

Physical activity for people with cardiovascular disease: recommendations of the National Heart Foundation of Australia

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Background and evidence base for recommendations

This position statement was prepared by an Expert Working Group chaired by Dr Roger Allan on behalf of the National Physical Activity and the Medical Issues Advisory Committees. The Working Group, which has expertise in physical activity, cardiovascular exercise physiology, cardiology, epidemiology, public health medicine, health promotion, general practice, and secondary prevention of coronary heart disease, prepared an initial evidence-based draft statement, which was circulated for comment. Comments were incorporated into a second draft, which was then circulated more widely and discussed at an open forum held on 28 February 2005.

Reviews published since the 1996 report by the United States Surgeon General on physical activity and health¹ were identified by searching PubMed, the Cochrane Library and PsycINFO, using the search terms exercise, physical activity, cardiovascular disease (CVD), heart disease, coronary heart disease, coronary artery disease, heart failure, stroke, peripheral vascular disease, peripheral arterial disease, claudication and diabetes mellitus. Limits of humans, adults and English only were imposed. These searches were complemented by searches of the reference lists of reviews, personal collections of the Working Group, and websites of leading national and international health agencies concerned with heart, stroke, vascular disease and diabetes. A total of 37 relevant articles were identified.

The level of evidence and grade of recommendation were classified according to the interim classification system of the National Health and Medical Research Council.² All levels of evidence, encompassing systematic reviews (I) through to case series (IV) or panel consensus, and grades of recommendation from "can be trusted to guide practice" (A) to "must be applied with caution" (D) (Box 1) underpin the formation of the position paper. Panel consensus judgement was used to grade two recommendations covering: those with debilitating CVD; and those with implantable cardiac devices, or congenital or valvular heart disease. ♦

ABSTRACT

- To provide physical activity recommendations for people with cardiovascular disease, an Expert Working Group of the National Heart Foundation of Australia in late 2004 reviewed the evidence since the US Surgeon General's *Report: physical activity and health* in 1996.
- The Expert Working Group recommends that:
 - people with established clinically stable cardiovascular disease should aim, over time, to achieve 30 minutes or more of moderate intensity physical activity on most, if not all, days of the week;
 - less intense and even shorter bouts of activity with more rest periods may suffice for those with advanced cardiovascular disease; and
 - regular low-to-moderate level resistance activity, initially under the supervision of an exercise professional, is encouraged.
- Benefits from regular moderate physical activity for people with cardiovascular disease include augmented physiological functioning, lessening of cardiovascular symptoms, enhanced quality of life, improved coronary risk profile, superior muscle fitness and, for survivors of acute myocardial infarction, lower mortality.
- The greatest potential for benefit is in those people who were least active before beginning regular physical activity, and this benefit may be achieved even at relatively low levels of physical activity.
- Medical practitioners should routinely provide brief, appropriate advice on physical activity to people with well-compensated, clinically stable cardiovascular disease.

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Evidence is compelling (National Health and Medical Research Council [NHMRC] level I²) for the impact of physical activity on the prevention and treatment of cardiovascular disease (CVD).³ Yet, over half the Australian adult population, including those with CVD, perform insufficient activity for health gain.⁴ Physical inactivity is associated with almost twice the risk of developing coronary heart disease (CHD)³ and results in a poorer prognosis in survivors of myocardial infarction compared with their active counterparts.⁵ While recent health promotion campaigns have passionately promoted physical activity for the general population, definitive national recommendations for those people with heart, stroke or vascular disease have not been available. To fill this void, the National Heart Foundation of Australia, in consultation with key stakeholders, has produced the following physical activity recommendations for people with CVD. More detailed information is available at the Heart Foundation website (<http://www.heartfoundation.com.au/index.cfm?page=45>).⁶

The recommendations provide health professionals with evidence-based physical activity information for specific cardiovascu-

