Community Engagement – approaches to improve health and reduce health inequalities

Rapid Review of Economic Evidence (Component 2, Stream 3)
Health Economics 2

Optimity Advisors for the National Institute for Health and Care Excellence
July 2015

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Acknowledgement

1. Executive Summary

1.1. Background

Optimity Advisors has been commissioned to undertake an economic analysis to support the development of the NICE guideline on 'Community engagement - approaches to improve health and reduce health inequalities' in order to update Public Health Guideline 9, published in 2008.

The work to update the guideline is divided in three streams:

- Community engagement: a report on the current effectiveness and process evidence, including additional analysis.
- Community engagement: UK qualitative evidence, including one mapping report and one review of barriers and facilitators.
- An economic analysis (cost effectiveness review and economic model).

Optimity Advisors has been commissioned to undertake the Stream 3 work package. It comprises three components, a précis of the economic evidence reported in "Community engagement to reduce inequalities in health: a systematic review, meta-analysis and economic analysis"[1], a rapid update review and an economic model. This report relates to the second component of Stream 3– A rapid review of economic evidence on community engagement interventions from 2010 onwards.

Community engagement is defined as "an umbrella term encompassing a continuum of approaches to engaging communities of place and/or interest in activities aimed at improving population health and/or reducing health inequalities"[2]. The scope for the guideline[3] associates community engagement with activities by which people can improve their health and wellbeing by helping to develop, deliver and use local services. Community engagement can involve varying degrees of participation and control. For the purposes of the economic analysis, NICE is particularly interested in the three main theoretical approaches to community engagement identified in the review cited above by the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre). These are:

- Peer/lay delivered interventions;
- Collaboration between health and other statutory services and communities;
- Interventions centred on the concept of empowerment.

1.2. Aims of the review

The aim of this review is to establish whether there is sufficient economic evidence to suggest that community engagement approaches to improve health and reduce health inequalities are cost-effective. Establishing the cost-effectiveness of community engagement approaches is important because, as per the *Methods for the*

[1] O'Mara-Eves A, Brunton G, McDaid D, Oliver S, Kavanagh J, Jamal F et al. (2013). Community engagement to reduce inequalities in health: a systematic review, meta-analysis and economic analysis. Public Health Research 1(4). Available at: http://www.journalslibrary.nihr.ac.uk/__data/assets/pdf_file/0006/94281/FullReport-phr01040.pdf.

[2] Popay J (2006). Community engagement for health improvement: questions of definition, outcomes and evaluation. A background paper prepared for NICE. London: National Institute for Health and Care Excellence.

[3] The guideline scope is available at https://www.nice.org.uk/guidance/gid-phg79/documents/community-engagement-update-final-scope-2

development of NICE public health manual[4], the Public Health Advisory Committee (PHAC) responsible for developing the current guideline is required to make decisions informed by the best available evidence of both effectiveness and cost-effectiveness. Therefore, the economic analysis is integral to the development of public health guidance as it will provide information on whether the resources are being used efficiently to improve the population's health. As the NICE methods' manual states, the cost effectiveness of an intervention or programme is assessed to ensure maximum health gain from the finite available resources, while still ensuring that there is an equitable allocation of resources.

In addition, this review aims to provide the PHAC with an update of the work carried out to date in the area of community engagement and to keep the literature review current. Finally, the review has also informed the economic analyses (component 3) Optimity carried out as part of the contract with NICE.

1.3. Research questions

We conducted the review of cost-effectiveness studies to answer the following questions set out in the final guideline scope[5]:

Question 1: How cost-effective are community engagement approaches at improving health and wellbeing and reducing health inequalities?

Question 2: How cost-effective are community engagement approaches at encouraging people to participate in activities to improve their health and wellbeing and realise their capabilities – particularly people from disadvantaged groups?

Question 3: What processes and methods help communities and individuals realise their potential and make use of the all the resources (people and material) available to them?

Subsidiary questions may include:
- What impact do the following have on the cost-effectiveness of different interventions:
  o deliverer;
  o community representative or group;
  o health topic;
  o setting;
  o timescale;
  o timing;
  o theoretical framework?

1.4. Methods

We conducted a search of relevant literature using electronic databases. To locate further literature, we worked in close collaboration with contractors undertaking Streams 1 and 2 evidence reviews commissioned to update the Community Engagement guideline. We have received from Stream 1 and Stream 2 contractors the results of their searches, in particular any studies identified containing an economic analysis of any type or any cost information potentially relevant for our future modelling work (component 3).

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[4] National Institute of Health and Care Excellence (2012) The NICE public health guidance development process. London: NICE. URL:
http://publications.nice.org.uk/the-nice-public-health-guidance-development-process-third-edition-pmg5

[5] National Institute for Health and Clinical Excellence; Public Health Guideline; Community engagement: approaches to improve health and reduce health inequalities - Guideline scope: https://www.nice.org.uk/guidance/gid-phg79/documents/community-engagement-update-final-scope-2

The search strategies we used are based on the guideline scope and the search strategy designed by the EPPI team undertaking stream 1 (see Appendix B). Stream 1 searches are in turn based on the searches carried out for a previous EPPI review published in 2013.

The study types included in the review are:
- Cost-benefit analyses (CBA);
- Cost-effectiveness analyses (CEA);
- Cost-utility analyses (CUA);
- Other relevant cost analyses, including cost-consequence analysis (CCA).

All the studies reviewed have been published in English after 1 January 2011 and we have only included in the review studies conducted in OECD countries.

1.5. Results

We located a total of 4,125 studies through the database search, and two independent reviewers screened all the titles and abstracts. We also screened 29 studies located by Stream 1 and Stream 2 contractors. Out of more than 4,000 references screened, we selected 68 studies for full-text screening. A total of 19 these 68 studies met our inclusion criteria, but in further discussions with NICE, eight of these studies were excluded. This review includes 11 studies. We extracted all the relevant data from the 11 studies into a data extraction table that was developed based on Appendix K3 "Example of evidence table for economic evaluation studies" of the *Methods for the development of NICE public health manual*[6]. The methodological quality of the studies was also assessed as per "Appendix I Quality appraisal checklist – economic evaluations" of the same methods manual. Through the quality appraisal checklists, applicability and limitations of the included studies are assessed. This assessment has been used in drawing conclusions about the cost-effectiveness of interventions and the quality of the evidence.

