laboratory-based analysis

- Use indirect calorimetry
- To quantify the amount of PA (intensity, frequency, duration);
  - Have the person keep a diary
  - Observe the person
- Measure food, drink and waste

However…

- Expensive
- Requires special equipment
- Requires specialist staff
- Time consuming
- Equipment requires regular calibration
- Artificial setting (lab)

Doubly labelled water



- Pros;
- Turnover rates of oxygen and hydrogen are measured
- Difference in rates is used to estimate carbon dioxide
- Urine samples collected over a specified time period
- Individuals can live normally

- Cons;
- Expensive
- Inconvenience of collection and storing
- Specialist equipment to analyse required
- Only estimates Total Energy Expenditure (not PAEE)

Direct Observation

- Individual observer monitoring a consenting individual for a set period of time
- Videos and still photos are possible alternatives
- Summary index of energy expenditure
- Impractical for large population studies
- Likely highly reactive

Job Classification

3D1440 [RM] (c) www.visualphotos.com

- Index and ranking of individuals based on energy demands of usual occupation/job title
- May be less useful in populations where variance in job energy demands is minimal
- Seasonality, selection, misclassification
- No indicator of leisure time activity

Self Report

- Diaries, interviews and self-administered surveys
- Varying lengths of recall, all assumed to be indicators of “usual” physical activity
- Varying quality of summary indices
- May not be transferrable among populations
- Most often used in population-based research
- Highly variable and questionnable accuracy

Self Monitoring Tools

Accelerometers

- Measures movement forces in one, two or three planes (or axes) and time
- Can be used to estimate EE
- Some can measure intensity
- Can store long term data
- Standard method for measurement of PA in children (Corder *et al* 2007; Reilly *et al* 2008)
- Human recall not required
- Only detects human movement (not other sources, e.g. cars)

- Cons;
- Expensive
- Not waterproof

Accelerometers and GPS

- GPS allows for the tracking of outdoor movement
- Measures location, distance travelled and speed

- Cons;
- Not effective when used indoors

Pedometers

- Cheaper than accelerometers
- Stores total amount of steps taken
- Can be used for walking, jogging, running

- Cons;
- Does not measure time
- Or intensity

Wearable tech and cardiometabolic conditions

- Hodkinson, Kontopantelis and Adenjii (2021)
- 38 RCTs evaluated with pedometer/accelerometer based interventions
- 4203 participants
- Significant improvements in PA levels recorded amongst people with cardiometabolic conditions when compared to individuals receiving usual care
- Combining use of wearable trackers with consultations with health care professional gave strongest improvements in PA

Part 1 - References

- Corder, K., Brage, S. & Ekeland, U. (2007). Accelerometers and pedometers: methodology and clinical application. *Current Opinion in Clinical Nutrition and Metabolic Care*. 10:597-603.
- Hodkinson, A., Kontopantelis, E., Adenjii, C., van Marwijk, H., McMillan, B. and Panagioti, M. (2021) Interventions using wearable physical activity trackers among adults with cardiometabolic conditions: a systematic review and meta-analysis, *Journal of the American Medical Association Network Open*, 4 (7), e2116382
- Jeukendrup, A. and Gleeson, M. (2010). *Sport Nutrition*. 2nd ed. Human Kinetics.
- Morrow, J.R; Jackson, A.;Disch, J.; and Mood, D. 2005. *Measurement and evolution in human performance*. 3rd ed. (Champaign, IL: Human Kinetics) 234; adapted from Y's Way to Physical Fitness, 3rd edition 1989, with permission of YMCA of the USA.
- Reilly, J.J., Penpraze, V., Hislop, J., Davies, G., Grant, S. & Paton, J.Y. (2008). Objective measurement of sedentary behaviour: review with new data. *Archives of Disease in Childhood*. 93:614-619.
- Ross R, Blair SN, Arena R, *et al*. (2016). Importance of assessing cardiorespiratory fitness in clinical practice: a case for fitness as a clinical vital sign: a scientific statement from the American Heart Association. *Circulation*; 134:e653-99.

Practical testing session

- Resting heart rate
- Height / weight / BMI
- Waist circumference
- Waist to hip ratio
- Body fat percentage
- Blood pressure
- 30 second sit to stand
- Sit to rise
- 3 minute step up test
- Grip strength
- Peak flow
- O_2 saturation
- Sit and reach

Body Mass Index (BMI)

Health risks associated with overweight and obesity will be covered in detail next week

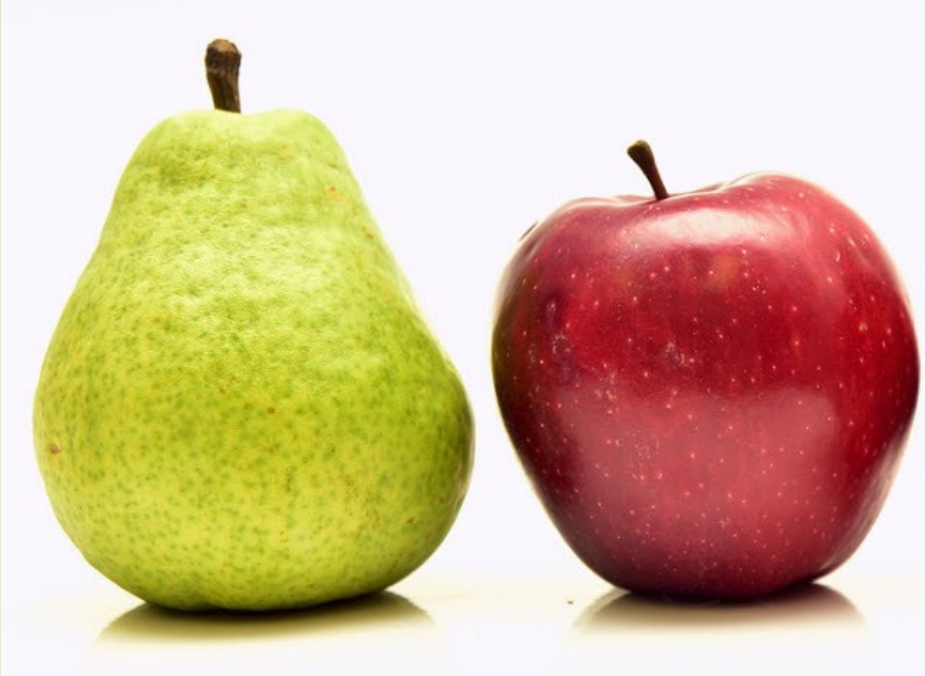
BMI is calculated as weight (in kilograms) divided by the square of your height (in meters)
On a calculator – weight (kg) divided by height (m) divided by height again
BMI units are kg/m^2

Underweight	<18.5
Healthy weight	18.5 – 24.9
Overweight	25.0 – 29.9
Obesity I	30.0 – 34.9
Obesity II	35.0 – 39.9
Obesity III (morbid or severe obesity)	40+

Waist circumference

Men's waist circumference (cm)	Women's waist circumference (cm)	Description
Less than 94	Less than 80	Desirable
94-102	80-88	High
More than 102	More than 88	Very high

NICE, 2014



Waist-to-Hip Ratio (WHR) Norms				
Gender	**Excellent**	**Good**	**Average**	**At Risk**
Males	<0.85	0.85–0.89	0.90–0.95	≥0.95
Females	<0.75	0.75–0.79	0.80–0.86	≥0.86

Waist to hip ratio

Body Fat Percentage

Males	Females	Rating
5-10	8-15	Athletic
11-14	16-23	Good
15-20	24-30	Acceptable
21-24	31-36	Overweight
>24	>37	Obese

Jeukendrup and Gleeson, 2010

Blood pressure

- A healthy blood pressure is considered to be between 90/60mmHg and 120/80mmHg

- High blood pressure is considered to be 140/90mmHg or higher

- Low blood pressure is considered to be 90/60mmHg or lower

Sit to stand test

- Purpose: To test leg strength and endurance
- How many sit to stands can you do in 30 secs?

