

Physical activity in the prevention and management of type 2 diabetes

Patients with diabetes should be treated according to the *Evidence based guidelines for type 2 diabetes: primary prevention, case detection and diagnosis*, endorsed by the National Health and Medical Research Council (available at: www7.health.gov.au/nhmrc/publications/subjects/diabetes.htm and www.diabetesaustralia.com.au)

This fact sheet is designed to assist health professionals with the issue of physical activity for people with **pre-diabetes** and those with **type 2 diabetes**.

People with **type 1 diabetes** will benefit from being physically active and should be referred to an endocrinologist or exercise physiologist for assessment and advice.



Heartsite www.heartfoundation.com.au
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NSW HEALTH

Physical activity is one of the cornerstones of the prevention and management of type 2 diabetes in men and women.¹ For people with **pre-diabetes** (impaired fasting glucose or impaired glucose tolerance) regular physical activity may delay or prevent the progression to diabetes.² International studies have found that modest weight loss of 5-7% and moderate physical activity for at least 30 minutes each day (150 minutes per week) lowered the risk of developing diabetes by 58% in overweight people with pre-diabetes.² In people with **type 2 diabetes**, physical activity can improve glycaemic control, prevent cardiovascular disease and reduce the risk of cardiovascular and total mortality.^{3,4}

GPs who incorporate targeted brief intervention into their practices can effectively influence activity levels of patients at risk of diabetes as well as those with type 2 diabetes.

Physical activity for people with pre-diabetes

Benefits

Physical activity can help **prevent or delay** the onset of type 2 diabetes. It is particularly effective in the prevention of type 2 diabetes in people who are sedentary. Physical activity appears to be the strongest predictor in reducing the incidence of type 2 diabetes in the absence of any change in weight, blood pressure or cholesterol.²

Target individuals with:

- ♥ Sedentary lifestyles or low activity levels
- ♥ Overweight or obesity (particularly abdominal obesity)
- ♥ Hypertension
- ♥ Hypercholesterolaemia
- ♥ History of gestational diabetes
- ♥ Polycystic ovary disease
- ♥ First-degree relative with diabetes
- ♥ Age 35 and over for some high-risk ethnic/cultural backgrounds (e.g. Pacific Islander, Chinese, Pakistani and Indian)
- ♥ Indigenous Australians
- ♥ Age 55 and over

Raising the issue of physical activity with patients who have pre-diabetes

- ♥ **Identify** people at high risk of developing type 2 diabetes.
- ♥ **Provide verbal advice** to increase physical activity.
- ♥ **Reinforce** the verbal advice with printed information.
- ♥ Set up a **follow-up** system and check progress at later consultations.
- ♥ **Assess** for development of diabetes by measuring fasting plasma glucose.
- ♥ Consider **referral** for advice, support or program development.

Preparing for physical activity

Before beginning regular physical activity, patients with pre-diabetes should undergo a thorough medical evaluation, including a detailed exercise history (baseline fitness, current physical activity and musculoskeletal status) and a cardiovascular assessment.^{1,5} Examination of feet and eyes is also recommended. **Physical activity recommendations for patients with pre-diabetes are outlined in Table 1.**

Physical activity for people with type 2 diabetes

Benefits

- ♥ Cardiovascular-based physical activity appears to improve glycaemic control, independent of its effect on bodyweight,^{4,6} and may allow for a reduction in the dose of diabetes medication.
- ♥ A moderate or high level of physical activity has been shown to reduce the risk of total and cardiovascular mortality among patients with type 2 diabetes, independent of BMI, blood pressure, total cholesterol and smoking status.³
- ♥ Resistance or strength training has also been shown to improve glycaemic control, reduce the required dose of diabetes medication and improve blood pressure control in people with type 2 diabetes.⁷

Preparing for physical activity

Before beginning regular physical activity, patients with diabetes should have a detailed medical examination that includes their exercise history.^{1,5} Specialist referral and the support of other health professionals with specific training in physical activity and/or behaviour change may be required.

A coronary artery disease exercise testing protocol (graded exercise test), using a 12-lead ECG, should be performed on individuals with one or more of the following:⁸

- ♥ Type 2 diabetes and aged over 35 years
- ♥ Type 2 diabetes and one or more additional cardiovascular risk factors
- ♥ Suspected or known coronary artery disease, including hypertension
- ♥ Microvascular or neurological diabetes complications, e.g. neuropathy, nephropathy, retinopathy.

Thoroughly assess the patient's feet for signs of peripheral neuropathy or peripheral vascular disease: check for blisters, redness, numbness, sores, coldness, decreased or absent pulses, atrophy of subcutaneous tissues, mechanics of the foot and hair loss. Check the patient's eyes before commencing a physical activity program. **Physical activity recommendations for patients with diabetes are outlined in Table 1.**

Patients who take insulin or oral hypoglycaemic agents

People who take insulin or oral hypoglycaemic agents to manage their type 2 diabetes need specific education and, where possible, referral to an exercise physiologist and a diabetes educator to develop a suitable physical activity program. Careful follow-up and adjustment of medications is needed to avoid hypoglycaemia and hypotension.

