

**A pragmatic review of risk identification and
interventions to prevent type 2 diabetes in high risk
adults in disadvantaged and vulnerable groups**

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Executive summary

This report describes the findings of a pragmatic evidence review of interventions targeted at vulnerable and disadvantaged adults which aim to:

1. identify and monitor those at high risk of progression to type 2 diabetes
2. prevent or delay progression to type 2 diabetes in those at high risk.

The review was commissioned to support the development of NICE guidance on preventing type 2 diabetes in high risk individuals and groups.

Evidence was identified via two calls for evidence as part of the development of current and previous NICE guidance on the prevention of type 2 diabetes, plus a targeted mail-out to key informants requesting details of evidence from practice and unpublished studies. This was supplemented by a focused search of relevant websites and other electronic resources. No restriction was placed on the type of study, but included projects were restricted to those with a completed evaluation or relevant reported outcomes (relevant outcomes include screening uptake and risk identification, plus health and behavioural changes associated with type 2 diabetes risk). The findings are indicative, rather than an exhaustive account of all relevant studies.

Twenty-four unique projects were identified: 10 concerned solely with risk identification, nine with prevention and five with a combination of both. Eight literature reviews provided contextual and supporting evidence. Most evidence involves very small sample sizes based on descriptive (not experimental) evaluation designs. The diversity of approaches adopted by the different projects combine with these methodological limitations to prevent firm conclusions being drawn about the most effective interventions, but common themes did emerge as described below and in box 1. No evidence on cost-effectiveness was identified.

A variety of tools have been used to *identify* adults at high risk of type 2 diabetes, using different combinations of anthropometric, clinical and self-reported measures. Many of these projects were operating as part of the NHS Health Check or Scottish Keep Well programme. Some success is reported in engaging hard-to-reach groups and identifying type 2 diabetes related health risks. Successful approaches include outreach, effective partnerships, accessible information, cultural sensitivity and flexibility in approach. Barriers to success include poor links with relevant agencies, cultural norms and attitudes to health, plus difficulties accessing long-term service funding.

Most of the identified *preventative* interventions focused on lifestyle, rather than pharmacological or surgical, approaches. Only one specifically targeted adults known to be at high risk of developing type 2 diabetes. Positive outcomes linked to type 2 diabetes risk include dietary improvements, reduction in weight/BMI/waist circumference and increased levels of physical activity. No UK evidence was identified linking these changes to relevant clinical endpoints, and long-term evidence on the sustainability of these changes is very limited. Successful preventative projects have adopted a tailored approach based on detailed knowledge of the target group and strong partnerships with the local

community. Other facilitators include positive support networks, continuity of staff, practical programme content and post intervention support. A range of personal, cultural and structural barriers are commonly encountered and chime with those faced by the included risk identification projects.

Box 1 summarises the main facilitators and barriers to successful implementation and outcomes common to both risk identification and interventions.

Box 1

<i>Successful approaches</i>	<i>Barriers to engagement and positive outcomes</i>
<ul style="list-style-type: none"> • Tailored and flexible approaches that are sensitive to the needs, ability and cultural or religious norms of the target group • Involvement of the target community in intervention design and delivery • Outreach delivery in convenient and appropriate local venues • Effective inter-agency working to facilitate inward and outward referrals • Methods of communication and resources that are accessible and understandable to the target group • Practical and experiential learning • Realistic, achievable goals • Social support through group work and engagement with the wider community • Sensitive, well-trained, dedicated staff • Ongoing post-intervention support • Widespread, varied and targeted publicity 	<ul style="list-style-type: none"> • Poor inter-agency working • Literacy and language difficulties • Cultural norms and religious codes of conduct • Low prioritisation of health relative to other, more pressing, issues • Weak or unsupportive social networks • Resource implications of costly programme adaptations • Structural barriers, in the form of poor access to facilities to support ongoing lifestyle changes • Highly mobile populations • Lack of sustainable funding sources

1 Background and context

The Centre for Public Health Excellence within NICE is currently in the process of developing the second of two pieces of guidance on prevention of type 2 diabetes in adults. The first (PH35) was published in May 2011 and focused on population and community approaches to prevention (<http://guidance.nice.org.uk/PH35>). The second is currently in development and is focused on preventing type 2 diabetes in high risk individuals and groups (<http://guidance.nice.org.uk/PHG/Wave19/62>).

This study has been commissioned to inform the development of the second piece of guidance. A number of generic evidence reviews are being undertaken to support the development of this guidance. Because the evidence base for diabetes prevention in disadvantaged and vulnerable adults is much less well developed, the Programme Development Group considered that a stand-alone piece of work was warranted focusing specifically on these groups.

For the purposes of this current review, vulnerable or disadvantaged groups are defined as:

- those who may suffer from inequality of opportunity – due to age, disability, gender, gender identity, ethnicity, religion and belief, sexual orientation or socio-economic status; *or*
- those whose risk of developing type 2 diabetes may be difficult to manage, or missed, by primary or secondary health and social care services - this includes (but is not exclusive to) people with learning disabilities or severe mental illness, frail older people, those with physical disabilities, prisoners, travellers, refugees and recent migrants, homeless, and those not registered with a GP.

Of course, many of these groups may overlap and will face similar risks. For example, prisoners, people with learning disabilities, homeless and travelling communities also tend to be living on low incomes, for a range of different reasons.

The elevated risk of developing type 2 diabetes in these disadvantaged and vulnerable groups is described in a 2006 Diabetes UK report. [1] For example, in the lowest socio-economic groups the risk of developing diabetes is 2.5 higher than the general population, six in every ten people with diabetes are over the age of 65 and black and minority ethnic groups are up to six times more likely to develop diabetes. Similarly, the prevalence of diabetes is up to five times higher among prisoners, while 10-15% of people with a severe mental illness are estimated to have a diabetes diagnosis (2-3 times higher than the general population). [2] Much of this increased risk is attributed to lifestyle factors, including obesity, physical inactivity and an unhealthy diet, all of which are more prevalent among deprived communities and within some of the vulnerable groups described above.

Many of these disadvantaged and vulnerable groups also face a range of practical and cultural barriers to accessing health care, preventative services and health checks or screening. An example of this is the tendency for healthcare professionals to focus on a patient's mental illness or learning disability at the expense of physical health needs, including diabetes risk (described as 'overshadowing' by the Disability Rights Commission [3]).

2 Aims, objectives and methods

The aim of this study is to provide a descriptive and focused review of evidence from practice and other sources on effective and cost-effective approaches to:

1. identifying and monitoring adults with impaired glucose regulation ("pre-diabetes") or at high risk of developing type 2 diabetes
2. preventing or delaying progression to type 2 diabetes in adults at high risk - through lifestyle, pharmacological or surgical interventions.

The particular focus of this review is on interventions which target adults in **disadvantaged** communities and **vulnerable** groups, as described in the previous section.

In light of the paucity of evidence on type 2 diabetes identification and prevention in vulnerable and disadvantaged groups, the scope of this review was widened to include interventions which target known risk factors for type 2 diabetes, rather than restricting to those which specifically measure and monitor impaired glucose regulation. These risk factors include overweight and obesity,¹ central obesity (i.e. large waist circumference),² sedentary lifestyle/low levels of physical activity and other associated cardiovascular risk factors (e.g. abnormal blood lipids or hypertension).

The inclusion criteria are described in box 2. Only interventions which have been evaluated, or for which outcome measures are available (e.g. screening uptake, attendance, health needs identified, behavioural and health outcomes) were considered for inclusion, but no restriction was placed on the type of evaluation methodology used.

A call for evidence relating to disadvantaged and vulnerable groups was made during the development of guidance on preventing type 2 diabetes among high risk individuals and groups (<http://guidance.nice.org.uk/PHG/Wave19/62>). Submissions from this call for evidence were examined alongside relevant submissions received in response to a previous call for evidence during the development of the guidance on *Prevention of type 2 diabetes – population and community interventions* (<http://guidance.nice.org.uk/PH35>). In addition, local practice examples of successful approaches were sought through a targeted mail-out to key informants (including stakeholders of both pieces of NICE guidance on type 2 diabetes prevention and relevant health and public health

¹ Body mass index (BMI) $\geq 30\text{kg/m}^2$ or 27.5kg/m^2 if of south Asian or Chinese descent.

² For women this is defined as $\geq 80\text{cm}$. For men of European or African descent $\geq 94\text{cm}$; for men of south Asian or Chinese descent $\geq 90\text{cm}$.

networks³). A copy of the questionnaire that was sent to key informants can be viewed in appendix 1. Evaluation reports were also accepted.

A focused web search was also conducted, using search terms describing one or more vulnerable group, plus 'diabetes' and type 2 diabetes risk factor terms. The final list of web resources consulted for this review is provided in appendix 2, along with broad search terms used where appropriate.

This pragmatic and inclusive approach to identifying and retrieving information on relevant projects and interventions was supplemented by evidence from recent literature and systematic reviews relevant to one or more vulnerable groups and identified through one of the search routes described above (see appendix 3 for details of included reviews). As such, the reported findings are indicative, rather than an exhaustive account of all relevant UK-based interventions.

³ Including JISCMail Minority Ethnic Health, Health Equity and Public Health networks, and the UK Health and Learning Disability Network, NHS Health Check learning network and local diabetes research networks.

Box 2 Inclusion criteria

UK-based projects or interventions that meet ALL of the following five criteria:

1. Interventions designed to **identify and monitor** adults with impaired glucose regulation
and/or

Interventions which **contribute to the prevention or delay of progression to type 2 diabetes**, including pharmacological and surgical interventions, plus lifestyle interventions which address one or more of the following:

- a) Physical activity - reduce sedentary behaviour and/or increase physical activity levels
- b) Weight loss - achieve/maintain a healthy body weight, body mass index (BMI) or weight circumference
- c) Diet - improve dietary intake, for example through diets which lower or control glycaemic index, (saturated) fat intake, carbohydrate intake, total calorie intake

2. Targeted at **individuals or groups of individuals**

3. For **adults aged 18 and above** with:

- a) **impaired glucose regulation**

or

- b) characteristics which put them **at high risk of developing diabetes**

4. **Focus on vulnerable groups** whose diabetes risk may be missed or difficult to manage. These groups may include, but are not restricted to, the following:

- frail older people
- adults with a physical disability
- people with severe mental illness (e.g. schizophrenia, bipolar disorder, on anti-psychotic medication) or learning disabilities
- those not registered with a GP
- prisoners
- travellers
- refugees, asylum seekers and recent migrants
- homeless people
- some minority ethnic or cultural groups
- some faith communities
- those living in poverty

5. **Formal evaluation** completed **or evidence of outcomes** recorded. Evidence may be quantitative or qualitative, published (**since 2000**) or unpublished

3 Overview of included projects and interventions

Table 1 provides an alphabetical list of the projects and interventions identified as part of this study, indicating the broad target group, type of intervention (risk assessment/identification or preventative) and source of information. A fuller description, including a summary of outcomes for each project, is provided in appendix 4. The appended tables contain all available information on project outcomes; where information is missing (e.g. on number of participants, baseline or follow-up measures), this is due to absence of available data. Appendix 5 contains a selection of case study projects to add context and depth to the report commentary.

Table 1 provides details of 24 projects that met the inclusion criteria, of which 10 projects were submitted in response to the targeted mail-out and four in response to the call for evidence for the guidance in development (one of these was also submitted in response to the PH35 call for evidence). Six further projects from the PH35 call for evidence were also included as they met the current inclusion criteria, and another was identified as a service development following on from one of these projects. An additional three projects were identified via the focused web search.

For some vulnerable groups (e.g. prisoners, recent migrants) there is very limited evidence, while for others (e.g. sedentary older people, adults with a physical disability) no evaluated studies were identified.

The focus of the included projects varies from diabetes-specific (mostly risk assessment interventions) and associated risk factors to healthy lifestyle improvements with no specified clinical endpoint (e.g. reduced weight or BMI, or increased levels of physical activity).

A number of the risk assessment interventions were linked to the NHS Health Check programme and the Scottish Keep Well programme. An overview of each of these programmes is presented in box 3. Please note that while Keep Well interventions have been classified as risk assessments in this report, this programme does include elements of brief lifestyle interventions to a greater or lesser degree. Where these projects also offer lessons for preventative interventions, this information is included and referenced in the relevant sections of the report.

Much of the evidence on effectiveness and outcomes is drawn from primarily descriptive accounts of project activity (including quantitative service data and feedback from participants and staff) and from before and after evaluation studies, involving small sample sizes. None of the formal evaluations included a control group and, in most cases, participants were self-selecting.

Combined with the diversity of project objectives, settings, approaches and eligibility criteria, it is difficult to conclude that the outcomes are generalisable beyond the scope of the specific interventions. However, in the following sections, common themes are drawn out to help identify approaches that have consistently proved to be successful and the type of barriers to effective delivery and positive outcomes that are shared across different projects.

