

# Type 2 diabetes prevention: population and community-level interventions

Public health guideline  
Published: 10 May 2011

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## Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the [Yellow Card Scheme](#).

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should [assess and reduce the environmental impact of implementing NICE recommendations](#) wherever possible.

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This guideline is the basis of QS94, QS111 and QS167.

## Overview

This guideline covers preventing type 2 diabetes in adult populations and communities who are at high risk. It aims to promote a healthy diet and physical activity at community and population level, and recommends how to tailor services for people in ethnic communities and other groups who are particularly at risk of type 2 diabetes.

NICE has also produced a [guideline on preventing type 2 diabetes in people at high risk](#).

## Who is it for?

- Directors and commissioners
- GPs, practice nurses, dietitians and public health nutritionists and other health professionals
- Practitioners involved in physical activity interventions and community engagement
- Members of the public

# Introduction

The Department of Health (DH) asked NICE to produce public health guidance on the prevention of type 2 diabetes mellitus among high-risk groups.

The referral was divided into two separate pieces of guidance. The first (this guidance) originally set out to address the prevention of 'pre-diabetes' among adults aged 18 to 74 in communities at high risk of developing type 2 diabetes. The second set out to focus on preventing the progression from 'pre-diabetes' to type 2 diabetes.

However, in January 2011 the World Health Organization (WHO) recommended that glycated haemoglobin (HbA1c) could be used as an alternative to standard glucose measures to diagnose type 2 diabetes among non-pregnant adults. HbA1c levels of 6.5% (48 mmol/mol) or above indicate that someone has type 2 diabetes – but there is no fixed point to indicate when someone has 'pre-diabetes'. (Increasing levels of HbA1c, up to the 6.5% (48 mmol/mol) cut-off point, mean someone is at increasing risk of type 2 diabetes.)

The title of this guidance has been changed since it went out for consultation to reflect this move away from recognising 'pre-diabetes' as a separate condition. However, the overall range and scope of the content remains the same. The second piece of guidance will consider the effectiveness and cost effectiveness of interventions to prevent type 2 diabetes among individuals at high-risk.

Factors which influence someone's risk of type 2 diabetes include: weight, waist circumference, age, physical activity and whether or not they have a previous history of gestational diabetes or a family history of type 2 diabetes.

In addition to these individual risk factors, people from certain communities and population groups are particularly at risk. This includes people of South Asian, African-Caribbean, black African and Chinese descent and those from lower socioeconomic groups.

The guidance is for commissioners, managers and practitioners with public health as part of their remit working within the NHS, local authorities, the national and local public health service and the wider public, private, voluntary and community sectors. It is also for national policy makers, caterers, food manufacturers and retailers.

The guidance is particularly aimed at: directors of public health, public health

commissioners and all those working in national and local public health services. This includes: GPs, practice nurses, dietitians, public health nutritionists and other health professionals, as well as those involved in delivering physical activity interventions, community engagement teams and community leaders. It may also be of interest to members of the public.

The guidance complements, but does not replace, NICE guidance on: behaviour change, cardiovascular disease, community engagement, diabetes in pregnancy, management of type 2 diabetes, maternal and child nutrition, obesity, physical activity and weight management before, during and after pregnancy.

The Programme Development Group (PDG) developed these recommendations on the basis of reviews of the evidence, economic modelling, expert advice, stakeholder comments and fieldwork.

Members of the PDG are listed in appendix A. The methods used to develop the guidance are summarised in appendix B. Supporting documents used to prepare this document are listed in appendix E.



# 1 Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in [making decisions about your care](#).

[Making decisions using NICE guidelines](#) explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

For the research recommendations see [section 4](#) and [for gaps in research see appendix D](#).

## Definitions

### Type 2 diabetes

Diabetes is a group of disorders with a number of common features characterised by raised blood glucose. In England the four commonest types of diabetes are:

- type 1 diabetes
- type 2 diabetes
- secondary diabetes (from pancreatic damage, hepatic cirrhosis, endocrinological disease/therapy, or anti-viral/anti-psychotic therapy)
- gestational diabetes (diabetes of pregnancy).

The underlying disorder for type 2 diabetes is usually [insulin](#) insensitivity combined with a failure of pancreatic insulin secretion to compensate for increased glucose levels. The insulin insensitivity is usually evidenced by excess body weight or obesity, and exacerbated by over-eating and inactivity. It is commonly associated with raised blood pressure and a disturbance of blood lipid levels. The insulin deficiency is progressive over time, leading to a need for lifestyle change often combined with blood glucose lowering therapy. See [NICE's guideline on managing type 2 diabetes in adults](#).

Type 2 diabetes is diagnosed in adults who are not pregnant by a glycated haemoglobin (HbA1c) level of 6.5% (48 mmol/mol) or above. A type 2 diabetes diagnosis can also be made by:

- random venous plasma glucose concentration the same or greater than 11.1 mmol/l or
- fasting venous plasma glucose concentration the same or greater than 7.0 mmol/l or
- 2-hour venous plasma glucose concentration the same or greater than 11.1 mmol/l 2 hours after 75 g anhydrous glucose in an oral glucose tolerance test (OGTT).

In patients without symptoms, the test must be repeated to confirm the diagnosis using World Health Organization criteria (see the World Health Organization's use of glycated haemoglobin in the diagnosis of diabetes mellitus and definition and diagnosis of diabetes mellitus and intermediate hyperglycemia).

## Overweight and obesity

The following table defines a healthy weight in relation to height using the body mass index (BMI). BMI is calculated from the weight in kg divided by the height in metres squared. The table also defines what it means to be overweight and different degrees of obesity (also see NICE's guideline on obesity).

**Table 1 Weight classifications using body mass index**

Classification	BMI (kg/m <sup>2</sup> )
Healthy weight	18.5–24.9
Overweight	25–29.9
Obesity I	30–34.9
Obesity II	35–39.9
Obesity III	40 or more

Being overweight or obese is the main contributing factor for type 2 diabetes. In addition, having a large waist circumference increases the risk of developing type 2 diabetes:

- Men are at high risk if they have a waist circumference of 94 to 102 cm (37 to 40 inches). They are at very high risk if it is more than 102 cm.
- Women are at high risk if they have a waist circumference of 80 to 88 cm (31.5 to 35 inches). They are at very high risk if it is more than 88 cm.

The above classification may not apply to some population groups, as noted in NICE's obesity guidance. For example, although some South Asian adults or older people may have a BMI lower than the overweight classification, they may still be at greater risk of developing conditions and diseases associated with being overweight or obese.

## Types of intervention

In this guidance, early intervention to prevent type 2 diabetes is considered as part of an integrated package of local measures to promote health and prevent a range of non-communicable diseases (including cardiovascular disease and some cancers).

The guidance also recommends national action to address the adverse environmental factors driving the increasing prevalence of type 2 diabetes.

Lifestyle interventions aimed at changing an individual's diet and increasing the amount of physical activity they do can halve the number with impaired glucose tolerance who go on to develop type 2 diabetes. However, the greatest impact on the levels – and associated costs – of type 2 diabetes is likely to be achieved by addressing these behavioural risk factors in whole communities and populations.

## Guiding principles

Type 2 diabetes shares common risk factors with other non-communicable diseases including cardiovascular disease and some cancers. This means that recommendations made in previously published NICE guidance can also help prevent it. Specifically, the following published statements underpin many of the recommendations made here.

## Supporting behaviour change

This recommendation should be read in conjunction with NICE's guideline on behaviour change: general approaches. Changing people's health-related behaviour involves:

- Helping them to understand the short, medium and longer-term consequences of health-related behaviour.
- Helping them to feel positive about the benefits and value of health-enhancing behaviours and changing their behaviours.
- Recognising how people's social contexts and relationships may affect their behaviour.
- Helping people plan changes in terms of easy sustainable steps over time.
- Identifying and planning for situations that might undermine the changes people are trying to make, and planning explicit 'if-then' coping strategies to maintain changes in behaviour.

## **Achieving and maintaining a healthy weight**

Everyone should aim to maintain or achieve a healthy weight, to improve their health and reduce the risk of diseases associated with overweight and obesity, such as type 2 diabetes. People should follow the strategies listed below. These may make it easier to maintain a healthy weight by balancing 'calories in' (from food and drink) and 'calories out' (from being physically active):

- base meals on starchy foods such as potatoes, bread, rice and pasta, choosing wholegrain where possible
- eat fibre-rich foods such as oats, beans, peas, lentils, grains, seeds, fruit, vegetables, wholegrain bread and brown rice and pasta
- eat at least five portions of a variety of fruit and vegetables each day, in place of foods higher in fat and calories
- adopt a low-fat diet
- avoid increasing fat or calorie intake
- consume as little as possible of fried food; drinks and confectionery high in added sugars (such as cakes, pastries and sugar-sweetened drinks); and other food high in fat and sugar (such as some take-away and fast foods)
- minimise calorie intake from alcohol

- watch the portion size of meals and snacks, and how often they are eating throughout the day
- eat breakfast
- make activities they enjoy, such as walking, cycling, swimming, aerobics and gardening, a routine part of life and build other activity into their daily routine – for example, by taking the stairs instead of the lift or taking a walk at lunchtime
- minimise sedentary activities, such as sitting for long periods watching television, at a computer or playing video games
- use physically active forms of travel such as walking and cycling. (This point is adapted from [NICE's guideline on physical activity in the workplace](#).)

## Effective weight-loss programmes

Effective weight-loss programmes should:

- address the reasons why someone might find it difficult to lose weight
- be tailored to individual needs and choices
- be sensitive to the person's weight concerns
- be based on a balanced, healthy diet
- encourage regular physical activity
- expect people to lose no more than 0.5 to 1 kg (1 to 2 lb) a week
- identify and address barriers to change.

Also see [NICE's guideline on obesity](#).

## Physical activity

For national recommendations for physical activity in adults aged 19 to 64 and older adults (over 65) see the [UK Chief Medical Officers' physical activity guidelines](#). For recommendations on physical activity in people who have obesity see [NICE's guideline on obesity](#).

## Cultural appropriateness

Culturally appropriate interventions take account of the community's cultural or religious beliefs and language and literacy skills by:

- Using community resources to improve awareness of, and increase access to, interventions. For example, they involve community organisations and leaders early on in the development stage, use media, plan events or make use of festivals specific to black and ethnic minority groups.
- Understanding the target community and the messages that resonate with them.
- Identifying and addressing barriers to access and participation, for example, by keeping costs low to ensure affordability, and by taking account of different working patterns and education levels.
- Developing communication strategies which are sensitive to language use and information requirements. For example, they involve staff who can speak the languages used by the community. In addition, they may provide information in different languages and for varying levels of literacy (for example, by using colour-coded visual aids and the spoken rather than the written word).
- Taking account of cultural or religious values, for example, the need for separate physical activity sessions for men and women, or in relation to body image, or beliefs and practices about hospitality and food. They also take account of religious and cultural practices that may mean certain times of the year, days of the week, settings, or timings are not suitable for community events or interventions. In addition, they provide opportunities to discuss how interventions would work in the context of people's lives.
- Considering how closely aligned people are to their ethnic group or religion and whether they are exposed to influences from both the mainstream and their community in relation to diet and physical activity.

## Whose health will benefit?

Adults (aged between 18 and 74), in particular, those from:

- black and minority ethnic groups

- lower socioeconomic groups.

## **Recommendation 1 Integrating national strategy on non-communicable diseases**

### **Who should take action?**

Commissioners and providers of national public health services working in partnership with:

- government departments
- the commercial sector
- local commissioners and providers of public health services
- the voluntary sector, not-for-profit and non-governmental organisations.

### **What action could they take?**

- When developing national strategy to target non-communicable diseases with a major link to diet, physical activity and obesity (for example, type 2 diabetes, cardiovascular disease, certain cancers), consider:
  - integrating the strategy with other relevant national actions to prevent related non-communicable diseases
  - addressing the key risk factors (for example, being overweight or obese, a sedentary lifestyle and an unhealthy diet)
  - highlighting the contribution that partners in national and local government, industry, healthcare and the voluntary sector can make by working together to reduce the risk of non-communicable diseases for the population as a whole
  - taking account of variations in different population subgroups (for example, by ethnicity, age or gender)
  - linking to targets and outcomes for reducing the key risk factors for type 2 diabetes and other non-communicable diseases.

