Medical Contraindications to Fitness Testing

The Physician – Fitness Interface

Ian Griffiths, FireFit Conference, September 2011

Physical Activity Readiness Questionnaire

- Is your doctor currently prescribing you drugs or medication?
- Do you currently drink more than the average amount of alcohol per week (21units for men and 14 units for women)?
- Do you have a bone or joint problem such as arthritis, which has been aggravated by exercise or might be made worse with exercise?

Contraindications to Exercise Testing

Absolute

- Acute myocardial infarction (within 2 days)
- Unstable angina not previously stabilized by medical therapy
- Uncontrolled cardiac arrhythmias causing symptoms or haemodynamic compromise
- Symptomatic severe aortic stenosis
- Uncontrolled symptomatic heart failure
- Acute pulmonary embolus or pulmonary infarction
- Acute myocarditis or pericarditis
- Acute aortic dissection

American College of Cardiology/American Heart Association Circulation. 1997; 96: 345-354

Contraindications to Exercise Testing cont.

Relative

- Left main coronary stenosis
- Moderate stenotic valvular heart disease
- Electrolyte abnormalities
- Severe arterial hypertension
- Tachyarrhythmias or bradyarrhythmias
- Hypertrophic cardiomyopathy and other forms of outflow tract obstruction
- Mental or physical impairment leading to inability to exercise adequately
- High-degree atrioventricular block

Irregular Pulse

- Regularly irregular
- Irregularly irregular

Irregular Pulse

- **Regularly irregular**
- Sinus arrhythmia
- Wenkebach

- **Irregularly irregular**
- Ectopics
- Atrial fibrillation

Sinus arrhythmia

Respiratory Sinus Arrhythmia

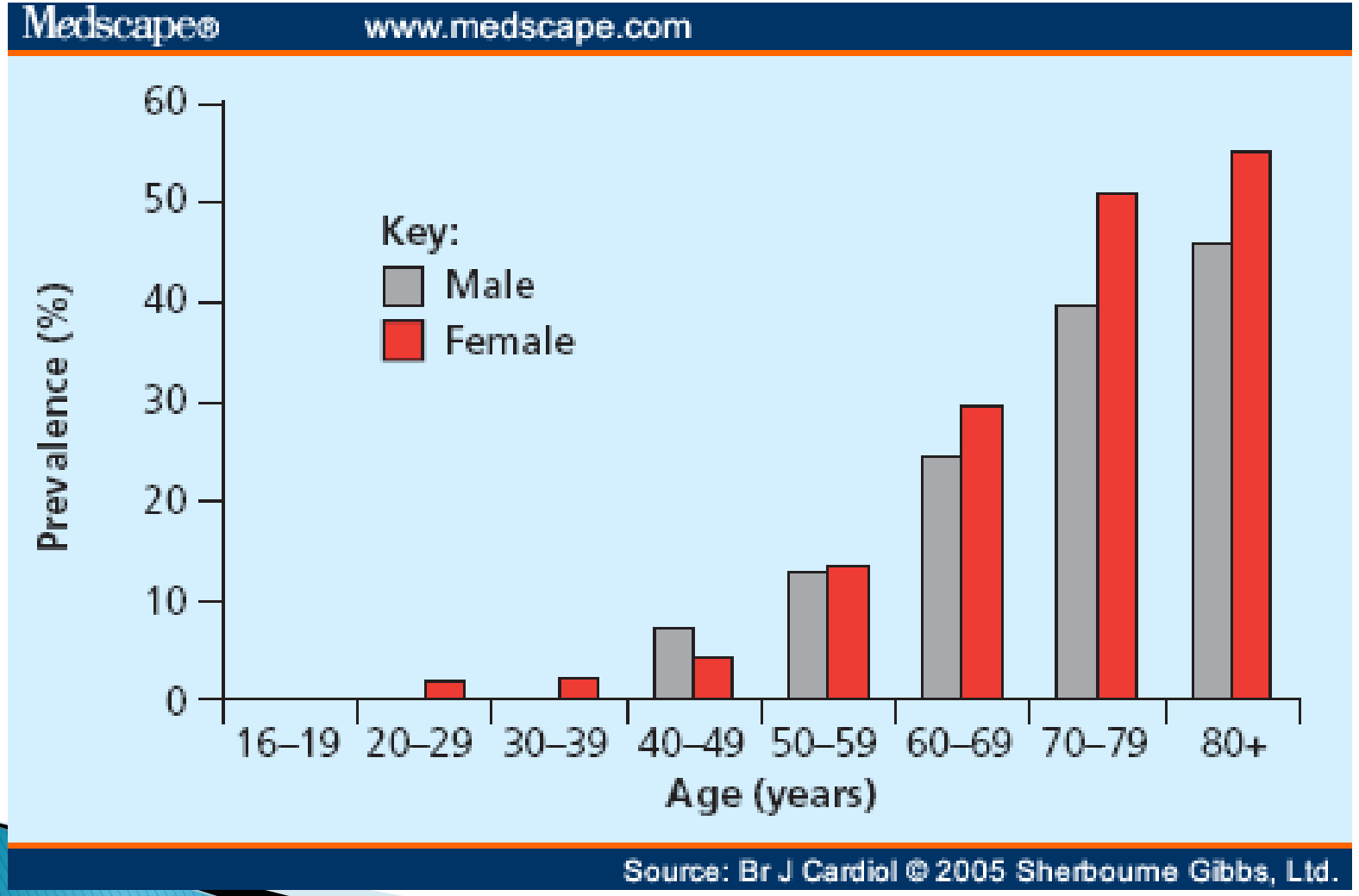
Wenkebach

Atrial fibrillation

Blood Pressure

- Relevance to fitness testing
- Relevance to firefighting

Prevalence of hypertension



Factors affecting BP

Patient factor	Systolic	Diastolic
'White coat' to physician	+11 to 28	+3 to 15
'White coat' to non-physician	+1 to 12	+2 to 7
Acute smoking	+6	+5
Acute caffeine	+11	+5
Acute ethanol	+8	+8
Distended bladder	+15	+10
Talking, sighing	+7	+8

Reeves RA. JAMA 1995;**273:1211-18.**

Factors affecting BP cont.