Chair Stand
Below Average Scores

AGE	MEN	WOMEN
60-64	< 14	< 12
65-69	< 12	< 11
70-74	< 12	< 10
75-79	< 11	< 10
80-84	< 10	< 9
85-89	< 8	< 8
90-94	< 7	< 4

Sit to rise

Check for updates

European Journal of Preventive Cardiology

EUROPEAN SOCIETY OF CARDIOLOGY®

Original scientific paper

European Journal of Preventive Cardiology
2014, Vol. 21(7) 892–898
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DOI: 10.1177/2047487312471759
ejpc.sagepub.com
SAGE

Ability to sit and rise from the floor as a predictor of all-cause mortality

Leonardo Barbosa Barreto de Brito[1], Djalma Rabelo Ricardo[1,2], Denise Sardinha Mendes Soares de Araújo[3], Plínio Santos Ramos[1,2], Jonathan Myers[4] and Claudio Gil Soares de Araújo[1,5]

- https://www.youtube.com/watch?v=LWyRUYMQ7ws&t=5s

- Start with the score of 10
- Decrease by 1
- 8-10 long and healthy life
- 6-8 = 2 x risk of less life
- 3.5 – 5.5 = 3 x risk of less life

Step Test

- Resting heart rate
- Step up and down (at pace) for 3 minutes
- Take pulse at end of 3 minutes
- Take pulse again after 60 secs rest

Step Test

Interpreting results

The results of the test are not given in Vo2 or Mets like other tests such as the Chester Step Test. They are a rating of aerobic fitness based on a test groups performance. Check the resting heart rate after the 60-second rest with the table below.

Age	18-25	26-35	36-45	46-55	56-65	65+
Excellent	50-76	51-76	49-76	56-82	60-77	59-81
Good	79-84	79-85	80-88	87-93	86-94	87-92
Above Average	88-93	88-94	92-88	95-101	97-100	94-102
Average	95-100	96-102	100-105	103-111	103-109	104-110
Below Average	102-107	104-110	108-113	113-119	111-117	114-118
Poor	111-119	114-121	116-124	121-126	119-128	121-126
Very Poor	124-157	126-161	130-163	131-159	131-154	130-151

Grip strength

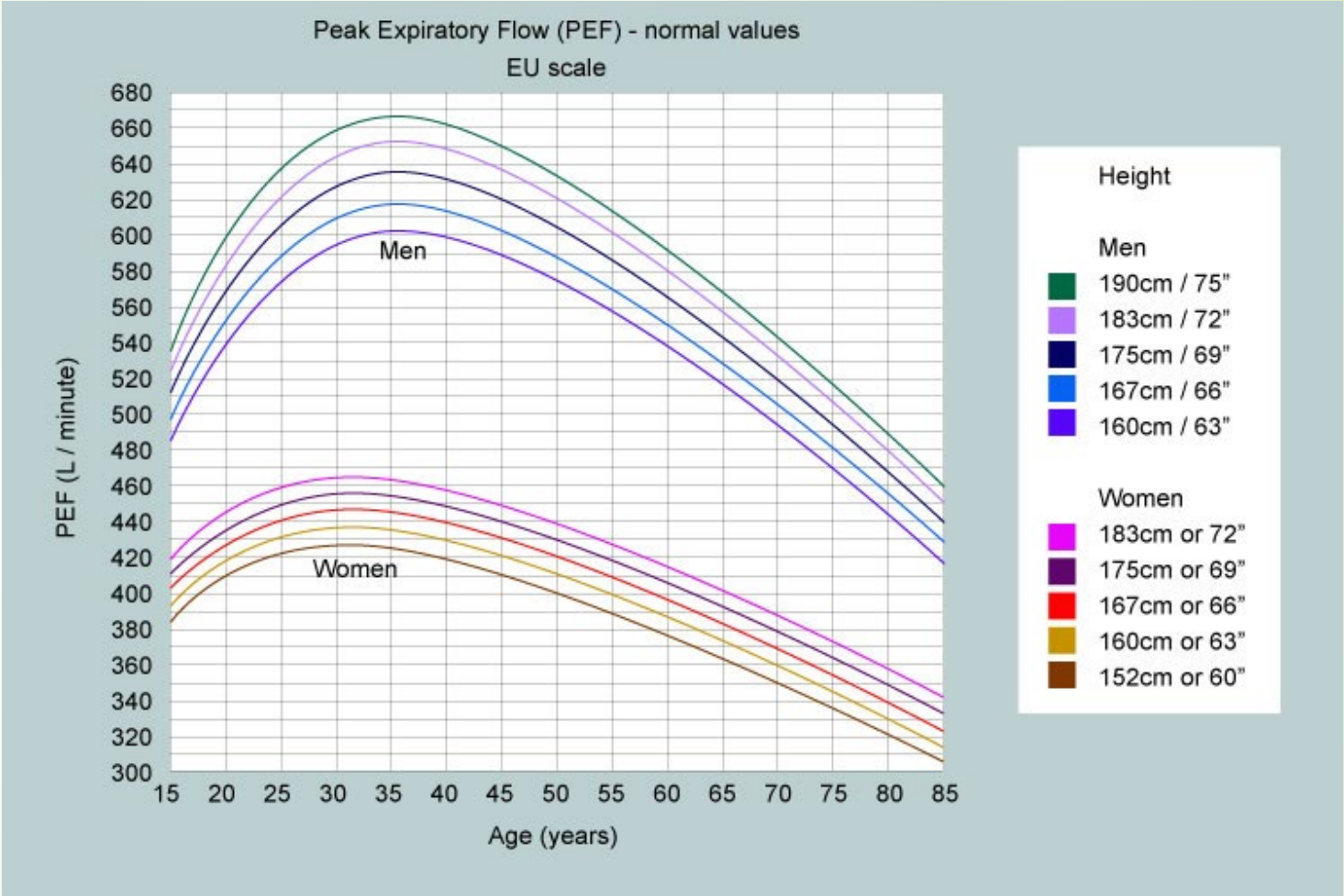
- Simple tool for assessing overall body strength
- Predictor of function and survival outcome in disease

Female (Age)	Needs Improvement	Fair	Good	Very Good	Excellent
15-19	< 54	54-58	59-63	64-70	> 70
20-29	< 55	55-60	61-64	65-70	> 70
30-39	< 56	56-60	61-65	66-72	> 72
40-49	< 55	55-58	59-64	65-72	> 72
50-59	< 51	51-54	55-58	59-64	> 64
60-69	< 48	48-50	51-53	54-59	> 59