Of the studies included in the review, there are six cost-effectiveness analyses, four cost-utility analyses and only one cost-consequence analysis. Four studies were conducted in the UK, three studies were conducted in the United States, two studies were based in Canada, one study was conducted in Ireland, and one in Australia. This means that all 11 studies were regarded either as partly applicable (six) or directly applicable (five). No studies were regarded as non-applicable.

In the tables below, we present a brief summary of the interventions evaluated in the review grouped by their theoretical approach to community engagement. In nine studies the authors have assessed **peer/lay delivered interventions**, and in two studies the authors have assessed **interventions delivered in collaboration between health and other statutory services and communities.** No **interventions centred on the concept of empowerment** were assessed in this review.

The initial categorisation was undertaken by the two researchers who carried out the data extraction and quality assessment of the studies. Studies were subsequently re-categorised independently and in discussions with the NICE team. Peer/lay delivered interventions were predominantly peer delivered with studies usually containing an explicit statement to that effect. Similarly, where interventions were provided by a collaborative approach, the parties involved were generally set out in the study report.

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[6] National Institute of Health and Care Excellence (2012) The NICE public health guidance development process. London: NICE. URL:
http://publications.nice.org.uk/the-nice-public-health-guidance-development-process-third-edition-pmg5

The full report includes additional subgroup analysis such as analysis by health and well-being topic area, this is diabetes, cardiovascular diseases, and healthier lifestyle, and the target population of the intervention when aimed at disadvantaged groups, such as low income groups and families. By examining the comparator interventions against which community engagement interventions have been evaluated, it also provides an indication of whether the cost-effectiveness evidence relates to community engagement as a supplement or add-on to an underlying base intervention or whether community engagement tends to take the form of a standalone intervention.

The following section provides details of the studies according to whether the study authors considered the intervention to be cost-effective or not cost-effective or were unable to draw conclusions about cost-effectiveness while Table 1 summarises the numbers of studies according to these groupings.

Table 1: Summary findings

Type of Community Engagement	Cost-effective	Inconclusive	Not cost-effective
Peer/lay	4	3	2
Collaborative	1	1	-
Empowerment	-	-	-

1.5.1. Study findings on cost-effectiveness

We categorise the community engagement interventions according to whether 1) the interventions evaluated are cost-effective, 2) the interventions are not cost effective or 3) no conclusion on cost-effectiveness can be drawn based on the information in the study. In the third category, it should be noted that inconclusive cost-effectiveness does not imply intervention ineffectiveness. It may simply be difficult to interpret the results of the analysis in relation to cost-effectiveness criteria applied by NICE and other organisations. Where appropriate, we took account of the extent to which the evidence indicates that an intervention or programme is clearly cost-effective or clearly not cost-effective relative to, for example, an established cost-effectiveness reference point or cost per QALY 'threshold'. However, this has not always been possible as the studies included in this update review do not present cost-effectiveness results in a consistent format and are conducted in different settings where different cost-effectiveness thresholds apply.

Table 2: Cost-effectiveness of interventions by community engagement approach

Community engagement approach	Cost-effective	Inconclusive	Not cost-effective
Peer/lay delivered interventions	Lay 'health trainer' (LHT) to improve heart-health lifestyles in deprived communities through advice and behaviour change – Barton 2012 (++, directly applicable) Lifestyle modification programme led by community health workers (CHWs) through education and self-management – Brown	Peer support group (PSG) - telephone based volunteer support of post-partum depression (PPD) – Dukhovny 2013 (+, partly applicable) Cardiovascular Health Awareness Programme (CHAP) – risk factor assessment and education sessions – Goeree 2013 (++, partly applicable)	Diet and exercise advice to patients with type 2 diabetes– Irvine 2011 (+, directly applicable) Educational and demonstrational sessions to educate pupils on sexually transmitted infections (peer or teacher led) – Cooper 2012 (++, directly applicable)

Community engagement approach	Cost-effective	Inconclusive	Not cost-effective
	2012 (++, partly applicable) Group based peer support in general practice for patients with <u>type 2 diabetes</u> – Gillespie 2012 (++, directly applicable) ASSIST (A Stop Smoking In Schools Trial) peer led informal interactions to <u>prevent smoking</u> – Hollingworth 2013 (+, directly applicable)	Lifestyle intervention utilizing <u>Diabetes Prevention Programme</u> (DPP) intervention materials adapted for group delivery – Krukowski 2013 (+, partly applicable)	
Collaboration between health and other statutory services and communities	Be Active Eat Well (BAEW) – a community based capacity building demonstration programme that <u>promotes healthy eating and physical activity</u> – Moodie 2013 (+, partly applicable)	<u>The Mental Health Services Program for Youth</u> through creating Care Planning Team with discussion with the family of the patient and based on needs – Grimes 2011 (+, partly applicable)	

1.6. Evidence statements

In summarising the balance of evidence, mixed evidence is used to indicate that some studies are positive (conclude that an intervention is cost-effective) and some negative (conclude that an intervention is not cost-effective).

Question 1: How cost-effective are community engagement approaches at improving health and wellbeing and reducing health inequalities?