Table 1 Overview of included projects (in alphabetical order)

Project name	Target group	Type of intervention	Source
10% Club (Plymouth)	Low income/ deprived area	Preventative intervention	PH35 call for evidence
Apnee Sehat (Coventry)	Ethnic minority/faith group	Risk assessment plus preventative intervention	Call for evidence (also PH35 call for evidence)
CASAHA 50 Plus (London)	Refugees, asylum seekers, new migrants	Risk assessment plus preventative intervention	Targeted mail-out
Choosing the Chance to Change (Westminster)	Learning disabilities	Preventative intervention	Focused web search
Cromwell House weight management clinic (Manchester)	Severe mental illness	Preventative intervention	Targeted mail-out
Diabetes UK/NHS Surrey Early Identification project	Ethnic minority/faith group	Risk assessment	PH35 call for evidence
Fit for Life (Devon)	Learning disabilities	Preventative intervention	Focused web search
Happy Hearts (Nottingham)	Low income/deprived area	Risk assessment	Focused web search
Keep Well (Scotland)	Low income/ deprived area	Risk assessment	Targeted mail-out
Keep Well in Prisons (Scotland)	Prisoners	Risk assessment	Targeted mail-out
Khush Dil (Edinburgh)	Ethnic minority/faith group	Risk assessment plus preventative intervention	Targeted mail-out
Keep Well Gypsy & Travellers (Lothian)	Travellers	Risk assessment	Targeted mail-out
Keep Well Gypsy & Travellers (Lanarkshire)	Travellers	Risk assessment	Targeted mail-out
Learning disability diabetes prevention group (Sandwell)	Learning disabilities	Preventative intervention	Targeted mail-out

Table 1 Overview of included projects (in alphabetical order, continued)

Project name	Target group	Type of intervention	Source
Lighten Up (S Birmingham)	Low income/ deprived area	Preventative intervention	PH35 call for evidence
NHS Health Check North East Essex: Colchester Mosque	Ethnic minority/faith group	Risk assessment	Call for evidence
NHS Health Check N E Essex: Jobcentre Plus	Low income/ deprived area	Risk assessment	Call for evidence follow-up
NHS Health Check N E Essex: Temporary accommodation	Homeless	Risk assessment	Call for evidence follow-up
'New life, New you' (Middlesbrough)	Low income/ deprived area	Risk assessment plus preventative intervention	Targeted mail-out
Seek Diabetes (E Midlands)	Ethnic minority/faith group	Risk assessment	PH35 call for evidence
Slimmers' Kitchen (Dudley)	Learning disabilities	Preventative intervention	Follow-up of PH35 community projects review submission
Slimmers' Kitchen (Dudley)	Low income/ deprived area	Preventative intervention	PH35 call for evidence
Weight Busters (Nuneaton)	Low income/ deprived area	Preventative intervention	PH35 call for evidence
Well-being Support Programme (national pilot, local implementation Kent)	Severe mental illness	Risk assessment plus preventative intervention	Targeted mail-out

Box 3 NHS Health Check and Scottish Keep Well programme

NHS Health Check (since 2008)

Aims to help prevent heart disease, stroke, diabetes and kidney disease. Adults between the ages of 40 and 74, who have not already been diagnosed with one of these conditions, are invited every five years for an assessment of their disease risk – including tests for cholesterol and blood pressure, BMI measurement and a diabetes risk assessment (based on test results and personal history), plus blood glucose tests for those identified at high risk. Support and advice is also given to help patients reduce or manage their personal disease risk.

Keep Well (NHS Scotland, since 2006)

Aims to increase rates of health improvement through an anticipatory care approach, with a particular focus on disadvantaged, hard-to-reach communities. Adults between the ages of 45 and 64 living in deprived areas are invited to attend a risk assessment – including tests for blood pressure, cholesterol and blood glucose, combined with self-reported lifestyle risk factors (including smoking, exercise and diet) and social factors. Individuals are offered or directed to appropriate services and support according to the results of the risk assessment.

4 Evidence synthesis

All available information on the identified projects, programmes and interventions was analysed to uncover key themes and sub-themes in relation to outcomes, facilitators and barriers to successful delivery. This information is supplemented with relevant contextual and supporting evidence from the literature reviews throughout.

The results of this pragmatic evidence review are synthesised into two sections, in line with the two main research questions outlined under the project aims and objectives:

1. methods to identify and monitor disadvantaged and vulnerable adults at high risk of progression to type 2 diabetes;
2. interventions which help to prevent or delay progression to type 2 diabetes in these individuals and groups.

4.1 Methods to identify and monitor disadvantaged and vulnerable adults at high risk of progression to type 2 diabetes

Fourteen of the reviewed projects included a risk assessment element to identify adults with impaired glucose regulation or associated risk factors (e.g. obesity, large waist circumference, hypertension, abnormal blood lipids). Seven of these projects were established either as part of the NHS Health Check (three, as part of a single PCT programme) or Scottish Keep Well health checks programme (four). Three projects were focused specifically on early identification of type 2 diabetes risk (Diabetes UK/NHS Surrey Early Identification project, Seek Diabetes East Midlands, and CASAHA 50 Plus). Four projects included screening as part of a wider lifestyle intervention programme (Apnee Sehat, CASAHA 50 Plus, Khush Dil [4] and 'New life, New you' [5]).

Information on cost was provided for only two projects (Keep Well in Prisons and Happy Hearts). Details are provided in appendix 4.

4.1.1 Risk assessment tools

A variety of risk assessment tools were used, incorporating different combinations of anthropometric (e.g. weight, height, waist circumference), clinical (e.g. blood glucose) and self-reported (e.g. levels of physical activity, dietary intake, personal and family history) measures. Tools include the Diabetes UK Risk Score Assessment Tool,⁴ QRISK⁵ (used in the NHS Health

⁴ <http://www.diabetes.org.uk/Professionals/Risk-score-assessment-tool/>

Check programme to assess cardiovascular risk), the ASSIGN⁶ cardiovascular risk tool and the FINDRISC⁷ diabetes risk tool. On occasion, these tools have been adapted specifically for the target population (e.g. using different BMI or waist circumference cut-offs for South Asian populations, or adjusting risk assessment scores to take account of differential underlying risk), but mostly generic tools were applied.

4.1.2 Outcomes

Risk assessment has had a positive impact across a range of vulnerable groups through the identification of unmet health needs and undiagnosed conditions related to type 2 diabetes risk. These include raised blood glucose levels or HbA_{1c}, overweight/obesity, central adiposity, nutrition imbalance and physical activity levels below nationally recommended levels. None of the projects reported outcomes of follow-up activity to monitor identified risk factors.

The reported outcomes of the included projects suggest that health checks can also help to raise awareness of type 2 diabetes risk factors and encourage engagement in preventative activities among vulnerable groups with low levels of health literacy. For example, the Keep Well in Prisons project in Scotland reported that some prisoners started using their own money to purchase fresh fruit and vegetables, while others were using the gym, as a direct result of this health screen plus brief interventions programme. And in Colchester, NHS Health Check offered at Friday prayers at a mosque resulted in 14 out of the 18 men assessed receiving lifestyle advice, with six directly referred to a weight management service. Screening has also been found to be an effective motivator for lifestyle change in a recent literature review of diabetes prevention initiatives in South Asian communities.[6]

4.1.3 Facilitators

Outreach

An essential ingredient of a successful risk assessment/health checks programme is considered to be locating the service in an appropriate, convenient and familiar venue. Taking the service out to vulnerable, hard-to-reach groups is considered a vital component in order to engage with them successfully.

⁵ <http://qrisk.org/>

⁶ <http://assign-score.com/>

⁷ A validate diabetes risk assessment tool, using simple measurements including height, weight and waist circumference[7]

For example, holding NHS Health Check sessions at the Colchester mosque as described previously was felt to be an invaluable means of accessing a group of men who tend to be missed by mainstream services. Similarly, the Keep Well Gypsy and Travellers services in Lothian and Lanarkshire successfully engaged with the target community (including men) through outreach work at local events frequented by its members; and the use of an outreach bus to deliver services on Lanarkshire traveller sites was perceived to be central to the success of the programme. The Happy Hearts project also successfully used community outreach clinics (in and out of normal working hours) to improve uptake of cardiovascular health checks.

The national Keep Well programme evaluation, however, suggests that community events may be good for awareness-raising/publicity, but not necessarily for engagement (i.e. signing people up for a health check). For the hardest-to-reach, home-based health checks were found to be an important means of engagement.[8]

Partnerships

Partnership working with other agencies and close links with local services, as well as a good relationship with the target community (including religious leaders where appropriate), were also identified as key factors for success. For example, organisers of the Keep Well Gypsy & Travellers service in Lothian liaised closely with the police, local authority site managers, local leisure services and GP practices, as well as the local gypsy and traveller community and church, in order to publicise the service and encourage attendance at the outreach clinics. Many other examples of strong joint agency working and close links with local services to facilitate inward and onward referrals were identified across a range of other projects.

Communication

Feedback from the included projects also highlights the value of accessible written and other materials that are understandable and meaningful to the target group. To be useful, these materials may require adaptation (e.g. for adults with learning disabilities or poor levels of literacy) or translation into languages other than English (e.g. for some ethnic minority groups and recent migrants). Feedback from the Lothian Keep Well Gypsy and Travellers service suggests that these communities may prefer audio-visual health information, an approach which has also been used successfully with people with learning disabilities (see section 4.2.2 and case study 6). Face-to-face communication has also been found to be successful in reaching and engaging with communities where literacy or language is a problem, but this can be costly.

The Happy Hearts programme followed social marketing principles to ensure that the motivations of their target group (adults living in deprived areas) were well understood, so that relevant messages could be developed and communicated through appropriate channels. Multiple methods of contact (letters, followed by telephone calls and text messages) were found to be more successful than using letters alone.⁸ The utility of multi-modal channels of communication to improve uptake is also reflected in the findings of the national Keep Well evaluation, which also targets residents of deprived areas.[8]

Cultural sensitivity

Delivery of a tailored and culturally sensitive service was backed up in the Lanarkshire Keep Well Gypsy and Travellers service by a limited number of specifically trained staff who became familiar to members of the community, thus enabling them to build relationships. Staffing issues were also identified as contributing to the success of a number of the preventative projects, and are described in section 4.2.2.

Flexibility

Finally, as a tool to engage otherwise 'hard-to-reach' communities, some projects have taken an inclusive approach, adopting flexibility in applying service eligibility criteria so as not to discourage uptake. For example, the Keep Well Gypsy and Travellers service in Lanarkshire provided a shortened health screening offer to those who fell outside the usual Keep Well eligible age range, and supported referrals to health services in demand within the community but outside the remit of Keep Well (e.g. dental and sight tests).

4.1.4 Barriers

Poor links with other agencies

As good links with local agencies facilitate delivery of risk assessment programmes, so poor links can hinder implementation. This is illustrated by the initial delays caused to the implementation of Keep Well in private prisons because of contractual issues, as well as the additional work created as a result of access to prison electronic health records being denied to the in-reach peripatetic nursing team.

8

<http://system.improvement.nhs.uk/ImprovementSystem/ViewDocument.aspx?path=Cardiac%2fNational%2fWebsite%2fNHS%20Health%20Check%2fHappy%20Hearts%20Evaluation%20Document%206.2.10.pdf>

Literacy and language barriers

As alluded to previously, literacy and language barriers can create problems in engaging vulnerable groups in a targeted type 2 diabetes-related risk screening programme. A number of projects identified this as an issue, including those working with some South Asian communities, adults with learning disabilities and gypsies and travellers. For example, evidence from the literature suggests that people with learning disabilities may require a follow-up call to remind them of their health check appointment and answer any queries they may have.[9] However, a recent study of barriers to screening (part of an ongoing diabetes prevention trial) did not find language difficulties to be important among the South Asians interviewed.[20]

Cultural barriers

Cultural barriers may also exist. For example, trusting to fate was mentioned in the context of both gypsy and traveller and South Asian communities, although the extent to which this holds true in practice for South Asians has been questioned.[6,10]

The Lanarkshire Keep Well Gypsy and Travellers project also described a widespread disregard for conventional time keeping which can create difficulties in keeping to appointment times, which is exacerbated by low literacy levels making it difficult to use written reminders and publicity. However, it was acknowledged that the extent to which these norms hold true within communities will vary.

Health as secondary concern

A number of personal barriers to engagement with risk assessment and screening services were also identified by the included projects. In particular, a common theme across a number of disadvantaged groups was the fact that health often takes a back seat to other, more pressing, issues (financial difficulties, social problems, family crises, unemployment, etc.). This again highlights the importance of establishing and maintaining close links with a range of local support agencies in order to cross refer as appropriate.

Funding

A final, but fundamental, barrier commonly mentioned is the lack of sustainable funding streams to support ongoing targeted outreach work. The Keep Well Gypsy and Travellers service in Lanarkshire pay a £450 vehicle charge for every screening session, and require significant additional staff and resource to run these outreach clinics. Other projects reported having to discontinue successful screening services in community locations due to limited funding. Poor recording of activity and outcomes during outreach

events often means that evidence cannot be produced to support funding extensions.

Group specific barriers

The Lothian and Lanarkshire Keep Well Gypsy and Travellers services face the particular challenges of onward referral and follow-up within a highly transient community. Suggested approaches to facilitate this include strengthening of cross-boundary referral arrangements and establishing a nationwide network of practitioners who work with these communities. A local policy of rapid removal from unauthorised sites in Lanarkshire has further hampered efforts to deliver services to traveller communities.

4.2 Interventions which help to prevent or delay progression to type 2 diabetes

Eleven projects were identified which offer a range of lifestyle interventions targeted at vulnerable adults who may be deemed at high risk of developing type 2 diabetes (including obesity and sedentary lifestyle), and which support participants in achieving outcomes that may reasonably be assumed to reduce their risk of progression to type 2 diabetes. Only one project ('New life, New you') specifically targeted people with an identified raised type 2 diabetes risk (using the FINDRISC tool [7]).

Participants were recruited via a combination of self-referral, GP and other health professional referral. Programmes included a mix of education, behavioural approaches (e.g. motivational interviewing) and experiential learning (e.g. accompanied shopping trips, cookery and exercise sessions), mostly delivered in a group setting. Personal goals, food diaries and pedometers are examples of the type of monitoring and motivation tools that have been used.

Nine of these projects provided follow-up data which enable some assessment of impact to be made, although as mentioned previously none of these were evaluated using a randomised or controlled design.