Male (Age)	Needs Improvement	Poor	Fair	Good	Excellent
15-19	< 84	84-94	95-102	103-112	> 112
20-29	< 97	97-105	106-112	113-123	> 123
30-39	< 97	97-104	105-112	113-122	> 122
40-49	< 94	94-101	102-109	110-118	> 118
50-59	< 87	87-95	96-101	102-109	> 109
60-69	< 79	79-85	86-92	93-101	> 101

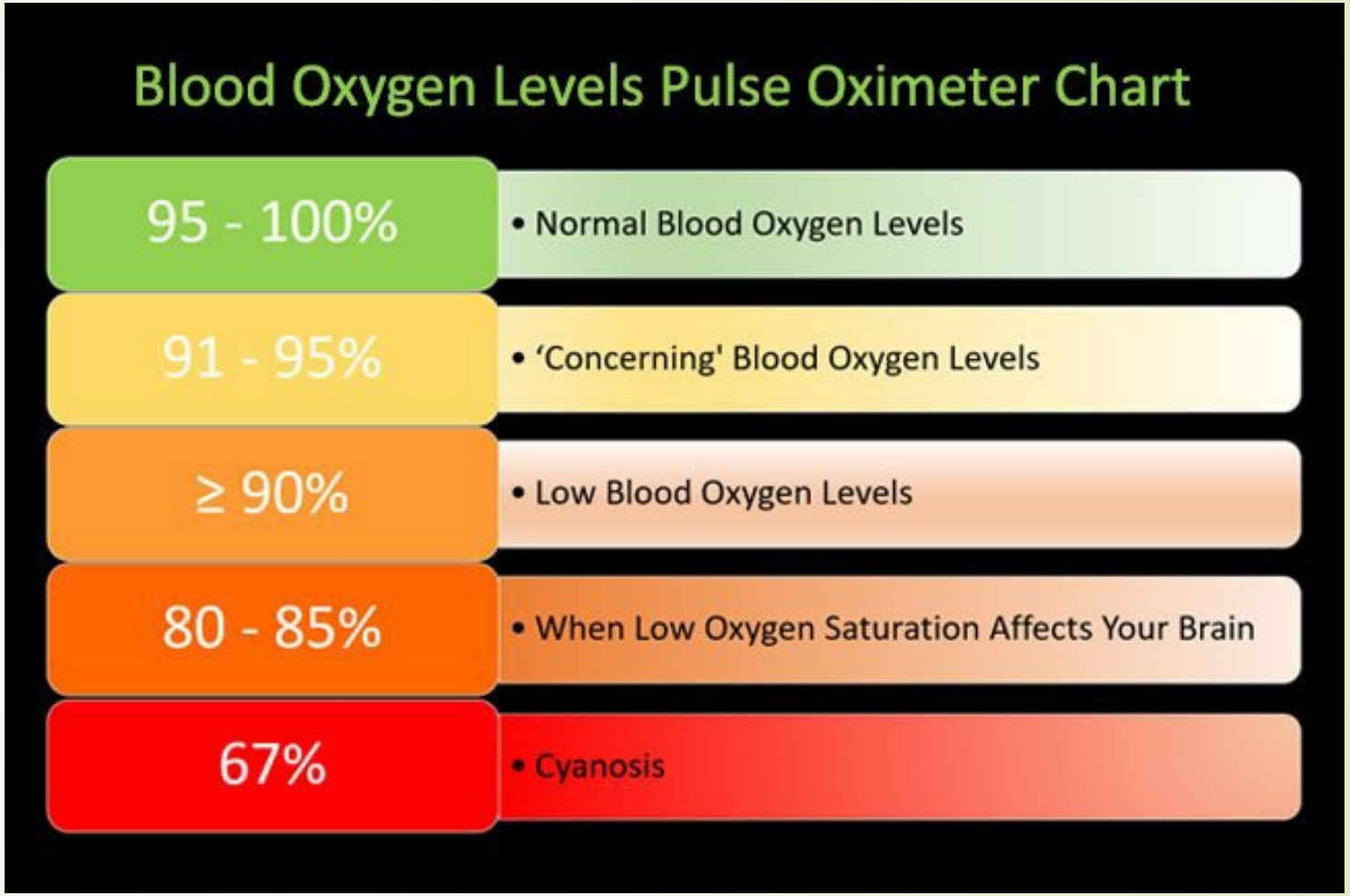
Peak flow test

- Quick and easy test often used to help diagnose and monitor asthma



Oxygen saturation

- Healthy range = 95-100%
- Lower levels can be an indication of a lung problem



Sit and reach test

- Simple test of flexibility
- Tests hamstring and lower back flexibility – important in health-related fitness
- E.g.,
  - Injury prevention
  - Risk of falling
  - Postural deviations

		Age (year)											
Percentile		18–25		26–35		36–45		46–55		56–65		>65	
Gender		M	W	M	W	M	W	M	W	M	W	M	W
90	Well above average	22	24	21	23	21	22	19	21	17	20	17	20
80	Above average	20	22	19	21	19	21	17	20	15	19	15	18
70		19	21	17	20	17	19	15	18	13	17	13	17
60	Average	18	20	17	20	16	18	14	17	13	16	12	17
50		17	19	15	19	15	17	13	16	11	15	10	15
40	Below average	15	18	14	17	13	16	11	14	9	14	9	14
30		14	17	13	16	13	15	10	14	9	13	8	13
20	Well below average	13	16	11	15	11	14	9	12	7	11	7	11
10		11	14	9	13	7	12	6	10	5	9	4	9

M, men; W, women.