- Encourage local, regional and national monitoring of the risk factors for diabetes and other non-communicable diseases. Also encourage monitoring of age-specific incidence rates for type 2 diabetes and other non-communicable diseases.
- Encourage local and national decision makers to assess the potential health impact of all new policies on the key risk factors for type 2 diabetes and other non-communicable diseases. Ensure they support any national prevention strategy.
- Clearly signpost national and regional resources, including toolkits and evaluation guides, that will help local services reduce the incidence of type 2 diabetes and other non-communicable diseases.
- Work with national and local commercial partners to encourage and support joint working with local public health teams to meet the national targets.

## **Recommendation 2 Local joint strategic needs assessments**

### **Who should take action?**

Commissioners and providers of local public health services in partnership with other local authority departments including:

- adult social care
- education
- environmental health
- planning
- public transport.



## What action should they take?

- Use national and local tools (such as the [Department of Health's guidance on joint strategic needs assessment](#)) and data from public health data collection agencies, public health reports, the census, indices of deprivation and other sources of high quality data (such as the [NHS Digital website](#)) to:
  - identify local communities at high risk of developing type 2 diabetes
  - assess their knowledge, awareness, attitudes and beliefs about the risk factors
  - assess their specific cultural, language and literacy needs.
- Identify successful local interventions and note any gaps in service provision.
- Identify local resources and existing community groups that could help promote healthy eating, physical activity and weight management, particularly within local communities at high risk of developing type 2 diabetes.

## Recommendation 3 Developing a local strategy

### Who should take action?

Commissioners and providers of local public health services in partnership with other local authority departments including:

- adult social care
- education
- environmental health
- planning
- public transport.

## What action should they take?

- Develop an integrated plan for local activities and programmes aimed at preventing type 2 diabetes and related non-communicable diseases (including cardiovascular disease). This should be based on the joint strategic needs assessment and relevant national strategy, targets and outcomes (such as the NHS outcomes framework).
- Those developing strategic plans should consult widely with local health professionals working closely with communities at high risk of developing type 2 diabetes.
- The plan should aim to increase physical activity levels and improve people's diet and weight management by:
  - identifying and assessing the effectiveness and cost effectiveness of existing local interventions
  - making recommendations for future investment and disinvestment
  - including action to raise awareness of type 2 diabetes and the risk factors for diabetes and other non-communicable diseases
  - creating local environments that encourage people to be more physically active and to adopt a healthier diet (for example, by ensuring local shops stock good quality, affordable fruit and vegetables)
  - targeting specific communities at high risk of developing type 2 diabetes, including people of South Asian, African-Caribbean or black African family origin, and those from lower socioeconomic groups
  - including interventions for individuals who are deemed at particular risk (based on clear criteria about the level of absolute risk that would trigger this provision, see also [NICE's guideline on preventing type 2 diabetes in people at high risk](#)).
- Ensure local outcomes and conclusions from the strategic plan are integrated into the local commissioning strategy.

## Recommendation 4 Interventions for communities at high risk of type 2 diabetes

### Who should take action?

Commissioners and providers of local public health services in partnership with:

- other local authority departments including: children's services, education, environmental health, leisure, planning, public transport, social housing and social services
- the NHS including: GPs, practice and community nurses, dietitians, public health nutritionists, doctors and nurses working in acute and emergency care, and occupational therapists
- the voluntary sector, not-for-profit and non-governmental organisations (include community leaders and trained lay workers).

### What action should they take?

- Work in partnership to develop cost-effective physical activity, dietary and weight management interventions. Interventions should take into account the religious beliefs, cultural practices, age and gender, language and literacy of black, minority ethnic and lower socioeconomic groups. (Interventions costing up to £10 per head would need to achieve an average weight loss of about 0.25 kg per head to be cost effective. Those costing up to £100 per head would need to achieve an average weight loss of about 1 kg per head.)
- Identify success criteria in the early stages of development to ensure interventions can be properly evaluated.
- Identify any skills gaps and train or recruit staff to fill the gaps.
- Identify and address barriers to participation. This includes developing communication strategies that are sensitive to the target audience's language and information requirements.

- Use community resources to improve awareness of the key messages and to increase accessibility to the interventions. For example, involve community organisations and leaders at the development stage and use media, plan events or attend festivals specifically aimed at black and minority ethnic communities and lower socioeconomic groups. Also involve existing community and social groups or clubs, such as toddler groups, pubs, social clubs and local sports clubs.
- Where they exist, use community links, outreach projects and lay or peer workers (from black and minority ethnic communities and from lower socioeconomic groups) to deliver interventions.
- Where necessary, train lay and peer workers in how to plan, design and deliver community-based health promotion activities. Training should be based on proven training models and evaluation techniques. It should give participants the chance to practice their new skills in the community. It should also encourage them to pass on their knowledge to their peers.
- Lay and peer workers and health professionals should identify and encourage community champions (for example, religious and community leaders) to promote healthy eating and physical activity.
- Encourage lay and peer workers to get other members of their community involved.
- Ensure lay and peer workers are part of a wider team led by health professionals. They should be involved in the planning, design and delivery of credible and culturally appropriate messages. This includes helping people to develop the practical skills they need to adopt a healthier lifestyle. For example, they should be able to run nutrition education sessions (theory and practice) or physical activity sessions. Management and supervision of these activities should be provided by the health professionals leading these teams.
- Commission culturally appropriate and financially accessible weight management programmes either from the NHS or non-NHS providers, based on the guiding principles for effective weight-loss programmes. These should be provided in community settings in areas where populations at high risk of type 2 diabetes live. (For example, they could be provided in religious venues or community and social clubs.)
- Ensure the systems or initiatives used to assess someone from a high-risk community are culturally appropriate.

- Ensure identification and assessment systems or initiatives are linked to effective services and interventions for individuals deemed to be at high risk.

See also [NICE's guidelines on preventing type 2 diabetes in people at high risk and community engagement](#).

## Recommendation 5 Conveying messages to the whole population

### Who should take action?

Commissioners and providers of national public health services working in partnership with:

- other government departments allied to health
- local commissioners and providers of public health services
- the commercial sector
- national voluntary sector, not-for-profit and non-governmental organisations.

### What action should they take?

- Ensure healthier lifestyle messages to prevent non-communicable diseases (including type 2 diabetes, cardiovascular disease and some cancers) are consistent, clear and culturally appropriate. Ensure they are integrated within other health promotion campaigns or interventions.
- Address any misconceptions about the risk of diabetes and other non-communicable diseases that can act as barriers to change. This includes the belief that illness is inevitable (fatalism) and misconceptions about what constitutes a healthy weight. Also address any stigma surrounding the conditions.
- Ensure any national media (for example, television and online social media) used to convey messages or information is culturally appropriate for the target audience.

- Identify and make use of existing campaign materials, messages and resources, including those from other countries, where appropriate. Messages and materials should:
  - highlight the need to reduce the amount of time spent being sedentary
  - highlight the importance of being physically active, adopting a healthy diet and being a healthy weight
  - increase awareness of healthier food choices, and the calorie content and nutritional value of standard-portion size meals and drinks.

## **Recommendation 6 Conveying messages to the local population**

### **Who should take action?**

Commissioners and providers of local public health services in partnership with:

- other local authority departments including education and leisure
- the NHS including: GPs, practice and community nurses, dietitians, public health nutritionists, doctors and nurses working in acute and emergency care, and occupational therapists
- the voluntary sector, not-for-profit and non-governmental organisations (including community leaders).

### **What action should they take?**

- Work with local practitioners, role models and peers to tailor national messages for the local community about preventing type 2 diabetes and other non-communicable diseases (such as cardiovascular disease and some cancers).
- Ensure healthier lifestyle messages are consistent, clear and culturally appropriate. Ensure they are integrated within other local health promotion campaigns or interventions. Provide details of the local support services available.

- Address any misconceptions in the local community about the risk of diabetes and other non-communicable diseases that could act as a barrier to change. This includes the belief that illness is inevitable (fatalism) and any misconceptions about what constitutes a healthy weight. Also address any stigma surrounding these conditions.
- Ensure messages and information are disseminated locally to groups at higher risk of type 2 diabetes than the general population, including black and minority ethnic and lower socioeconomic groups. Use local newspapers, online social media and local radio channels targeted at these groups. Also make use of local shops and businesses, community workers and groups, social establishments, educational institutions, workplaces, places of worship and local health care establishments, for example, hospitals.
- Offer communities support to improve their diet and physical activity levels, and ensure they are aware of the importance of both.

## **Recommendation 7 Promoting a healthy diet: national action**

### **Who should take action?**

Commissioners and providers of national public health services working in partnership with:

- other government departments
- the commercial sector
- the voluntary sector, not-for-profit and non-governmental organisations
- local commissioners and providers of public health services.

## What action could they take?

- Identify and work with a range of commercial partners to promote the provision of healthier food choices. For example:
  - Work with food manufacturers to improve the composition of prepared foods, where needed, to decrease calories, saturated fat and salt content. Encourage manufacturers to achieve any nationally agreed reformulation targets.
  - Work with caterers across the industry to help them reduce the amount of calories, saturated fat and salt in recipes and to use healthier cooking methods. They should also ensure healthier options are an integral part of all menus.
  - Work with food retailers to develop pricing structures that favour healthier food and drink choices.
  - Work with food retailers to ensure a range of portion sizes are available and that they are priced accordingly. This is particularly important for energy-dense foods and drinks.
  - Work with food manufacturers, caterers and retailers to provide clear, non-ambiguous and consistent nutrition information. This includes prominent displays of calorie content on the front of packaging and the use of clear signage for unpackaged food and drink. If calorie content is not known, consider indicating healthier options, such as food prepared using healthier ingredients or cooking methods.
  - Support the development of home-cooking resources that give information on nutritional content (for example, web-based recipe sites). Offer practical advice on preparing healthier meals, including the ingredients and cooking methods to use.
- Monitor the population's diet to determine the success of national-level interventions.
- Assess the health impact of all initiatives and interventions aimed at encouraging people to have a healthier diet.



## **Recommendation 8 Promoting a healthy diet: local action**

### **Who should take action?**

Commissioners and providers of local public health services in partnership with:

- other local authority departments including: environmental health, education, leisure, social services, planning and public transport
- the NHS including: dietitians and public health nutritionists
- voluntary sector, not-for-profit and non-governmental organisations (include community leaders and trained lay workers)
- local food retailers and caterers
- large and medium-sized employers.

### **What action should they take?**

- Make people aware of their eligibility for welfare benefits and wider schemes that will supplement the family's food budget and improve their eating patterns. This includes free school meals, free school fruit and Healthy Start food vouchers.
- Provide information on how to produce healthier meals and snacks on a budget.
- Work with local food retailers, caterers and workplaces to encourage local provision of affordable fruit and vegetables and other food and drinks that can contribute to a healthy, balanced diet.
- Provide nutrition education sessions (theory and practice) at times to suit people with children (or provide a crèche) or to fit with working hours. Sessions should take place in acceptable, accessible venues such as children's centres.

- Use existing planning mechanisms (for example, national planning guides or toolkits) to increase the opportunities available for local people to adopt a healthy, balanced diet. For example, ensure:
  - food retailers that provide a wide range of healthier products at reasonable cost are readily accessible locally, either on foot or via public transport
  - planning policies consider healthier eating when reviewing applications for new food outlets.
- Encourage local retailers to use incentives (such as promotional offers) to promote healthier food and drink options. The aim should be to make the healthier choice the easiest and relatively cheaper choice. The retailers targeted may include regional and national supermarkets and convenience store chains, as well as street markets and small independent shops.
- Encourage local caterers to include details in menus on the calorie content of meals to help consumers make an informed choice. If the nutritional value of recipes is not known, they should consider listing ingredients and describing the cooking methods used.
- Ensure local authorities and NHS organisations develop internal policies to help prevent employees from being overweight or obese. Encourage local employers to develop similar policies. This is in line with existing NICE guidance and (in England) the local obesity strategy. For example, organisations could promote healthier food and drink choices in staff restaurants, hospitality suites, vending machines and shops by using posters, pricing and the positioning of products.

## **Recommendation 9 Promoting physical activity: national action**

### **Who should take action?**

Commissioners and providers of national public health services working in partnership with:

- other government departments
- organisations with a remit for town planning

- organisations with a remit for increasing physical activity levels
- commissioners and providers of local public health services
- the voluntary sector, not-for-profit and non-governmental organisations.

## **What action could they take?**

- Ensure the benefits of physical activity – and the national recommendations for physical activity – are made clear to encourage people to be more physically active.
- Support a shift in the population towards being more physically active by encouraging even small changes.
- Use planning regulations to maximise the opportunities available to be physically active.
- Encourage the use of national and local planning guidance to ensure physical activity is a primary objective of transport policy, and when designing new buildings and the wider built environment.
- Monitor the population's overall physical activity levels to determine the success of national interventions. Assess the health impact of all initiatives and interventions to encourage physical activity.