4.2.1 Outcomes

On the whole, the included preventative projects report positive outcomes, with many participants achieving their goals, including:

- dietary improvements – e.g. half of the female participants in the Khush Dil project reported having adopted more healthy cooking methods (baking, steaming or grilling instead of frying in oil) at 6-12 month follow-up;

- reduction in weight, BMI or waist circumference – e.g. adults with severe mental illness attending the Cromwell House weight management clinic lost an average of 7.6kg over a 10 year period;
- increased exercise/physical activity levels – e.g. ‘New life, New you’ participants who completed the 10 week programme increased their physical activity levels by an average of 6.2 MET-hour/day.⁹

It is important to note that for none of the included projects was evidence provided to show that the observed changes resulted in relevant clinical outcomes (i.e. prevention of progression to type 2 diabetes). None of these projects measured blood glucose outcomes, as this was not an explicit objective of the interventions. However, unpublished data from the ‘New life, New you’ programme show that mean FINDRISC scores have decreased in the target group with elevated baseline scores. Moreover, a recent non-UK study (ineligible for the current review) suggests that weight management programmes may be effective in preventing antipsychotic-induced deterioration of glucose metabolism in adults with severe mental illness.[11]

Feedback from some of the included projects also highlights positive impacts in terms of knowledge and attitudes towards healthy lifestyle changes that may protect against progression to type 2 diabetes in the future. For example, participants in a number of projects (Slimmers’ Kitchen (both programmes), Khush Dil, Apnee Sehat, 10% Club, CASAHA 50 Plus and Sandwell Learning Disability diabetes prevention group) demonstrated greater awareness of healthy eating and nutrition and/or were encouraged to maintain and improve their fitness levels.

Six projects provided financial information, and where this was provided there was a good deal of variation. Support for these projects has come from mainstream service funding as well as special grants (see appendix 4).

The included literature reviews (summarised in appendix 3) confirm that positive outcomes associated with reduced diabetes risk can be attained in vulnerable groups, including overweight/obese adults with learning disabilities and severe mental illness. Well-designed lifestyle interventions can be effective in supporting weight loss in both groups, and there is some evidence that pharmacological interventions (metformin in particular) can prevent or attenuate antipsychotic-induced weight gain in severe mental illness (although combined interventions may be more effective).[12,13,14,15,16] However,

⁹ Metabolic equivalent task. This is defined as the amount of energy spent in performing different activities compared with inactivity. One MET is equivalent to a metabolic rate consuming (1) 3.5 millilitres of oxygen per kilogramme of bodyweight per minute (2) 1 kilocalorie per kilogramme of body weight per hour.

<http://www2.lse.ac.uk/LSEHealthAndSocialCare/LSEHealth/pdf/eurohealth/VOL14No1/Bandolier.pdf>

there is some uncertainty about the applicability of these findings to the UK context.

No further evidence on the effectiveness of pharmacological interventions was identified, and no relevant studies describing surgical interventions were found.

It is important to note that most projects only follow participants to the end of the programme or for a short period following completion, so it is generally not possible to assess the longer-term impact of the included interventions (one exception to this is the Cromwell House weight management clinic for adults with severe mental illness, which has followed participants for ten years to date).[16]

4.2.2 Facilitators

The core elements of a successful preventative intervention have much in common with those described for risk assessment and screening interventions.

A tailored approach

The included projects placed a strong emphasis on developing a detailed understanding of the needs of the target audience and tailoring interventions carefully to meet those needs. For example, the Fit for Life team had already learnt that some people with learning disabilities feel uncomfortable taking mainstream exercise classes, worrying that they will be unable to keep up with the rest of the class or complete the full session, and can find it difficult to travel to facilities. Consequently, they developed a tailored programme specifically for adults with learning disabilities, delivered by a fitness instructor with experience of working with these groups in an easily accessible location, in order to encourage participation and build confidence.

Similarly, the social marketing approach underpinning the 'New life, New you' pilot project was credited with being a key success factor in engaging with, and designing a programme which meets the needs of, the target population (case study 4).

When designing tailored preventative interventions, projects have tended to prioritise the four main areas described below.

- Communication – e.g. simple messages, translated materials, ethnic language speaking facilitators, use and adaptation of existing audio-

visual tools (e.g. Total Communication,¹⁰ CHANGE picture bank resources¹¹), creation of bespoke DVDs and other materials, use of role play.

- Cultural and religious sensitivity – e.g. single sex sessions (delivered by same sex facilitators as appropriate), sympathetic to norms regulating diet and physical activity, ‘sharing stories’ format for communicating health messages.
- Type and level of activities – e.g. offer a choice of activities, initial emphasis on achievable targets to build confidence and motivation, flexibility according to levels of knowledge, ability and fitness, plus taster/trial sessions.
- Convenient and appropriate locations and times – e.g. venues within easy walking distance or easily accessible using public transport, located in familiar and ‘safe’ settings (e.g. Children’s Centres, community centres, faith buildings, day centres, social clubs), evening and day sessions.

A couple of projects went so far as to advocate a person-centred, case-management approach for the most vulnerable, hard-to-reach groups.

This customised approach is endorsed in a recent systematic review and meta-analysis [15], which concluded that a tailored and flexible combination of weight management interventions (exercise, diet and behavioural) is likely to produce the best outcomes in terms of preventing/attenuating antipsychotic-induced weight gain in adults with severe mental illness.

Of particular importance when designing a tailored programme is to avoid assuming the target community form a single homogenous group. For example, the degree to which some South Asian Muslim women adhere to cultural norms of behaviour and are constrained by language barriers varies widely.[17] Similarly, the Keep Well team in Lanarkshire explain that while female Roma gypsies tend to be reluctant to discuss health needs in the presence of male associates, women from other travelling communities are more comfortable doing so.

Social support

The Fit for Life project emphasised the social aspect of belonging to a like-minded group as an important element of a successful intervention, which has

¹⁰ The Total Communication system enables people to communicate in any way they are able, including gestures, facial expressions, photographs, symbols, drawings, technological tools.

¹¹ www.changepeople.co.uk

been confirmed in other studies.[18] The importance of social networks and other interpersonal facilitators were mentioned by a number of projects, both in terms of peer support during the intervention, and family and community support to encourage sustained healthy lifestyle changes. This is confirmed in a recent review of the literature on preventing type 2 diabetes in South Asians, which identified the involvement of family and the wider community in dietary and physical activity interventions as a key component for success.[6]

One project, Khush Dil, specifically adopted a community development approach to programme design and delivery, which included training up members of the South Asian community to be part of the delivery team. One other project, Slimmers' Kitchen, also encouraged successful participants to take on a formal peer support role and share their experiences with newer group members. Choosing the Chance to Change also have plans to create similar roles for their programme, and have already run sessions specifically for carers (paid and family) of people with learning disabilities to attend. The support of carers is of particular importance where they are responsible for preparing meals and/or providing transport to and from activities, and has also been adopted in one of the other included projects targeting this group (case study 6).

Free or low charges

Offering services at low cost or free of charge was also highlighted by many projects as essential to engaging a range of disadvantaged groups on low incomes.

Partnerships

As with screening interventions, establishing and maintaining close working relationships with partner agencies, community leaders and the voluntary sector was also highlighted as key to successful implementation of a lifestyle programme. Links with other lifestyle services (e.g. Health Trainers) are also thought to support the maintenance and consolidation of health gains beyond the end of a specific programme.

Staffing

Delivery of staff training and continuity of staffing were also mentioned by a number of projects as supporting participants in achieving lifestyle goals. 'New life, New you' exercise sessions, for example, were led by named fitness instructors who built up excellent relationships with participants during the course of the programme (case study 4). As well as being well-versed and experienced in delivery of the programme content, other aspects of staff

training perceived to be important include cultural awareness, motivational interviewing and group facilitation skills.

Conversely, lack of staff motivation and training was suggested as one of the reasons for disappointing results from a local adaptation of the successful Well-being Support Programme national pilot, for patients with a severe mental illness.[19]

Programme content

The most popular programme content tends to involve practical skills and experiential learning (e.g. cooking sessions, accompanied supermarket trips, led walks), particularly when supported by incentives and supportive resources (e.g. pedometers, physical activity log, shopping and eating diaries, recipe cards, prizes). The 'eatwell plate'¹² resource was commonly used as the basis of dietary advice within sessions.

Maintenance and ongoing support

In order to encourage longer-term lifestyle change beyond the life of the programme, 'New life, New you' specifically designed its exercise programme to be delivered in existing community leisure facilities. A number of projects provide different levels of ongoing support for sustained lifestyle changes, including time-limited drop-in sessions and follow-up calls. The Cromwell House weight management programme for adults with severe mental illness offers open-ended support, and has found that this contributes significantly to the success of the programme (case study 7): ongoing attendance at the clinic was found to be the only statistical predictor of weight loss, while those who stop attending have re-gained the weight they lost.[16]

The Lighten Up project also provided programme completers with a maintenance pack, which included a voucher to purchase a set of digital weighing scales, a weight record card, plus 'hints and tips'.

Publicity

Finally, but importantly, a number of projects emphasised the need for widespread and varied publicity (including local radio and press, plus positive word-of-mouth) to raise awareness and encourage members of the target community to participate. 'New life, New you', for example, devoted significant resources to promoting the programme through a social marketing campaign. However, the extent to which this is a sustainable recruitment approach is questioned by the evaluation authors.

¹² <http://www.nhs.uk/Livewell/Goodfood/Pages/eatwell-plate.aspx>

Group specific facilitators

Feedback from the Lothian Gypsy and Travellers service suggests that universal leisure cards, i.e. not restricted to use within a single local authority area, may help to encourage participation in sports and other activities in this highly mobile population.

Structural facilitators also play a role in encouraging participation in physical activity among prisoners, with easy access to the gym identified as a positive aspect of prison life contributing to the success of the Keep Well in Prisons project. Personal facilitators are evident too, as those prisoners nearing the end of their sentence tend to be more motivated to engage in health improving activities so that they can enjoy time with their families following their release. Access to facilities in the prison setting may also help to support positive outcomes in a group of people who often have poor access to preventative services in the community.

The importance of providing crèche facilities was highlighted in the context of supporting participation in physical activity interventions targeted at South Asian Muslim women,[17] but may also apply for women in other groups.

4.2.3 Barriers

Barriers are again largely consistent with those found for screening interventions.

Poor links with other agencies

One voluntary sector project identified poor cooperation with the local primary care trust as a barrier to the sustainability of the service, despite excellent links with the local authority and local health services.

Interpersonal barriers

The disruptive nature of negative group dynamics and association with people who are not supportive of participants' efforts to make positive lifestyle changes can seriously hamper progress. The Weight Busters project attempted to overcome some of these problems by implementing a four week exit strategy for group members who were not motivated to lose weight, as this was impacting on group morale.

As described previously, carers of people with learning disabilities were included in some lifestyle programmes so as to educate them and enable them to provide appropriate support. There is some evidence that carers can be reluctant to intervene in the diet and activities of people with learning disabilities for fear of undermining principles of self-determination,[12] and

that the exclusion of carers from preventative programmes may increase risk of non-completion by participants.[18]

Lifestyle change as secondary concern

As for screening interventions, other priorities often take precedence among vulnerable and disadvantaged groups. The 10% Club in Plymouth, for example, reported a range of personal barriers to recruitment and sustained participation in the programme, including illness and medication, family crises and chaotic lifestyles. For some, including prisoners and adults with learning disabilities, certain 'unhealthy' foods are regarded as a rare personal pleasure in an otherwise difficult and stressful life, a pleasure they (or their carers) are reluctant to give up.

Costly adaptations

While acknowledging the importance of developing programmes and supporting materials that are appropriate and accessible for the target group, 'translating' resources and adapting content can be challenging and very time and resource intensive.

Cultural barriers

The fatalism that was described in section 4.1.4 in the context of screening interventions may also be relevant to preventative interventions. Other cultural norms may also create difficulties in designing and delivering programmes. For example, the Keep Well Gypsy and Travellers service in Lothian describe an 'all or nothing' (rather than small achievable steps) approach to lifestyle change and unfamiliarity with planning and goal setting among their target communities as some of the difficulties they have faced. Cultural attitudes towards overweight/obesity also throw up challenges where this is not considered undesirable or damaging to health. Similarly, low levels of physical activity among South Asian Muslim women and older people from this community have been attributed to cultural codes of conduct.[10,17] However, it is important to stress again that not all members of the same community will share the same attitudes towards adhering to cultural norms.

These challenges emphasise the importance of careful preparatory work, in partnership with members of the target community, before designing and implementing preventative interventions.

Structural barriers

As structural factors can contribute to the success of a preventative intervention, so they can create barriers for participants. For example, the rigid routines, regimens and physical limitations of prison life, combined with

perceived 'unattractive' healthy food options at mealtimes, can hinder prisoners' efforts to improve their diet or increase the amount of exercise they do.

Limited control over timing and content of meals, as well as access to activities, are barriers common to vulnerable adults living in any type of 'institutionalised' environment. This includes prisons and psychiatric hospitals as well as residential care homes for frail elderly people and adults with learning and/or physical disabilities.

Similarly, poor access to cooking facilities can be a major barrier to healthier eating at meal times among homeless people living in temporary accommodation.

Funding

Absence of sustainable funding sources was again cited as a common challenge facing the preventative projects included in this review. The cost of running high quality tailored programmes can be difficult to maintain when most funding is short-term in nature. Consequently, a number of projects had ended due to lack of resources, while others were making small charges for the services on offer. One project was considering training up volunteers, including successful participants, to deliver the programme at lower cost in future.

Group-specific barriers

A culture of 'therapeutic nihilism' in treating obesity and overweight in people with severe mental illness and learning disabilities, combined with 'diagnostic overshadowing' (whereby physical health is attributed as an inherent part of the person's illness), can create barriers to appropriate referrals to preventative interventions and treatments for these groups.[16,18] A recent literature review suggests that the rolling out of primary care health checks for people with learning disabilities may help to overcome some of these attitudes and help to educate GPs and practice nurses in the preventative health needs of this group.[9]

The Choosing the Chance to Change project found that DNA (did not attend) rates among adults with learning disabilities can be quite high without follow-up calls to remind them of session dates and times.

5 Summary of main themes

Despite a range of reported difficulties, evidence from the included projects and reviewed literature has demonstrated that it is possible to engage successfully with at risk individuals within disadvantaged and vulnerable communities and achieve positive health outcomes relevant to type 2 diabetes prevention. However, the effects are often small and evidence of longer-term outcomes is scarce.