Evidence statement 1: Overall, there is mixed evidence on the cost-effectiveness of community engagement approaches in improving health and reducing health inequalities.
Five studies concluded that community engagement approaches are cost-effective. The evidence on cost-effectiveness is presented in E.S. 1.1 below. Evidence from two studies suggests that community engagement approaches are not cost-effective. The evidence is presented in E.S. 1.2 below. Finally, evidence from four remaining studies does not allow conclusions to be drawn in regards to the cost-effectiveness of community engagement approaches. The evidence is presented in E.S. 1.3 below.
E.S. 1.1. There is evidence from five high and moderate quality studies suggesting that community engagement approaches are cost-effective. Evidence of cost-effectiveness has been broken down according to three different theoretical approaches to community engagement:

1. Peer/lay delivered interventions:

There is evidence from three high quality studies (one UK, one US, one Ireland) and one moderate quality study (UK) suggesting that the peer/lay delivered interventions under investigation are cost-effective:

- A lay health trainer (LHT) intervention compared with no LHT (with both groups receiving health promotion literature) to improve heart-health lifestyle resulted in 0.007 Quality Adjusted Life Year (QALY) gains with an incremental cost of £98. The Incremental cost-effectiveness ratio (ICER) was £14,480 per QALY gained[7], within NICE's £20,000 benchmark. Although, in the base case, the probability of the intervention being cost-effective was only 39.5% at a £20,000 per QALY threshold and 40.1% at a £30,000 per QALY threshold, in sensitivity analysis, ICERs ranged between dominant and £22,347. The authors highlight this uncertainty in their conclusions (Barton et al. 2012 [++]).
- One diabetes lifestyle modification programme led through community health workers proved to be cost-effective at a cost of $33,319 per QALY (£20,458 in 2010) gained across the whole population, compared with standard care, a figure around the NICE benchmark of £20,000 per QALY at exchange rates prevailing in recent years (Brown et al. 2012 [++]).
- An intervention targeting diabetic patients through group-based peer support plus standardized diabetes care versus standard diabetes care alone was associated with an incremental 0.09 QALY gain per patient while saving €637.43 (£475.14 in 2008) in mean lifetime healthcare costs per patient. The intervention was therefore dominant on the basis of mean costs and effects (Gillespie et al. 2012 [++]). In health economics, when comparing two interventions, an option that is more effective and costs less is said to be dominant[8].
- ASSIST (A Stop Smoking In Schools Trial), a peer/lay delivered programme aimed at reducing smoking prevalence and introduced in addition to usual smoking education was delivered at £32 per student and resulted in an incremental cost of £1,500 per student not smoking at two years compared with usual smoking education alone. There was a 2.1% reduction in smoking prevalence at two years follow-up (Hollingworth et al. 2013 [+]).

2. Collaboration between health and other statutory services and communities

There is evidence from one moderate quality study (Australia) suggesting that a collaboration intervention is cost-effective:

- The Be Active Eat Well programme, delivered through collaboration, was associated with a reduction in body mass index (BMI) units and in the disability-adjusted life year (DALY) burden. The intervention resulted in modest cost offsets (AUD$27,311 or £12,276 in 2006). The net cost per DALY saved was AUD$29,798 (£13,394 in 2006) compared with current practice (Moodie et al. 2013 [+]).

3. Interventions centred on the concept of empowerment

No interventions centred on the concept of empowerment have been included in the review.

E.S. 1.2. There is evidence from one high quality study (UK) and one moderate quality study (UK) of community engagement approaches suggesting that they are not cost-effective:

- At a Willingness To Pay (WTP) threshold of £20,000 per QALY gained, the probability of the peer/lay delivered University of East Anglia Impaired Fasting Glucose programme being cost-effective was 16%. The intervention was associated with a mean loss of 0.001 QALYs over the follow-up period compared with a loss of 0.004 QALYs in the control group (usual care). The intervention had an ICER of £67,184 per QALY gained and was not considered to be cost-effective. However, the authors

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[7] In general, interventions with an ICER of less than £20,000 per QALY gained are considered to be cost effective

(http://www.nice.org.uk/article/pmg4/chapter/6-incorporating-health-economics#economic-evidence-and-guidance-recommendations)

[8] Definition of "Dominance" according to the NICE Glossary: https://www.nice.org.uk/Glossary?letter=D

highlight the need for future research (Irvine et al. 2011 [+]).

- Peer and teacher-led educational and demonstrational sessions to educate pupils on sexually transmitted infections (STI). Using evidence from the literature, the study modelled the impact of behaviour changes due to the intervention on the occurrence of sexually transmitted infections. Compared with standard education, the ICERs of the teacher led and peer led interventions (peer/lay delivered) were €24,268 (£20,162 in 2012) and €96,938 (£80,536) per QALY gained, respectively. Both interventions resulted in a 0.35 QALY gain. However, the peer led intervention was nearly four times as expensive as the teacher delivered one (Cooper et al. 2012 [++]).

E.S. 1.3: Evidence from four moderate and high quality studies (two Canada, two US) does not allow conclusions to be drawn on the cost-effectiveness of community engagement approaches:

- A peer/lay delivered intervention aiming to reduce postpartum depression resulted in an 11% absolute reduction in rates of depression at a cost of CAN$4,497 (£2,860 in 2011)) per woman compared with usual care. The base case incremental cost per case of postpartum depression (PPD) prevented was $10,009 (£6,366). The authors concluded that there was a 95% probability of the cost per case of PPD prevented being less than $20,196 (£12,845). The authors offered no conclusion about the cost-effectiveness of the programme (Dukhovny et al. 2013 [+]).

- A community-wide cardiovascular health awareness programme (CHAP) delivered through collaboration between health and other statutory services and communities led to a lower absolute rate of hospitalisations for cardiovascular diseases (CVD) (a mean reduction of 2.90 hospitalisations/1,000) at a cost of $11,976 - $57,113 (£7,150 - £34,096 in 2010) depending on community size compared with no CHAP (with usual health promotion and health care services being available in both groups). The intervention was successful in mobilising community support. No conclusion has been offered about the cost-effectiveness of the intervention (Goeree et al. 2013 [++], Canada).

- An integrated family- and community-based intervention for young people with mental health needs delivered through collaboration between health and other statutory services and communities was associated with reduced claims expenses for emergency rooms and inpatient psychiatry (32% and 74% lower, respectively, compared to the usual care group) and cost $761.69 (£478.57 in 2011) per month per member. No comment is made about its cost-effectiveness (Grimes et al. 2011 [+], US).