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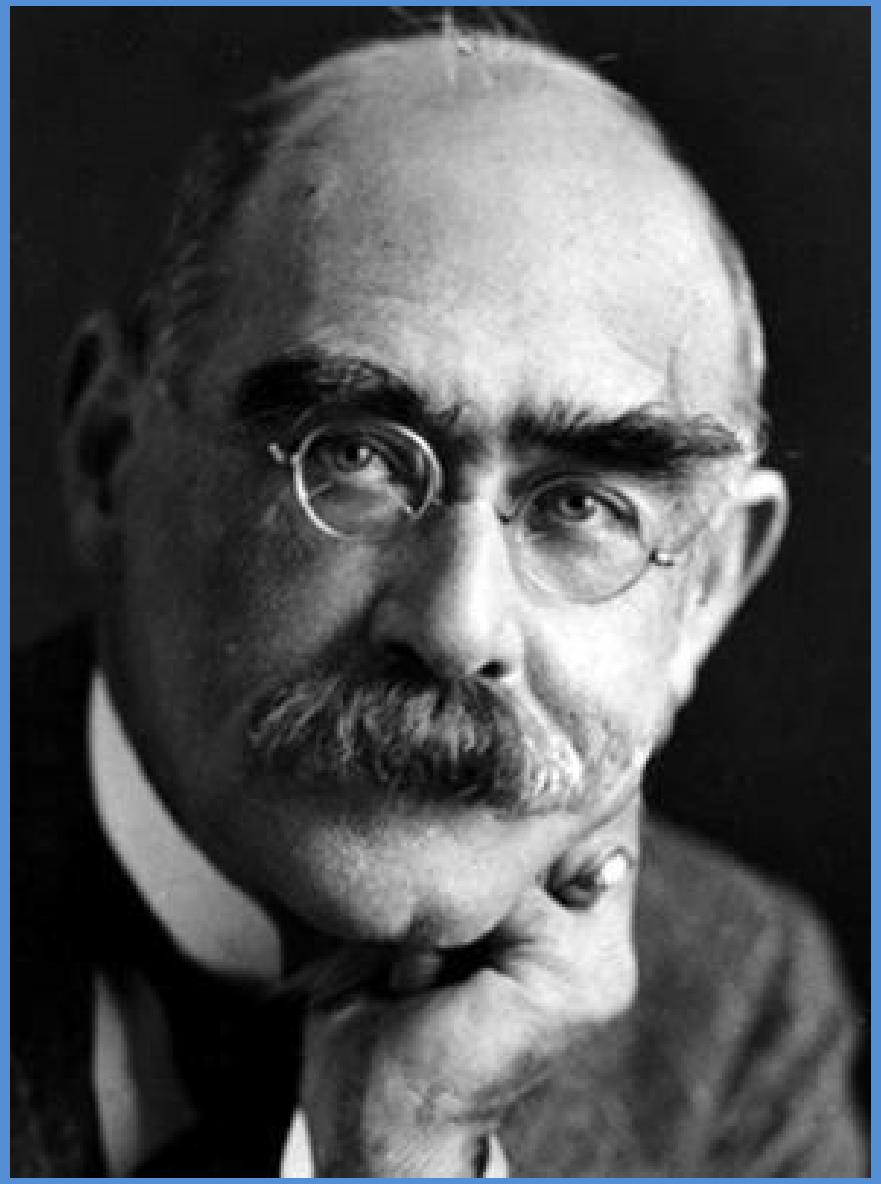
Part 2 - FITT Principles of PA

- Brief recap of key points this semester including the week 3 seminar from Blessing, Meg and Margaret

Rudyard Kipling (1980)

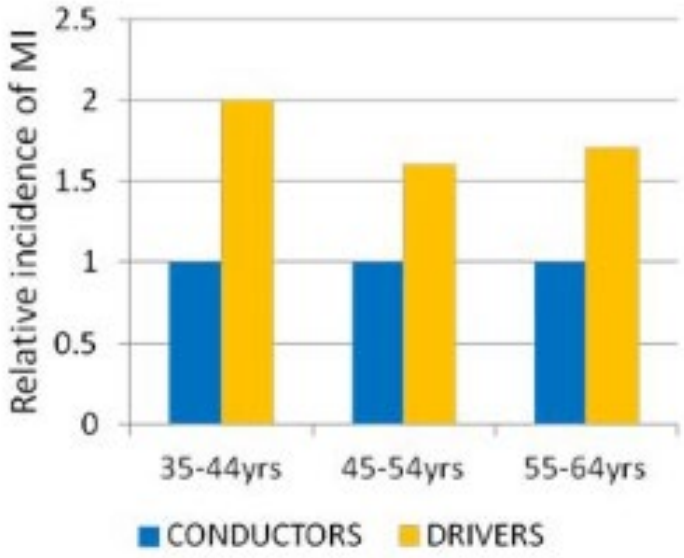
- ‘The cure for this ill is not to still still,
- Or frowst with a book by the fire;
- But to take a large hoe and a shovel also,
- And dig till you gently perspire’.

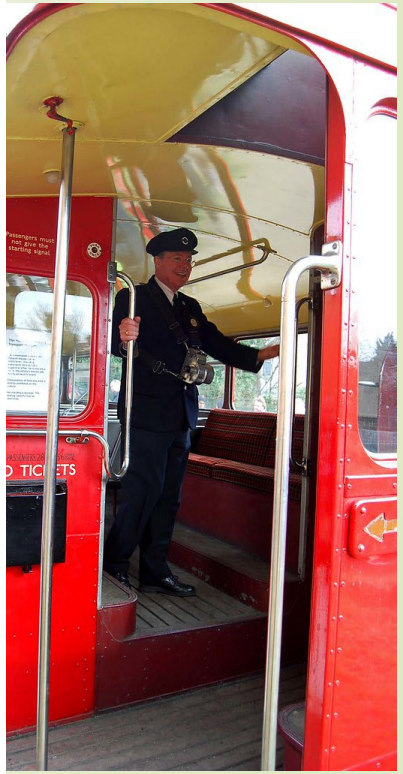


Early evidence of PA impact & chronic disease

Occupational physical activity and heart attacks

- Jerry Morris – compared heart attack incidence in drivers vs conductors





Morris et al (1953) "Coronary heart-disease and physical activity of work". Lancet 265 (6795): 1053–7

Evidence for health benefit of PA

Children	Adults	Older Adults
Bone Health	All-cause mortality	Falls
Cognitive function	Stroke and heart disease	Frailty
CV fitness	Hypertension	Physical function
Muscle fitness	Type 2 diabetes	
Weight status	8 cancers	
Depression	Depression	
	Cognitive function	
	Dementia	
	Quality of life	
	Sleep	
	Anxiety/depression	
	Weight status	

UK CMO PA Guidelines (Dept. of Health & Social Care, 2019)

Physically active people have lower health risks

Regular physical activity can reduce health risks

Cognitive decline
↓40%

Type 2 diabetes
↓35%

Hypertension
↓33%

Depression
↓48%

All-cause mortality
↓30%

Bone fractures
↓66%

Breast cancer
↓20%

Coronary heart disease and stroke
↓25%

Colorectal cancer
↓19%

Source: Physical Activity Guidelines Advisory Committee Scientific report (2018); Department of Health & Human Services – USA

Current UK PA guidelines

- UK Chief Medical Officers' Physical Activity Guidelines (DoHSC, 2019) provides recommendations for the amount of PA across the lifespan to maintain and improve health
- UK consensus on the amount and type of PA needed to benefit health, reduce NCDs, reduce all-cause mortality, improve life expectancy
- On Blackboard

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf

Current UK PA Guidelines

- Summarises guidelines by age groups:
- Under 5's
  - Infants, toddlers and pre-schoolers
- Children and young people
- Adults
- Older adults
- Additional guidelines for
  - pregnant women
  - women after childbirth (birth – 12 months)
  - disabled adults