Due to the nature of the available evidence on outcomes, it has not been possible to draw any firm conclusions about the most effective approaches to identifying type 2 diabetes risk and preventing progression to type 2 diabetes in the target groups. And no evidence was identified on the cost-effectiveness of these interventions.

Nevertheless, a number of common themes have emerged regarding successful approaches and barriers to delivery of type 2 diabetes risk assessment and preventative interventions among disadvantaged and vulnerable groups, as summarised below.

Successful approaches include:

- tailored and flexible approaches that are sensitive to the needs, ability and cultural or religious norms of the target group;
- involvement of the target community in design and evaluation of interventions;
- outreach delivery in convenient and appropriate local venues;
- effective inter-agency working to facilitate inward and outward referrals;
- methods of communication and resources that are accessible and understandable to the target group;
- practical and experiential learning;
- realistic, achievable goals;
- social support through group work and engagement with the wider community;
- sensitive, well-trained, dedicated delivery staff;
- ongoing support post-intervention;
- widespread, varied and targeted publicity.

Common barriers to engagement and positive outcomes include:

- poor inter-agency working;

- literacy and language difficulties;
- cultural and religious codes of conduct;
- low prioritisation of health relative to other, more pressing, issues;
- weak or unsupportive social networks;
- resource implications of costly programme adaptations;
- structural barriers, in the form of poor access to facilities to support ongoing lifestyle changes;
- highly mobile populations (e.g. travellers);
- lack of sustainable funding sources.

6 References

1. Diabetes UK. *Diabetes and the disadvantaged: reducing health inequalities in the UK*. World Diabetes Day 14 November 2006. A report by the All Parliamentary Group for Diabetes and Diabetes UK.
2. Holt R, Pevelert R, Byrne C. Schizophrenia, the metabolic syndrome and diabetes. *Diabetic Medicine*. 2004; 21: 515-523
3. Disability Rights Commission. *Equal treatment: closing the gap. A formal investigation into the physical health inequalities experience by people with learning disabilities/mental health problems*. 2006.
4. Mathews G, Alexander J, Rahemtulla T, Bhopal R. Impact of a cardiovascular risk control programme for South Asians (Khush Dil) on motivation, behaviour, obesity, blood pressure and lipids. *Journal of Public Health*. 2007; 29(4): 388-97.
5. Penn L, Lordon J, Lowry R, Smith W, Mathers J, Walker M, White M. Translating research evidence to service provision for prevention of type 2 diabetes: development and early outcomes of the 'New life, New you' intervention. *British Journal of Diabetes and Vascular Disease* (in press).
6. Szczepura A, Taggart F, Johnson M, Clay D, Hubbard W. *South Asians: Grey literature review of health promotion interventions to reduce risk of diabetes*. Centre for Evidence in Ethnicity, Health & Diversity (Warwick Medical School and De Montfort University). 2011.
7. Lindstrom J and Tuomiheto J. The diabetes risk score: a practical tool to predict type 2 diabetes risk. *Diabetes Care*. 2003; 26: 725-31
8. Wang Y, O'Donnell C, Mackenzie M, Reid M, Turner F, Clark J, Sridharan S, Platt S. *National Evaluation of Keep Well. Policy & Practice paper no. 4. Keep Well – Reach and engagement*. NHS Scotland. 2010.
9. Robertson J, Roberts H, Emerson E. *Health checks for people with learning disabilities: a systematic review of evidence*. Improving Health and Lives: Learning Disability Observatory. 2010. IHAL 2010-04.
10. Grace C, Begum R, Subhani S, Kopelman P, Greenhalgh T. Prevention of type 2 diabetes in British Bangladeshis: qualitative study of community, religious and professional perspectives. *BMJ* 2008;337:a1931.
11. Cordes J, Thünker J, Regenbrecht G, Zielasek J, Correll CU, Schmidt-Kraepelin C, Lange-Asschenfeldt C, Agelink MW, Kahl KG, Gaebel W, Klimke A, Hauner H. Can an early weight management program (WMP) prevent olanzapine (OLZ)-induced disturbances in body weight, blood glucose and lipid metabolism? Twenty-four and 48-week results from a 6 month randomized trial. *The World Journal of Biological Psychiatry*. July 2011 (Epub ahead of print)
12. Jinks A, Cotton A, Rylance R. Obesity interventions for people with a learning disability: an integrative literature review. *Journal of Advanced Nursing*. 2001; 67(3):460-71.
13. Maayan L, Vakhrusheva J, Correll C. Effectiveness of medications used to attenuate antipsychotic-induced weight gain and metabolic abnormalities: a systematic review and meta-analysis. *Neuropsychopharmacology*. 2010; 35: 1520-30.
14. Bushe C, Bradley A, Doshi S, Karangianis J. Changes in weight and metabolic parameters during treatment with antipsychotics and metformin: do the data inform as to potential guideline development? A systematic review of clinical studies. *International Journal of Clinical Practice*. 2009; 63(12): 1743-61.

15. Álvarez-Jiménez M, Hetrick S, González-Blanche C, Gleeson J, McGorry P. Non-pharmacological management of antipsychotic-induced weight gain: systematic review and meta-analysis of randomised controlled trials. *The British Journal of Psychiatry*. 2008; 193: 101-7.
16. Holt R, Pendlebury J, Wildgust H, Bushe C. Intentional weight loss in overweight and obese patients with severe mental illness: 8-year experience of a behavioural treatment programme. *Journal of Clinical Psychiatry*. 2010;71(6):800–805.
17. Carroll R, Ali N, Azam N. Promoting physical activity in South Asian Muslim women through ‘exercise on prescription’. *Health Technology Assessment*. 2002; 6(8).
18. Taylor J. *Healthy weight for adults with learning disabilities: a review of support and preventative services in Hackney (London)*. London School of Hygiene and Tropical Medicine MSc dissertation. 2009.
19. Eldridge D, Dawber N, Gray R. A well-being support program for patients with severe mental illness: a service evaluation. *BMC Psychiatry*. 2011; 11: 46.
20. Samsudeen B, Douglas A, Bhopal R. Challenges in recruiting South Asians into prevention trials: health professional and community recruiters’ perceptions on the PODOSA trial. *Public Health*. 2011; 125(4): 201-9.

APPENDIX 1: Targeted mail-out questionnaire

If you are reporting on more than one project, please complete and return a separate questionnaire for each. Alternatively, we would be happy to receive any relevant project or evaluation reports.

Please email all questionnaires and/or reports to prediabetes@nice.org.uk or post to: Jayne Taylor, NICE, 3rd Floor MidCity Place, High Holborn, London WC1V 6NA

Project details	
Q1 Project name	
Q2 Project start date	
Q3 Project end date (if relevant) - or state if ongoing	
Q4 Target group(s) Who is the intervention aimed at?	
Q5 Aims and objectives of the project Why was it set up? What is it trying to achieve?	

How is the project or intervention delivered?	
<p>Q6 Brief description of the project/intervention – what activities take place?</p> <p>Include nature and frequency of interaction with participants</p>	
<p>Q7 Location – geographical area where project/intervention takes place</p> <p>e.g. town, neighbourhood, estate</p>	
<p>Q8 Venue(s) intervention delivered from</p> <p>e.g. health centre, community venue, GP surgery</p>	
<p>Q9 Who is the project/intervention funded by?</p>	
<p>Q9a Please provide an estimate of the cost of the project/intervention</p>	
<p>Q10 Who manages the project? Which organisation(s) are they employed by?</p>	
<p>Q11 Please list the job roles of those involved in delivering the project or</p>	

intervention Include volunteers and lay workers	
What are the outcomes of the project or intervention?	
Q12 What outcome measures are recorded for those participating in the project or intervention? Please list <u>all</u> quantitative <i>and</i> qualitative outcome data that is collected <i>Outcome measures may include:</i> number of people targeted number of people attending numbers completing lifestyle changes made/goals achieved satisfaction with the intervention user experience	
Q13 Over what period are outcomes monitored? For how long are participants followed up?	
Q14 Has the project been evaluated? Please tick as appropriate	Yes <input type="checkbox"/> <i>If yes, please answer Q14a. Otherwise skip to Q15</i> No <input type="checkbox"/>
Q14a Was the evaluation carried out independently, by an external organisation? Please tick as appropriate	Yes <input type="checkbox"/> <i>If yes, please state organisation name:.....</i> No <input type="checkbox"/>

What are the outcomes of the project or intervention (continued)?

Q15 Please describe the outcomes of the project. How have participants benefited, if at all?

Please summarise all quantitative and qualitative outcomes – positive and negative

Please describe short, medium and long-term outcomes if available

Please describe any differences in outcomes between different groups of participants

If the project has been evaluated, please summarise results

Outcomes may include:

number of people targeted

number/proportion of target group(s) attending

number/proportion completing

number/proportion making lifestyle changes or achieving goals

levels of satisfaction with the intervention

What lessons have been learnt?	
Q16 What has worked well? What has been successful?	
Q17 What has worked less well? What has been less successful?	
Q18 How have problems been overcome?	
Q19 What advice would you give to others planning a similar intervention in their area?	
Further information	
Please list any reports that have been produced describing the outcomes of the project. If possible, please email reports to prediabetes@nice.org.uk or post to: Jayne Taylor NICE, 3 rd Floor MidCity Place, 71 High Holborn London WC1V 6NA	
Please list any websites that contain information about the project Please provide full website address	
Please provide contact details of person who can be contacted for further information	

THANK YOU VERY MUCH FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

Your response may be included in a piece of work to be considered alongside other evidence in the development of NICE guidance on preventing the progression of pre-diabetes to type 2 diabetes among adults in high risk groups

APPENDIX 2: Web resources consulted and broad search terms used

Electronic databases

NHS Evidence

www.evidence.nhs.uk

The Healthcare Management Information Consortium (Department of Health and King's Fund) – accessed through NHS Evidence

Social Policy and Practice (Ovid)

www.ovid.com/site/catalog/DataBase/1859.jsp

Websites

Local Government Improvement and Development (best practice examples)

www.idea.org.uk

Diabetes UK

www.diabetes.org.uk

NHS Health Check (case studies)

www.healthcheck.nhs.uk/CaseStudies.aspx

National Diabetes Information Service

<http://ndis.ic.nhs.uk> and www.diabetes.nhs.uk

Scottish Government and NHS Health Scotland

www.scotland.gov.uk

NHS Health Scotland

<http://www.healthscotland.com/>

National Diabetes Information Clearing House (U.S.)

<https://diabetes.niddk.nih.gov/>

National Institute of Diabetes and Digestive and Kidney Disease (U.S.)

www2.niddk.nih.gov/

Health Observatories (specialist topics)

www.yhpho.org.uk (diabetes)

www.mentalhealthobservatory.org.uk/mho/ (mental health)

www.nepho.org.uk/topics/Offender%20Health (prisoners)

www.lho.org.uk/LHO_Topics/National_Lead_Areas/EthnicHealthIntelligence.aspx

(minority ethnic groups)

www.wmpho.org.uk/topics/page.aspx?id=454 (older people)

Social Care Institute for Excellence

www.scie.org.uk

Improving Health and Lives: learning disability observatory

www.improvinghealthandlives.org.uk

Offender Health Research Network

www.ohrn.nhs.uk

Age UK

www.ageuk.org.uk

Search terms

diabet* / glucose

obes* / weight

physical activity / exercise

diet*

lifestyle

poverty / disadv* / depriv*

disab*

elderly / older people / older adult*

mental*

ethnic*

faith / religio*

traveller* / gyps*

prison* / offend*

refugee / asylum / migra*

homeless

APPENDIX 3: Included literature/systematic reviews

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
<p>Jinks A <i>et al</i> (2011) Obesity interventions for people with a learning disability¹³</p>	<p>Effectiveness and experiences of non-surgical, non-pharmacological interventions to promote weight loss in obese adults (age 16+) with a learning disability</p> <p>Quantitative and qualitative study designs</p> <p>English language studies published 1998-2009</p>	<p>Integrative literature review</p> <p>Databases searched: CINAHL, Proquest, Medline (PubMed), PSYCHINFO databases, Cochrane Library. Plus hand searching of references and key journals studies</p> <p>12 papers selected for inclusion following screening</p>	<p>Most studies involved education approaches, 3/12 included a behavioural element and 2/12 practical skills (e.g. supermarket visits, food preparation and tasting sessions)</p> <p>Reduction in BMI achieved in 8/8 studies where used as outcome measure, however not all reported as statistically significant</p> <p>Improved fitness and activity levels reported in 3/5 studies.</p>	<p>Meta-analysis not conducted due to study heterogeneity</p> <p>8/12 studies conducted in USA, 4/12 in UK</p> <p>Limitations identified by the authors include: methodological quality of included studies (small sample sizes, lack of controls, limited follow-up), short duration of intervention, lack of information on attrition rates</p>

¹³ Jinks A, Cotton A, Rylance R, Obesity interventions for people with a learning disability: an integrative literature review. *Journal of Advanced Nursing*. 2011; 67(3):460-71.

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
Robertson <i>et al</i> (2010), Health checks for people with learning disabilities ¹⁴	Effectiveness of health checks for people with learning disabilities Included studies=peer reviewed, all study designs, any outcome English language studies published 1989-2010	Systematic review and narrative synthesis Databases searched: Medline, CINAHL, Web of Science, PsycINFO, plus in press/grey literature search via a specialist health research group 38 studies (5000+ subjects) selected for inclusion following screening (3 RCTs, 1 non-randomised matched control study, one pooled analysis)	Health checks do help detect unmet health needs in people with learning disabilities (including overweight/obesity and other diabetes risk factors) and can lead to targeted actions to meet those needs. Limited evidence suggests weight loss can be sustained following dietary management In one nurse led screening service, total cost= £4,080 or £82 per person (fixed costs account for half of this figure)	Studies not excluded on basis of methodological quality Variable methodological quality (primarily case series, case studies, audit/analysis of medical records and questionnaire/interview surveys) Mostly very small samples and limited follow-up. 6 studies from Australia, 5 from U.S., 1 from New Zealand Meta-analysis not appropriate/possible due to substantial heterogeneity in screening delivery methods, outcomes, study design and subjects

¹⁴ Robertson J, Roberts H, Emerson E, *Health checks for people with learning disabilities: a systematic review of evidence*. Improving Health and Lives: Learning Disability Observatory. 2010. IHAL 2010-04.