## **Recommendation 10 Promoting physical activity: local action**

### **Who should take action?**

Commissioners and providers of local public health services in partnership with:

- other local authority departments including: planning, regeneration, public transport, leisure, sports and parks
- schools with community recreation facilities (for example, as part of the extended schools programme)

- the NHS including: GPs, practice and community nurses, community pharmacists and occupational therapists
- voluntary sector, not-for-profit and non-governmental organisations (include community leaders and trained lay workers)
- the fitness industry
- large and medium-sized employers.

## What action should they take?

- Ensure local planning departments use existing mechanisms (for example, national planning guides) to:
  - prioritise the need for people (including those whose mobility is impaired) to be physically active as a routine part of their daily life (for example, when developing the local infrastructure and when dealing with planning applications for new developments)
  - provide open or green spaces to give people local opportunities for walking and cycling
  - make sure local facilities and services are easily and safely accessible on foot, by bicycle and by other modes of transport involving physical activity (they should consider providing safe cycling routes and secure parking facilities for bikes)
  - provide for physical activities in safe locations that are accessible locally either on foot or via public transport
  - encourage people to be physically active inside buildings, for example, by using the internal infrastructure of buildings to encourage people to take the stairs rather than the lift (also see [NICE's guideline on physical activity and the environment](#)).
- Enable and encourage people to achieve the national recommended levels of physical activity by including activities such as walking, cycling or climbing stairs as part of their everyday life.

- Assess the type of physical activity opportunities needed locally and at what times and where. Consider social norms, family practices and any fears people may have about the safety of areas where physical activities take place (this includes fears about how safe it is to travel there and back).
- Map physical activity opportunities against local needs and address any gaps in provision.
- Ensure commissioned leisure services are affordable and acceptable to those at high risk of developing type 2 diabetes. This means providing affordable childcare facilities. It also means public transport links should be affordable and the environment should be culturally acceptable. For example, local authorities should consider the appropriateness of any videos and music played. They should also consider providing single-gender facilities, exercise classes, swimming sessions and walking groups – for both men and women.
- Provide information on local, affordable, practical and culturally acceptable opportunities to be more active. If cultural issues affect people's ability to participate, work with them to identify activities which may be acceptable. (This may include, for example, single-gender exercise and dance classes, or swimming sessions with same-gender lifeguards.)
- Encourage local employers to develop policies to encourage employees to be more physically active, for example, by using healthier modes of transport to and from work. Walking and cycling can be encouraged by providing showers and secure cycle parking. Signposting and improved decor could encourage employees to use the stairs rather than the lift. In addition, people could be encouraged to be active in lunch breaks and at other times through organised walks and subsidies for local leisure facilities. Flexible working policies and incentives that promote physical activity in the workplace should be considered. (This is an extract from [NICE's guidelines on obesity and promoting physical activity in the workplace](#); see the latter for further guidance on developing programmes and policies to encourage and support employees to be more physically active).
- Ensure the basic training for professional fitness instructors covers: the role of physical activity in improving people's health, how to get marginalised groups involved and cultural issues that may prevent them from participating.

## Recommendation 11 Training those involved in

## promoting healthy lifestyles

### Who should take action?

Commissioners and providers of national and local public health services in partnership with:

- royal colleges and professional associations, further and higher education training institutions, and other organisations responsible for competencies and continuing professional development programmes for health professionals
- other local authority departments including education and leisure services
- voluntary sector, not-for-profit and non-governmental practitioners
- the commercial sector.

### What action should they take?

- Ensure training programmes for those responsible for, or involved in, promoting a healthy lifestyle cover:
  - diversity, including cultural, religious and economic issues, delivering health promotion interventions in a non-judgemental way, and meeting age, gender, language and literacy needs
  - how to identify communities at increased risk of developing type 2 diabetes
  - strategies for changing behaviour (for those devising health promotion interventions)
  - how to provide advice on healthy eating, physical activity and weight management in relation to the prevention of type 2 diabetes and related non-communicable diseases
  - how to challenge stigma and dispel myths around type 2 diabetes.
- Ensure those responsible for, or involved in, promoting healthy lifestyle choices are given time and support to develop and maintain the skills described above.

- Monitor health professionals' knowledge and awareness of how to encourage people to adopt a healthy lifestyle. Use, for example, personal development plans and annual reviews. Ensure they keep their knowledge and practical skills up to date.
- Ensure training programmes for all health professionals (including undergraduate, continuing professional development and, where appropriate, post-graduate training):
  - incorporate the knowledge and skills needed to ensure health promotion interventions are culturally sensitive
  - cover nutrition, physical activity and weight management in relation to the prevention of type 2 diabetes
  - are focused, structured and based on proven models and evaluation techniques
  - offer opportunities to practice new skills in the community
  - encourage the sharing of knowledge among colleagues
  - provide up-to-date information on topics such as nutrition advice and physical activity (information should be updated regularly).

## 2 Public health need and practice

### Overview

On average, 100,000 people in the UK are diagnosed with diabetes every year, but in 2009 this figure reached 150,000. Many more are unaware that they have the condition (Diabetes UK 2006). It can lead to long-term complications including eye problems, kidney disease, foot ulcers and cardiovascular disease. On average at age 55, the life expectancy of people with type 2 diabetes is 5 to 7 years less than for the general population (DH 2006).

In addition to the personal cost to individuals, families and communities, diabetes is estimated to account for at least 5% of UK healthcare expenditure. For example, up to 10% of hospital budgets are spent on the condition – it is estimated that drug costs alone for people with type 2 diabetes account for about 7% of the total NHS drugs budget (Waugh et al. 2007).

In 2007, 60% of primary care trusts (PCTs) reported that programmes were in place to raise public awareness of the risk factors for type 2 diabetes – and 37% were raising awareness of its signs and symptoms. However, only 42% had assessed the needs of their population in relation to type 2 diabetes – and less than 40% had developed a type 2 diabetes strategy (Innove 2008).

### Risk factors for type 2 diabetes

Individual risk factors for type 2 diabetes include:

- weight (a body mass index [BMI] of 25kg/m<sup>2</sup> or more)
- a large waist circumference (more than 80 cm or 31.5 inches in women and 94 cm or 37 inches in men)
- low physical activity levels
- a family history of type 2 diabetes,
- a history of gestational diabetes



- age (being older than 40 or older than 25 for some black and minority ethnic groups).

In addition, people from the following communities are particularly at risk: those of South Asian, African-Caribbean, black African and Chinese descent and those from lower socioeconomic groups.

The more risk factors someone has, the more likely they are to develop diabetes (Harding et al. 2006).

## Vulnerable groups

People of South Asian family origin living in the UK are up to six times more likely to have type 2 diabetes than the white population (DH 2001). They are also likely to develop type 2 diabetes 10 years earlier (Nicholl et al. 1986). People of African and African-Caribbean descent are three times more likely to have type 2 diabetes than the white population. Type 2 diabetes is also more common among Chinese and other non-white groups than among white European populations (DH 2001).

The higher risk for South Asian people living in the UK is at least partly due to the fact that they may accumulate significantly more 'metabolically active' fat in the abdomen and around the waist than white European populations. (This is true even for those with a BMI in the 'healthy' range – that is, 18.5–24.9 kg/m<sup>2</sup>.) 'Metabolically active' fat is closely associated with insulin resistance, pre-diabetes and type 2 diabetes (McKeigue et al. 1991; 1992; 1993; Banerji et al. 1999).

Minority ethnic groups are less likely to participate in at least moderate-intensity physical activity (for 30 minutes continuously a week) than the general population. For example Bangladeshi men and women have the lowest levels of participation in physical activity when standardised for age (The NHS Information Centre 2006). Black Caribbean men are the only subgroup of an ethnic minority population that are not less physically active than the general population in England (The NHS Information Centre 2006).

In England, type 2 diabetes is 40% more common among those who are in social class V (people who are most socioeconomically deprived) compared with those in social class I (The NHS Information Centre 2010). In addition, people in social class V are three and a half times more likely than those in social class I to be ill as a result of diabetic complications (DH 2002).

People in social class V are also more likely to be obese than those in higher social classes. In 2004, 18% of men in social class I were obese compared to 28% in social class V. Similarly, 10% of women in social class I were obese compared with 25% of women in social class V (Foresight 2007).

In addition, there is also a clear link between physical activity and income level. For example, those on the lowest income are less likely to undertake more than 30 minutes of at least moderate-intensity activity a week compared with higher income groups (The NHS Information Centre 2008b).

The 'Low income diet and nutrition survey' found that, overall, people on lower incomes ate similar types and quantities of food as the general population. However, they were less likely to eat wholemeal bread, wholegrain and high fibre breakfast cereals and vegetables. They were also more likely to drink non-diet soft drinks and eat more processed meats, whole milk and sugar (Nelson et al. 2007).

There is overlap between the high-risk groups, that is, those who are disadvantaged and some black and minority ethnic communities, as some of the latter are more likely to live in areas of social and economic deprivation (Barakat et al. 2001).

## **Tackling barriers to change**

People from lower socioeconomic groups and those from black and minority ethnic communities may face economic, social and cultural barriers which prevent them from being physically active and managing their weight. Barriers include, for example, lack of funds for a healthy diet or a lack of awareness and opportunity to take part in physical activities or weight management programmes that are culturally acceptable.

## 3 Considerations

The Programme Development Group (PDG) took account of a number of factors and issues when developing the recommendations.

### Individual versus population approaches

3.1 The PDG considered three types of approach to reducing population and community risk of type 2 diabetes. These were:

a) Individual: focusing on people identified as being at high risk of type 2 diabetes.

b) High-risk population: identifying and targeting communities of people at high risk of type 2 diabetes.

c) Total population: no assessment of risk or targeting of interventions.

3.2 The PDG noted that people from lower socioeconomic groups and from some black and minority ethnic communities are at higher risk of type 2 diabetes than the general population. This is due to a set of shared characteristics and behaviours or 'determinants'. Examples include: a higher than average level of overweight and obesity, a higher than average number of people eating a less healthy diet or participating in lower than average levels of physical activity. These groups and communities would collectively benefit from interventions that target the 'shared' risk factors. In addition, more people within these groups and communities (compared with the general population) would benefit from an assessment of their individual risk – and individual interventions to alleviate that risk.

3.3 This guidance aims to reduce the risk of type 2 diabetes among populations at particularly high risk. Overweight and obesity is the single biggest risk factor for type 2 diabetes. Since recent estimates (for example, the Foresight report [2007]) suggest that more than half of adults may be obese by 2050, the PDG noted that some of the

recommendations would also have a beneficial effect on a large proportion of the general population.

- 3.4 The national NHS Health Check programme identifies and treats individuals at high risk of developing vascular-related diseases including type 2 diabetes. The PDG noted that not all those who are identified as being at risk will choose to change their behaviour or act on the advice. NICE guidance to prevent the progression from pre-diabetes to type 2 diabetes will aim to provide commissioners and practitioners with advice on how they can support people identified as being at high risk through this or other initiatives.
- 3.5 The PDG was mindful that actions to improve the health of the population overall may widen health inequalities between different groups. For example, people from higher socioeconomic groups may be more ready (or able) to change their behaviour than those on a lower income. Therefore, to address health inequalities, it may be necessary to specifically target high-risk groups – even if this is not the most cost-effective option.
- 3.6 Addressing the needs of high-risk communities involves working beyond geographical boundaries. A community is not necessarily a group of people living within a specific geographic location. It might, for example, involve people with shared values or a shared interest. In addition, although people may recognise themselves (and be recognised within a group) as belonging to that group or community, it may not be immediately obvious to 'outsiders'. This can make it difficult to identify and target some of those who may need help to prevent type 2 diabetes. This includes people who are homeless and those who have a disability or a long-term mental health problem. People who are unofficial migrants are another example.
- 3.7 Case studies of ongoing work in the UK, backed up by expert testimony, demonstrated the importance of taking the target group's needs into account from the start. This includes ensuring that any cultural sensitivities are acknowledged.

## Evidence

3.8 Trials have shown (Gillies et al. 2007) that behavioural interventions help reduce the likelihood of type 2 diabetes developing among people with pre-diabetes. For example, the Finnish diabetes prevention study (Tuomilehto et al. 2001) showed that the risk of these individuals developing type 2 diabetes is reduced if they achieve one or more of the following:

- reduce their weight by more than 5%
- keep their fat intake below 30% of energy intake
- keep their saturated-fat intake below 10% of energy intake
- eat 15 g/1000 kcal of fibre or more
- are physically active for at least 4 hours per week.