Table 1. Physical activity recommendations for patients with pre-diabetes or diabetes^{4,5}

If the patient with pre-diabetes has no limitations to exercise, they may be advised to:

- ♥ Perform 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week. This may be accumulated throughout the day. If weight loss is desired, patients should build up to 45-60 minutes of continuous exercise on most, preferably all, days of the week
- ♥ Perform resistance training on at least 2-3 days/week
- ♥ Reduce sedentary behaviours by being active in as many ways as possible throughout the day. Regard physical activity as an opportunity to improve health and well-being
- ♥ See an exercise physiologist with experience in diabetes management for assistance with assessment, safe instruction and follow up.

People with complications or limitations to physical activity should be referred to a diabetes team, including an exercise physiologist. The Medicare Chronic Disease Management items may be applicable to these patients.

Patients should be advised to:

- ♥ Avoid strenuous exercise if glucose levels > 14 mmol/L
- ♥ Consume additional carbohydrate foods (15 g of preferably low-GI carbohydrate) if blood glucose levels < 5.5 mmol/L immediately before planned moderate intensity exercise
- ♥ Monitor blood glucose before and after exercise, and during prolonged exercise (> 30 minutes), to identify when changes in food intake or insulin are necessary (blood glucose levels may be affected for up to 48 hours post physical activity)
- ♥ Avoid giving an insulin injection into a limb that will be involved in the activity: exercise will increase insulin uptake
- ♥ Be aware of their glycaemic response to different exercise conditions
- ♥ Make sure carbohydrate-based foods are readily available during and after exercise
- ♥ Consult an endocrinologist or diabetes educator about appropriate insulin adjustment as required

- ♥ Arrange medication review once a regular exercise program is established.

References

1. American Diabetes Association. Position statement. Diabetes mellitus and exercise. *Diabetes Care* 2002; 25: S64-S68.
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3. Hu G, Jousilahti P, Barengo NC, et al. Physical activity, cardiovascular risk factors, and mortality among Finnish adults with diabetes. *Diabetes Care* 2005; 28: 799-805.
4. Dunstan DW, Zimmet P, Slade R, et al. *Diabetes and physical activity. Joint position statement of the International Diabetes Institute and Diabetes Australia Victoria on the role of physical activity in the risk reduction and management of diabetes.* November 2003.
5. Sigal, RJ, Kenny GP, Wasserman, DH, Castaneda-Sceppa C. Physical activity/exercise and type 2 diabetes. *Diabetes Care* 2004; 27: 2518-39.
6. Boulé NG, Haddad E, Kenny GP, et al. Effects of exercise on glycemic control and body mass in type 2 diabetes: a meta-analysis of controlled clinical trials. *JAMA* 2001; 286: 1218-27.
7. Castaneda C, Layne JE, Munoz-Orians L, et al. A randomised controlled trial of resistance exercise training to improve glycemic control in older adults with type 2 diabetes. *Diabetes Care* 2002; 25: 2335-41.
8. Hornsby WG, Albright AL. In: Durstine JR, Moore GE, eds. *ACSM's exercise management for persons with chronic diseases and disabilities.* 2nd ed. Champaign, IL: Human Kinetics Publishers 2003; 21; 133-141.

Heart Foundation programs and services

- ♥ **Just Walk It** program – refer your patient to a community walking group (NSW): call **1300 36 27 87** (local call cost)
- ♥ **Heartline** – information for you and your patients on healthy eating, physical activity, blood pressure, blood cholesterol, smoking cessation, etc: call **1300 36 27 87** (local call cost)
- ♥ **Heartmoves** – refer your patient to a safe, low- to moderate-intensity exercise class suitable for every fitness level, delivered by trained and accredited fitness leaders: call **(02) 4952 4699**
- ♥ **Heartsite** – www.heartfoundation.com.au
- ♥ **Accredited exercise physiologists' services**
Risk stratification, clinical exercise prescription and health-behaviour change management; assistance with starting and maintaining physical activity programs.
For referral: visit the 'Find an Exercise Physiologist' section of the Australian Association for Exercise and Sport Science (AAESS) website (www.aaess.com.au) or call (07) 3856 5622.
- ♥ **Diabetes Australia programs and services**

Diabetes Australia NSW has several resources available to assist patients with physical activity, including videos, fact sheets, Ezy Walk CD personal trainer, Healthy Activity kit and contact details for experienced diabetes educators, exercise physiologists and dietitians. Call 1300 136 588 or go to www.diabetesaustralia.com.au