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
<p>Taylor J (2009), Healthy weight for adults with learning disabilities [Multi-method approach, including rapid evidence review plus qualitative research with carers, commissioners and healthcare staff]¹⁵</p>	<p>Descriptive rapid evidence review of interventions which aim to support overweight/obese adults with learning disabilities to lose weight Primary outcomes: weight loss, BMI reduction All study designs included</p>	<p>Databases searched: PsycInfo, Global Health, Medlin, Embase, Database of Abstracts of Reviews of Effects Other sources: NHS Evidence (Learning Disability specialist collection), UK Health and Learning Disability Network, national policy documents Three review papers and three intervention studies included following screening</p>	<p>Effective approaches: combination of dietary education and physical activity sessions; use of activities which can be easily continued post-intervention and which offer opportunities for social interaction Lack of carer involvement increases risk of programme non-completion Amount of weight loss tends to be small and not always statistically significant No evidence on cost or cost-effectiveness</p>	<p>Methodological weaknesses of included studies: small samples, lack of controls, poor adjustment for confounding Substantial heterogeneity across studies; difficult to generalise Search, screening and quality assessment all carried out by a single researcher</p>

¹⁵ Taylor J. *Healthy weight for adults with learning disabilities: a review of support and preventative services in Hackney*. London School of Hygiene and Tropical Medicine, MSc Dissertation. 2009.

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
<p>Maayan <i>et al</i> (2010), Effectiveness of medications used to attenuate antipsychotic-related weight gain and metabolic abnormalities¹⁶</p>	<p>Effectiveness of weight reduction medication in treating antipsychotic-related weight gain</p> <p>Included studies=placebo-controlled RCTs (double-blind and open label), primary outcomes change in body weight and BMI, secondary outcomes include changes in glucose</p>	<p>Systematic review and meta-analysis</p> <p>Databases searched: MEDLINE, Web of Science, PsycNET, EMBASE, plus hand searching of references.</p> <p>32 studies (1482 patients) selected for inclusion following screening</p>	<p>Weighted mean difference (WMD) body weight= -1.99kg (95% CI -2.77 to -1.2).</p> <p>Largest effects for younger/less chronic patients</p> <p>Greatest reported weight loss for metformin (WMD= -2.94kg (-4.89 to -0.99), but CIs overlap for all agents compared across different studies</p> <p>Blood glucose outcomes inconsistent across different studies/agents</p> <p>Significant heterogeneity reported.</p>	<p>Selected studies from wide range of different countries – applicability to UK unclear</p> <p>Main methodological weaknesses identified by authors: paucity of RCTs for some agents, short follow-up periods (mean trial duration 13.1 weeks, range 6-16)</p>

¹⁶ Maayan L, Vakhrusheva J, Correll C, Effectiveness of medications used to attenuate antipsychotic-related weight gain and metabolic abnormalities: a systematic review and meta-analysis. *Neuropsychopharmacology*. 2010; 35: 1520-30.

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
<p>Bushe <i>et al</i> (2009), Changes in weight and metabolic parameters during treatment with antipsychotics and metformin¹⁷</p>	<p>Effectiveness of metformin for non-diabetic patients on antipsychotic treatments in reducing weight gain or improving metabolic parameters</p> <p>Included studies=double blind and open-label clinical studies, primary outcome weight change (loss or attenuation)</p> <p>English language studies only</p>	<p>Systematic review and narrative synthesis</p> <p>Databases searched: Biosis Previews, Current Contents, Embase, Medline</p> <p>11 studies selected for inclusion following screening</p>	<p>Significant adult weight loss/BMI reduction associated with metformin in 3 RCTs and 1 open label study. In 3 adult studies, glucose parameters were significantly improved in patients prescribed metformin relative to controls.</p> <p>In one study where metformin directly compared to lifestyle and dietary interventions, metformin superior but combined intervention most effective</p> <p>Greatest improvements in weight and glucose parameters in studies of patients with first-episode schizophrenia</p>	<p>Three studies in patients under 18 years. No adult study involved a Caucasian population.</p> <p>No UK studies. Five studies conducted in Venezuela by same investigator.</p> <p>Subjects almost exclusively diagnosed with schizophrenia and on a single antipsychotic agent (olanzapine)</p> <p>Methods for selecting studies, publication dates for inclusion not described.</p> <p>Meta-analysis not appropriate due to significant heterogeneity across studies and subjects</p> <p>Short follow-up (8-16 weeks)</p> <p>Results from 8/12 studies confounded by parallel weight and lifestyle intervention programmes</p>

¹⁷ Bushe C, Bradley A, Doshi S, Karagianis J. Changes in weight and metabolic parameters during treatment with antipsychotics and metformin: do the data inform as to potential guideline development? A systematic review of clinical studies. *International Journal of Clinical Practice*. 2009; 63(12): 1743-61.

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
<p>Alvarez-Jimenez <i>et al</i> (2008), Non-pharmacological management of antipsychotic-induced weight gain¹⁸</p>	<p>Effectiveness of non-pharmacological adjunctive interventions aimed at preventing or controlling antipsychotic-induced weight gain, compared to standard care or active comparator intervention. At least 75% of patients diagnosed with schizophrenia-spectrum disorders.</p> <p>Included studies=RCTs, primary outcomes mean change body weight and BMI at intervention end</p> <p>No language restriction</p>	<p>Systematic review and meta-analysis</p> <p>Databases searched: Cochrane Central Register of Controlled Trials, Medline, EMBASE, PsycINFO, CINAHL, UMI Proquest Digital Dissertations, SCI-EXPANDED, SSCI, Information Arts and Humanities Citation Index, registers of ongoing clinical trials, plus hand searching of references and key journals</p> <p>10 studies (482 patients) selected for inclusion following screening</p>	<p>Weighted mean difference (WMD) body weight=-2.56kg (95% CI -3.2 to -1.9, p<0.001); WMD BMI=-0.91kg/m² (-1.13 to -0.68, p<0.001)</p> <p>Weight loss sustained/increased at follow-up (2-3 months).</p> <p>Results robust to inclusion/exclusion of lower quality studies and modelling approach</p> <p>Sub-group analysis found no difference between individual vs. group interventions, behavioural v nutritional approaches, prevention v weight control target, recent onset v chronic schizophrenia subjects</p>	<p>Selected studies from Europe, Asia, USA, Australia</p> <p>Methodological weaknesses identified by authors include possibility of biased results due to poor reporting on some important aspects of design, plus non-randomised sub-group analysis</p> <p>Short follow-up (8 weeks to 6 months intervention period, 3 studies included follow-up 2-3 months post intervention)</p>

¹⁸ Álvarez-Jiménez M, Hetrick S, González-Blanch C, Gleeson J, McGorry P. Non-pharmacological management of antipsychotic-induced weight gain: systematic review and meta-analysis of randomised controlled trials. *The British Journal of Psychiatry*. 2008; 193: 101-7.

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
<p>Szczepura <i>et al</i> (2011), Grey literature review of health promotion interventions to reduce risk of diabetes in South Asians¹⁹</p>	<p>Rapid review of grey literature sources</p> <p>Included studies: lifestyle/behaviour change interventions in South Asian populations to reduce diabetes risk; staff awareness-raising interventions</p> <p>Children as well as adults</p> <p>Published reviews from 2000</p>	<p>Sources: university higher degree theses, bibliographies of published reviews, South Asian search engines and journals, websites and other electronic sources, research in progress, expert testimony</p>	<p>Lack of consistent evidence on effectiveness or cost-effectiveness of interventions. Focus tends to be on general health, not diabetes-specific. Most projects focus on weight management, often with a prior screening stage. Screening can be an effective motivator for lifestyle change.</p> <p>Effective physical activity interventions: family and community walks, single sex gyms for women.</p> <p>Effective dietary interventions: whole community education, family-based interventions, recipes tailored to food preferences, traditional cuisine and religious food observance.</p> <p>Facilitators: tailored, simple messages, visual and experiential methods, goals and targets, small changes, non-judgemental culturally sensitive staff.</p> <p>Barriers: language, cost, religious and cultural practices.</p>	<p>A major limitation of the included studies as identified by the authors is the retrospective, poor or incomplete nature of most intervention evaluations</p>

¹⁹ Szczepura A, Taggart F, Johnson M, Clay D, Hubbard W. *South Asians: Grey literature review of health promotion interventions to reduce risk of diabetes*. Centre for Evidence in Ethnicity, Health & Diversity (Warwick Medical School and De Montfort University). 2011.

Study	Review question, inclusion/exclusion criteria	Search methods	Main findings	Comments
Carroll R <i>et al</i> (2002), Promoting physical activity in South Asian Muslim women through 'exercise on prescription' ²⁰	Aim=to gather knowledge to develop a theoretical framework for the development of pilot intervention Selection criterion= paper adds knowledge that may be useful for theoretical framework	Broad, but focused, review of empirical and conceptual literature Databases searched: MEDLINE, HMIC, Cochrane Library, ERIC, British Education Index, Sports Discus.	Low levels of physical activity among S Asian Muslim women. Barriers are similar to those faced by general population, but also influenced by cultural norms of behaviour and language difficulties. Very few exercise on prescription schemes targeted at this group, but evidence that they have the potential to increase exercise participation.	Authors argue that it would not be appropriate to conduct full systematic search due to breadth and focus of review (i.e. not confined to empirical studies) Methods for selecting studies, publication dates for inclusion and number of studies retrieved not described

²⁰ Carroll R, Ali N, Azam N, Promoting physical activity in South Asian Muslim women through 'exercise on prescription'. *Health Technology Assessment*. 2002; 6(8).

APPENDIX 4: Project summaries

Table A1 Prisoners

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
Keep Well in Prisons (May 2010 to March 2012) CASE STUDY	Prisoners: age 35+ convicted/sentenced to 6+ months, all Scottish adult prisons	Cardiovascular screening by peripatetic nursing team, appropriate health/social interventions, plus follow-up care as required	Descriptive/qualitative evaluation of process and screening outcomes ²¹ Evaluation period May to Oct 2010	<ul style="list-style-type: none"> - Good engagement (1312/1890 (65%) attended on first invite) - dietary, exercise and weight management needs identified - 2010-11 budget=£384,000 (funded by Scottish government); actual spend=£135 per health check plus additional costs to prison service (not quantified)

²¹ Sharp C, McConville S, Martin C et al. *Evaluation of Keep Well in Prisons*. 1 April 2001. NHS Health Scotland.

Table A2 Minority ethnic/faith groups (primarily S Asian)

Project name	Target group	Intervention	Evaluation details	Outcomes
Diabetes UK SE Region/NHS Surrey Early Identification Project – screening activity in a mosque (May to August 2010)	Woking mosque attendees	Risk assessment using Diabetes UK Risk Tool (medium/high risk referred to GP for further tests) plus lifestyle advice	Descriptive report of screening activity and outcomes	<ul style="list-style-type: none"> - 27/38 (71%) assessed as moderate/high risk and referred to GP - [similar results more recently following screening in a Gurdwara – 80%+ identified as high/moderate risk]
NHS North East Essex: Health checks at a Colchester Mosque (September and October 2010)	South Asian men, primarily age 40+	NHS Health Check: initial health screen for diabetes and risk factors including BMI, waist circumference, blood pressure, plus HbA1c.	Descriptive report of screening activity and outcomes of two screening events	<ul style="list-style-type: none"> - 18 eligible for full NHS Health Check: 4/18 obese (BMI\geq27.5kg/m² for S Asian men); 9/18 large waist circumference (\geq90cm for S Asian men); HbA1c =5.7% to 6.4% in 6/18 (HbA1c \geq6.5% in 6/18, \leq 5.7% in 2/18, missing data for 4/18); 10/18 did not meet government recommended guidelines for physical activity (30+ minutes moderate exercise daily) - 14/18 given advice on diet and/or exercise, 6/18 referred to weight management service
Seek Diabetes, East Midlands (May to December 2009)	South Asian adults living in East Midlands	Screening at 10 community events including random blood glucose tests – ‘borderline’ results re-tested, ‘high’ referred to GP	Descriptive report of screening activity and outcomes	<ul style="list-style-type: none"> - 104/905 adults identified as ‘borderline’ diabetes, 44 with ‘high’ score (i.e. undiagnosed disease)

Table A2 Minority ethnic/faith groups (primarily S Asian) (continued)

Project name	Target group	Intervention	Evaluation details	Outcomes
Apnee Sehat (“Our health”), Coventry	South Asian communities	GP and self-referral to healthy lifestyle seminars; opportunistic screening for risk factors at religious festivals; signposting to physical activity opportunities (including women only gym); culturally appropriate health promotion resources	Descriptive reporting of screening outcomes; feedback from participants	<ul style="list-style-type: none"> - 76% of those screened had abnormal results for blood pressure, blood glucose or cholesterol and advised to see GP [size of screened population not available] - Self-reported improvements in knowledge of healthy eating and lifestyle changes made
Khush Dil (“happy heart”), Edinburgh (June 2002 to July 2004) CASE STUDY	South Asian adults living in North East Edinburgh	Community based screening for risk factors (anthropometric and clinical measures, plus combined risk score based on CALM heart questions/Framingham equation), one-to-one nutritional support, plus practical activities (e.g. cookery and exercise sessions)	Before and after study, comparing baseline with 6-12 month follow-up N=304 (screened at baseline)	<ul style="list-style-type: none"> - 140/304 returned for follow-up - 66/140 increased physical activity to moderate levels (17/140 reduced their level of physical activity); over half of women reported using more ‘healthy’ cooking methods - statistically significant improvements in weight (mean loss 0.61kg, 95% CI 0.22 to 1.02), blood pressure (reduction in mean systolic BP=3.7mm Hg, 0.98 to 6.7; reduction in mean diastolic BP=3.15mm Hg, 1.5 to 5.08), triglycerides (mean reduction=0.29mmol/l, 0.14 to 0.47), and combined risk score (male mean score reduction 28.22 to 18.14 (p<0.0005); female mean score reduction 27.68 to 20.88 (p<0.0005)). - A £50,000 grant funded the project