In addition, a population-based study (Simmons et al. 2006) found an inverse relationship between the number of these goals achieved and the risk of type 2 diabetes developing among the general population. Therefore, the PDG felt that interventions promoting these goals could significantly lower the risk of developing type 2 diabetes among people from lower socioeconomic communities and from black and minority ethnic groups.

3.9 The PDG considered systematic reviews of interventions to address the risk factors associated with type 2 diabetes, including high body mass index (BMI), high waist measurement, sedentary lifestyle or poor diet among high-risk groups. The group did not identify any evidence directly related to the prevention of 'pre-diabetes' among black and minority ethnic or lower socioeconomic groups in the UK. Overall, relevant UK-based intervention studies were scarce. Similarly, the evidence on behaviour change among minority ethnic communities was very limited. The data available tended to be based on self-reported measures related to participants' perceptions of the barriers and facilitators to behaviour change. It was not clear whether or not addressing the stated barriers and introducing facilitators would actually result in positive change.

3.10 There was no evidence of effectiveness on UK interventions aiming to

raise health professionals' awareness of the risk factors for type 2 diabetes or to help them identify groups at high risk. Evidence on the effectiveness of interventions delivered by health professionals and lay workers (such as health trainers) was also lacking.

- 3.11 The potential effect of any intervention may vary according to the risk someone faces of developing type 2 diabetes. However, evidence was not available to assess this theory in practice.
- 3.12 While demonstrating promising results, most of the UK-based community projects considered by the PDG had limited reach. The group felt that they were neither large nor sustainable enough and that they would benefit from being based on established community networks. Staff training for such interventions was another issue.
- 3.13 The PDG developed recommendations through inductive and deductive reasoning, based on the evidence presented in the systematic reviews, expert testimony and its members' knowledge, understanding and experience of the topic area. Due to the scarcity of evidence available, the PDG also drew on existing NICE guidance on: behaviour change, community engagement, obesity, physical activity and cardiovascular disease.
- 3.14 The economic analysis for this work is based on a range of assumptions. The observed effect sizes for individuals, while important, are small and the confidence intervals are large. Most of the interventions considered are estimated to be cost effective (and usually very cost effective). (This assumes that the estimated effect sizes have been used to make the calculation.) The PDG recognised that the bulk of these effects were generally observed only after a number of years.

## Cost effectiveness

- 3.15 Economic modelling showed that weight-loss programmes in black and minority ethnic and Asian populations in England that cost £100 per head and yielded an average weight loss of at least 1 kg were cost effective at a cost per quality-adjusted life year (QALY) threshold of £20,000. Interventions that could produce an average weight loss of 3 to 4 kg

would be cost-saving.

- 3.16 An intervention programme applied at the population level that resulted in an average weight of loss of 0.25 kg, would be cost effective at the £20,000 threshold if the cost per head of the intervention was £10. A number of the interventions reported in the literature had a per capita intervention cost of this magnitude. The PDG agreed that this analysis justified the recommendation to balance individual-level interventions of large effect aimed at high-risk individuals with cheaper interventions of small effect to individuals that could be cost effective when applied across whole populations.

## Existing NICE guidance

- 3.17 The PDG recognised that a number of existing activities and programmes aim to help people change their behaviour to prevent a range of diseases and conditions. It acknowledged that these activities and programmes could also help prevent type 2 diabetes and that many have been the focus of earlier NICE guidance. Similarly, the recommendations outlined in this guidance may have an impact on a range of other health conditions (including for example, cardiovascular disease, some common cancers, respiratory diseases and mental wellbeing).
- 3.18 There are many reasons why people who are socially and/or economically disadvantaged can find it more difficult than others to change their behaviour (Swann et al. 2009). The recommendations in this guidance draw on [NICE's guideline on behaviour change: general approaches](#) in an attempt to address this inequality. The aim is to create a local environment which encourages people in disadvantaged groups to make change.
- 3.19 The PDG noted the recommendations made in [NICE's guideline on obesity](#). These focus on a range of effective, community-based programmes and stress the importance of ensuring interventions are tailored, long term and address both diet and physical activity. The guideline also outlines strategies for improving diet and increasing physical activity to help prevent obesity and minimise excess weight gain.

- 3.20 The PDG discussed the links between sedentary behaviour and type 2 diabetes – and the need to encourage people to be more physically active. It was aware of evidence to suggest that a sedentary lifestyle may play a more important role than diet in the higher prevalence of type 2 diabetes among black and minority ethnic groups. NICE has published a range of guidance to help the whole population be physically active. The recommendations in this guidance attempt to address specific barriers to physical activity which might face populations at high risk of developing type 2 diabetes. However, more research is needed into how to increase physical activity levels among these groups.
- 3.21 The PDG recognised that the success of interventions can depend on identifying local 'key players' and 'champions' and it looked to recommendations made in NICE's 2008 guideline on community engagement. It noted that, although some community leaders may be able to promote or help deliver type 2 diabetes prevention programmes, not all of them will be willing or able to do so – nor would it always be appropriate.

## Issues outside the scope

- 3.22 The PDG acknowledged the need to consider risk factors and vulnerability at all stages of the life course. In particular, it recognised that maternal and early infant nutrition may be important in the prevention of non-communicable diseases such as type 2 diabetes. Interventions aimed at children are also likely to be crucial in reducing the prevalence of type 2 diabetes in the longer term. For example, preventing gestational diabetes and delaying the onset of type 2 diabetes until after childbearing age would reduce the risk of a child getting type 2 diabetes later in life. These issues were beyond the remit of this guidance. However, they are addressed in other NICE guidance.
- 3.23 The PDG were mindful that while the scope for this guidance was adults in high-risk groups, many interventions are delivered in a family setting and these will have benefits for all family members not just adults.
- 3.24 The upper age cut-off point for this guidance (74 years) reflects the age limit of the national NHS Health Check programme. This programme



assesses the risk of heart disease, stroke, kidney disease and type 2 diabetes among all adults aged 40–74. It aims to help them reduce or manage their risk by giving them individually tailored advice. (The second piece of guidance will consider interventions among high-risk individuals and groups.)

- 3.25 The PDG did not consider evidence on how specific nutrients or types of diet may reduce the risk of type 2 diabetes, as this falls under the remit of the Scientific Advisory Committee on Nutrition (SACN). As such, it was outside the scope of this guidance. However, the Group supports existing recommendations on healthy eating, as advocated in the 'Eat well' plate (Food Standards Agency 2007).
- 3.26 The PDG was aware of a range of factors that need to be tackled at national and international level to help high-risk groups adopt behaviours that minimise the risk of type 2 diabetes. This includes issues that could be tackled by the food industry, such as the fat content of foods, food labelling, advertising and costs. It also includes issues in relation to the built environment, such as the impact of planning decisions on physical activity levels. The PDG wholeheartedly supported existing NICE recommendations which aim to tackle these issues. It was also mindful that disadvantaged groups may be disproportionately affected and that, as such, any solutions should consider the potential impact on these groups.

## 4 Recommendations for research

The Programme Development Group (PDG) recommends that the following research questions should be addressed. It notes that 'effectiveness' in this context relates not only to the size of the effect, but also to cost effectiveness and duration of effect. It also takes into account any harmful/negative side effects.

- How effective and cost effective are interventions which use either a 'total population' or 'high-risk population' approach to preventing type 2 diabetes among people from black and minority ethnic or lower socioeconomic groups?
- What are the most effective and cost effective ways of developing, implementing and assessing tailored and culturally appropriate community-level interventions to prevent type 2 diabetes among people at high risk? This includes people from a range of black and minority ethnic groups and those from lower socioeconomic communities.
- Which participatory approaches are most effective and cost effective among populations at higher risk of type 2 diabetes? This should consider the awareness, knowledge, understanding and skills of the providers of interventions for people at high risk of developing type 2 diabetes?
- How do socioeconomic, environmental, biological and psychosocial factors determine diet and physical activity behaviours and how do they contribute to differences in the risk of developing type 2 diabetes?
- How do financial factors (including incentives, pricing and taxation of food and incentives, and pricing for physical activity opportunities) affect food and physical activity choices?

More detail on the gaps in the evidence identified during development of this guidance is provided in [appendix D](#).

## 5 Glossary

### Body mass index

Body mass index (BMI) is commonly used to measure whether or not adults are a healthy weight or underweight, overweight or obese. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m<sup>2</sup>).

### Community

A group of people who have common characteristics. Communities can be defined by location, race, ethnicity, age, occupation, a shared interest (such as using the same service), a shared belief (such as religion or faith) or other common bonds. A community can also be defined as a group of individuals living within the same geographical location (such as a hostel, a street, a ward, town or region).

### Community champions

Community champions are inspirational figures, community entrepreneurs, mentors or leaders who 'champion' the priorities and needs of their communities and help them build on their existing skills. They drive forward community activities and pass on their expertise to others. They also provide support, for example, through mentoring, helping people to get appropriate training and by helping to manage small projects.

### Diabetes

Diabetes is caused when there is too much glucose in the blood and the body cannot use it as 'fuel' because the pancreas does not produce any or sufficient insulin to help it to enter the body's cells. Alternatively, the problems may be caused because the insulin produced may not work properly ('insulin resistance'). Also see 'glucose' and 'insulin'.

### Fasting glucose sample

Glucose sample taken after a person has refrained from eating or drinking any liquids other

than water for 8 hours.

## Glucose

Glucose comes from digesting carbohydrate and is also produced by the liver. Carbohydrate comes from many different kinds of food and drink, including starchy foods such as bread, potatoes and chapatis; fruit; some dairy products; sugar and other sweet foods (Diabetes UK 2010).

## HbA1c

Glycated haemoglobin (HbA1c) forms when red cells are exposed to glucose in the plasma. The HbA1c test reflects average plasma glucose over the previous eight to 12 weeks. Unlike the oral glucose tolerance test, an HbA1c test can be performed at any time of the day and does not require any special preparation such as fasting.

HbA1c is a continuous risk factor for type 2 diabetes. This means there is no fixed point when people are or are not at risk. The World Health Organization recommends a level of 6.5% (48 mmol/mol) for HbA1c as the cut-off point for diagnosing type 2 diabetes in non-pregnant adults.

## Impaired glucose tolerance

See definition below of 'pre-diabetes'.

## Insulin

Insulin is the hormone produced by the pancreas that allows glucose to enter the body's cells, where it is used as fuel for energy. It is vital for life (Diabetes UK 2010).

## Lay or community workers

People recruited from the local community or subgroup of the population to assist in the delivery of an intervention to a group of people who they identify with and are knowledgeable about. They might be peers or from the wider community but they are not professional health or public health workers.

## Oral glucose tolerance test

An oral glucose tolerance test involves measuring the blood glucose level after fasting, and then 2 hours after drinking a standard 75 g glucose drink. Fasting is defined as no calorie intake for at least 8 hours. More than one test on separate days is required for diagnosis in the absence of hyperglycaemic symptoms.

## Physical activity

The full range of human movement, from competitive sport and exercise to active hobbies, walking, cycling and the other physical activities involved in daily living.

## Pre-diabetes

Where used in this guidance, the term pre-diabetes refers to raised (but not diabetic) blood glucose levels (also known as non-diabetic hyperglycaemia, impaired glucose regulation). It indicates the presence of impaired fasting glucose and/or impaired glucose tolerance. People with pre-diabetes are at increased risk of getting type 2 diabetes. They are also at increased risk of a range of other conditions including cardiovascular disease.

## Socioeconomic group

A person's socioeconomic group is defined by a combination of their occupation, income level and education level. There is a strong relationship between socioeconomic group and health, with people from lower socioeconomic groups generally experiencing poorer health than those from higher socioeconomic groups.

## Type 2 diabetes

Type 2 diabetes (previously termed non-insulin dependent diabetes) results from reduced tissue sensitivity to insulin (insulin resistance) and/or reduced insulin production.

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# Appendix A: Membership of the Programme Development Group (PDG), the NICE project team and external contractors

## Programme Development Group

PDG membership is multidisciplinary. The Group comprises public health practitioners, clinicians, local authority officers, teachers, social care professionals, academics, technical experts and representatives of the public as follows.

