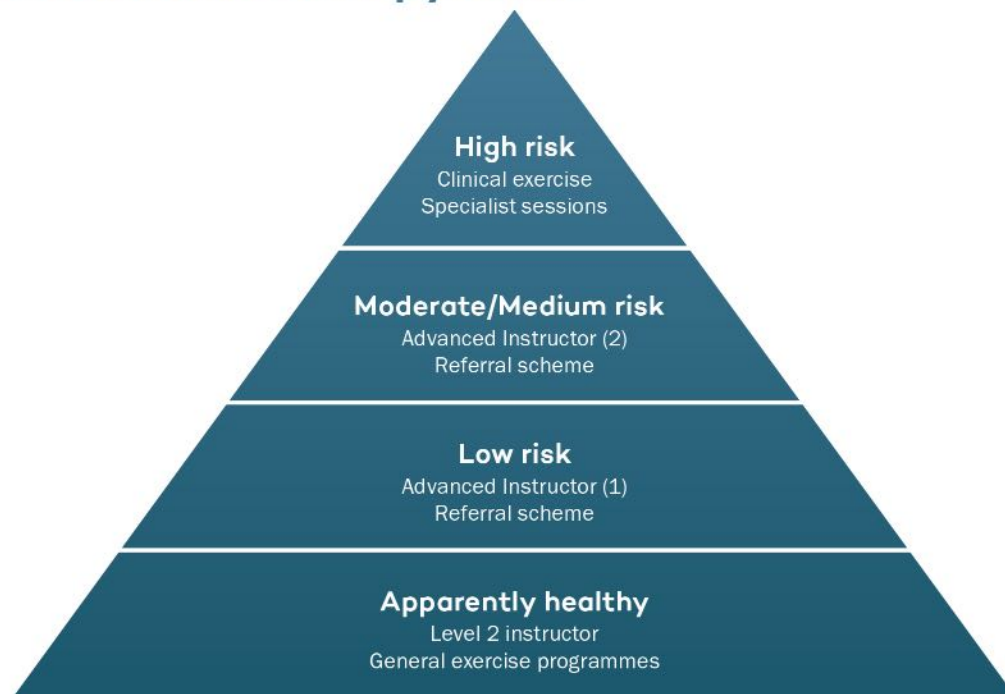
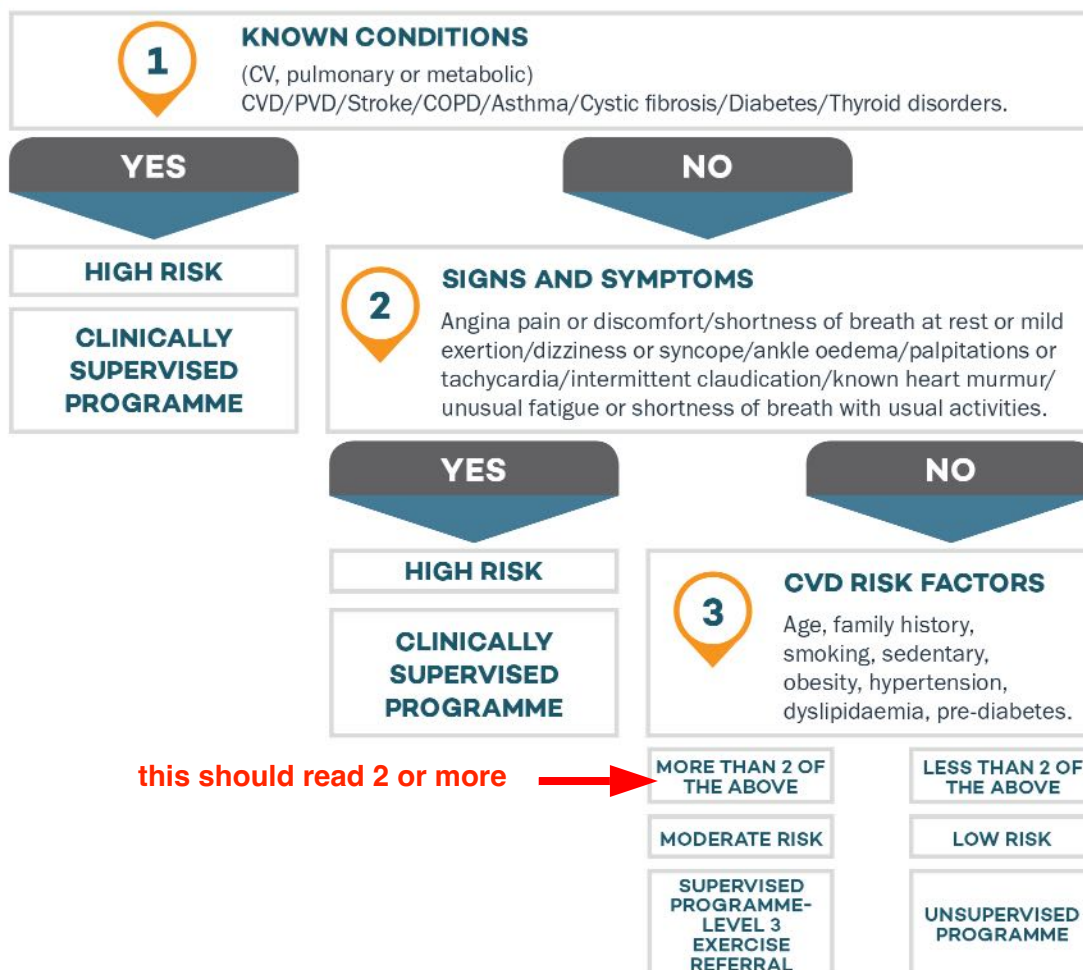