1 Grades of recommendation defined by the National Health and Medical Research Council²

- A: Body of evidence can be trusted to guide practice
- B: Body of evidence can be trusted to guide practice in most situations
- C: Body of evidence provides some support for recommendation(s), but care should be taken in its application
- D: Body of evidence is weak, and recommendation must be applied with caution ◆

lar conditions, including CHD, heart failure, stroke and peripheral vascular disease (PVD). There is NHMRC level I evidence (low risk of bias²) for the recommendations on CHD and heart failure, with lower levels of evidence for PVD and stroke (level II: moderate risk of bias), and for other cardiac conditions such as valvular heart disease and implantable cardiac devices (level IV: high risk of bias). The provision of accurate and safe physical activity advice to people with CVD, if put into practice, should improve individual and population health outcomes. Physical activity also has a significant impact for people with coexisting risk factors, such as raised blood pressure, adverse lipid profiles, overweight and obesity, insulin resistance, depression and social isolation.³

How much physical activity for cardiovascular health?

What is physical activity?

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure¹ significantly beyond resting level, particularly involving continuous actions of large muscles. Exercise is defined as the systematic execution of physical activity for a specific purpose.³

Broad recommendation

The Heart Foundation's Expert Working Group recommends that people with established clinically stable CVD should aim, *over time*, to achieve 30 minutes or more of moderate intensity physical activity (such as purposeful walking) on most, if not all, days of the week.⁷ Moderate intensity is associated with a moderate, noticeable increase in the depth and rate of breathing while still allowing comfortable talking, and is relative for a given person (Box 2). The amount of activity can be accumulated in shorter bouts, such as three 10-minute sessions.⁸ Less intense, even shorter bouts, with more rest periods, may suffice for those with debilitating CVD. In addition, regular low-to-moderate level resistance activity, preferably initiated under the supervision of an exercise professional, is encouraged.

The potential for functional benefit is greatest in those people who were least active before commencing regular physical activity,

2 Levels of intensity of physical activity

Low intensity physical activity elicits a slight increase in breathing rate and is relative for a given person (eg, strolling < 3 km/h on level firm ground, tidying the house, leisurely stationary cycling < 50 watts, and social lawn bowls).

Moderate intensity physical activity elicits a moderate, noticeable increase in depth and rate of breathing, while still allowing comfortable talking and is relative for a given person (eg, purposeful walking 3–6 km/h on level firm ground, water aerobics, cycling for pleasure < 16 km/h, and cleaning the house). ◆

and this benefit may be achieved even at relatively low levels of physical activity.³

Benefits of physical activity for people with CVD

People of any age with CVD can benefit from regular, moderate physical activity unless otherwise contraindicated.⁷ The associated benefits of regular physical activity for those with CVD include the following.

Augmented physiological function

Exercise rehabilitation consistently improves objective measures of functional capacity in those with heart disease.^{3,9} Endurance training improves walking mobility among stroke survivors,¹⁰ and increases walking distance in people with PVD and exercise-induced claudication¹¹ (NHMRC level of evidence [LOE] I, grade of recommendation [GOR] A²). (see Box 1 for NHMRC classifications.)

Reduction in symptoms

Exercise training reduces recurrent anginal symptoms,¹² lessens breathlessness associated with heart failure¹³ and stroke,¹⁴ and reduces severity of claudication pain with walking in patients with PVD¹¹ (LOE I, GOR A).

Enhanced quality of life

Exercise rehabilitation is associated with small but consistently favourable changes in self-reported quality-of-life domains among survivors of myocardial infarction,¹⁵ people with heart failure¹⁶ and PVD¹⁷ (LOE II, GOR B). No significant quality-of-life benefit for exercise-trained stroke survivors has been found in the limited studies reported.¹⁰

Improved coronary risk profile

Regular moderate physical activity favourably alters raised blood pressure,¹⁸ raised triglyceride concentrations,¹⁹ and low high-density lipoprotein cholesterol concentrations¹⁹ in those with CHD, and insulin resistance and glucose intolerance in those predisposed to diabetes²⁰ (LOE I, GOR A).

More research is warranted to establish the efficacy of regular moderate physical activity on obesity, depression and social isolation among those with CVD.