**Amanda Adler** (Co-opted Member) Consultant Physician, Addenbrooke's Hospital

**Akeem Ali** Director of Public Health, NHS Surrey and Surrey County Council

**Ameet Bakhai** Consultant Cardiologist, Barnet General Hospital

**Neel Basudev** General Practitioner, Springfield Medical Centre, London

**Marie Cummins** Regional Programme Manager, NHS Diabetes

**Steven Cummins** Senior Lecturer, National Institute for Health Research Fellow, Queen Mary, University of London

**Anne Dornhorst** Consultant Physician; Honorary Senior Lecturer, Imperial College Healthcare NHS Trust

**Margaret Guy** Independent Public Health Physician (recently retired Director of Public Health and Medical Director, Westminster Primary Care Trust)

**Wasim Hanif** Consultant Physician; Honorary Senior Lecturer, University Hospital Birmingham

**Mireia Jofre-Bonet** Professor, Economics Department, City University, London

**Aderonke Jomo-Coco** Community Member

**Tracy Kelly** Clinical Team Manager, Diabetes UK

**Tim Marsh** Associate Director, National Heart Forum

**Bennett Quinn** General Practitioner, Blackheath Medical Centre

**Marc Suhrcke** Professor of Public Health Economics, School of Medicine, Health Policy and Practice, University of East Anglia

**Sabina Syed** Community Member

**Jennifer Tringham** Consultant Physician, Diabetes and Endocrinology, Frimley Park Hospital

**Nigel Unwin** Professor of Epidemiology, Institute of Health and Society, Newcastle

**Nick Wareham** Director, Medical Research Council Epidemiology Unit

**Sarah Wild** Reader in Epidemiology and Public Health, University of Edinburgh

**Saiyyidah Zaidi** Community Member

## **NICE project team**

**Mike Kelly** CPHE Director

**Catherine Swann** Associate Director

**Clare Wohlgemuth** Lead Analyst

**Adrienne Cullum** Analyst

**Ruaraidh Hill** Analyst

**Karen Peplow** Analyst

**Alastair Fischer** Technical Adviser, Health Economics

**Emma Doohan** Project Manager

**Palida Teelucknavan** Coordinator

**Sue Jelley** Senior Editor

**Alison Lake** Editor

## External contractors

### Evidence reviews

Review 1: 'Prevention of type 2 diabetes: interventions to reduce risk factors for pre-diabetes among UK adults from a lower socioeconomic group' was carried out by the School of Health and Related Research (SchARR) Public Health Collaborating Centre. The principal authors were: Maxine Johnson, Emma Everson-Hock, Roy Jones, Helen Buckley Woods, Sue Baxter, Elizabeth Goyder, Jim Chilcott and Nick Payne.

Review 2: 'Prevention of type 2 diabetes: interventions to reduce risk factors for pre-diabetes among UK adults from black and minority ethnic groups' was carried out by SchARR Public Health Collaborating Centre. The principal authors were: Maxine Johnson, Emma Everson-Hock, Roy Jones, Helen Buckley Woods, Sue Baxter, Elizabeth Goyder, Jim Chilcott and Nick Payne.

Review 3: 'Prevention of type 2 diabetes: interventions to raise awareness in health professionals and assist identification of high-risk groups' was carried out by SchARR Public Health Collaborating Centre. The principal authors were: Maxine Johnson, Emma Everson-Hock, Roy Jones, Helen Buckley Woods, Suzy Paisley, Elizabeth Goyder, Jim Chilcott and Nick Payne.

Review 4: 'Interventions for the prevention of pre-diabetes in high-risk groups: examples of current practice in relation to the UK evidence base' was carried out by SchARR Public Health Collaborating Centre. The principal authors were: Roy Jones, Maxine Johnson, Emma Everson-Hock, Helen Buckley Woods, Liddy Goyder, Jim Chilcott and Nick Payne.

Review 5: 'Review of review-level evidence to inform the development of NICE public health guidance for the prevention of pre-diabetes among adults in high-risk groups' was carried out by Matrix Evidence. The principal authors were: Alison Martin, Theo Lorenc, Alison O'Mara, Will Parry, Joe Savage and Chris Barclay.

Review 6: 'Identification of effective community projects focused on addressing risk factors for the development of pre-diabetes in adults from black and minority ethnic groups and lower socio-economic groups' was carried out by David Leah Associates Ltd. The principal author was Mary Ryan.

## **Cost effectiveness**

The review of economic evaluations and economic modelling 'Prevention of type 2 diabetes: preventing pre-diabetes among adults in high-risk groups. Report on cost-effectiveness evidence and methods for economic modelling' was carried out by SchARR Public Health Collaborating Centre. The principal authors were: Mike Gillett, Alan Brennan, Laurence Blake, Nick Payne, Liddy Goyder, Helen Buckley Woods, Emma Everson-Hock, Maxine Johnson, Jim Chilcott and Monica Hernandez.

## **Fieldwork**

'Fieldwork validation report: prevention of pre-diabetes among adults in high-risk groups' was carried out by Word of Mouth Research Ltd.

## **Expert testimony**

Expert paper 1: 'Type 2 diabetes and pre-diabetes: diagnosis and definition' by Nick Wareham, Medical Research Council Epidemiology Unit.

Expert paper 2: 'Illness labelling and illness experience' by Mike Kelly, NICE.

Expert paper 3: 'Socio-economic status and risk factors for type 2 diabetes' by Nigel Unwin, Newcastle University.

Expert paper 4: 'Expert advice, dietary surveys and nutrition research' by Alison Tedstone, Food Standards Agency.

Expert paper 5: 'CPD and training, enabling professionals to practice effectively and confidently' by Sabina Syed, PDG Community Member.

Expert paper 6: 'BME groups, diet and risk of type 2 diabetes' by Nita Forouhi, Medical Research Council Epidemiology Unit.

Expert paper 7: 'Developing population level guidance – CVD, the Foresight report' by Klim McPherson, New College Oxford.

Expert paper 8: 'Dietary strategies for the prevention of pre-diabetes' by Susan Jebb, Medical Research Council Human Nutrition Research.

Expert paper 9: 'Low income groups and behaviour change interventions' by Susan Michie, University College London.

Expert paper 10: 'Adapting health promotion interventions for BME communities' by Gina Netto, Herriot Watt University.

Expert paper 11: 'Health policy and health' by Mark Exworthy, Royal Holloway, University of London.

Expert paper 12: 'Ismaili Nutrition Centre' by Azmina Govindji and Aleem Sachedina, Aga Khan Health Board.

Expert paper 13: 'Environment and physical activity' by Steve Cummins, Queen Mary, University of London.

Expert paper 14: 'Nutritional food labelling: current thinking and practice' by Tim Marsh, National Heart Forum.

Expert paper 15: 'Fiscal policy instruments to improve diet' by Marc Suhrcke, University of East Anglia.

# Appendix B: Summary of the methods used to develop this guidance

## Introduction

The reviews, primary research, commissioned reports and economic modelling report include full details of the methods used to select the evidence (including search strategies), assess its quality and summarise it.

The minutes of the Programme Development Group (PDG) meetings provide further detail about the Group's interpretation of the evidence and development of the recommendations.

All supporting documents are listed in [appendix E](#).

## Key questions

The key questions were established as part of the scope. They formed the starting point for the reviews of evidence and were used by the PDG to help develop the recommendations.

The overarching question was:

How effective and cost effective are interventions to improve the modifiable risk factors associated with pre-diabetes among black and minority ethnic groups and among lower socioeconomic groups?

The subsidiary questions were:

1. What are the most effective and cost-effective methods of raising health professionals' awareness of the groups at high risk of pre-diabetes?
2. What are the most effective and cost-effective methods of identifying communities, groups and individuals at high risk of pre-diabetes?

3. What are the most effective and cost-effective population-level interventions to prevent pre-diabetes?
4. What are the most effective and cost effective-ways of raising awareness of how to prevent pre-diabetes among high-risk groups?
5. What are the most effective and cost-effective ways of ensuring interventions are culturally sensitive and appropriate for use with communities at high risk of pre-diabetes?
6. What factors might discourage individuals, groups and communities at high risk of pre-diabetes from getting involved with preventive interventions? How might these barriers be addressed?
7. What are the most effective and cost-effective methods of helping people at high risk of pre-diabetes to improve their diet, be more physically active and manage their weight?

These questions were made more specific for each of the reviews (see reviews for further details).

## Reviewing the evidence

### Effectiveness reviews

Four reviews of effectiveness were conducted (reviews 1, 2, 3 and 5).

### Identifying the evidence

The [evidence reviews for this guideline](#) list the databases searched for each review. However, the general approach is outlined below.

The following databases were searched for reviews 1, 2 and 3 (from 1990 onwards):

- British Nursing Index
- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
- Cochrane Library

- EMBASE
- Evidence for Policy and Practice Information and Co-ordinating Centre Databases (EPPI Centre Databases)
- MEDLINE
- PsycINFO
- Science Citation Index
- Social Science Citation Index.

Additional searches of the grey literature were carried out and the following websites were also searched:

- [Association of Public Health Observatories](#)
- [Diabetes UK](#)
- [Joseph Rowntree Foundation](#)
- [NHS Evidence](#)

The following databases were searched for review 5 (from 1999 onwards):

- Applied Social Sciences Index and Abstracts (ASSIA)
- Cochrane Database of Systematic Reviews
- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
- Database of Abstracts of Reviews of Effectiveness (DARE)
- Database of Promoting Health Effectiveness Reviews (DoPHER)
- Education Resources Information Centre (ERIC)
- EMBASE
- Health Management Information Consortium (HMIC)
- HTA database (in the Cochrane Library)
- MEDLINE



- PsycINFO
- Social Policy and Practice.

## Other reviews

Two separate sets of research were conducted to identify and describe community-level interventions to prevent type 2 diabetes (reviews 4 and 6).

### Identifying the evidence

Review 4 studied the search results from reviews 1 to 3. It also assessed grey literature identified via Google, the Internet search engine and via selected primary care trust (PCT) websites.

Review 6 involved searching the Internet and other networks used by managers and commissioners of community-level interventions to prevent type 2 diabetes. In addition, a referral questionnaire was sent to individuals or groups identified during the searches.

### Selection criteria

The [evidence reviews for this guideline](#) list the inclusion and exclusion criteria for each review. Details can be found within each review. However, in general, the following applied.

#### Effectiveness reviews 1 to 3

Studies were included in reviews 1 to 3 if they were published since 1990 and:

- covered people at high risk of pre-diabetes
- included interventions to prevent pre-diabetes
- Included interventions to help professionals support people at high risk of developing pre-diabetes
- were conducted in the UK.

Studies were excluded if they focused on:

- people diagnosed with pre-diabetes (impaired fasting glucose/impaired glucose tolerance) or diabetes
- pregnant women, people younger than 18 or older than 74
- people taking medication that increases the risk of developing type 2 diabetes
- population-level screening
- diagnostic testing (such as clinical tests to identify pre-diabetes)
- diabetes risk assessment tools using, for example, body mass index (BMI) and waist circumference.

## Effectiveness review 5

Studies were included in review 5 if they were reviews published in 1999 or later and covered:

- black and minority ethnic populations and groups from a low socioeconomic background in the UK, any other EU country, the USA, Canada, Australia or New Zealand
- a 'general' population (but only if the ethnicity and socioeconomic status of those included in the primary studies was systematically presented)
- people clinically diagnosed with pre-diabetes or obesity
- interventions in a range of settings to prevent pre-diabetes or type 2 diabetes (or relevant risk factors), including those aimed at reducing or preventing obesity, promoting physical activity or reducing calorie intake
- the measurement of any relevant outcome such as physical activity or dietary behaviour.

Studies were excluded if they:

- focused on those aged 0–17 years
- focused on minority ethnic groups not relevant to the UK (for example, American Indians or Australian Aboriginals)

- covered people who were clinically diagnosed with type 2 diabetes
- primarily focused on pharmacological, surgical or individual interventions (such as counselling)
- did not aim to change any of the key risk factors for pre-diabetes and type 2 diabetes
- were delivered in healthcare settings
- were not published in English.

## Reviews 4 and 6

Broadly, interventions were included in review 4 if they:

- covered activities to improve diet, increase physical activity levels or raise awareness of the risk factors for pre-diabetes
- targeted adults from low socioeconomic backgrounds or from black and minority ethnic groups in the UK.

## Quality appraisal

Included papers were assessed for methodological rigour and quality using the NICE methodology checklist, as set out in the NICE technical manual 'Methods for the development of NICE public health guidance' (see [appendix E](#)). Each study was graded (++, +, –) to reflect the risk of potential bias arising from its design and execution.

### Study quality

++ All or most of the checklist criteria have been fulfilled. Where they have not been fulfilled, the conclusions are very unlikely to alter.

+ Some of the checklist criteria have been fulfilled. Those criteria that have not been fulfilled or not adequately described are unlikely to alter the conclusions.