Technical factor	Systolic	Diastolic
Cuff too narrow	−8 to +10	+2 to 8
Cuff not centred	+4	+3
Low elbow	+6	+6
Back unsupported	+6 to 10	+6 to 10
Arm unsupported	+1 to 7	+ 5 to 11
Cold season	+6	+3 to 10

Measuring BP

Standardise the environment and provide a relaxed, temperate setting with the person quiet and seated.

When using an automated device:

- palpate the radial or brachial pulse before measuring blood pressure. If pulse is irregular measure blood pressure manually
- ensure that the device is validated and an appropriate cuff size for the person's arm is used.

NICE Guidance August 2011

If the clinic blood pressure is 140/90 mmHg or higher, offer ambulatory blood pressure monitoring (ABPM) to confirm the diagnosis of hypertension.

ACSM

The pre-exercise BP greater than 200 mm Hg systolic or 120 mm Hg diastolic is a contraindication to exercise.

MOEfRRFRS

"It would be prudent to remove firefighters from operational duties if their resting blood pressure exceeds 180mmHg systolic and 120mmHg diastolic."

Group 2 Driving Standard

Disqualifies from driving if resting BP consistently 180 mm Hg systolic or more and/or 100 mm Hg diastolic or more.

Differences in obesity prevalence rates between QOF and HSE, 2008/09

SHA	QOF	HSE – men	HSE – women
North East	12.3	23	28
North West	10.8	23	24
Yorkshire and The Humber	10.7	26	26
East Midlands	10.2	22	25
West Midlands	10.9	26	28
East of England	9.3	23	24
London	9.0	21	22
South East Coast	8.5	26	25
South Central	9.4	25	25
South West	9.3	27	23
England	**9.9**	**24.1**	**24.9**

Medical reasons for obesity

Genetics

- Poorly tuned appetite control system in which food intake is persistently above energy needs (1)
- Obesity genes exert their effects by modulation of feeding behaviour. The evidence for involvement of other mechanisms, such as altered energy utilisation, is very limited (2)
- Prader – Willi syndrome

(1) Foresight (2007). Tackling obesities: Future choices – project report.
(2) Blakemore, A.I.F., & Froguel, P.

Medical reasons for obesity cont.

- Hypothyroidism
- Cushing's Syndrome
- Drugs

Hypothyroidism

- UK prevalence 1-2%; 10x commoner in women
- Onset is extremely insidious
- Lethargy, fatigue and physical and mental slowness predominate
- Weight gain, cold intolerance, dry thickened skin, alopecia, constipation, hoarse voice, aches & pains, bradycardia, impotence, heavy periods

Hypothyroidism

7.65 **Gross clinical hypothyroidism** produces characteristic non-pitting oedematous changes in the skin of the face, giving rise to a characteristic clinical appearance. Note the dry, puffy facial appearance and the coarse hair. This patient was admitted with hypothermia. Her skin was cold and she showed mental apathy.

Cushing's Syndrome

- Rare, commoner in women
- steroid excess
- thin skin with easy bruising and oedema
- proximal muscle wasting and weakness
- osteoporosis
- weight gain and obesity – distribution is around the trunk and abdomen (buffalo hump) and the face (moon face); limbs are relatively thin

Mousa A et al. BMJ 1999;319:560-561

Drugs

- corticosteroids
  - have potent weight-promoting actions, particularly at higher doses
- psychotropic drugs
  - atypical antipsychotics such as olanzapine and clozapine
- anti-retroviral agents
  - e.g stavudine and zidovudine promote central adiposity
- thiazolidinediones
  - rosiglitazone, pioglitazone

    weight gain averaging 3-4 kg is common during the first few months of thiazolidinedione therapy, tending to stabilise thereafter

    www.gpnotebook.co.uk

Tachycardia & Exercise Testing

- Maximal pulse rate declines with age
- $HR_{max} = 220 - age$ is simplistic (1)
- $220 - age$ overestimates HR_{max} in young adults and underestimates it in older people.

(1) Gellish et al

Aerobic Fitness Testing

- Risk assess
- Health screen & BP measurement
- Written consent

Referral from Doctors to Fitness Instructors

Level 3 Exercise Referral qualification:
Instructors are qualified to work with low risk patients with:

- Asthma or COPD
- Hypertension or Hypercholesterolaemia
- OA; RA; Joint replacement; Simple mechanical back pain or Osteoporosis
- Depression; Stress or Anxiety
- Type 1 and Type 2 Diabetes or obesity

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Referral from Doctors to Fitness Instructors cont.

Level 4 Specialist Exercise qualification:

Instructors have additional training to cover one or more of the following specialist areas:

- **Cardiac Rehabilitation**
- **Falls Prevention**
- **Low Back Pain**
- **Stroke**
- **Cancer**
- **Accelerated Rehabilitation**

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Brief Interventions for weight management

- Strategies for self-monitoring
- Specific and proximal goals
- Plan for frequent follow-up and feedback
- Use motivational interviewing (MI) strategies, particularly when an individual is less ready to change their dietary and physical activity behaviour

National Obesity Observatory, April 2011