Section 1: Risk stratification models

The risk stratification pyramid



Logic model for risk stratification



Cardiovascular disease risk stratification (ACSM, 2014)

Cardiovascular disease risk factors		Normal	Special attention 2 or more = moderate risk Signpost to GP	Medical referral
Age.		Male <45 years. Female <55 years .	Male >45 years. Female >55 years.	
Family history.	MI or sudden death in 1st degree relative. Male <55 years. Female <65 years.	No family history.	Positive family history.	
Smoking.		Non-smoker.	Current smoker (1+/ day) or quit within the last 6 months.	
Exercise (physical activity levels for a minimum of 8 weeks).		≥30+ mins CV 3-5 times/week.	<30 mins CV 3-5 times/week (inactive).	
Blood pressure.	SBP & DBP (mmHg).	≤139 and ≤89	≥140 or ≥90	≥160 or ≥100
Cholesterol.	Total cholesterol (mmol/L).	≤5.2	>5.2	>5.7
	LDL cholesterol (mmol/L).	≤3.4	>3.4	
	HDL cholesterol (mmol/L).	≥0.9 (or 25%+ of Total)	<0.9 (or <25% of Total)	
Impaired glucose fasting (Diabetes).	Fasting blood glucose (mmol/L).	≤6.0	6.1–6.9	≥7.0 Diabetic.
Other factors		Normal	Special attention May require clearance if other risks present	Medical referral
Resting heart rate.		≤89 bpm	90–99 bpm	≥100 bpm Contraindication for exercise.
Body Composition.	Body fat (% body fat).	Male 18-25% Female 25-30%	<6% or 26-30% <14% or 31-40%	>30% >40%
	Waist-to-hip ratio.	Male <0.85 Female <0.75	>0.9 >0.8	
	BMI.	18.5–24.9 kg/m ²	25–29.9 kg/m ²	30+ kg/m ²
Alcohol consumption.	Units of alcohol per week.	Male ≤21 units. Female ≤14 units.	Male 29–42 units. Female 22–35 units.	Male ≥43 units. Female ≥36 units. Cirrhosis.
Lung function.	Forced expiratory rate (FER).	Within predicted range values.	Below predicted range values.	Known pulmonary disorder unless under control.

Recommended levels of supervision for assigned risk (ACSM, 2014)

Risk status	Criteria	Activity guidelines Recommended level of supervision
Low.	Men <45/Women <55 years of age who are asymptomatic and meet no more than 1 risk factor threshold: <ul style="list-style-type: none"> Family history. Smoking. Hypertension. High cholesterol. Impaired fasting glucose. Obesity. Sedentary lifestyle. 	Medical exam not necessary. Supervision of exercise test not necessary. Activity – Unsupervised.
Moderate.	Men ≥45/Women ≥55 years or those who meet the threshold for 2 or more risk factors.	Medical exam recommended prior to vigorous exercise (>60% VO ₂ max). Supervision of maximal exercise test (not necessary for submaximal test). Activity – Supervised.
High.	Individuals with one or more of the following signs and symptoms: <ul style="list-style-type: none"> Anginal pain or discomfort. Shortness of breath at rest or with mild exertion. Dizziness or syncope. Orthopnoea or paroxysmal nocturnal dyspnoea.* Ankle oedema. Palpitations or tachycardia. Intermittent claudication. Known heart murmur. Unusual fatigue or shortness of breath with usual activities. Or known cardiovascular, pulmonary or metabolic disease: <ul style="list-style-type: none"> Cardiac (myocardial infarction, coronary artery bypass surgery, coronary angioplasty or angina). Cerebrovascular (stroke, transient ischaemic attack). Peripheral vascular disease. Pulmonary disease (chronic obstructive pulmonary disease/cystic fibrosis or asthma). Metabolic disease (diabetes (type 1 and type 2), thyroid, renal or liver disease). <p>*Orthopnoea – breathlessness (dyspnoea) occurring at rest in the recumbent position that is relieved by sitting upright.</p> <p>Paroxysmal nocturnal dyspnoea – breathlessness, which usually begins 2-5 hours after going to sleep.</p>	Medical exam recommended prior to moderate and vigorous exercise. Supervision of submaximal exercise test and maximal test. Activity – Supervised.