Department of Health & Social Care

Llywodraeth Cymru Welsh Government

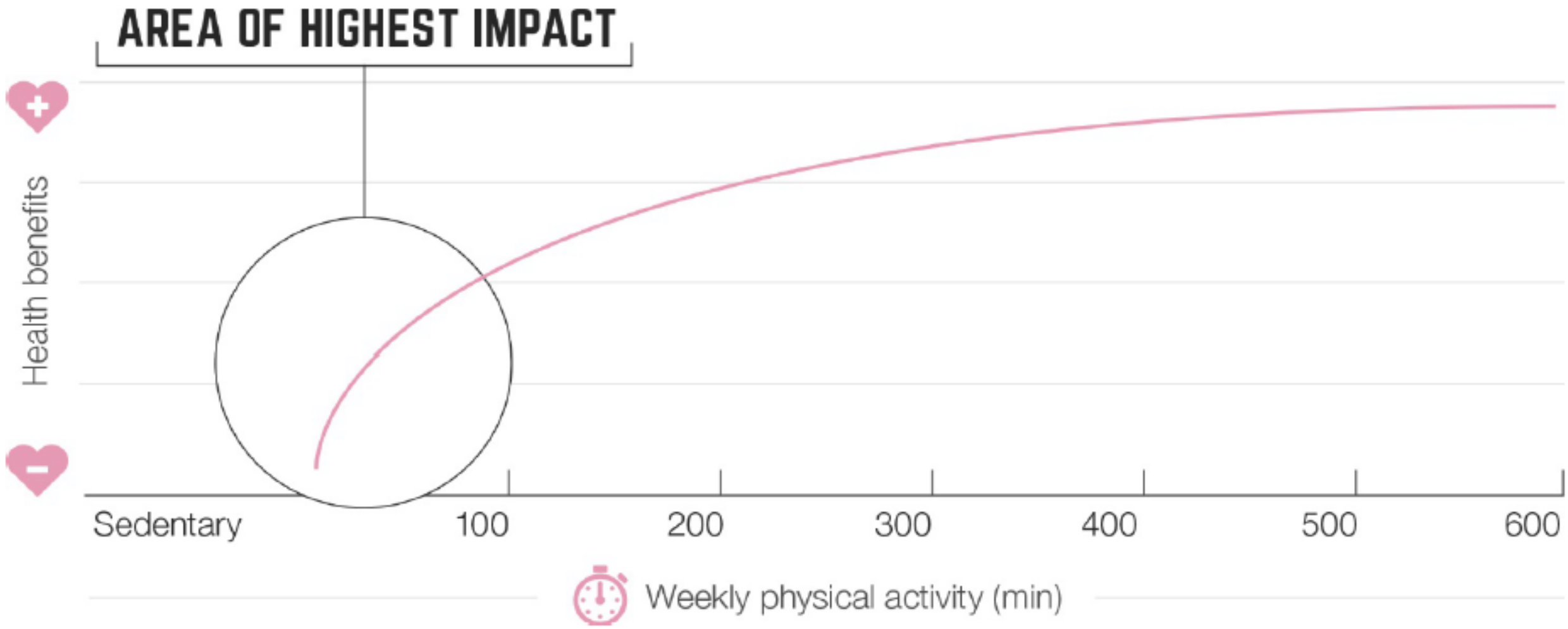
Department of Health An Roinn Sláinte Männystrie O Poustie www.health-ni.gov.uk

Scottish Government Riaghaltas na h-Alba gov.scot

UK Chief Medical Officers' Physical Activity Guidelines

Published 7 September 2019

Dose-response curve of PA and benefits



UK CMO PA Guidelines (Dept. of Health & Social Care, 2019)

How does being active benefit health?

- Physiological response to PA
- Improvements in health and fitness occur as a result of structural and functional adaptations to the stimulus of physical activity
  - McArdle, Katch and Katch (2015)
- These adaptations result from the following principles:
  - Overload
  - Specificity
  - Reversibility

Overload principle

- Exercising at levels greater than normal stimulates specific adaptations to allow the body to function more efficiently
- Achieving overload requires the manipulation of frequency, intensity or time or a combination of these
- This concept of overloading applies to elite athletes through to sedentary or even clinical populations
- There needs to be a progression of the programme to sustain overload
  - McArdle, Katch and Katch (2015)

Specificity principle

- Adaptations in function depend on the FITT principles
- E.g., short duration, intense strength-power PA will enhance strength-power adaptations
- Endurance training improves aerobic system adaptations
- Limited interchange of benefits
  - McArdle, Katch and Katch (2015)

Reversibility principle

- Improvement in adaptations as a result of regular PA is lost when the stimulus is removed
- This can happen quickly, e.g. after 1-2 weeks for exercise capacity
  - McArdle, Katch and Katch (2015)

So how much PA should we do?

- How much PA is enough?
- Enough for what?
- What is the minimum I can get away with?
- How much PA do I need to do to stay healthy?
- How much PA do I need to do to help me live longer?

Prescription of PA

- The art of exercise/PA programming is to create a programme that fits the needs and interests of the individual as well as their health needs and clinical status
  - ACSM (2010)
- The most widely used method of prescribing exercise/PA in health related settings is by using the FITT principles

F.I.T.T. Acronym

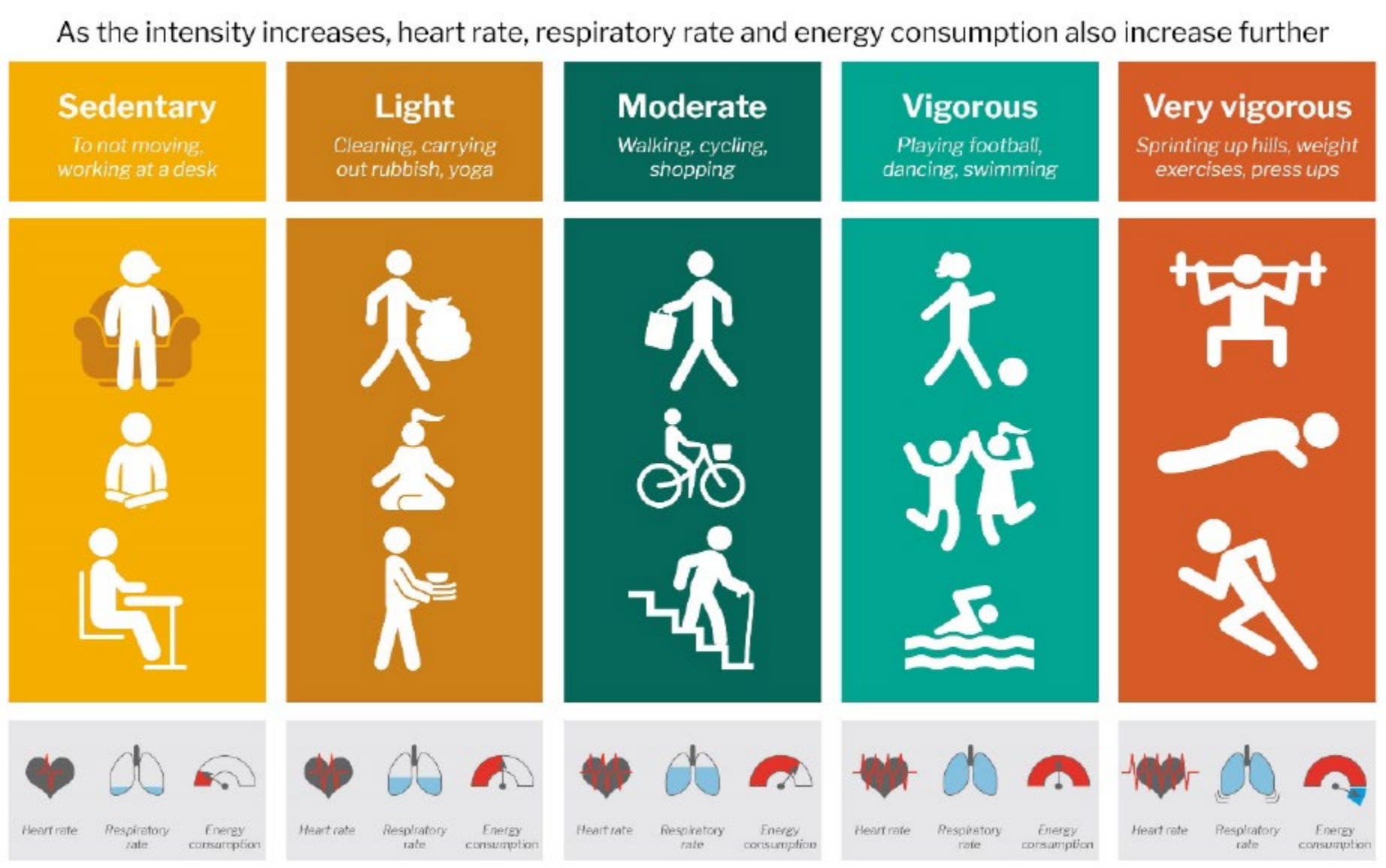
- F = Frequency (how often – times per week)
- I = Intensity (how hard)
- T = Time (how long)
- T = Type (what mode of activity)