- A peer/lay delivered intervention (lifestyle or attention control intervention delivered by lay health educators) was associated with the achievement of weight loss after four months of the lifestyle intervention at low cost among older adults in rural US (on average 3.7kg per participant at a cost of US$165 or £112 per person; 2009 prices). No conclusion was stated on cost-effectiveness. (Krukowski et al. 2013 [+], US).

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Applicability	Five of the 11 studies are considered directly applicable (Barton et al. 2012, Cooper et al. 2012, Gillespie et la. 2012, Hollingworth et al. 2012, Irvine et al. 2011,). The other six studies (Brown et al. 2012, Dukhovny et al. 2013, Goeree et al. 2013, Grimes et al. 2011, Krukowski et al. 2013, and Moodie et al. 2013) are regarded as partly applicable. No studies were regarded as non-applicable.

Question 2: How cost-effective are community engagement approaches at encouraging people to participate in activities to improve their health and wellbeing and realise their capabilities – particularly people from disadvantaged groups?

Evidence statement 2: There is evidence that community engagement approaches aimed at

encouraging people, particularly from disadvantaged groups, to participate in activities to improve their health and well-being are cost-effective.

E.S. 2.1. There is evidence from two high quality studies (one UK, one US) suggesting that community engagement approaches targeting low income groups and families are cost-effective:

- A study explored the cost-effectiveness of heart-health lifestyle interventions in deprived communities. A lay health trainer (LHT) intervention compared with no LHT (with both groups receiving health promotion literature) to improve heart-health lifestyle resulted in 0.007 Quality Adjusted Life Year (QALY) gains with an incremental cost of £98. The Incremental cost-effectiveness ratio (ICER) was £14,480 per QALY gained[9], within NICE's £20,000 benchmark. Although, in the base case, the probability of the intervention being cost-effective was only 39.5% at a £20,000 per QALY threshold and 40.1% at a £30,000 per QALY threshold, in sensitivity analysis, ICERs ranged between dominant and £22,347. The authors highlight this uncertainty in their conclusions (Barton et al. 2012 [++]).

- A study by Brown et al. 2012 estimated the long-term cost-effectiveness of a lifestyle modification programme in a low-income Hispanic population with type two diabetes. The programme led through community health workers proved to be cost-effective at a cost of $33,319/£20,458 per QALY gained across the whole population, compared with standard care, a figure around the NICE benchmark of £20,000 per QALY at exchange rates prevailing in recent years (Brown et al. 2012 [++]).

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Applicability	One study is considered directly applicable (Barton et al. 2012) and one study (Brown et al. 2012), is regarded as partly applicable. No studies were regarded as non-applicable.

Question 3: What impact does the health topic have on the cost effectiveness of different interventions?

Evidence statement 3: Overall, there is mixed evidence on the impact that the health topic has on the cost effectiveness of different interventions

E.S. 3.1 There is mixed evidence on the cost-effectiveness of community engagement interventions aimed at patients with or at risk of type 2 diabetes.

There is evidence from two high quality studies (one US, one Ireland) suggesting that community engagement interventions aimed at patients with or at risk of type 2 diabetes are cost-effective:

- One diabetes lifestyle modification programme led through community health workers proved to be cost-effective at a cost of $33,319/£20,458 per QALY gained across the whole population, compared with standard care, a figure around the NICE benchmark of £20,000 per QALY at exchange rates prevailing in recent years (Brown et al. 2012 [++]).

- An intervention targeting diabetic patients through group-based peer support plus standardized diabetes care versus standard diabetes care alone was associated with an incremental 0.09 QALY gain per patient while saving €637.43/£475.14 in mean lifetime healthcare costs per patient. The intervention was therefore dominant on the basis of mean costs and effects (Gillespie et al. 2012 [++]).

There is evidence from one moderate quality study (UK) suggesting that a community engagement intervention aimed at patients with or at risk of type 2 diabetes is not cost-effective:

- At a Willingness To Pay (WTP) threshold of £20,000 the probability of the peer/lay delivered University of East Anglia Impaired Fasting Glucose programme being cost-effective was 16%. The

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[9] In general, interventions with an ICER of less than £20,000 per QALY gained are considered to be cost effective
(http://www.nice.org.uk/article/pmg4/chapter/6-incorporating-health-economics#economic-evidence-and-guidance-recommendations)

intervention was associated with a mean 0.001 QALY loss over follow-up compared with a 0.004 QALY loss in the control group (usual care). The intervention had an ICER of £67,184 per QALY gained. The intervention was not considered to be cost-effective. However, the authors highlight the need for future research (Irvine et al. 2011 [+]).

Evidence from one moderate quality study (US) does not allow conclusions to be drawn on the cost-effectiveness of community engagement interventions aimed at patients with or at risk of type 2 diabetes:

- A peer/lay delivered lifestyle intervention was associated with the achievement of weight loss after four months of the intervention at low cost among older adults in the rural US (on average 3.7kg per participant at a cost of US$165/£112 per person). No conclusion has been offered on cost-effectiveness (Krukowski et al. 2013 [+], US).

E.S. 3.2. There is mixed evidence of the cost-effectiveness of community engagement interventions aimed at patients with or at risk of cardiovascular diseases (CVD).

There is evidence from one high quality study (UK) suggesting that community engagement interventions aimed at patients with or at risk of CVD are cost-effective:

- A lay health trainer (LHT) intervention compared with no LHT (with both groups receiving health promotion literature) to improve heart-health lifestyle resulted in 0.007 Quality Adjusted Life Year (QALY) gains with an incremental cost of £98. The Incremental cost-effectiveness ratio (ICER) was £14,480 per QALY gained[10], within NICE's £20,000 benchmark. Although, in the base case, the probability of the intervention being cost-effective was only 39.5% at a £20,000 per QALY threshold (and less than 50% at all levels of the threshold), in sensitivity analysis, ICERs ranged between dominant and £22,347. The authors highlight this uncertainty in their conclusions (Barton et al. 2012 [++]).