Table A3 Low income/deprived areas

Project name	Target group	Intervention	Evaluation details	Outcomes
Keep Well Scotland (since 2006)	Age 45-64 registered with GP practices in areas of highest deprivation	Anticipatory care approach – free screening/health check in primary care setting, combined with appropriate health/social interventions based plus follow-up	Mixed methods national evaluation of wave 1 pilot sites - documentary analysis, feedback from patients/staff, descriptive analysis of service activity data, case studies	<ul style="list-style-type: none"> - Reach: 60,804 contacted across 3 pilot sites; significant minority live in less deprived areas despite targeting - Engagement: 59% attended for health check (range 52% to 70%); women more likely to attend (54.3% to 74.8% vs. 51.8% to 66% of men); older people more likely to attend (e.g. at one pilot site attendance rates twice as high among in 60+ vs. age 45-49); attendance rates fall with levels of area deprivation (52% to 70% in lowest quintile vs. 55% to 78% in highest quintile)*; outreach can improve engagement even in most deprived areas.
NHS N E Essex Jobcentre Plus (JCP) Health Check (February 2010, 2 week period)	Registered JCP claimants	NHS Health Check: measurement of BMI, waist circumference, blood pressure, random blood cholesterol and blood glucose, family history disease, physical activity; referral to GP for further testing/treatment as appropriate; QRISK score calculation. Plus: handed out free fruit and vegetables; limited number of free leisure centre membership places.	Descriptive reporting of screening activity and outcomes	<ul style="list-style-type: none"> - 98 eligible clients received full NHS Health Check and relevant lifestyle advice; 10 year cardiovascular QRISK scores: 4/98 20%+ (high risk), 18/98 10-19%, 29/98 5-9%, 47/98 <5% - 81% expressed motivation to make lifestyle changes as a result

* Lowest quintile refers to poorest 20%; highest quintile to most affluent 20%.

Table A3 Low income/deprived areas (continued)

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
Happy Hearts, Nottingham ²² (October 2007 to June 2009)	Adults aged 40-74 registered with GP practices located in the most deprived 40% areas of the city	risk assessment: age, gender, smoking status, total cholesterol/HDL cholesterol ration, systolic blood, blood sugar levels, BMI. Plus goal-setting to address risk factors, signposting to prevention service, or referral to GP if 10 year risk \geq 20%. Screening in GP practices and community locations following invitation letter.	Descriptive process evaluation plus analysis of screening activity and outcomes data	<ul style="list-style-type: none"> - 2154/3518 attended initial risk assessment (61%) - risk \geq 20% in 1352/2064 (missing data for 90/2154); 526/2064 obese; 131 referred to Health Trainers, 192 to physical activity advisors - Cost per risk assessment = £44 (GP practice), £83 (community-based) – but these are likely to be underestimates
10% Club, Plymouth (ongoing)	Primary focus: adults with BMI 30-35kg/m ² living in areas of high deprivation	Free 10 week healthy lifestyle programme, including education on nutrition and exercise, practical skills, behaviour regulating techniques, interactive sessions. Also provided with a pedometer plus activity log to monitor progress. Emphasis on losing 10% of body weight by end of programme.	Descriptive analysis of project monitoring data.	<ul style="list-style-type: none"> - Number participants per group=6-12; most lose between 3 and 7kg in weight and report increased physical activity levels; before and after assessment shows improved knowledge of healthy lifestyle

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<http://system.improvement.nhs.uk/ImprovementSystem/ViewDocument.aspx?path=Cardiac%2fNational%2fWebsite%2fNHS%20Health%20Check%2fHappy%20Hearts%20Evaluation%20Document%2026.2.10.pdf>

Table A3 Low income/deprived areas (continued)

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
Lighten Up, South Birmingham (start date January 2009)	Adults with BMI≥30kg/m2 living in deprived areas (83% participants in PCT deprivation quintile 1 or 2)	Call centre directed and managed referrals to a 12 week programme at a choice of existing local weight management services, purchased using NHS funded voucher. Call handlers also provide limited practical and non-judgemental support (based on a successful local smoking cessation model). 5% target weight loss at 12 weeks and maintenance at 12 months.	Descriptive analysis of project monitoring data. RCT compared effectiveness of different weight management programmes.	<ul style="list-style-type: none"> - 5240 accessed service in first 18 months (mean baseline BMI=34kg/m2); average 12 week weight loss=3.6% (n=4837), average 12 month weight loss=5.1% (n=3143); 74% still in contact with call centre at 18 months - RCT reported greatest weight loss effect among Weightwatchers participants; PCT provided programmes were highest cost and least effective. - Total cost=£68 per patient per year (funded by NHS South Birmingham)

Table A3 Low income/deprived areas (continued)

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
New Life, New You, Middlesbrough (pilot) (since April 2009, ongoing) CASE STUDY	Adults age 45-65 on low incomes	Social marketing, type 2 diabetes risk assessment (based on FINDRISC) and 10 week programme of supported group- based physical activity for those with FINDRISC score >11 (FINDRISC 7-11 allocated discount vouchers for local activities, FINDRISC>20 advised to contact GP)	Before and after study ²³ N=217 (recruited, first cohort); 166 10 week programme	<ul style="list-style-type: none"> - 217 recruits (159 female, 58 male): 166/217 with FINDRISC score 11-20 (mean FINDRISC score all recruits=13.2, SD 3.3) - 133/166 completed 10 week programme (80%), 116 assessed at 6 months - 6 month mean weight loss among those on 10 week programme=2.5kg (95% CI 1.7-3.4); mean waist circumference reduction=5.7cm (4.6-6.8); mean physical activity increase*=6.2 MET-hour/day (5.2-7.2) - unpublished data suggest positive changes are increased/sustained at 12 months, plus improvements in FINDRISC score
Slimmers' Kitchen, Dudley (2006 to 2008)	Age 18+ living in 40% most deprived wards with BMI>30 kg/m ² (27.5 Asian) or BMI>28 kg/m ² with co-morbidities (23.5 Asian)	12 week programme nutritional advice and practical cookery sessions/led walks. Focus on weight loss with maintenance– 5% end-of-programme weight loss target.	Descriptive analysis of project monitoring data	<ul style="list-style-type: none"> - In 2009/10: 5 groups, 54 referrals, 47 started, 29 completed programme; average weight loss 3.3kg, 2.4cm waist circumference; 7/47 completers lost ≥5% of starting weight - Set-up costs=£1,200; running costs £823 per group (PCT funded)

²³ Penn L, Lordon J, Lowry R, Smith W, Mathers J, Walker M, White M. Translating research evidence to service provision for prevention of type 2 diabetes: development and early outcomes of the 'New life, New you' intervention. *British Journal of Diabetes and Vascular Disease* (in press)

Table A3 Low income/deprived areas (continued)

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
Weight Busters, Nuneaton/Bedworth (start date September 2008)	Primary focus adults with BMI≥30 and living in deprived areas	Weekly weight management programme, including weekly weigh-in. 5% target weight loss.	Descriptive reporting of attendance data	<ul style="list-style-type: none"> - 385 members as of June 2010, 215 of whom had lost weight; 29/385 lost 10% starting weight, 69/385 lost 5% starting weight - £50 per class (funded by Warwickshire county council); £1.50 contribution from participants for exercise sessions

*metabolic equivalent tasks (MET)-hour/day

Table A4 Gypsy and traveller communities

Project name	Target group	Intervention	Evaluation details	Outcomes
Keep Well Gypsy & Traveller Outreach Service, Lothian (January to December 2010) CASE STUDY	Gypsies & travellers, target age 35+ authorised and unauthorised sites	Cardiovascular screening, appropriate health/social interventions, plus follow-up care as required	Descriptive analysis of service monitoring data and feedback from participants	<ul style="list-style-type: none"> - 113 age-eligible adults received full KW screen (8 DNA, 25-30 declined): 54% male - complete clinical data available for N=90: 70% men and 50% women obese (BMI\geq30kg/m²); 18/39 men and 13/30 women met criteria for metabolic syndrome* (many more meet 2 out of 3 criteria); 13/88 had ASSIGN cardiovascular risk scores above 20% cut-off for treatment - heavy reliance on take-away food (5+ times per week) and very high intake 'full sugar' drinks - case study examples of sustained positive lifestyle changes (see case study 5)
Keep Well Gypsy & Traveller Service, Lanarkshire (start date summer 2009)	Gypsies & travellers, target age 35-64 years	As above	Process evaluation of staff experience and views – group interview approach	<ul style="list-style-type: none"> - 90/145 aged 35-64 and received full KW health screen (18/145 age 16-34, 40/145 age 65+) - <i>no screening outcome data reported</i>

* Metabolic syndrome is defined here as 3+ of the following: increased waist circumference, elevated Triglycerides, low HDL cholesterol, elevated blood pressure/on treatment for blood pressure, elevated fasting glucose (e.g. IGT/IFG).²⁴ Metabolic syndrome is associated with insulin resistance leading to type 2 diabetes.

²⁴ SIGN 97. Risk estimation and the estimation of cardiovascular disease: a national clinical guideline (<http://www.sign.ac.uk/pdf/sign97.pdf> - accessed 28.06.11).

Table A5 Refugees, asylum seekers, recent migrants

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
<p>Casa de la Salud Hispano Americana (CASAHA) 50 Plus Health Initiative (July 2004 to August 2006)</p>	<p>Over 50s Latin American community in Greater London and their dependents</p>	<p>Various activities to increase awareness of type 2 diabetes, improve diet and fitness, improve access to mainstream health services - one-to-one drop-in health advice, health promotion seminars/workshops on diabetes prevention, opportunistic diabetes risk scoring (including glucose test), physical activity programme, outreach services, plus social and cultural events</p>	<p>Descriptive report of service activity data plus feedback from a sample of participants</p>	<ul style="list-style-type: none"> - 500 people registered, 50 used on regular basis; more than 2000 people reached through programme, 50% of whom identified to be at highest risk of type 2 diabetes on basis of obesity/overweight and family history - of 50 attendees who responded to survey, half were now participating in regular activity 3x per week on programme; 85% reported feeling healthier as a result of taking part in programme - £62,000 total cost (funded by Dunhill Medical Trust and London Borough of Haringey)

Table A6 Learning disabilities

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
Choosing the Chance to Change, Westminster (since March 2008, ongoing)	Adults with learning disabilities who are overweight/obese	8 week programme to educate participants about healthy eating and physical activity, including experiential learning (supermarket visit, exercise sessions). Pedometer provided to measure weekly steps. Personal goal-setting. Carers invited to attend. Weight loss not main focus, but encouraged.	Descriptive reporting of service monitoring data at start/end of each programme – data reported for intake 4 & 5 (2010)	<ul style="list-style-type: none"> - 11/17 completed programme (intakes 4 & 5); mean reduction waist circumference to end of programme=3.85cm (mean baseline measurement 116cm, range 97-137)); mean BMI loss=0.49 (mean baseline value 35kg.m², range 25-44); 6/11 lost weight during 8 week period - Of those who completed programme, all but two reported increased levels of physical activity
Fit for Life, North Devon (since May 2008, ongoing)	Adults with learning disabilities with low levels of physical activity	Tailored programme of weekly exercise sessions for adults with learning disabilities, plus A4 Healthy Living calendar with tips for healthy living/eating and 'Keep Fit' DVD to support home exercise	Descriptive reporting of service activity data	<ul style="list-style-type: none"> - Over 40 participants so far; 18-20 now attend regularly - In first year, all progressed from very basic level of fitness to being able to complete an hour of continuous exercise; 2 participants recruited fitness instructor as personal trainer and lost 'considerable' amount of weight and developed fitness levels 'far exceeding expectations'²⁵ - £2.50 charge per group (initially fully funded)

²⁵ Howe P and Hancox L, Fit for life: promoting healthy lifestyles for adults with learning disabilities. *Nursing Times*. 2010; 106(31):14-15.

Table A6 Learning disabilities (continued)

Project name	Target group	Intervention	Evaluation details	Outcomes/cost
Learning disability diabetes prevention group, Sandwell (2008 to 2010)	Adults with learning disabilities who either have diagnosed diabetes or impaired blood glucose regulation	Fortnightly group education and interactive sessions – including introduction food preparation, carbohydrate/calorie counting, exercise, 'weigh-ins'. Carers invited to one of the sessions.	Descriptive report of service activity data and feedback from participants	<ul style="list-style-type: none"> - 20/30 attendees had impaired blood glucose - Positive feedback from participants, particularly on the food preparation sessions
Slimmers' Kitchen, Dudley (piloted November 2010, main programme now being rolled out) CASE STUDY	Age 18+ with mild to moderate learning disability and overweight/obese, living in deprived areas	Adaptation of generic 12 week Slimmers' Kitchen model (see table A3), supplemented with 6 week healthy eating foundation course prior to start of programme. 5% weight loss target set.	Before and after analysis of pilot outcomes	<ul style="list-style-type: none"> - Pilot study (6 week programme): 11/11 completed and achieved personal goals; 3/11 continuing to participate in walking activity; 4/11 using healthy recipe options; 1/11 lost ≥5% starting weight, 2/11 lost >2.5% (4/11 no weight loss); mean BMI reduction=1kg/m² (mean baseline BMI=36.9, range 30-47.8 (N=9)); 2/11 lost over 1 stone in weight (1 during/1 post programme) - Annual cost in first 2 years approximately £2,500 (3 programmes per year); predict ongoing running costs to be less than £1,000 p.a.