- These four principles combine to quantify and monitor a PA programme
- PA guidelines incorporate the FITT principles within their recommendations

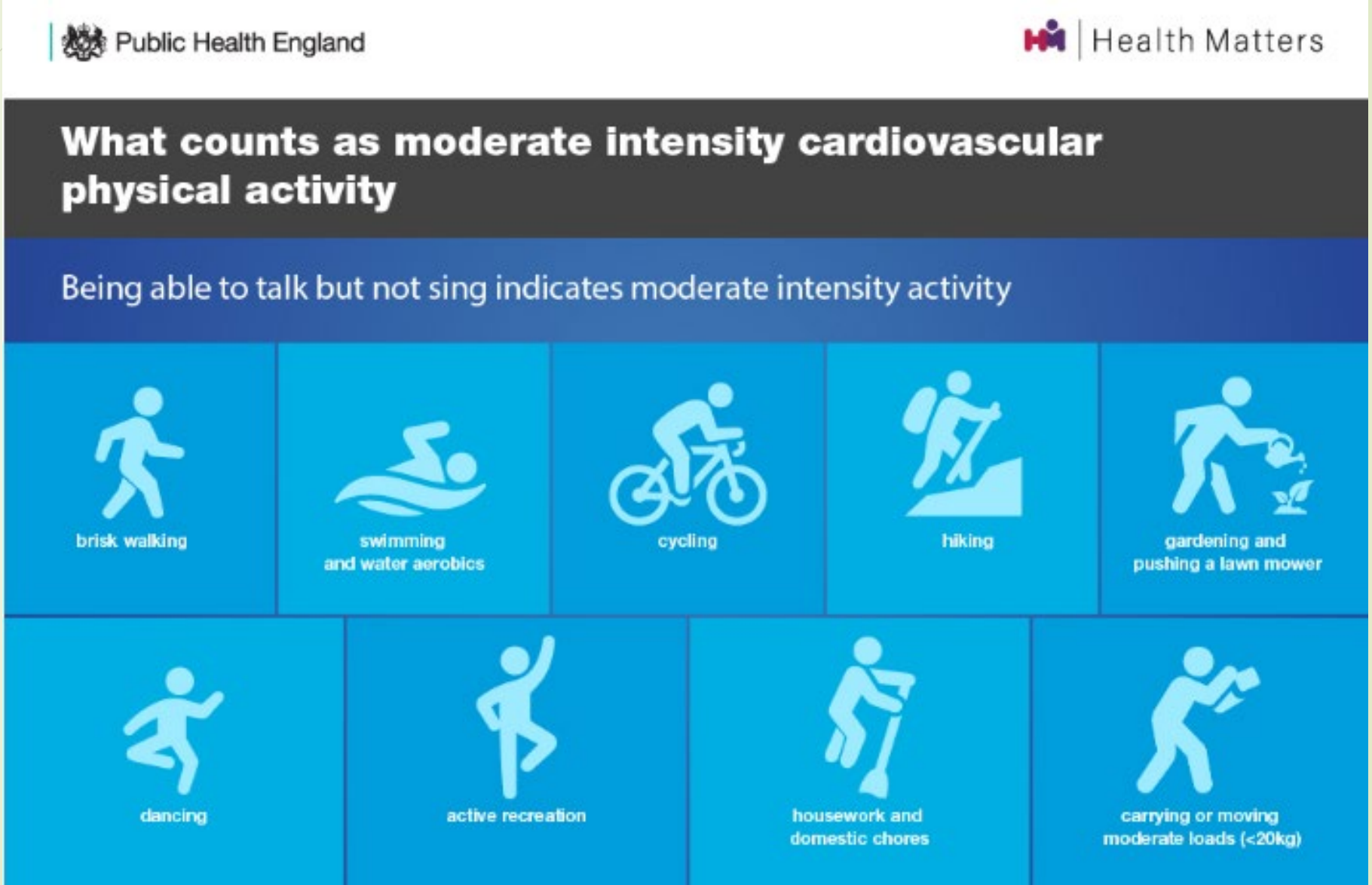
F.I.T.T. principles

- Frequency and time are relatively easy to quantify
- Type may be aerobic/cardiovascular, anaerobic/strength & power, balance, combination, etc.
- Intensity is quantifiable but needs further clarification

Intensity of PA and exercise



Moderate intensity PA



Vigorous intensity PA

Monitoring intensity

- Consider physiological response to increasing intensity
- What happens when we work harder?
- Measurement of direct physiological responses
  - E.g., heart rate, oxygen consumption, O_2/CO_2 ratio, respiratory rate
- Indirect responses
  - E.g., talk test, subjective response – rating of perceived exertion, standard value of PA - METS

Heart rate training zones

- Many wearable tech devices now calculate your personal training zone
- You can determine your own ranges for varying intensities
- Determine your maximum heart rate (220 - your age)
- Multiply this figure by 0.6 and 0.8 to determine your 60-80% of HR Max 'zone'.
- This is *your* moderate intensity
- NB. Definitions of 'moderate' intensity may vary in terms of the percentage of your heart rate max