Evidence from one high quality study (Canada) does not allow conclusions to be drawn on the cost-effectiveness of community engagement interventions aimed at patients with or at risk of CVD:

- A community-wide cardiovascular health awareness programme (CHAP) delivered through collaboration between health and other statutory services and communities led to a lower absolute rate of hospitalisations for CVD (a mean reduction of 2.90 hospitalisations/1,000) at a cost of $11,976 - $57,113 (£7,150 - £34,096) depending on community size compared with no CHAP (with usual health promotion and health care services being available in both groups). The intervention was successful in mobilising community support. No conclusion has been made about the cost-effectiveness of the intervention (Goeree et al. 2013 [++], Canada).

E.S. 3.3. Evidence from two moderate quality studies (one UK, one Australia) suggests that community engagement approaches to promote healthier lifestyles are cost-effective:

- ASSIST (A Stop Smoking In Schools Trial), a peer/lay delivered programme aimed at reducing smoking prevalence and introduced in addition to usual smoking education was delivered at £32 per student and resulted in an incremental cost of £1,500 per student not smoking at two years compared with usual smoking education alone. There was a 2.1% reduction in smoking prevalence at two years follow-up (Hollingworth et al. 2013 [+]).
- The Be Active Eat Well programme, delivered through collaboration, was associated with a reduction in BMI units and in the DALY burden. The intervention resulted in modest cost offsets (AUD$27,311/£12,276). The net cost per DALY saved was AUD$29,798/£13,394 compared with current practice, a figure around or below the NICE benchmark of £20,000 per QALY gained when

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[10] In general, interventions with an ICER of less than £20,000 per QALY gained are considered to be cost effective
(http://www.nice.org.uk/article/pmg4/chapter/6-incorporating-health-economics#economic-evidence-and-guidance-recommendations)

converted at recent exchange rates (Moodie et al. 2013 [+]).

Evidence from one high quality study (US) suggests that a community engagement intervention aimed at improving sexual health is not cost-effective:

- Peer and teacher-led educational and demonstrational sessions to educate pupils on sexually transmitted infections (STI). Using evidence from the literature, the study modelled the impact of behaviour changes brought due to the intervention on the occurrence of sexually transmitted infections. Compared with standard education, the ICERs of the teacher led and peer led interventions (peer/lay delivered) were €24,268/£20,162 and €96,938/£80,536 per QALY gained, respectively. Both interventions resulted in a 0.35 QALY gain. However, the peer led intervention was nearly four times as expensive as the teacher delivered one (Cooper et al. 2012 [++]).

Applicability:	Five of the studies are considered directly applicable (Barton et al. 2012, Cooper et al. 2012, Gillespie et la. 2012, Hollingworth et al. 2012, Irvine et al. 2011). The other four studies (Brown et al. 2012, Goeree et al. 2013, Krukowski et al. 2013, and Moodie et al. 2013,) are regarded as partly applicable. No studies were regarded as non-applicable.

1.7.   Conclusions

The extent to which conclusions can be drawn on the cost-effectiveness of community engagement approaches as a whole is limited by the broad spectrum of community engagement approaches studied and by the identification of only 11 cost-effectiveness studies in this review. It is worth noting that most studies considered a community engagement intervention either added to usual care (four out of 11 studies) or, more commonly, as an alternative to usual care (six out of 11 studies). The remaining study compared two interventions which could both be classified as community engagement interventions.

The evidence reviewed here suggests that community engagement can generate additional benefit over and above usual care, in many cases at reasonable cost, although it is generally unclear how cost-effective usual care is in comparison with a do nothing option. Less frequent were studies which looked at different modes of delivery of a distinctively community-orientated intervention. In one study, a teacher-led behavioural intervention was found to be less costly than but to have similar effectiveness to the same intervention delivered on a peer-led basis. There is no clear indication of the relationship between the intensity or type of community engagement and cost-effectiveness. Where particular health conditions are concerned, we can tentatively suggest that community engagement among those with or at risk of diabetes is relatively cost-effective. This review has also found evidence of cost-effectiveness around other health areas such as cardiovascular diseases and healthier lifestyles. It should be noted that, where possible, we have used NICE benchmarks as a way of judging cost-effectiveness. Where this has not been possible, we have relied on the judgement of study authors as to whether or not an intervention is cost-effective.

Five out of 11 studies included in the review consider the interventions assessed to be cost-effective to varying degrees. Overall, there is evidence on the cost-effectiveness of two types of community engagement – peer/lay delivered (four out of seven studies), and collaboration (one out of two studies). In terms of the methodological quality of these studies, five peer/lay delivered interventions were considered to have minor limitations, whereas the rest (four peer/lay delivered and two collaborative interventions) were considered to have potentially serious limitations and the results need to be considered with caution. In only two studies could it be concluded that the community engagement intervention was not cost-effective while, in four studies, no conclusion could be drawn.

In terms of the cost-effectiveness of community engagement approaches aimed at encouraging people, particularly from disadvantaged groups, to participate in activities to improve their health and well-being, the findings in this review suggest that there is positive evidence on the cost-effectiveness of interventions targeting low income groups and families (two out of two studies).

2.   Introduction

The Centre for Public Health (CPH) at the National Institute for Health and Care Excellence (NICE) has commissioned an economic analysis to support the development of NICE guideline on 'Community engagement - approaches to improve health and reduce health inequalities' in order to update Public Health Guideline 9 (2008).   The final guideline scope is available at https://www.nice.org.uk/guidance/gid-phg79/documents/community-engagement-update-final-scope-2.

There are **three streams** of work associated with the guideline update:

1.   Community engagement: a report on the current effectiveness and process evidence, including additional analysis.
2.   Community engagement: UK qualitative evidence, including one mapping report and one review of barriers and facilitators.
3.   An economic analysis (cost effectiveness review and economic model)

Stream 3 is further divided into **three components:**

Component 1: A précis of the economic evidence reported in "Community engagement to reduce inequalities in health: a systematic review, meta-analysis and economic analysis" available at: http://www.journalslibrary.nihr.ac.uk/__data/assets/pdf_file/0006/94281/FullReport-phr01040.pdf, the précis to include detailed evidence tables and NICE style evidence statements.