– Few or no checklist criteria have been fulfilled. The conclusions of the study are likely or very likely to alter.

The evidence was also assessed for its applicability to the areas (populations, settings,

interventions) covered by the scope of the guidance. Each evidence statement concludes with a statement of applicability (directly applicable, partially applicable, not applicable).

## Summarising the evidence and making evidence statements

The review data was summarised in evidence tables (see full reviews).

The findings from the reviews and expert reports were synthesised and used as the basis for a number of evidence statements relating to each key question. The evidence statements were prepared by the external contractors and public health collaborating centres. The statements reflect their judgement of the strength (quality, quantity and consistency) of evidence and its applicability to the populations and settings in the scope.

## Cost effectiveness

There was a review of economic evaluations and an economic modelling exercise.

### Review of economic evaluations

Studies were identified through the effectiveness review search strategies. The following databases were searched:

- EconLit
- NHS Economic Evaluation Database
- Public Health Interventions Cost Effectiveness Database (PHICED) (obesity and physical activity).

Previous NICE guidance on obesity and physical activity was also reviewed, as was the FORESIGHT modelling work. In addition, citation searching and reference tracking was also undertaken. The database searches followed the same inclusion and exclusion criteria as were used in the associated mapping review.

### Economic modelling

A number of assumptions were made which could underestimate or overestimate the cost effectiveness of the interventions (see review modelling report for further details).

An economic model was constructed to incorporate data from the reviews of effectiveness and cost effectiveness. The [results of the economic model](#) are reported in: 'Prevention of type 2 diabetes: preventing pre-diabetes among adults in high-risk groups. Report on cost-effectiveness evidence and methods for economic modelling'.

## Fieldwork

Fieldwork was carried out to evaluate how relevant and useful NICE's recommendations are for practitioners and how feasible it would be to put them into practice. It was conducted with practitioners and commissioners who are involved in the prevention of pre-diabetes among adults in high-risk groups, including those working in the NHS, local government, voluntary sector and private sector.

The fieldwork comprised:

- two focus groups carried out nationally
- 25 telephone interviews
- an online survey.

The main issues arising from this report are set out in the [fieldwork findings section of appendix C](#).

The fieldwork was carried out by Word of Mouth Research Ltd.

## How the PDG formulated the recommendations

At its meetings during December 2009 to February 2011, the Programme Development Group (PDG) considered the evidence, expert reports and cost effectiveness to determine:

- whether there was sufficient evidence (in terms of strength and applicability) to form a judgement
- where relevant, whether (on balance) the evidence demonstrates that the intervention or programme/activity can be effective or is inconclusive
- where relevant, the typical size of effect (where there is one)

- whether the evidence is applicable to the target groups and context covered by the guidance.
- The PDG developed draft recommendations through informal consensus, based on the following criteria:
- Strength (type, quality, quantity and consistency) of the evidence.
- The applicability of the evidence to the populations/settings referred to in the scope.
- Effect size and potential impact on the target population's health.
- Impact on inequalities in health between different groups of the population.
- Equality and diversity legislation.
- Ethical issues and social value judgements.
- Cost effectiveness (for the NHS and other public sector organisations).
- Balance of harms and benefits.
- Ease of implementation and any anticipated changes in practice.

Where possible, recommendations were linked to evidence statements (see [appendix C](#)). Where a recommendation was inferred from the evidence, this was indicated by the reference 'IDE' (inference derived from the evidence).

The draft guidance, including the recommendations, was released for consultation in November 2010. At its meeting in February 2011, the PDG amended the guidance in light of comments from stakeholders and experts and the fieldwork. The guidance was signed off by the NICE Guidance Executive in April 2011.

## Appendix C: The evidence

This appendix lists the evidence statements from six reviews provided by the public health collaborating centre and links them to the relevant recommendations. (See [appendix B](#) for the key to quality assessments.) The evidence statements are presented here without references – these can be found in the full review (see [appendix E](#)). It also lists eight expert papers and their links to the recommendations and sets out a brief summary of findings from the economic analysis.

The six reviews of effectiveness are:

- Review 1: 'Prevention of type 2 diabetes: interventions to reduce risk factors for pre-diabetes among UK adults from a lower socioeconomic group'
- Review 2: 'Prevention of type 2 diabetes: interventions to reduce risk factors for pre-diabetes among UK adults from black and minority ethnic groups'
- Review 3: 'Prevention of type 2 diabetes: interventions to raise awareness in health professionals and assist identification of high-risk groups'
- Review 4: 'Interventions for the prevention of pre-diabetes in high-risk groups: examples of current practice in relation to the UK evidence base'
- Review 5: 'Review of review-level evidence to inform the development of NICE public health guidance for the prevention of pre-diabetes among adults in high-risk groups'
- Review 6: 'Identification of effective community projects focused on addressing risk factors for the development of pre-diabetes in adults from black and minority ethnic groups and lower socio-economic groups'

**Evidence statement number 1.1a** indicates that the linked statement is numbered **1a** in review **1**. **Evidence statement number 3.1** indicates that the linked statement is numbered **1** in review **3**. **EP1** indicates that expert paper **1** is linked to the recommendation.

The [reviews, expert reports and economic analysis](#) are available. Where a recommendation is not directly taken from the evidence statements, but is inferred from the evidence, this is indicated by **IDE** (inference derived from the evidence).

Where the Programme Development Group (PDG) has considered other evidence, it is

linked to the appropriate recommendation below. It is also listed in the additional evidence section of this appendix.

**Recommendation 1:** additional evidence NICE (2007); IDE

**Recommendation 2:** evidence statements 1.21a, 1.21b, 1.29, 2.5; EP9, EP10, EP13

**Recommendation 3:** evidence statements 1.21b, 1.29, 2.7b, 3.2, 3.6, 3.8; EP13

**Recommendation 4:** evidence statements 1.5, 1.21a, 1.21b, 1.21c, 1.22, 2.3, 2.9a, 3.6, 3.7, 3.8; EP8, EP9, EP10; additional evidence NICE (2006), (2008a); IDE

**Recommendation 5:** evidence statements 1.21a, 1.21d, 1.25, 2.4, 2.5, 2.6, 2.7a, 2.7b, 2.7c, 2.10, 3.7, 3.8; EP6, EP8, EP9, EP10

**Recommendation 6:** evidence statements 1.21a, 1.21d, 1.25, 2.4, 2.5, 2.6, 2.7a, 2.7b, 2.7c, 2.10, 3.7, 3.8; EP6, EP8, EP9, EP10

**Recommendation 7:** evidence statements 1.21b; EP7, EP8, EP11, EP12, EP14, EP15; IDE

**Recommendation 8:** evidence statements 1.5, 1.7, 1.21b, 1.22, 1.28, 1.29, 2.8; EP8, EP10, EP15; additional evidence NICE (2006); IDE

**Recommendation 9:** evidence statements 1.27, 2.5, 2.7b, 2.9b; EP13; additional evidence NICE (2008b)

**Recommendation 10:** evidence statements 1.21b, 1.21d, 1.27, 1.28, 1.29, 2.3, 2.4, 2.8, 2.9b EP8, EP15; additional evidence NICE (2006), (2008b), (2008c)

**Recommendation 11:** evidence statements 3.2, 3.3, 3.4; EP5

## Evidence statements

Please note that the wording of some evidence statements has been altered slightly from those in the evidence review(s) to make them more consistent with each other and NICE's standard house style.



## **Evidence statement 1.5**

Evidence of mixed effectiveness was found in relation to nutrition knowledge. One poor quality case series (-) found that a 10-week programme focused on translating dietary recommendations into practice, including guided hands-on food preparation, led to an increase in nutrition knowledge in two of the four intervention groups studied. No significant increase in nutrition knowledge was found in the other two groups.

## **Evidence statement 1.7**

Evidence of mixed effectiveness was found in relation to fruit and vegetable intake. One reasonable quality prospective cohort study (+) found an overall increase in overall average fruit and vegetable consumption in both the community where a new food hypermarket had opened and the comparison community with no new hypermarket over 12 months. There was however no significant change in either groups in average fruit consumption, and an increase in only the comparison community in vegetable consumption. One poor quality case series (-) examining the impact of the introduction of a new large-scale food retail outlet over a 1-year period found an increase in fruit and vegetable consumption among those who switched to the new store, but not among those who did not. Among both switchers and non-switchers, those with low pre-intervention levels significantly increased their fruit and vegetable consumption.

## **Evidence statement 1.21a**

There is evidence that information is more accessible and interventions more acceptable where key workers possess the appropriate knowledge, skills and personal attributes, such as empathy and trustworthiness.

One (+) evaluation found that trained lay workers were able to access and raise awareness in hard-to-reach groups through their knowledge of the community in which they were working, and their personal communication skills. Attributes of workers were found to be influential in three (all [+]) evaluations on the success of interventions. Other (four [+]) evaluations found that the skills of an intervention adviser facilitated the feeling of empowerment among participants, and that skills were learned through engaging the interest of the participants. As well as disseminating information in a meaningful way.

## Evidence statement 1.21b

Three (all [+]) evaluations of included intervention studies found evidence that acceptability is increased when practical demonstrations make abstract concepts and scientific language more meaningful, and when progressive small steps are taken in terms of behaviour change.

Two (both [+]) evaluations reported suggestions made by participants that might increase acceptability. These were: the development of women-only classes and more activities at weekends to fit in with other commitments; free sessions, free childcare (especially in school holidays), free food, individual and group tailored recipes and useful enjoyable activities.

In one (+) evaluation there was evidence that male-only classes using creative ways to conceptualise weight management increased acceptability and motivation.

One exploratory study and one evaluation (both [+]) found that acceptability of a food educational intervention was increased by first exploring participants' needs in terms of topic content. Three evaluations (two [+] and one [++]) found that incentives such as access to free food increased motivation to participate in nutrition educational interventions. The experimental use of familiar and affordable food increased the acceptability of a food and health project.

There was evidence (one [+]) that interventions delivered by community members rather than health professionals tended to encourage community participation and meet local needs with an open and holistic agenda.

## Evidence statement 1.21c

There is evidence that acceptability of interventions that aim to change behaviour is enhanced by the added value of social inclusion. Social interaction has a positive subjective effect on wellbeing as well as providing a shared forum for discussion of concerns.

Evaluation of a healthy living centre (one [++]) found that social inclusion was stated as one aim of the intervention, while another randomised controlled trial (RCT) qualitative evaluation (+) found that interactive Internet portals increased social capital for people with shared health issues. Social interaction was a positive and facilitating factor for

participation in four interventions (all [+]) aimed at increasing physical activity, and one aimed at improving eating behaviours. Positive social aspects of the interventions included an informal atmosphere, the opportunity to chat and discuss with other participants, as well as humour.

### **Evidence statement 1.21d**

There is evidence that interventions aimed at raising awareness of healthy behaviours are more acceptable when they are made appropriate to the target audience and have a positive image.

One (++) qualitative study found that young women will be less motivated to participate in sporting activities if the image associated with those activities, for example the required clothing, is perceived as negative. Two process evaluations found that participants held negative associations with the term 'healthy eating'. The group in one (++) study associated the term with government policy and the other (+) study group regarded healthy eating as boring and not filling.

### **Evidence statement 1.22**

There was qualitative evidence from two (both [+]) multi-method evaluations of changes in participants' and their family's eating behaviour, and also of a developing interest in cooking as well as increased feelings of wellbeing. In one of these evaluations, the use of fat in cooking had reduced.

### **Evidence statement 1.25**

There is evidence that adopting healthy lifestyle behaviours can be influenced by existing attitudes toward health. One (++) qualitative study found evidence of a range of attitudes from actively seeking to improve health prospects to a disinterest in health issues. Another (+) interview and focus group study found a perceived lack of control over weight. Two rationales for excess weight included a flawed metabolism and genetics, neither of which were perceived as subject to change. There was evidence from one (+) interview study that for the mothers in the study, the five-a-day message was perceived as impractical and a joke. One focus group study (+) found that lack of exercise was generally not emphasised as a health risk factor by male and female blue-collar workers. In another focus group study (+), women of lower educational attainment were not clear about the links between food and health, often equating weight with health, and believed it was not

good to be 'too healthy', although the long-term health of their children was considered important and related to food. Another focus group study (+) found that some mothers deliberately sought out cheap and healthy foods, however others were less concerned about the healthiness of their family meals.