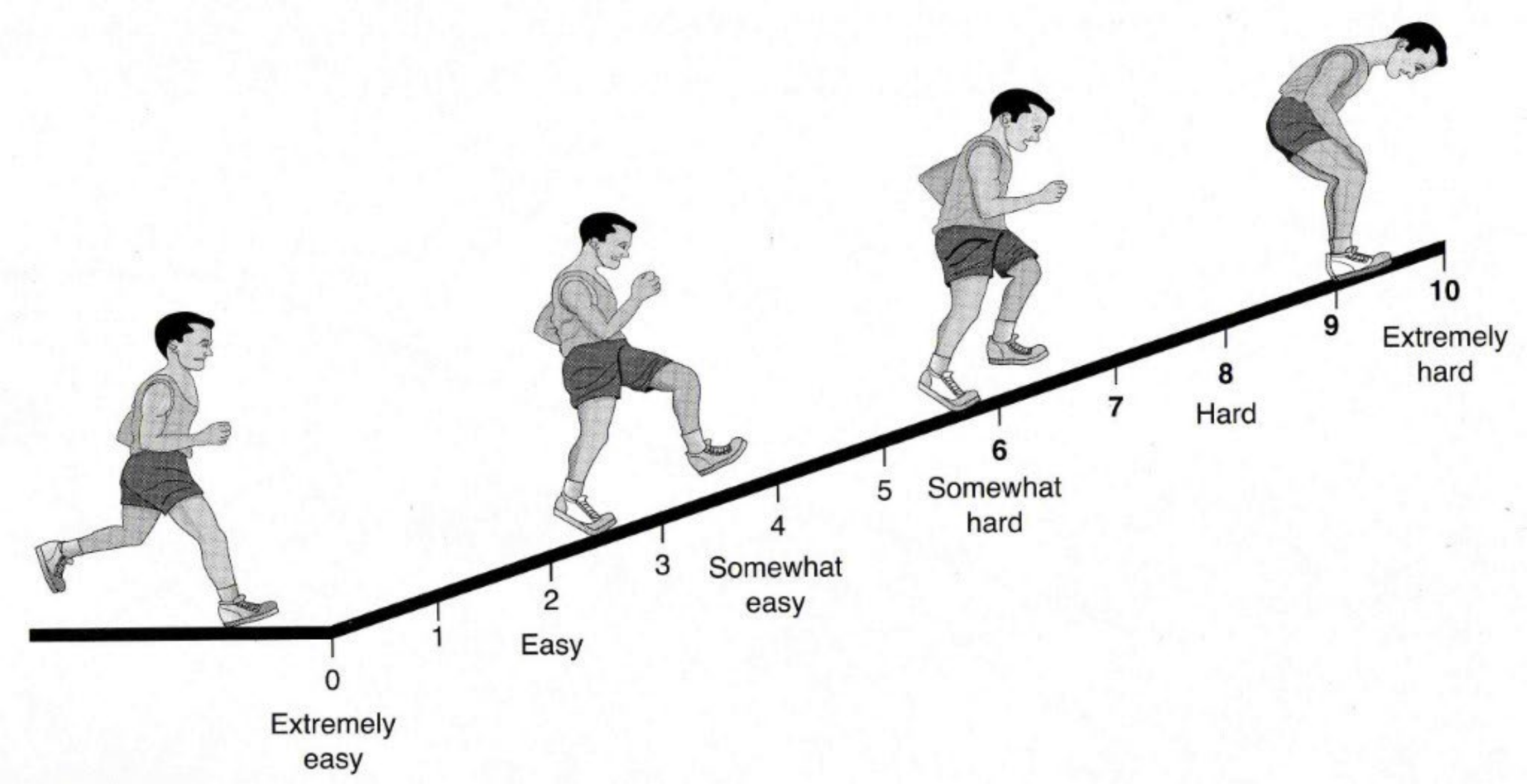
Monitoring intensity in PH

- Outside of the sports science laboratory, indirect measures of intensity measurement are needed
- Often rating of perceived exertion (RPE), METS and talk-tests are used
- Many RPE scales are available, e.g. Borg scale
- Gunnar Borg – 1927-2020

Borg RPE Scale
How do your muscles and breathing feel?

6	No exertion at all
7	Extremely light
8	
9	Very light
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Extremely hard
20	Maximum exertion

Adult OMNI walk-run scale



METs and intensity of PA

- MET = Metabolic Equivalent of Task
- Objective measure of the rate at which a person expends energy
- 1 MET = the average resting oxygen uptake per kilogram per minute
- Equates to 3.5 ml/O_2/kg/min
- If an activity has a MET value of 10, you would expend 10 times the energy that you would at rest
- Light intensity = 1.1-2.9 METs
- Moderate intensity = 3.0-5.9 METs
- Vigorous intensity = 6.0 + METS

Intensity–time inverse relationship

- As intensity increase, the time you can perform the activity decreases
- Reflected in MIPA – VIPA PA guidelines
- Greater benefit comes from lower levels of higher intensity activity
- Remember HIIT from last week
- Consider adherence of PA
- Adherence dictates longer term outcomes
- Remember concept of reversibility

World records for running
(as of 17/02/22)

	Men		Women	
Distance	Time	Speed (mp/h)	Time	Speed (mp/h)
100m	9.58s	23.35	10.49s	21.32
200m	19.19s	23.31	21.34s	20.97
400m	43.03s	20.79	47.60s	18.80
800m	1:40.91	17.73	1:53.28	15.80
1500m	3:26.00	16.29	3:50.07	14.58
3000m	7:20.67	15.23	8:06.11	13.81
5000m	12:35.36	14.81	14:06.62	13.21
10.000m	26:11.00	14.24	29:01.03	12.85
Marathon	1:59.40.2	13.13	2:14.04	11.73

Volume of PA

- Volume of PA is often mentioned in guidelines
- This may be the total amount of PA achieved in a week (frequency x time)
- May also take intensity into account
  - E.g., MET minutes, MET hours

METs, MET minutes and MET Hours

Tables of MET values are available for different tasks

- E.g., ACSM, Ainsworth *et al.*, (2011)

WHO recommends that people conduct at least 600 MET minutes of activity per week

- E.g., 150 minutes of activity at 4 METs

Evidence in current UK guidelines that refers to MET hours or MET -h per week

- E.g., hypertension risk is reduced if you do 10 MET-h per week; equivalent to 150 minutes (2.5 hours) of activity at 4METs

Physical activity intensity	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 (4 km/h)	2.9
Moderate intensity activities	3–6
Bicycling, stationary, 50 W, very light effort	3.0
Walking 3.0 mph (4.8 km/h)	3.3
Calisthenics, home exercise, light or moderate effort, general	3.5
Walking 3.4 mph (5.5 km/h)	3.6
Bicycling, <10 mph (16 km/h), leisure, to work or for pleasure	4.0
Bicycling, stationary, 100 W, light effort	5.5
Vigorous intensity activities	>6
Jogging, general	7.0
Calisthenics (e.g., push-ups, sit-ups, pull-ups, jumping jacks), heavy, vigorous effort	8.0
Running jogging, in place	8.0
Rope jumping	10.0

From compendium of Physical Activity found at https://sites.google.com/site/compendiumofphysicalactivities/home. Project supported by University of Arizona and the National Cancer Institute

Physical activity for early years
(birth – 5 years)

Active children are healthy, happy, school ready and sleep better

- BUILDS RELATIONSHIPS & SOCIAL SKILLS
- MAINTAINS HEALTH & WEIGHT
- CONTRIBUTES TO BRAIN DEVELOPMENT & LEARNING
- IMPROVES SLEEP
- DEVELOPS MUSCLES & BONES
- ENCOURAGES MOVEMENT & CO-ORDINATION

Every movement counts

Aim for at least **180** Minutes per day for children 1-5 years

- PLAYGROUND
- JUMP
- CLIMB
- MESSY PLAY
- THROW/CATCH
- SKIP

Under-1s at least 30 minutes across the day

- OBJECT PLAY
- DANCE
- GAMES
- PLAY
- TUMMY TIME
- SWIM
- WALK
- SCOOT
- BIKE

Get Strong. Move More. Break up inactivity

UK Chief Medical Officers' Physical Activity Guidelines, 2019

Physical activity
for children and young people (5 – 18 Years)