Irwin and Morgan risk stratification tool (BHF Toolkit, 2016)

Low risk	
Overweight.	No complications.
High normal blood pressure.	130-139/85-89. Not medication controlled.
Deconditioned.	Due to age or inactive lifestyle.
Type 2 diabetes.	Diet controlled.
Older adults >65.	No more than 2 CHD risk factors and not at risk of falls.
Prenatal.	No symptoms of pre-eclampsia/no history of miscarriage.
Postnatal.	Provided 6 week postnatal check complete and no complications.
Osteoarthritis.	Mild where physical activity will provide symptomatic relief.
Mild bone density changes.	BMD >1 SD and <2.5 SD below young adult mean.
Exercise-induced asthma.	Without other symptoms.
Smoker.	One other CHD risk factor and no known impairment of respiratory system.
Stress/mild anxiety.	No other psychiatric diagnosis.
Seropositive HIV.	Asymptomatic.
Medium risk	
Hypertension stage 1.	140-159/90-99. Medication controlled.
Type 2 diabetes.	Medication controlled.
Type 1 diabetes.	With adequate instructions regarding modification of insulin dosage depending on timing of exercise and warning signs.
Physical disabilities.	No other risk factors or conditions.
Moderate osteoarthritis or rheumatoid arthritis.	With intermittent mobility problems.
Clinical diagnosis of osteoporosis.	BMD >2.5 at spine, hip or forearm or >4 on fracture index, no history of previous low trauma fracture.
Surgery pre and post.	General or orthopaedic – NOT CARDIAC.
Intermittent claudication.	No symptoms of cardiac dysfunction.
Stroke/TIA.	>1 year ago. Stable CV symptoms. Mobile, no assistance required.
Asthma.	Mild (ventilatory limitation does not restrain submaximal exercise).
COPD.	Without ventilatory limitation but would benefit from optimisation of respiratory system mechanics and correction of physical deconditioning.
Neurological conditions.	E.g. young onset Parkinson's disease (stable), multiple sclerosis.
Early symptomatic HIV.	Moderately diminished CD4 cells. Intermittent or persistent signs and symptoms e.g. fatigue, weight loss, fever, lymphadenopathy.
Chronic fatigue syndrome.	Significant de-conditioning due to long-standing symptoms.
Depression.	Mild to moderate.
Fibromyalgia.	Associated impaired functional ability, poor physical fitness, social isolation, neuroendocrine and autonomic system regulation disorders.

High risk	
Older adults >65 at risk of falls.	REFER directly to falls service.
Frail older people with osteoporosis and history of fractures.	REFER directly to falls service. (BMD >-2.5 at spine, hip or forearm in the presence of 1 or more documented low trauma or fragility fractures).
Unstable/uncontrolled cardiac disease.	
Claudication with cardiac dysfunction.	
Orthostatic hypotension.	Fall SBP >20mmHg or DBP >10mmHg within 3 minutes of standing.
Stroke/TIA.	Recent (<3 months ago).
Severe osteoarthritis/rheumatoid arthritis.	With associated immobility.
Type 1 or type 2 diabetes (advanced).	With accompanying autonomic neuropathy, advanced retinopathy.
Moderate to severe asthma.	Where ventilatory limitation restrains submaximal exercise.
COPD/emphysema.	With true ventilatory limitation.
AIDS.	With accompanying neuromuscular complications, severe depletion of CD4 cells, malignancy or opportunist infection.
Psychiatric illness/cognitive impairment/dementia.	AMT score <8.

Absolute contraindications to exercise

BACR (2005) and ACSM (2005) guidelines for absolute contraindications	BHFNC (2010) guidelines for absolute contraindications
<ul style="list-style-type: none"> Unstable* angina. Resting systolic blood pressure of more than 180mmHg. Resting diastolic blood pressure of more than 100mmHg. Symptomatic hypotension (BP drop > 20 mmHg demonstrated during ETT). This will not be evident unless client undergoes an exercise stress test or has exercising blood pressure measured. Resting or uncontrolled tachycardia > 100bpm. Unstable* or acute heart failure. New or uncontrolled arrhythmias (atrial or ventricular). Valvular heart disease/aortic stenosis. Unstable* diabetes. Febrile illness. Acute systemic disease (such as cancers). Neuromuscular, musculoskeletal or rheumatoid disorders that are exacerbated by exercise. Unmanaged pain. 	<ul style="list-style-type: none"> A recent significant change in a resting ECG, recent myocardial infarction or other acute cardiac event. Symptomatic severe aortic stenosis. Acute pulmonary embolus or pulmonary infarction. Acute myocarditis or pericarditis. Suspected or known dissecting aneurysm. Resting systolic BP ≥180mmHg. Resting diastolic BP ≥100mmHg. Uncontrolled/unstable* angina. Acute uncontrolled psychiatric illness. Unstable* or acute heart failure. New or uncontrolled arrhythmias. Other rapidly progressing terminal illness. Experiences significant drop in BP during exercise. Uncontrolled resting tachycardia (≥100 bpm). Febrile illness. Experiences pain, dizziness or excessive breathlessness during exertion. Any unstable, uncontrolled condition.
<p>*a condition is defined as being unstable if there has been a need for a change in medication, or deterioration in signs and symptoms in the previous month.</p>	