## **Evidence statement 1.27**

There is evidence that adopting healthy lifestyle behaviours can be influenced by current lifestyle. Two evaluations (both [+]) and one (+) interview and focus group study found evidence that commitments and responsibilities were seen as a barrier to participation in physical activity. There was also evidence that for some, existing activity around the home is sufficient. Participants cited lack of time, particularly if employed in work or looking after children, as a barrier to physical activity. There was evidence from one (+) qualitative study that parents regard 'stress', 'comfort eating' 'being stuck in a rut' and 'embarrassment' as reasons for not carrying out sufficient physical activity. Health professionals interviewed in the same study discussed the prevalence of mental health issues such as depression in the area, and its impact on health behaviours.

## **Evidence statement 1.28**

There is mixed evidence that affordability has an impact on lifestyle behaviour change. One (+) qualitative study found that costs limited the extent to which deprived mothers could buy healthy food. Another (+) qualitative study exploring the beliefs of those living in new deal communities (NDCs) found a perceived lack of affordable goods in the local area, with public transport costs also regarded as prohibitive. Affordability in two studies was only an issue where buying extra food, or organic food might be considered. One (+) evaluation and one (++) qualitative study found that cooking different meals to suit the preferences of family members was considered too expensive. In one (+) evaluation there was evidence that low-income groups were resistant to change because of financial risk. In one (+) interview study with low income consumers and health professionals, both stated that pricing strategies were not regarded as helpful in encouraging healthy eating. However, health professionals held the view that healthy foods could be prioritised over convenience foods when shopping. One focus group study (+) identified the cost of food as a barrier to healthy eating due to its cost in relation to other priorities, marketing strategies and special offers not being placed on healthier foods and the waste generated by buying food that did not get eaten. Similarly, another focus group study (+) found that mothers would choose less healthy but cheaper options when shopping and wasting money on food that their families would not eat was a consideration. Expense was also

reported by men as a barrier to healthy eating in another focus group study (++), although the authors did not explore this in detail.

There is evidence (one [+] study) that affordability may be addressed by including budgeting as a topic in nutrition educational programmes. Evidence from one (+) interview study showed cost as a perceived barrier to physical activity in disadvantaged groups for both consumers and health professionals. Transport to – and use of – facilities were both perceived as costly. Physical activity referral schemes were suggested as one way of overcoming the cost of using facilities.

## **Evidence statement 1.29**

Evidence was found that environmental factors can be a barrier to improving nutrition. One (+) qualitative study found that a perceived lack of local amenities was a prohibiting factor in shopping for healthy foods. Access to food shopping was regarded as a barrier to healthy eating among women with lower educational attainment in one focus group study (+), in particular navigating round shops with pushchairs, coping with demanding children and bringing the shopping home on public transport and into high-rise flats. Evidence was also found that environmental factors can be a barrier to change in take-up of physical activity. One (++) qualitative evaluation found that fear of crime and feeling intimidated inhibited the motivation to participate in a new cycling initiative. One (+) qualitative study found that fear of attack prevented walking in certain areas. Another (+) evaluation showed that dark evenings and poor weather are barriers to physical exercise outdoors. One large-scale cross-sectional survey (+) found that active travel was associated with being younger, living in owner-occupied accommodation, travelling less than 4 miles to work, having access to a bicycle and not having access to a car, whereas overall physical activity was associated with living in social-rented accommodation and not being overweight.

## **Evidence statement 2.3**

There was evidence from one (+) focus group study that acceptability of lifestyle change interventions can be increased by raising the cultural sensitivity of delivery. For example, the importance of avoiding Ramadan needs to be considered in the timing of delivery, and separate sessions for men and women need to be considered. There was evidence that flexibility around the timing of interventions as well as the bilingual abilities of staff were important. Learning to cook traditional foods in a more healthy way was one way to preserve cultural identity. In addition, advice (particularly one-to-one) and information that

takes into account literacy levels and is encouraging were crucial to sustaining motivation to adopt a healthier lifestyle.

Evidence from one (++) focus group study that included suggestions from participants, showed that acceptability of a nutritional education intervention might be increased by: including free food, timing classes to suit those with childcare responsibilities, and providing a crèche or possibly holding the classes in schools. Evidence from one (+) needs assessment study showed that cook and eat sessions and weight management classes that were made freely available on a gypsy traveller site were valued by women residents for their non-threatening environment and as a forum for discussion of health issues – as well as a way to reduce social isolation. Lack of childcare facilities, transport issues and costs were barriers to off-site activity.

Evidence from an interview-guided questionnaire study (+) and one qualitative evaluation (+) included suggestions to increase the acceptability for Muslim Bangladeshi women who may wish to access a gym. Suggestions included the provision of women-only facilities, women-only sessions, swimming facilities for women, more walking physical activity facilities, fewer aerobic classes, Sylheti-speaking assistants, better transport and childcare facilities, less loud music, no inappropriate TV programmes and provocative music videos, and access to more local gyms. Evidence from one qualitative evaluation (+) of exercise on prescription (EoP) also identified lack of access to facilities, lack of childcare arrangements, as well as a limited choice of women-only sessions as barriers to attendance.

There was evidence from one (+) mixed method study that social interaction was a motivator for South Asian women attending a healthy eating and physical activity group. Some women also stated that they ate less when attending as they were not tempted to snack in the same way as when they stayed in the house.

## **Evidence statement 2.4**

There was evidence from one (++) focus group study of lack of understanding between professional and lay groups in terms of Islamic teaching and its relation to healthy lifestyle practices. There was also evidence from the same study of communication difficulties arising from health literacy deficiencies in lay Bangladeshi people and cultural sensitivity deficiencies in professionals which obstruct appropriate health promotion messages.

## Evidence statement 2.5

There was evidence from four focus groups and two interview studies that religious customs can become barriers or facilitators to lifestyle change. Change was more likely where participants believed they had some degree of free will. There was conflicting evidence regarding fatalism; in one (++) study health professionals spoke of fatalism as a barrier to health prevention in some black and minority ethnic groups. However, evidence from one (+) study suggests that while the occurrence of health conditions might be regarded as God's will, it is also, according to teachings, the responsibility of the individual to attempt to maintain good health and wellbeing.

There was evidence from three focus groups (one [++] and two [+]) and one (+) interview study and one qualitative evaluation (+) that healthy activities were acceptable provided they did not include aspects that were conflicting with religious teachings. One (++) focus group study showed evidence that some practices, such as eating Halal meat could limit the use of fast-food outlets.

## Evidence statement 2.6

There was evidence from nine qualitative studies that cultural influences and issues of identity can be barriers or facilitators to lifestyle change.

There is evidence from one (+) focus group study that a nomadic identity influenced dietary choices for Somalians. As descendants of camel herders, diet in the UK continued to be influenced by the staple diet of meat with rice or spaghetti and a low consumption of fruit and vegetables which were less valued.

A (+) needs assessment with gypsy travellers found that some fruit and vegetables were eaten daily, as they were seen as relatively cheap. In particular, vegetables were favoured as they could be incorporated into daily cooking. However, while 60% of participants considered themselves as 'heavy', they also stated that the meal was often followed by a take-away in the evening.

Evidence from one (+) interview study suggested that traditional South Asian beliefs regarding the preventive attributes of certain vegetables in terms of ill health are part of a cultural identity, and that this might be taken on board by professionals when discussing health promotion. Dietary practices in the UK can involve experiences that are alien to traditional culture and identity. However, one (+) qualitative study showed that food

choices made by South Asian women can be informed by both traditional ('our' food) and Western ('your sort of foods') explanations in terms of 'good' and 'bad' effects upon the body so long as such explanations are complementary rather than in conflict.

Evidence was found in one (+) guided interview study, one (+) focus group study and one (+) needs assessment for differences between UK culture and non-Western culture in terms of the perception of physical activity as either 'separate' or 'integral' to daily routine. Physical activity as 'separate' incurred financial costs as well as often being organised in ways that are insensitive to different cultural values.

Evidence from one (+) study highlighted the belief that expending sweat is important for increased wellbeing; this influenced the practices that might be taken up in the UK where a cold climate limits sweat production.

There was evidence from one (+) guided interview study and two (one [+] and one [++]) focus group studies and one qualitative evaluation (+) that a limited command of the English language is a barrier to accessing information, as well as accessing activities and shopping facilities outside of the individual's neighbourhood.

There was evidence from one (+) interview study that some South Asians consider that nothing can be done to prevent diabetes if there is already a family history.

## **Evidence statement 2.7a**

There was evidence from three (two [++] and one [+]) focus group studies that knowledge regarding risk factors is high in South Asian communities. However, evidence from one (+) focus group study of predominantly male Somali participants suggested a low level of knowledge. When knowledge levels were high, there was evidence from two (one [++] and one [+]) focus group studies that this does not always translate to practice in terms of healthy lifestyle. Evidence from one (++) focus group study suggested that education may be one way of overcoming restrictive practices.

## **Evidence statement 2.7b**

Evidence from one (+) focus group study suggested that South Asian people in the UK would appreciate increased information on risk factors, advice and encouragement in order to motivate and sustain behaviour change.



There was evidence from one (+) focus group study that information and advice regarding physical activity came mainly from the media, role models, family and friends, the medical establishment (mainly hospitals) and to a limited degree, fitness campaigns.

### **Evidence statement 2.7c**

There was evidence from one guided interview study and two focus group studies (one [++] and two [+]) and one qualitative evaluation (+) that a limited command of the English language is a barrier to accessing information, as well as activities and shopping facilities outside the neighbourhood.

### **Evidence statement 2.8**

For South Asian and African populations in the UK, and especially first generation migrants, there was evidence from three (two [++] and one [+]) focus group studies that traditional fresh foods are not readily available locally and are expensive.

Evidence from one (++) focus group study showed that older people are less willing to travel beyond the immediate neighbourhood for food due to language barriers and fears for their safety. There is evidence from one (++) focus group study that the price of food is more of an issue for older people.

There was evidence from one (+) mixed method evaluation and one qualitative evaluation (+) that: distance from physical activities, lack of transport, fear of walking alone, having conflicting family commitments, not being able or willing to walk, ill health and cold weather were all barriers to attending a healthy eating and physical activity group. Having to travel to venues incurred extra costs even if physical exercise was on prescription, as for some South Asian women even a small financial contribution was reported as a barrier.

### **Evidence statement 2.9a**

There was evidence from four (two [+] and two [++]) focus group studies that traditional South Asian cooking is associated with a high usage of fat, particularly for special occasions (which occur frequently) and that there is resistance to change such traditions. Indian men who wished to control their diet within a close-knit community where social events were common found it particularly difficult.

Evidence from one (+) focus group study showed that Somali cooking is associated with

high meat and low fruit and vegetable content and again there is resistance to change. These traditions are part of the cultural identity and symbolic of prosperity and hospitality.

Evidence from two focus (one [++] and one [+]) group studies suggested that consumption of take-away food is common in second generation South Asian males and females as a change from traditional fare. Similarly, take-away meals were commonly used by Somalian males, particularly those living alone.

Some South Asian women are beginning to cook in more healthy ways. There were suggestions from one (+) focus group study that learning to cook traditional food in healthy ways may be beneficial to South Asian groups. Another focus group study (++) suggested that women from Zimbabwe were not used to cooking for themselves as in Africa, maids had done the cooking; having to cook in the UK was seen as time consuming.

## **Evidence statement 2.9b**

There was evidence from two (both [+]) interviews and four (one [++] and three [+]) focus group studies and one qualitative evaluation (+) that in South Asian groups, physical activity was perceived as a part of normal life and that there was little time for formal or 'separate' sessions, due to work or childcare commitments.

In particular, evidence from one (++) focus group study suggested women were expected to stay home and look after children rather than enrol the help of others. Evidence from one (+) interview study suggested that older participants perceived that vigorous physical activity was unnecessary in the context of advancing age and that keeping active and mobile was preferable.

There was evidence from one (+) focus group study of variation in views of South Asian and black participants regarding the appropriate level of physical activity required to obtain benefits, depending on own level of activity. There was evidence from the same study among South Asian participants that partaking in physical activity could compensate for unhealthy eating or smoking.

Evidence from two interview studies (both [+]), three focus group (one [++] and two [+]) studies and one qualitative evaluation (+) suggests that vigorous activity such as aerobics was not acceptable to some South Asian participants, particularly females, for whom modesty and single-sex classes were important considerations. One (+) focus group study

found that for some young people, however, going to the gym created a means of filling time, escape from social conditions and keeping up with fashion trends. There was evidence from one (+) focus group study of South Asian participants that partaking in physical activity could compensate for unhealthy eating or smoking.

There was also evidence from one (+) focus group study that encouraging sweating was important to some South Asian people. Evidence from one (+) focus group study and one guided interview study suggested that swimming and slow walking were preferred ways to remain active.