Table A7 Severe mental illness (SMI)

Project name	Target group	Intervention	Evaluation details	Outcomes
Cromwell House Weight Management Clinic, Manchester (since May 2000) CASE STUDY	Adults with SMI receiving psychotropic medication, concerned about their weight and able to self-refer to clinic	Weekly group session involving weigh-in, 15 minute facilitated group discussion/feedback, 30 minute 'rotational' topics (healthy eating, self-esteem, meal planning/demonstrations, motivation, evaluation, other topics as required). Plus 'dietary experience' diary.	Before and after study – 8 years data ²⁶	<ul style="list-style-type: none"> - 113 enrolled on programme (46 male/67 female); 142 patient episodes (mean age 43.8±1.7 years; 89 schizophrenia, 23 affective disorder, 1 brain injury); 35% drop-out at 3 months; 50% at 1 year - Mean final weight loss=7.2±0.6kg; 61% (N=64) achieved 'clinically significant' (7%) weight loss at 1 year; continued statistically significant reduction in mean weight, BMI and % weight loss for duration of study; weight loss correlated with number of sessions attended - Unpublished 10 year data shows that progressive statistically significant reductions in mean weight and BMI have continued, with no suggestion of a plateau

²⁶ Holt R, Pendlebury J, Wildgust H, Bushe C. Intentional weight loss in overweight and obese patients with severe mental illness: 8-year experience of a behavioural treatment programme. *Journal of Clinical Psychiatry*. 2010;71(6):800–805

Table A7 Severe mental illness (SMI) (continued)

Project name	Target group	Intervention	Evaluation details	Outcomes
<p>Well-being Support Programme</p> <ul style="list-style-type: none"> - Pilot programme involved 7 mental health trusts across England and Wales (2003-2005) - Locally adapted programme example, Kent (2006-2008) 	<p>Patients with SMI who took up invitation to enrol in the programme</p>	<p>National pilot: 6 nurse advised individual consultations in a secondary care setting over a 2 year period, targeting cardiovascular risk factors; consultations included initial basic health check and lifestyle assessment, clinical measurements (including random blood glucose), basic health education, follow-up consultations; plus weekly weight management/physical activity groups, or referral to GP or specialist, as appropriate.</p> <p>Kent adaptations to national pilot programme: delivery by trained mental health practitioners; 4 individual consultations over a 1 year period</p>	<p>Before and after service evaluation – 2 year follow-up (national pilot)²⁷ and 1 year follow-up (Kent programme)²⁸</p>	<p>National pilot:</p> <ul style="list-style-type: none"> - 966 enrolled on programme (51% male); high prevalence of obesity, hypertension, smoking, poor diet and lack of exercise at baseline; 20% drop-out rate at 2 years (drop-outs more commonly male, older and with lower BMI) - Improvements in weekly physical activity (mean difference 37.4 minutes (95% CI 28.4-46.4)) and diet (poor diet* in 68/720 (8.0%) at 2 year follow-up vs. 304/893 (32%) at baseline); no change in BMI; weight loss in 42.4%, weight gain in 30.8%, no change in 26.8%; significant improvements in self-esteem <p>Adapted Kent programme:</p> <ul style="list-style-type: none"> - 754 enrolled on programme (56% male), c.3% of service caseload; 79% drop-out rate at 1 year (drop-outs had lower BMI and healthier diet on average) - No significant change in BMI (reduced in 15/23 completers, increased in 8/23); no significant changes in physical activity, quality of diet or self-esteem

*Based on nurse assessment of low fibre, high calorie and high fat diet over one week

²⁷ Smith S, Yeomans D, Bushe CJP, Eriksson C, Harrison T, Holmes R, Mynors-Wallis, Oatway H, Sullivan G. A well-being programme in severe mental illness. Reducing risk for physical ill-health: a post-programme service evaluation at 2 years. *European Psychiatry*. 2007; 22(7): 413-418

²⁸ Eldridge D, Dawber N, Gray R. A well-being support programme for patients with severe mental illness: a service evaluation. *BMC Psychiatry*. 2001; 11: 46

Table A8 Homeless

Project name	Target group	Intervention	Evaluation details	Outcomes
<p>NHS N E Essex Health Check in Temporary Accommodation (26-30 July, 16-20 August 2010)</p>	<p>Residents of temporary accommodation in Colchester age 40+</p>	<p>risk assessment for over 40s as part of family health checks. £10 leisure voucher, plus bag of fruit & vegetables offered as incentive.</p>	<p>Descriptive report of screening activity and outcomes</p>	<ul style="list-style-type: none"> - 10 adults age 40+ attended for risk assessment (4/10 female, all white British) - BMI 30+ in 3/10; large waist circumference in 6/10 (>80cm women, >90cm men); 5/10 did not met government recommended guidelines for physical activity (30+ minutes moderate exercise daily); risk score <5% in 4/10, 5-9% in 4/10 (missing data for 2/10) - 6/10 given advice on diet and/or exercise, 1/10 referred to weight management service

APPENDIX 5: Case studies

1 Keep Well in Prisons

Aims and objectives

Keep Well is a Scottish health improvement programme established in 2006 and targeted at hard-to-reach populations (see box 3 in section 3 of main report). It aims to reduce cardiovascular risk through health change behaviours and address health inequalities. The Keep Well approach includes reach and engagement, delivery of a health check with appropriate health and social interventions, followed by referral and signposting to relevant services. The target age group is 45-64.

Keep Well in Prisons was designed to deliver the programme in all Scottish adult prisons to prisoners convicted and sentenced to six months or more. Eligibility has been extended to prisoners from the age of 35 due to the higher prevalence of risk factors among this population.

Description of intervention

The programme was adapted for the prison setting and involved health checks of up to one hour per prisoner (including sexual health and mental wellbeing checks as additions to the core Keep Well screening offer). The health check was carried out by two visiting peripatetic nursing teams, who also delivered brief interventions in smoking cessation, alcohol, diet and weight management. Referrals to appropriate prison-based and community-based services were made and post-release follow-up plans drawn up.

The service was advertised on posters within the prison, information sessions, health promotion events and letters sent to eligible prisoners. A follow-up letter was sent to all prisoners who failed to attend first time and personal contact used to encourage attendance. Prisoners who failed to attend following a second reminder were removed from the list.

Health checks involved blood pressure/pulse, blood test for cholesterol and blood glucose levels, lung function, BMI, waist circumference, plus full medical and family history. Consent was sought to share this information with the prisoner's GP and prison health staff.

Clinics were held in a variety of settings within the prisons, including health centres, multi-purpose areas, link centres and a residential hall.

Outcomes

An evaluation report was produced in May 2011²⁹ and relevant findings are summarised below.

Two thirds (65%) of prisoners engaged with the programme (in one prison this reached 93%), the majority of whom were close to their release date. Prisoners aged 45 and over were more likely to attend than younger groups (76% vs. 67%). Most of those who attended a health check did so on their first invite (69%, range 58-100%).

²⁹ Sharp C, McConville, Martin C. *Evaluation of Keep Well in Prisons*. 2011. NHS Health Scotland.

One in ten of those assessed generated ASSIGN scores of 20% or higher, i.e. at high risk of disease.

Modest changes in knowledge, attitudes and behaviours in healthy diet choices and exercise were reported. Most prisoners were offered advice on diet (87%) and/or exercise (79%), while over one third (37%) were offered specific weight management advice.

Costs

The programme was funded by the Scottish Government with a budget of £384,000 in 2010-11. Actual spend was £153 per health check. Additional potential costs to the Scottish Prison Service are also described in the 2011 evaluation report (including additional staff time answering queries, follow-up tests, etc), but were not quantified.

Successful approaches

Strong partnership between the nursing team and prison-based health care staff was an important element of the programme. Positive support and advice from wider prison staff is also credited as a facilitating factor. The ready availability of equipped gyms and instructors plus the opportunity for prisoners to use their own money to buy fresh fruit and vegetables has also helped to make the programme a success.

Difficulties faced

There were some initial problems in obtaining access to private prisons due to contractual issues, but these were soon ironed out. Difficulties were also created by security issues preventing the Keep Well team from accessing electronic prisoner health records.

The rigid rules, routines and physical limitations of prison life placed restrictions on opportunities for physical activity, while dietary improvements were constrained by prisoners' perceptions of limited healthy choices at mealtimes.

Personal barriers, including competing uses of prisoners' own money plus the stress of being incarcerated, also acted as deterrents to changing behaviour. In addition, high sugar or fat diets constitute a 'personal pleasure' that prisoners can be reluctant to forego.

Lessons learnt

Information sessions and staff briefings prior to implementation helped to overcome the fears of prison health care workers that their role would be undermined.

The evaluation report strongly recommends a prison-wide approach to health promotion to support a shift in norms and cultures within these settings.

2 Khush Dil ('Happy Heart'), Edinburgh

Aims and objectives

The aims of the programme were to identify South Asians with cardiovascular risk factors (including diabetes) for primary prevention, and to establish those with established disease for secondary prevention. Funding was obtained to develop and test methods for a locally-based, culturally sensitive prevention and control service. The programme adopted a community development approach and ran from June 2002 to July 2004.

Description of intervention

There were three service elements:

1. health visitor led screening at the project site plus various community venues – plus follow-up appointments to discuss results and set personal risk reduction goals as appropriate;
2. dietetic clinics offering one-to-one nutritional support;
3. practical activities including nutrition and cookery workshops, exercise classes (aerobics for women, circuit training for men), walking and jogging groups, and diabetes awareness sessions.

Participants who were set goals were then followed up at 6-12 months to assess progress.

The open screening invitation was widely publicised, and referrals were also received from GPs, other health workers and voluntary organisations.

A validated risk assessment tool (CALM heart questions adjusted for relevance to South Asians) was used, along with a risk prediction tool based on the Joint British Society guidelines (adjusted upwards for underestimation of risk in South Asians).

Outcomes

The project was formally evaluated using a before-and-after study design.³⁰

304 South Asians were screened, 140 of whom returned for follow-up. Returnees were more likely to be women, slightly older and to have hypertension.

41% of those screened were male; the mean age was 44.4 years (SD 13.5, range 17-73). Almost one half (49%) had a family history of diabetes.

Three broad categories of outcomes were assessed at follow-up: motivational change (based on the Transtheoretical Model of behaviour change), self-

³⁰ Mathews G, Alexander J, Rahemtulla T, Bhopal R. Impact of a cardiovascular risk control programme for South Asians (Khush Dil) on motivation, behaviour, obesity, blood pressure and lipids. *Journal of Public Health*. 2007; 29(4): 388-97.

reported behavioural change (physical activity, cooking habits), anthropometric measures (weight and BMI change) and clinical measures (blood pressure, cholesterol, triglycerides, blood glucose).

Half progressed to a higher stage of change (based on the Transtheoretical Model), 21% regressed and 28.5% remained at the same stage. Positive outcomes were also reported for physical activity levels, changes to healthier cooking practices, weight and BMI reduction, plus some clinical risk factors. Mean collective risk scores also decreased significantly. Details are provided in table A2 in appendix 4. While blood glucose tests were performed, this data is not available.

Costs

The project was funded by a £50,000 health service innovation grant.

Successful approaches

The use of a summary risk score and colour print-outs of a person's heart health profile (using CALM heart) helped to promote understanding and focus participants on goal-setting.

Outreach work in mosques, temples and workplaces was credited with engaging men in the programme.

Difficulties faced

Despite various outreach activities, men were less likely to return for follow-up than women.

Lessons learnt

The success of the project was attributed to the fostering of good relationships with, and a detailed understanding of the target community, which enabled delivery of a culturally sensitive, flexible and accessible service. The securing of a sustainable resource base and strong senior management commitment was also regarded as essential.

3 New life New you, Middlesbrough

Aims and objectives

'New life, New you' aims to promote healthy lifestyles that will reduce the risk of developing type 2 diabetes, through increased physical activity (PA) and a healthy diet, with support for individual behaviour change. It is targeted at adults age 45-65 at risk of developing type 2 diabetes living in socio-economically disadvantaged circumstances. The target population is based on Sport England Market Segmentation Groups C14 ('middle age women working full-time to make ends meet') and C15 ('inactive older men on low

incomes with little in the way of retirement provision'). It is an ongoing project; a pilot evaluation has been completed.³¹

Description of intervention

This pilot project was instigated as a collaboration between Sport England, local government, North East England Strategic Health Authority, NHS Middlesbrough, Newcastle University and Diabetes UK, in response to the aspiration that the Olympic and Paralympic games would increase participation in PA.

A marketing campaign was launched at the start of the pilot programme to attract and engage participants. Subsequently, word-of-mouth recommendation or practitioner signposting are now the main channels of recruitment.

The intervention is delivered by health and fitness trainers in leisure and community settings and involves:

- individual assessment, including weight, waist and self-reported PA measures, calculation of FINDRISC score and motivational interview with action planning (30-40 minutes) - at baseline, six and 12 months;
- for those with a FINDRISC score of 11-20 (i.e. elevated risk of developing type 2 diabetes), allocation to a 'like minded' group according to activity preferences and personal goals (10-15 people per group, mostly single sex, led by a named level 3 qualified health and fitness instructors trained in motivational interviewing);
- 20 physical activity and behavioural advice sessions of 1.5 hours each, completed over 10 weeks – activities relate to those currently available locally (including walking groups);
- free gym access;
- dietary advice based on the 'eatwell' plate – including leaflets and 'cook and eat' sessions;
- a clear exit strategy, providing encouragement to continue with activities post intervention – including maintenance classes and 'drop in' sessions, regular newsletters and updates on achievements of group members.

Outcomes

A description of the main outcomes of the pilot are described in table A3 of appendix 4. In summary, recruitment was successful and programme completion rates were high, mean reductions in weight and waist circumference were attained at six months, and mean physical activity levels increased. In addition, unpublished data indicates that these changes are sustained and improved at 12 months. Further unpublished data shows that

³¹ Penn L, Lordon J, Lowry R, Smith W, Mathers J, Walker M, White M. Translating research evidence to service provision for prevention of type 2 diabetes: development and early outcomes of the 'New life, New you' intervention. *British Journal of Diabetes and Vascular Disease* (in press).

improvements have also been observed in FINDRISC scores at six and 12 months.