Component 2: A rapid review of economic evidence on community engagement interventions from 2010 onwards. Cost data and outcomes to be included to inform any economic modelling (component 3 below).

Component 3: An economic model (or models) exploring the cost effectiveness of different approaches to community engagement.

This report relates solely to the second component – A rapid review of economic evidence on community engagement interventions from 2010 onwards - of the third work stream.

Community engagement is defined as **"an umbrella term encompassing a continuum of approaches to engaging communities of place and/or interest in activities aimed at improving population health and/or reducing health inequalities"**[11]. For the purposes of this guideline, 'community engagement' covers community engagement and community development. The scope for the guideline associates the term 'community engagement' with a number of activities by which **people can improve their health and wellbeing by helping to develop, deliver and use local services and by being involved in local activities**. Community engagement can involve varying degrees of participation and control: for example, giving views on a local health issue, jointly delivering services with public service providers (co-production) and completely controlling services.

For the purposes of the economic analysis, NICE is particularly interested in the three main theoretical approaches to community engagement identified in an earlier review by the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre)[12]. These are:

•   Peer/lay delivered interventions;

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[11] Popay J (2006). Community engagement for health improvement: questions of definition, outcomes and evaluation. A background paper prepared for NICE. London: National Institute for Health and Care Excellence

[12] O'Mara-Eves A, Brunton G, McDaid D, Oliver S, Kavanagh J, Jamal F et al. (2013). Community engagement to reduce inequalities in health: a systematic review, meta-analysis and economic analysis. Public Health Research 1(4)

- Collaboration between health and other statutory services and communities;
- Interventions centred on the concept of empowerment.

O'Mara-Eves et al. (2013) define the three approaches to community engagement as follows:

1. Peer-/lay-delivered interventions: This involves services engaging communities, or individuals within communities, to deliver interventions. In this model, change is believed to be facilitated by the credibility, expertise or empathy that the community member can bring to the delivery of the intervention.

2. Collaboration interventions: This involves engagement with communities, or members of communities, in strategies for service development, including consultation or collaboration with the community about the intervention design. Such models hold the underlying belief that the intervention will be more appropriate to the participants' needs as a result of incorporating stakeholders' views.

3. Empowerment interventions: Empowerment models require that the health need is identified by the community and that they mobilise themselves into action. These models have the underlying belief that, when people are engaged in a programme of community development, an empowered community is the product of enhancing their mutual support and their collective action to mobilise resources of their own and from elsewhere to make changes within the community.

2.1. Overview of the study

The purpose of this review is to update and to build on the learning from the cost-effectiveness reviews undertaken to inform NICE's Public Health guideline on community engagement (PH9) and the EPPI review, published in 2008 and 2013, respectively.

The NICE economic reviews found limited (and problematic) evidence on the economic costs and benefits of community engagement. Two pieces of economic modelling were carried out. In both cases the community engagement approach that was used would be highly cost-effective under one set of assumptions. However, if a key assumption was changed (such as the length of time the effect lasts), the results changed substantially. An approach which was previously deemed very cost-effective could then be judged to be 'cost-ineffective'.

Since the publication of PH9 in 2008, further contributions to the literature have been forthcoming, notably the previously mentioned EPPI systematic review by O'Mara–Eves et al. (2013) but also including, for example, the Knapp et al. (2010) study which examined the cost-effectiveness of time banks, befriending services and community navigators. The Knapp et al. (2010) review discussed several types of befriending services, for two of which (Partnerships for older People Projects (POPPs) and the Brighter Futures Group programme), NHS savings were greater than the cost of the intervention. The third programme (Deep Outreach in Devon) was found to have a positive impact on depression in older people. While the authors of the review did not comment on the cost-effectiveness of this programme, they estimate that a typical befriending service costs around £80 per older person and reduces treatment costs and support for mental health needs by £35 in the first year. In addition, they put the monetary value of improved mental health, based on findings from some of the POPPs pilots, at around £300 per person per year.

A systematic review by Pennington et al. (2013)[13] that has not been included in the current review[14] by Optimity Advisors assesses the cost-effectiveness of the peer or lay health-related lifestyle advisor (HRLA) related interventions and concludes that there is limited evidence suggesting that HRLAs are cost-effective in terms of changing health-related knowledge, behaviours or health outcomes. The evidence that does exist indicates that HRLAs are only cost-effective when they target behaviours likely to have a large impact on overall health-related quality of life. The authors estimated Incremental Cost-effectiveness Ratios (ICERs) at £6,000 for smoking cessation; £14,000 for telephone based type 2 diabetes management; and £250,000 or greater for promotion of mammography attendance and for HIV prevention amongst drug users. Pennington et al. (2013) point out that they lacked sufficient evidence to estimate ICERs for breastfeeding promotion and mental health promotion, or to assess the impact of HRLAs on health inequalities.

O'Mara–Eves et al. (2013) identified 22 economic studies[15] that satisfied the inclusion criteria for their review. However, these evaluations appeared to be more informative than the evidence base available to the reviews conducted for PH9. Of the 22 studies included, eleven studies fell into the category of peer or lay delivered interventions, eight[16] were categorised, to varying extents, by collaboration between health and statutory services and communities and three were concerned with models of engagement centred on empowerment.