- BUILDS CONFIDENCE & SOCIAL SKILLS
- MAINTAINS HEALTHY WEIGHT
- DEVELOPS CO-ORDINATION
- STRENGTHENS MUSCLES & BONES
- IMPROVES SLEEP
- IMPROVES CONCENTRATION & LEARNING
- IMPROVES HEALTH & FITNESS
- MAKES YOU FEEL GOOD

Be physically active

Spread activity throughout the day

Aim for an average of at least **60** minutes per day across week

All activities should make you breathe faster & feel warmer

- PLAY
- RUN/WALK
- BIKE
- ACTIVE TRAVEL
- SWIM
- SKATE
- SPORT
- PE
- SKIP
- CLIMB
- WORKOUT
- DANCE

Include muscle and bone strengthening activities **3 TIMES PER WEEK**

Get strong — INACTIVITY (REDUCE) — **Move more**

Find ways to help all children and young people accumulate an average of at least 60 minutes physical activity per day across the week

UK Chief Medical Officers' Physical Activity Guidelines, 2019

Physical activity for adults and older adults

- Benefits health
- Improves sleep
- Maintains healthy weight
- Manages stress
- Improves quality of life

Reduces your chance of

Type II Diabetes	-40%
Cardiovascular disease	-35%
Falls, depression etc.	-30%
Joint and back pain	-25%
Cancers (colon and breast)	-20%

Some is good, more is better

Make a start today: it's never too late

Every minute counts

Be active

at least **150** minutes moderate intensity per week
increased breathing able to talk

OR

or a combination of both

at least **75** minutes vigorous intensity per week
breathing fast difficulty talking

to keep muscles, bones and joints strong

Build strength on at least **2** days a week

Swim, Brisk walk, Cycle, Gym, Yoga, Carry heavy bags, Run, Stairs, Sport

Minimise sedentary time

Break up periods of inactivity

For *older adults*, to reduce the chance of frailty and falls

Improve balance 2 days a week

Bowls, Tai Chi, Dance

UK Chief Medical Officers' Physical Activity Guidelines 2019

Physical Activity for Disabled Adults

Make it a daily habit

Disabled adults

- Physical activity makes you feel good
  Give things a go and enjoy what you do
- Being inactive is harmful to health
- Don't be still for too long
  Even a little movement is better than nothing

Creates opportunities to meet new people and feel part of the community

Improves mental health and quality of life

Makes maintaining a healthy weight easier

Makes daily tasks easier and increases independence

Strengthens muscles and bones

Improves fitness

Improves mobility and balance

Helps to prevent chronic disease

Do strength and balance activities on at least two days per week

For substantial health gains aim for at least 150 minutes each week of moderate intensity activity

Remember the talk test:

Can talk, but not sing = moderate intensity activity

Difficulty talking without pausing = vigorous intensity activity

UK Chief Medical Officers' Physical Activity Guidelines, 2019

Physical activity for pregnant women

- Helps to control weight gain
- Helps reduce high blood pressure problems
- Helps to prevent diabetes of pregnancy
- Improves fitness
- Improves sleep
- Improves mood

Not active?
Start gradually

Already active?
Keep going

Do **muscle strengthening** activities twice a week

Every activity counts, every minute counts, more is better

No evidence of harm

Listen to your body and adapt

Don't bump the bump

UK Chief Medical Officers' Physical Activity Guidelines, 2019

Physical activity for women after childbirth (birth to 12 months)

- Time for yourself - reduces worries and depression
- Helps to control weight and return to pre-pregnancy weight
- Improves tummy muscle tone and strength
- Improves fitness
- Improves mood
- Improves sleep

Not active?
Start gradually

Active before?
Restart gradually

Start **pelvic floor exercises** as soon as you can and continue daily

Build back up to **muscle strengthening** activities twice a week

It's safe to be active. No evidence of harm for post partum women

Depending on your delivery listen to your body and start gently

You can be active while breastfeeding

UK Chief Medical Officers' Physical Activity Guidelines, 2019

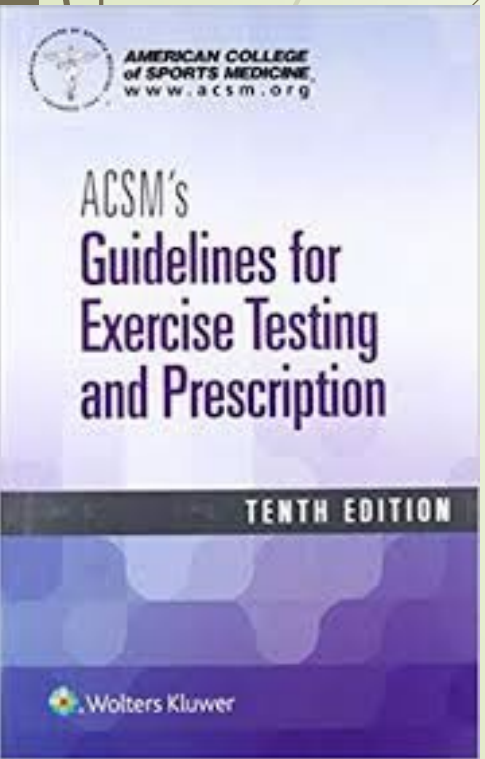
PA guidelines and health conditions

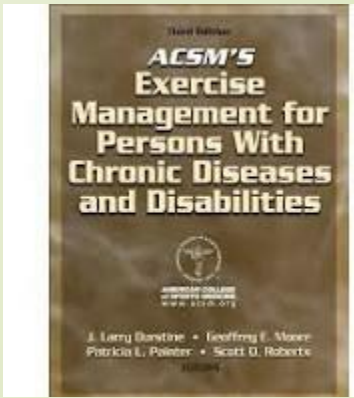
- Specific guidelines have been developed for certain health conditions, e.g.
  - Diabetes - ABCD (2010), ADA (2016), ACSM (2010)
  - Hypertension – ACSM (2004)
  - CHD – ACPICR/BACPR (2015)
- There are no general UK guidelines about exercising after cancer. But several studies have shown that exercise is safe, possible and helpful for many people with cancer (Cancer Research UK, 2019).
- This is also the case for many other conditions including pulmonary disease, COPD, stroke, osteoarthritis, renal disease, etc. and is often incorporated into condition specific management guidelines (e.g. NICE) as a cornerstone therapy.

PA guidelines and health conditions

- See position statement/expert statements from organisations such as the American College of Sports Medicine (ACSM) and the British Association of Sport and Exercise Science (BASES)
- http://www.acsm.org/acsm-positions-policy/official-positions/ACSM-position-stands
- https://www.bases.org.uk/spage-resources-bases_expert_statements.html
- Also see ACSM's Guidelines for Exercise Testing and Prescription
- ACSM's Exercise Management for Persons with Chronic Disease and Disabilities

- NB. PA and obesity will be covered in detail next week





Review of intended learning outcomes

- Define and describe the FITT principles of PA prescription
- Define and discuss the principles of overload, specificity and reversibility
- Understand and discuss specific amounts of PA required for certain health conditions

Part 2 - References

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