Costs

No information provided.

Successful approaches

Success of the programme so far is attributed to a range of factors, including evidence-based intervention design, the excellent relationships that have built up between fitness instructors and group participants, the 'cohesive' structure of the groups which encourages social support, and use of activities that are available within the community to support post-intervention maintenance. The investment in social marketing to develop and promote the programme at the start contributed to the programme's success in recruiting members of the target group.

Difficulties faced

The main weaknesses identified by the evaluation team include the costly, and perhaps unsustainable, social marketing activity; relatively short time (12 months) to follow-up for assessing long-term impact and under-representation of ethnic minority groups.

Lessons learnt

Additional administrative support was required for local data collection.

The importance of piloting and thorough testing of the programme (including in-built evaluation from the start), the value of a strong multidisciplinary team and an appreciation of team members' differing perspectives and professional expertise were highlighted as key learning points.

Next steps

A process evaluation is planned to determine and describe procedures for a diabetes prevention intervention based on the NLNY pilot study model. This evaluation includes exploration of the perspectives of participants, fitness trainers and other stakeholder staff.

4 Keep Well Gypsy and Travellers Services, Scotland

Aims and objectives

The Keep Well programme has been described elsewhere in this report (see box 3 in section 3). Two pilot areas developed and delivered a targeted programme for the gypsy and traveller communities, in Lothian and Lanarkshire. As with the prisoner programme, the lower age limit was extended down from 45 to 35 years.

Description of intervention

Following detailed consultations with site managers and residents, Keep Well screening clinics were delivered on authorised (both areas) and unauthorised (Lothian only) sites. The Lothian project also consulted with police gypsy and traveller liaison officers regarding unauthorised roadside encampments.

Outreach activity involved attendance at events likely to be frequented by the target communities (including racing events and church conventions). Substantial effort was devoted to staff training in Lanarkshire, including shadowing health professionals currently working with the gypsy and traveller community and cultural awareness training run by the local NHS health promotion department.

In Lothian, individuals with identified risk factors are case managed with a clear plan regarding interventions and follow-up. A case management approach is also adopted in Lanarkshire when additional support is required to access services.

Outcomes

Some success has been achieved in engaging the respective gypsy and traveller communities, and very high levels of /diabetes risk have been identified as a result (see table A4 in appendix 4 for more details). Reporting of positive health outcomes is limited, but a couple of case study examples were provided. These include successful lowering of blood pressure to stable and safe levels in a woman with BMI >30kg/m² and 'large' waist circumference, and identification of undiagnosed type 2 diabetes in a 58 year-old man.

Costs

No information provided.

Successful approaches

Both projects highlighted the importance of close partnership working, especially with site managers and community members and organisations, but also with local GPs and leisure services and the police. The Lothian project reported good engagement with male members of the community, which they attributed to outreach work on unauthorised sites, visiting at different times of the day (including evenings), engaging with the church and employing a male health care worker on the delivery team. In Lanarkshire, initial problems engaging with men were overcome through similar changes in service delivery (e.g. later working hours and attendance at community events).

The Lanarkshire project took a flexible approach to both eligibility (younger and older people were seen at the outreach clinics) and referrals (arranging referrals to services in demand but out of the Keep Well remit, including sight and eye tests) in order to encourage engagement from eligible members of the community.

The small team in Lanarkshire was felt to be an advantage in terms of developing relationships and building recognition of the service. And good

links across the two teams have also facilitated information sharing and follow-up of those signed-up members of the community who pass from one area to the other.

Difficulties faced

Significant additional resources are required to deliver interventions within this community (e.g. the outreach bus utilised by the Lanarkshire team cost £450 per session), a situation which is exacerbated by the short-term nature of available funding.

In Lothian, 25-30 invitees declined to attend, for a range of different reasons - including health needs already being met, a 'what will be will be' attitude to health, reluctance to be made aware of health problems and simply stating 'not interested'.

Other difficulties faced by the delivery teams include problems engaging with men in Lanarkshire (although these problems have largely been overcome as described above), cultural challenges (including a fatalistic attitude to health problems, goal setting and planning ahead as alien concepts and disregard for conventional time keeping) and low levels of literacy.

Plans to deliver screening clinics on unauthorised sites in Lanarkshire were hampered by a local policy of rapid removal of such encampments.

A final set of fundamental barriers to delivering preventative interventions to gypsy and traveller communities are those created by dealing with a highly transient population. These include time to arrange referral appointments and follow-up while individuals are still resident on the local site, compounded by poor links with services across sites in different areas.

Lessons learnt

Despite these difficulties, the two projects have shown that ongoing contact and efforts to develop a detailed understanding of the needs of the community can help to overcome many of the initial challenges. In particular, understanding that travellers do not form a single homogenous group was an important lesson that the Lanarkshire project highlighted.

Suggested approaches to further improve engagement include training up members of the community as peer health educators.

Proposals for a nationwide network of practitioners working with these communities would also facilitate onward referrals and help to support sustained positive lifestyle changes and consistency of preventative care.

5 Slimmers' Kitchen (Learning disabilities), Dudley

Aims and objectives

The stated aim of this intervention is to obtain substantive, long-term lifestyle changes for people with learning disabilities, based on healthy eating, goal-setting and physical activity to promote weight loss and weight maintenance. The generic Slimmers' Kitchen model, which targets residents of deprived areas, was adapted to meet the needs of adults (aged 18 and over) with mild

to moderate learning disabilities who are overweight or obese (BMI > 30kg/m² (27.5 if of Asian Origin) or BMI > 28kg/m² with co-morbidity (23.5 if of Asian origin)). It is an ongoing intervention; pilot outcomes are reported below.

Description of intervention

A six week 'foundation course' precedes the standard 12 week Slimmers' Kitchen model, to ensure participants start with a basic level of understanding of healthy eating. The specially adapted 12 week pilot programme is then delivered in 'Healthy Hubs' which allow access to green spaces, gym equipment and a kitchen. Both the foundation course and the pilot were held at the Learning Disability Centre, a familiar venue for those attending. The weekly sessions are two hours in duration and include a nutritional education hour (education about obesity, use of the 'eatwell' plate, fats and sugars, physical activity, plus guided supermarket tours) and a practical activity hour (alternating weekly between graded led walks and healthy cookery sessions based on participants favourite dishes). The approach is person-centred and involves collection of anthropometric data at the beginning and end of the programme and weekly weigh-ins at the discretion of the participants, along with the setting of weekly SMART lifestyle goals. A 5% weight loss target is set for all participants at the start of the programme. Carers were also included in the education programme.

The project is jointly funded and managed by NHS Dudley's Public Health team and the Learning Disability Specialist Health Service (LDSHS). Three trained sessional workers from Public Health and LDSHS, and one volunteer, deliver the sessions.

Outcomes

From the foundation programme, 11 adults were eligible to be placed on the pilot programme; two declined so nine progressed to the pilot. . At the end of the six week pilot, all nine had achieved their SMART goals, one achieved a 5% reduction in their weight, while another two achieved at least a 2.5% loss. (see table A6 in appendix 4 for a more detailed description of outcomes). All participants fed back that they enjoyed the course, found the information useful and enjoyed the practical teaching format. Follow-up beyond the end of the programme by Learning Disability nurses indicates that around half have continued to lose weight.

Costs

Annual costs for the first two years are estimated at approximately £2,500, based on delivery of three programmes per annum. Ongoing annual running costs are likely to be significantly lower (less than £1,000) once one-off purchases and initial staff training has been paid for. The service is free for participants.

Successful approaches

Close partnership working between Public Health and LDSHS and delivery in familiar, convenient locations were identified as key factors underpinning success. Offering the service at an appropriate level for participants to

understand, using resources that are adapted to be learning disability compliant were equally important.

Educating carers was felt to enhance the sustainability of project outcomes, by providing a source of ongoing support to participants.

Difficulties faced

'Translating' mainstream resources and activities for a learning disabled audience was found to be time consuming and challenging. While being familiar, the pilot venue was not on a direct bus route, requiring pilot workers to pick up and drop off participants, which again was time consuming and resource intensive. The main programme has been relocated to Dudley's Healthy Hubs, which are more conveniently located and allow for independent travel, as well as free exercise options outside of the Slimmers' Kitchen programme.

Lessons learnt

The length of time required for some adults with learning disabilities to absorb the key messages of the programme have led the management team to consider extending the original 12 week programme to 15 weeks for this group. Consultation with Public Health and LDSHS, as well as use of CHANGE picture bank resources, was felt to be invaluable in adapting the content of the programme.

Feedback from the project team also highlighted the importance of giving as much time as possible to initial planning of the programme - including selection of participants, costing, venue accessibility, adaptation of resources, training of staff, staffing levels and ensuring referral pathways are established and that other local health professionals are aware of the programme. The management team also agreed that to ensure future success, the training of carers is essential.

6 Cromwell House weight management clinic, Manchester

Aims and objectives

This voluntary clinic was established in 2000 for people with severe mental illness receiving antipsychotic medication who are concerned about their weight and able to self-refer.

Description of intervention

Weekly group sessions are held during a lunchtime when it was most convenient for participants to attend. The sessions involve weighing, a 15 minute facilitated group discussion and feedback, followed by 30 minutes covering one of eight rotational topics (including healthy eating, self-esteem, meal planning and demonstrations, motivation, evaluation). Additional topics are covered as required. Emphasis is placed on physical activity independent of weight loss.

Participants were also asked to keep a personal diary of dietary experiences, for discussion either one-to-one or within the group, as a behaviour change tool. No written materials are provided.

Outcomes

The first eight years of the programme have been evaluated as a before and after study, and the results published.³²

46 men and 67 women have enrolled on the programme over this period, with several leaving and then re-registering. In total, there have been 142 patient episodes. Baseline mean weight was 90.1±1.6kg and baseline mean BMI was 32.2±0.5 kg/m² (11 'normal' weight, 44 overweight and 87 obese). Other baseline characteristics are summarised in table A7 in appendix 4 of this report.

Clinically significant weight loss was defined as 7%. The longer patients are engaged with the programme, the larger the percentage weight loss. For example, at three months, 12% of patients had achieved at least 7% weight loss (n=92). At six months, this had increased to 35% (n=75), at one year to 61% (n=64) and at two years to 80% (n=35). Only seven participants have been followed for six years, but all have lost at least 7% of their starting weight.

Younger people have tended to lose weight faster in the first six months, but differences disappear at later follow-up. There were no differences between gender, diagnosis or type of treatment.

Unpublished 10 year data shows that the success of the programme continues, with mean final weight loss of 7.6± kg (range -43.7 to +17.0 kg).

Costs

Not available.

Successful approaches

The apparent success of this programme is attributed to:

- the offer of a multi-modal intervention (involving nutrition, exercise and behavioural aspects)
- a group setting and the peer support that this offers
- self-defined goals and small, stepwise changes to encourage progress
- an open-ended approach, where people can attend as many sessions for as long as they wish.

Difficulties faced

Drop-out rates were quite high (35% within the first three months), although probably similar to drop-out rates for weight management programmes in the general population.

Lessons learnt

This programme has demonstrated that clinically significant weight loss can be achieved in adults with severe mental illness, despite widespread

³² Holt R, Pendlebury J, Wildgust H, Bushe C. Intentional weight loss in overweight and obese patients with severe mental illness: 8-year experience of a behavioural treatment programme. *Journal of Clinical Psychiatry*. 2010;71(6):800–805

pessimism in treating obesity in this group. The effects are reported to be at least as good as lifestyle modification programmes in the general population. Efforts to support continued engagement of participants is warranted, as those who attended for longer periods were more successful in losing weight.

APPENDIX 6: Excluded projects/studies submitted in response to call for evidence and targeted mail-out*

Project/study details	Source	Reason for exclusion
North Mersey Diabetes QIPP	Call for evidence	Audit only – no intervention delivered
Scottish Type 2 Diabetes Needs Assessment: screening and prevention	Call for evidence	Nothing specific on vulnerable groups
Targeting People with pre-diabetes (BMJ article) ³³	Call for evidence	Commentary
Prevention of type 2 diabetes in British Bangladeshis: a qualitative study of community, religious and professional perspectives (BMJ article) ³⁴	Call for evidence	Perspectives study
External validation of QDScore for predicting 10 year risk (research paper) ³⁵	Call for evidence	Nothing specific on vulnerable groups
Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups (Cochrane review) ³⁶	Call for evidence	Not focused on individuals at high risk of type 2 diabetes
A controlled trial of the effectiveness of a diabetes education programme in a multi-ethnic community in Glasgow (research paper) ³⁷	Call for evidence	Population with type 2 diabetes
PODOSA (Prevention of Diabetes and Obesity in South Asians)	Targeted mail-out	In progress, no outcomes
Early Identification of Diabetes, Wakefield	Targeted mail-out	In progress, no outcomes
Westminster 'Drop in to Weigh in'	Targeted mail-out	Not focused on vulnerable groups

* All submissions were reviewed for relevant information to support or refute findings from included projects, and this was incorporated into the report commentary where appropriate.

³³ Narayan K, Imperatore G, Benjamin S, Engelgau M. Targeting people with pre-diabetes: lifestyle interventions should also be aimed at people with pre-diabetes. *BMJ* 2002;325:403–4

³⁴ Grace C, Begum R, Subhani S, Kopelman P, Greenhalgh T. Prevention of type 2 diabetes in British Bangladeshis: a qualitative study of community, religious and professional perspectives. *BMJ* 2008;337:a1931

³⁵ Collins G and Altman D. External validation of QDScore for predicting 10 year risk of developing type 2 diabetes. *Diabetic Medicine*, 2011; 28(5): 599-607

³⁶ Hawthorne K, Robles Y, Cannings-John R, Edwards A. Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups. *Cochrane Database of Systematic Reviews*. 2011;6

³⁷ Baradaran H, Knill-Jones R, Wallis S, Rodgers A. A controlled trial of the effectiveness of a diabetes education programme in a multi-ethnic community in Glasgow. *BMC Public Health*. 2006;6: 134