It is plausible that such benefits may also apply to exercise-trained stroke survivors and those with PVD, but no data are currently available.

Reduced mortality

Habitually, physically active survivors of myocardial infarction are up to 25% less likely to die than their sedentary counterparts⁵ (LOE II, GOR B).

Survival benefits may also occur in people with heart failure,⁹ but more studies involving larger numbers are needed. More studies are also needed to evaluate the prognostic implications of regular physical activity among people with stroke and PVD, and the elderly.³

Improved muscle fitness

Resistance exercise improves physical strength and self-confidence in those with CVD and enhances the capacity to perform strength-related activities of daily living^{3,21} (LOE II, GOR B).

3 Indications for deferral or termination of physical activity (adapted from Gibbons et al²⁷)

Indications to defer activity, warranting medical review

- unstable angina
- uncontrolled cardiac failure
- severe aortic stenosis
- uncontrolled hypertension or grade 3 (severe) hypertension (eg, blood pressure \geq 180 mmHg [systolic] or \geq 110 mmHg [diastolic])
- symptomatic hypotension $<$ 90/60 mmHg
- acute infection or fever, or feeling unwell (including, but not limited to, acute myocarditis or pericarditis)
- resting tachycardia or arrhythmias
- diabetes with poor blood glucose control (eg, blood glucose level $<$ 6 mmol/L or $>$ 15 mmol/L)

Indications to terminate activity

- squeezing, discomfort or typical pain in the centre of the chest or behind the breastbone \pm spreading to the shoulders, neck, jaw and/or arms; or symptoms reminiscent of previous myocardial ischaemia
- dizziness, light headedness or feeling faint
- difficulty breathing
- nausea
- uncharacteristic excessive sweating
- palpitations associated with feeling unwell
- undue fatigue
- leg ache that curtails function
- physical inability to continue
- for people with diabetes: shakiness, tingling lips, hunger, weakness, palpitations

estimated to be 1 for every 117 000 hours of activity (major event) and 1 per 750 000 hours (fatal event).²³ Exceeding the recommended dose may increase the risk for recurrent cardiovascular events.³

Medicolegal considerations: adequate disclosure

For optimal safety and benefits when recommending physical activity, the doctor should discuss the risks and gains for the individual, emphasise intensity at or below a moderate level as determined by fitness and symptoms, and, where appropriate, provide a management plan for acute chest pain/discomfort and/or diabetes symptoms. Where doctors feel unable to provide detailed advice, they may of course refer the patient to tertiary services for advice.

Pre-activity evaluation

The extent of a pre-activity evaluation depends on the intensity of anticipated physical activity and on the person's symptoms, signs, overall CVD risk, clinical CVD and other comorbidities. Any pre-activity evaluation should involve a medical review, physical examination and a history of physical activity to ensure there is no contraindication to becoming more active. Further, patients should be taking relevant pharmacological therapies and reducing their overall coronary risk profile, in accordance with national guidelines.⁷ It is not necessary for individuals starting a low-to-moderate progressive program of physical activity to perform an exercise tolerance test.²⁴

If there is uncertainty about the safety of physical activity, or if the patient aspires to regular vigorous exercise, exercise stress testing should be considered, preferably with echocardiography or radionuclide scintigraphy.²⁵

Brief counselling

Brief physical activity counselling by general practitioners, combined with supporting written material, leads 10%–20% of patients to increase their activity for up to 6 months.²⁶ Sustained changes can be achieved by episodic follow-up, reinforcing positive behavioural change, and by referral to community programs.

Doctors should routinely provide brief, appropriate, written physical activity advice to people with well compensated, clinically stable CVD (LOE II, GOR B).

Who requires referral for supervision?

Patients who have advanced CVD and those who lack confidence or request group support will benefit most from up to 12 weeks of supervised exercise rehabilitation that incorporates endurance and resistance activity. Supervision may be beneficial to reduce anxiety, monitor symptoms and arrhythmias, and establish appropriate physical activity intensity after an acute cardiovascular event or vessel revascularisation.