Peer/lay delivered interventions investigated by O'Mara et al. (2013) tended to be ones which were aimed at achieving behaviour change among particular target groups, for example encouraging breastfeeding among minority groups, changes in sexual behaviour among those frequenting gay bars in a particular town or the prevention of smoking uptake in schools. The studies which investigated collaboration between health/statutory services and communities also tended to be concerned with behaviour change, such as health education, physical activity, smoking behaviour or diabetes self-management and uptake of existing services such as vaccinations. One study examined the setting up of a new service aimed at the prevention of accidental injuries. One study, of voluntary participation in activities in schools by older people investigated whether there would be benefits, in terms of improved physical, social and mental health for those providing the activities (the voluntary participants) rather than the children who were the recipients of those activities (e.g. help with literacy). Two of the three studies on engagement models centred on empowerment evaluated health promotion interventions, in one case the use of health workers to provide information on decreasing exposure to indoor asthma triggers and, in the other, adult education classes. The third study investigated a neighbourhood renewal initiative, the Neighbourhood Warden Schemes, in England and Wales. While resident surveys identified a variety of outcomes, including quality of life improvements, crime benefits were the only ones to be valued in monetary terms.

As reported by O'Mara-Eves et al. (2013), the majority of the 22 studies identified by the EPPI review team were of limited quality. Of the studies reviewed, only eight included some form of stochastic or sensitivity analysis to address uncertainty around effectiveness and cost estimates. None appeared to undertake any form of subgroup analysis, while only five looked at productivity costs and three considered costs to family members. According to the authors of the review, positive benefits associated with the acquisition of skills and confidence were noted but not valued in economic studies. The authors also point out that although most of these studies suggested that different community engagement actions can be a cost-effective use of resources, caution must be exercised. O'Mara-Eves et al. (2013) noted that community engagement is not

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[13] Pennington, M., Visram, S., Donaldson, C., White, M., Lhussier, M., Deane, K., Carr, S. M. (2013). Cost-effectiveness of health-related lifestyle advice delivered by peer or lay advisors: synthesis of evidence from a systematic review. Cost Effectiveness and Resource Allocation: C/E, 11(1), 30. doi:10.1186/1478-7547-11-30

[14] All the studies included in the systematic review have been published prior to 2011.

[15] The EPPI review reports having included 21 studies, but they in fact make reference to 22 studies.

[16] The review states seven but actually references eight studies.

often evaluated as an 'adjuvant' to existing interventions. The authors considered that there is also some literature highlighting the impact that poor cash flow and worries about long-term sustainability can have on the success of different engagement schemes. Finally, the authors conclude that the impacts of financial incentives on the success of community engagement strategies, as well as the impacts of different levels of payment for peers involved in delivering community engagement interventions, merit further attention.

The inclusion criteria used for the original EPPI review (O'Mara-Eves et al, 2010) are broadly relevant for the update of the review of cost-effectiveness evidence although, as the guideline will not cover engagement activities that do not report on primary or intermediate health outcomes, the eligibility of primary studies may be narrower for this review than in the original EPPI study. At the same time, while the focus of the EPPI review was on health inequalities, this review has a broader focus as it looks at community interventions initiatives to improve health and also to address inequalities.

Finally, in this review we also include the searches and coding carried out by the contractor of stream 1 for the following databases:
1. Trials Register of Promoting Health Interventions (TRoPHI) database;
2. Database of promoting health effectiveness reviews (DoPHER);
3. Cochrane Database of Systematic Reviews (CDSR);
4. Database of Abstracts of Reviews of Effects (DARE);
5. Campbell Library;
6. NIHR Health Technology Assessment (HTA) programme website / journals library;
7. Health Technology Assessment (HTA) database.

3. Aims and objectives and research questions

3.1. Aims

The aim of this study is to review recent economic evidence in an attempt to establish whether community engagement approaches to improve health and reduce health inequalities are cost-effective. Establishing the cost-effectiveness of community engagement approaches is important because, as per the public health methods manual, the Public Health Advisory Committee (PHAC) responsible for developing the new Community Engagement guideline is required to make decisions informed by the best available evidence of both effectiveness and cost-effectiveness. Therefore, the economic analysis is integral to the development of public health guidance as it will provide information on whether the resources are being used efficiently to improve the population's health. As explained in the public heath manual, the cost-effectiveness of an intervention or programme is assessed to ensure maximum health gain from the finite available resources. However, as the manual states, it is important to bear in mind that a balance must be struck between efficient allocation of resources and an equitable allocation of those resources. Public health recommendations should be based on the balance between the estimated cost and the expected health benefits of each intervention.

The review also aims at providing the PHAC with an update of the work to date in the area of community engagement and to keep the literature review current. The review also informed the economic analysis (component 3) Optimity has carried out as part of the contract with NICE.

3.2. Objectives

1. To undertake a systematic review according to the NICE public health guidance development process[17] and the Methods for the development of NICE public health guidance[18];
2. To report clear findings of the evidence review (including the formulation of evidence tables, narrative summaries and tables, graphical presentation and meta-analysis if appropriate), evidence statements and applicability assessment.

3.3. Review questions

Question 1: How cost-effective are community engagement approaches at improving health and wellbeing and reducing health inequalities?

Question 2: How cost-effective are community engagement approaches at encouraging people to participate in activities to improve their health and wellbeing and realise their capabilities – particularly people from disadvantaged groups?

Question 3: What processes and methods help communities and individuals realise their potential and make use of the all the resources (people and material) available to them?

Subsidiary questions may include:

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[17] National Institute of Health and Care Excellence (2012) The NICE public health guidance development process. London: NICE. URL:
http://publications.nice.org.uk/the-nice-public-health-guidance-development-process-third-edition-pmg5

[18] National Institute of Health and Care Excellence (2012) Methods for the development of NICE public health guidance. London: NICE. URL:
http://publications.nice.org.uk/methods-for-the-development-of-nice-public-health-guidance-third-edition-pmg4/appendix-b-electronic-resources

- What impact do the following have on the cost-effectiveness of different interventions:
  - deliverer;
  - community representative or group;
  - health topic;
  - setting;
  - timescale;
  - timing;
  - theoretical framework?

4.   Methodology

4.1.   Searching

We have conducted a search using electronic databases. The list of database sources is presented in Appendix A.