There is evidence from one (++) focus group study of a 'complex value hierarchy'. For example, choosing healthier options such as using less fat in cooking, and having to wear certain clothing for particular physical activities were seen as shameful and as more important than the benefits of a healthy lifestyle. In addition, as in white communities, support from families can act as a facilitator (if the new behaviour is integrated with the sense of self and one's own values without the control of others) or a barrier to changing health-related behaviours.

## **Evidence statement 2.10**

There was evidence from five good quality (two [++] and three [+]) qualitative studies (three focus group and two interview studies) that body image expectations vary according to background and culture and often differ from those currently popular within the UK.

There is evidence from one (++) focus group study that body size can be positively or negatively associated with health and attractiveness, and attempting to reach an ideal body size can be a strong motivator for behaviour change. There was evidence from one (+) interview guided questionnaire that only 64% of overweight or obese Bangladeshi women classed themselves as overweight. There was evidence from one (+) interview study that weight management was more important for South Asian males than females, and a (+) focus group study found it important for young South Asian and black females.

Evidence was found for an association between being overweight and prosperity in one (+) focus group study with Indian, Pakistani and Indian participants. Changing dietary and physical activity patterns in old age was perceived as potentially weakening.

Having the 'right' body size was influenced by the media as well as some male views, and

was important for attracting a partner for young South Asian and black females in one (+) focus group study.

In one (++) focus group study body size was found to be a stronger motivator for healthy behaviour changes than health issues.

### **Evidence statement 3.2**

There is evidence from one (+) study that did not focus on low income or BME groups to suggest that the process of identifying and referring high-risk patients in primary care to an exercise scheme varies between general practices. GPs and practice nurse's methods of identifying and referring patients to an exercise scheme was ad-hoc and based on: patients asking about exercise themselves, chance discussion during consultations, requests for referral by another doctor, and asking patients to choose from a variety of behaviour change activities that might produce health benefits.

Evidence from one (+) evaluation of healthy living centres acknowledges the challenges of identifying groups at risk. Hard-to-reach groups might be reached in small numbers at community events or eventually be motivated to engage with initiatives through word of mouth from relatives.

### **Evidence statement 3.3**

Evidence from one (+) survey study that evaluated the contribution of nurses to targeting health and social need suggests that in order to be able to empower high-risk groups to make choices about adopting healthy lifestyles, health professionals require a deep understanding of the cultural and religious beliefs and economic influences within the communities with which they are working.

One (+) evaluation highlighted the need for practitioners to take into account the realities of the people they are targeting. For example, making it clear that low-income groups do not require expensive clothing to engage in a community physical activity initiative.

### **Evidence statement 3.4**

Evidence from one (+) qualitative study of nurses' attitudes identified two discourses in relation to health promotion with disadvantaged groups. One was associated with the philosophy of holism that nurses were exposed to during training, resulting in empathy for

the disadvantages that low-income groups face in attempting to achieve a healthy lifestyle. The other discourse reflects personal values, and beliefs that individuals must take responsibility for their own health. This tension may need addressing when practising health promotion in a culturally sensitive way.

### **Evidence statement 3.6**

Evidence from two evaluations (one [+] and one [++]) suggests that the training of lay workers to identify and disseminate health promotion messages to members of their community is a way of reaching hard-to-reach and high-risk groups.

One (+) evaluation in which 11 women (seven of Pakistani, two of Indian and two of Chinese origin; of Muslim, Hindu and Christian religious backgrounds) undertook formal training to become community health workers (CHWs) provides evidence that lay workers trained by health professionals can identify target groups within the community and deliver health messages in a culturally sensitive way in an appropriate language. Knowledge of the communication channels in a community assisted in the success of the initiative. For example, in this study, younger women were targeted for training as they are relied upon in the community for passing on information.

Evidence from a qualitative evaluation (++) study that explores the role of the lay food and health worker suggests a consensus of opinion that the primary role for lay workers is the encouragement of dietary change by making complex messages more credible and culturally appropriate. A proactive strategy for lay workers to identify and contact at-risk individuals is to create lists of contacts within the community and introduce themselves to those on the list.

One (+) evaluation of healthy living centres highlighted a difference in focus between lay workers, who considered the larger social picture, and health professionals, whose focus was more on outcomes such as improved fruit and vegetable intake.

### **Evidence statement 3.7**

One (-) evaluation of peer education training as part of a community health promotion programme (Project Dil), provides evidence of a high level of uptake and enthusiasm from those engaged in peer education. The project was designed to improve the effectiveness of primary and secondary prevention of coronary heart disease in volunteer Leicestershire general practices with a high percentage of South Asian patients. Peer education was

reported to facilitate health promotion within a range of organised community events.

Evidence from one (+) evaluation suggests that fostering a team spirit and sharing experiences was a key facilitator in training lay workers. However, there is evidence from the same study that scheduled activities prevented lay workers from having time to participate.

### **Evidence statement 3.8**

One (+) evaluation of lay worker training provides evidence that target groups within the community increased their knowledge as a result of lay worker activity, and found the cultural sensitivity of health promotion messages an important factor in helping to make changes in dietary practice.

### **Expert papers**

Expert paper 5: 'CPD and training, enabling professionals to practice effectively and confidently'.

Expert paper 6: 'BME groups, diet and risk of type 2 diabetes'.

Expert paper 7: 'Developing population level guidance – CVD, the Foresight Report.'

Expert paper 8: 'Dietary strategies for the prevention of pre-diabetes'.

Expert paper 9: 'Low income groups and behaviour change interventions'.

Expert paper 10: 'Adapting health promotion interventions for BME communities'.

Expert paper 11: 'Health policy and health.'

Expert paper 12: 'Ismaili Nutrition Centre'.

Expert paper 13: 'Environment and physical activity'.

Expert paper 14: 'Nutritional food labelling current thinking and practice'.

Expert paper 15: 'Fiscal policy instruments to improve diet'.

## Additional evidence

[NICE's guideline on obesity.](#)

[NICE's guideline on general approaches to behaviour change: general approaches.](#)

NICE's 2008 guideline on community engagement.

[NICE's guideline on physical activity in the workplace.](#)

NICE's 2008 guideline on physical activity and the environment.

## Cost-effectiveness evidence

The recommended interventions operate on groups of people – and often quite large groups. For most people, the amount of weight they lose, the extent of changes to their diet and any increase in the amount of exercise they take will be relatively small. In addition, a few will make changes in the wrong direction. Thus the average changes in behaviour within the group as a whole will usually be small. However, the total changes will eventually be discernable at a population level: that is, fewer people will be diagnosed with type 2 diabetes in the long run, or will be diagnosed later in life.

Modelling over the lifetime of individuals demonstrates that, if the total costs of undertaking the initial interventions are sufficiently small, these interventions will be cost effective. Some interventions will be very cost effective or, in the long run, cost saving, even after discounting future benefits at the usual rate of 3.5% per year. ('Cost saving' means that the costs saved from not having to undertake treatment later in life exceed the costs of the intervention.)

However, for a range of reasons, there is an element of uncertainty in the modelling results. This includes the possibility that better health outcomes in the future may be attributable to something other than the named interventions, or that there might be far better and cheaper treatments for type 2 diabetes in the future.

## Fieldwork findings

Fieldwork aimed to test the relevance, usefulness and feasibility of putting the

recommendations into practice. The PDG considered the findings when developing the final recommendations. For details, see the [fieldwork section in appendix B](#).

The guidance was welcomed by fieldwork participants. It was felt that it could help raise the profile of type 2 diabetes prevention activities, and provide renewed impetus. Many participants stated that the recommendations represented best practice in the area rather than offering a new approach. Most participants expressed the need for an integrated strategy on healthy lifestyles, covering the main related long-term conditions (such as cardiovascular disease, obesity, diabetes and hypertension) and the main lifestyle risk factors (for example, unhealthy diet and lack of physical activity). It was also felt that a better balance between recommendations for action at a local level and action at national level was important.



## Appendix D: Gaps in the evidence

The Programme Development Group (PDG) identified a number of gaps in the evidence related to the programmes under examination, based on an assessment of the evidence and expert comment. These gaps are set out below.

1. There was not enough evidence to judge the effectiveness of interventions to reduce the risk of – and prevent – pre-diabetes. In particular, there was a lack of evidence on how effective they are with people from black and minority ethnic and lower socioeconomic communities in the UK. (Source Reviews 1–3 and 5)
2. There was limited evidence on how different approaches could be combined. (For example, targeting the population as whole, targeting 'high-risk' populations and other approaches, including 'individual' interventions.) (Source Reviews 1–3 and 5)
3. There was limited evidence on the 'cultural appropriateness' of interventions and how they could be effectively adapted or tailored to prevent pre-diabetes. (Source Reviews 1–6; Expert paper 10)
4. There was limited evidence on how the environment in which people live may affect their risk of developing pre-diabetes. (Source Reviews 1 and 2; Expert paper 13)
5. There was limited evidence on the effectiveness of interventions to develop the awareness, knowledge, understanding and skills of healthcare professionals and others responsible for people at high risk of developing pre-diabetes. (Source Review 3)
6. There was limited evidence on the potentially regressive effects of food taxation on health inequalities. (Source Expert paper 15)

The Group made five recommendations for research.

## Appendix E: Supporting documents

Supporting documents include the following:

- Evidence reviews:
  - Review 1: 'Prevention of type 2 diabetes: interventions to reduce risk factors for pre-diabetes among UK adults from a lower socioeconomic group'
  - Review 2: 'Prevention of type 2 diabetes: interventions to reduce risk factors for pre-diabetes among UK adults from black and minority ethnic groups'
  - Review 3: 'Prevention of type 2 diabetes: interventions to raise awareness in health professionals and assist identification of high-risk groups'
  - Review 4: 'Interventions for the prevention of pre-diabetes in high-risk groups: examples of current practice in relation to the UK evidence base'
  - Review 5: 'Review of review-level evidence to inform the development of NICE public health guidance for the prevention of pre-diabetes among adults in high-risk groups'
  - Review 6: 'Identification of effective community projects focused on addressing risk factors for the development of pre-diabetes in adults from black and minority ethnic groups and lower socio-economic groups'.
- Economic modelling: 'Prevention of type 2 diabetes: preventing pre-diabetes among adults in high-risk groups. Report on cost-effectiveness evidence and methods for economic modelling'.

- Expert papers:
  - Expert paper 1: 'Type 2 diabetes and pre-diabetes: diagnosis and definition'
  - Expert paper 2: 'Illness labelling and illness experience'
  - Expert paper 3: 'Socio-economic status and risk factors for type 2 diabetes'
  - Expert paper 4: 'Expert advice, dietary surveys and nutrition research'
  - Expert paper 5: 'CPD and training, enabling professionals to practice effectively and confidently'
  - Expert paper 6: 'BME groups, diet and risk of type 2 diabetes'
  - Expert paper 7: 'Developing population level guidance – CVD, the Foresight report'
  - Expert paper 8: 'Dietary strategies for the prevention of pre-diabetes'
  - Expert paper 9: 'Low income groups and behaviour change interventions'
  - Expert paper 10: 'Adapting health promotion interventions for BME communities'
  - Expert paper 11: 'Health policy and health'
  - Expert paper 12: 'Ismaili Nutrition Centre'
  - Expert paper 13: 'Environment and physical activity'
  - Expert paper 14: 'Nutritional food labelling: current thinking and practice'
  - Expert paper 15: 'Fiscal policy instruments to improve diet'.
- Fieldwork report: 'Fieldwork validation report: prevention of pre-diabetes among adults in high-risk groups'.

## Finding more information

You can see everything NICE says on this topic in the [NICE Pathway on preventing type 2 diabetes](#).

To find NICE guidance on related topics, including guidance in development, see our [topic page for diabetes](#).

For full details of the evidence and the guideline committee's discussions, see the [supporting documents](#). You can also find information about [how the guideline was developed](#).

NICE has produced [tools and resources](#) to help you put this guideline into practice. For general help and advice on putting NICE guidelines into practice, see [resources to help you put guidance into practice](#).

## Update information

**August 2020:** The information in the guiding principles section about national recommendations for physical activity was changed to refer to the UK Chief Medical Officers' physical activity guidelines.

**May 2018:** Changes made to update links in footnotes.

**October 2015:** Title changed from 'Preventing type 2 diabetes: population and community-level interventions' to 'Type 2 diabetes prevention: population and community-level interventions' for clarity and consistency with other guidance on this topic.

ISBN: 978-1-4731-2958-0

## Accreditation