Indications for deferral or termination of physical activity

For those with severe or uncontrolled clinical CVD (Box 3), medical evaluation and review of prescription medicines is warranted before beginning physical activity. Concomitantly, clinical advice should be given to cease physical activity when indicated (Box 3). People who experience signs or symptoms indicative of ischaemia or hypoglycaemia should be advised to follow their

Importantly, the influence of regular physical activity on cardiovascular health determinants (eg, functional capacity) is transient, with a rapid decline on stopping regular physical activity. Further, more substantial health gains are likely to be achieved with appropriate concomitant pharmacological therapy.⁷

Limitations of current evidence

Notwithstanding the functional and quality-of-life gains, the evidence for survival benefits from habitual physical activity for people with CVD is drawn from studies with some limitations. Studies mostly involve men undertaking light-to-moderate intensity structured exercise, with varying degrees of supervision, and ongoing medical review. Most studies pre-date the recent major interventional and pharmacological advances in CVD management. Further research is warranted to confirm the survival benefit with physical activity in those with CVD receiving contemporary medical therapy.

Implementing physical activity in general practice

Is physical activity safe?

The benefits of physical activity clearly far outweigh the risks, with a particularly low prevalence of musculoskeletal injury for walking, gardening and cycling.²² The risks of a major or fatal cardiovascular event occurring among participants across the gamut of CHD attending supervised exercise rehabilitation are

chest pain/discomfort or diabetes management plan, and to discontinue physical activity pending medical review if they recur.

How to progress and maintain physical activity

Sedentary people should be encouraged to build up gradually from a low intensity to the recommended dose of physical activity. Progression will be slower for those with advanced CVD or comorbidities. Initially, emphasise frequency (through the day and number of days) followed by duration. Having achieved at least 30 minutes on most, and preferably all, days of the week, progression to moderate intensity may be considered. Maintaining regular physical activity for health gain is underpinned by the medical professional's encouragement and support at periodic reviews. If, for any reason, a person's habitual physical activity is curtailed for several weeks they should resume at a lower intensity and for a shorter duration. Longer disruptions associated with disease progression or new comorbidities will require greater modulations in dose, including brief abstinence in some cases.

For specific practical or special considerations pertaining to engaging in regular physical activity or resumption of sports participation, see the complete guidelines.⁶

Specific recommendations

Supervised exercise rehabilitation

After an acute cardiovascular event, many people may need outside help to achieve appropriate levels of physical activity. After discharge from hospital, patients with myocardial infarction, unstable angina pectoris, or coronary artery bypass grafting or percutaneous coronary interventions who have no contraindications to physical activity (Box 3) should be offered, and participate in, up to 12 weeks of supervised exercise rehabilitation²⁴ (LOE I, GOR A).

People with implantable cardiac devices, congenital and valvular heart disease

People with well compensated, clinically stable CVD, including those with implantable cardiac devices, and congenital and valvular heart disease, should progress over time to the recommended physical activity dose¹³ (LOE panel consensus, GOR D).

People with debilitating CVD

People with advanced CVD or severely impaired functional status should progress toward the recommended dose of physical activity after first having achieved lower categories of exercise (less intense, shorter duration, less frequent) interim targets, preferably under supervision³ (LOE panel consensus, GOR D).

People undergoing revascularisation

People who have recently had surgery or angioplasty, with or without stenting for CVD, should be advised to curtail any structured physical activity for several days, or longer in the case of wound infection or a large postprocedural haematoma.

People with peripheral vascular disease and stroke survivors

Unless contraindicated, all people with PVD and stroke survivors should progress over time to the recommended level of physical activity^{3,11,21} (LOE II, GOR B).

Resistance activity

In addition, people with well compensated, clinically stable CVD are likely to gain additional muscle fitness from light-to-moderate resistance activities³ (LOE II, GOR B). Ideally, these should be implemented under the guidance of an exercise professional and initially supervised.

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Competing interests

None identified.

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