The search strategies are based on the guideline scope and the search strategy designed by the EPPI team undertaking workstream 1. The search strategies conducted for this review are presented in Appendix AB. As EconLit covers a broad spectrum of economics literature, we ran our searches on this database with and without an economics filter. As screening a 10% sample of the additional abstracts identified by the unfiltered search did not identify any relevant studies, we restricted ourselves to the filtered search. While we would not normally consider it appropriate to apply an economics filter to a specialist economics database, the excess of the unfiltered over the filtered results yielded studies which were out of scope of this study, covering subjects such as macroeconomics, economics of climate change, agricultural policy, trade policy and general social inequalities. In addition, much of it was non-OECD literature.

To keep the review current, searches in two databases (EconLit and NHS EED) have been updated in March in order to incorporate any new evidence before submission of the final report. After searching for new references published between August 2014 and March 2015, a total of 168 abstracts were screened but none of the studies met the inclusion criteria for the review.

To locate any literature in addition to that identified via the sources presented in Appendix A, we have worked in close collaboration with contractors undertaking streams 1 and 2 to ensure we incorporate in this review all the relevant economic studies they have identified when sifting effectiveness or qualitative search results.

Stream 1 contractors undertook an update and extension of an existing review (O'Mara-Eves et al. 2013) with extended analysis of community engagement literature. Stream 2 contractors undertook an evidence review to address the barriers to, and facilitators of, community engagement approaches and practices.

We received from stream 1 contractors the results of their searches, in particular any studies identified containing an economic analysis of any type or any cost information potentially relevant for our modelling work (component 3). In addition, while we located a high number of 'grey' literature papers or non-peered reviewed literature through the database searches, we also received potentially relevant reports identified by the stream 2 contractors. The contractors undertaking stream 2 of the Community Engagement guideline update have browsed relevant websites in order to locate further evidence. The list of websites that has been suggested by the contractors undertaking work stream 2 is presented in Appendix A.

Further search sources include:
- The call for evidence made by NICE; and

Additional forwards/backwards citation searching based on the studies we include in the review. So far, the studies identified this way have been excluded from the review as they were not relevant.

All records from the searches carried out by Optimity (stream 3) have been uploaded into an MS Access database we have developed for our systematic reviews and duplicates removed. The database is also used to keep a record of screening decisions and to support reconciliation for double screening. The number of studies we have identified in each database and other sources, including those identified by streams 1 and 2, are presented in Appendix B.

Electronic records of the references retrieved by searches have been stored using a reference management software compatible with EndNote.

4.2. Screening

4.2.1. Study types

We have included in the review any relevant economic and cost studies, including the following study types:
- Cost-benefit analyses (CBA);
- Cost-effectiveness studies (CEA);
- Cost-utility analyses (CUA);
- Other relevant cost analyses, including cost-consequence analysis (CCA).

The definitions of the above types of economic analysis are presented in the Glossary.

Where we have retrieved systematic reviews including any of the study types listed above, we have used the review as a source of further economic studies – or primary studies that include an economic focus - rather than include them in their own right. We have also reviewed the studies identified by Stream 1 and Stream 2 that included an economic analysis or primary studies reporting economic data although most have been discarded because they did not present relevant cost information.

4.3. Inclusion criteria

The inclusion criteria developed for the review are as follows:
- The study was published in 2011 or later;
- The study is an economic study as per the list of study types above;
- The study does not report a full comparative economic analysis, but is a systematic review or includes primary research (in that data have been collected during that study through interaction with or observation of study participants) and also includes relevant economic information (e.g. unit costs);
- The main focus of the study is a community engagement activity, as per the guideline scope (4.2.1). In the case of a systematic review or a non-peer reviewed report about specific initiatives, programmes or interventions, the study should describe at least one intervention relevant to community engagement;
- The study is relevant for at least one community or group as per the guideline scope (4.1.1);
- The study measures and reports health or intermediate outcomes as per the guideline scope (4.3.1):
- Expected health outcomes:
  o Improvement in individual- and population-level health and wellbeing;
- Expected intermediate outcomes:
  o Positive changes in health-related knowledge, attitudes and behaviour;
  o Improvement in process outcomes, such as service acceptability and uptake, efficiency, productivity and partnership working;
  o Increase in the number of people involved in community activities to improve health;
  o Increase in the community's control of health promotion activities;
  o Improvement in personal outcomes and assets, such as self-esteem, independence, resilience, friendships, personal resources, mutual help, empowerment, social capital, trust, etc.
  o Improvement in the community's ability and capacity to make changes and improvements to foster a sense of belonging (social cohesion).

All the studies reviewed have been published in English and we have only included in the review studies conducted in OECD countries. Because of differences in health care systems and structure between high-income and low-income countries, it is unlikely that results from low-income countries will be readily transferable to the UK context. However, restricting inclusion to studies conducted in England or the UK would unduly limit the range of available data. We have applied this exclusion criterion at the screening stage.

As defined in guideline scope (4.2.2), the following have been excluded:
- Studies which do not aim to reduce the risk of a disease or health condition;
- Studies which do not aim to promote or maintain good health (by tackling, for example, the wider determinants of health);
- Studies which focus on the planning, design, delivery or governance of treatment in healthcare settings; and
- Studies which target individuals rather than a specific community.

4.4. Screening

All titles and abstracts (N=4,125 + N=168) have been reviewed by two independent reviewers from the Optimity team, using an abstract inclusion checklist presented in Appendix D.. 10% of abstracts were double-screened with no disagreement between reviewers.

Where there is uncertainty about the relevance of a paper from the abstract, the full text was retrieved. Full text references have also been screened by two reviewers independently, with any disagreement resolved by discussion, or through consultation with a third reviewer. Of the 68 papers included for full text screening, 36 studies (53%) have been double-screened and 7 (10%) have been screened by a third reviewer.

The flow of literature for the review is presented below:

Figure 1: Flow of literature


```
Records identified          Additional
through database            records
searching                   identified
(n = 6,875)                 through other
                            sources
       │                    (Stream 1 and        Records
       ▼                    Stream 2             identified in
Records identified after    contractors)         update search
duplicates removed          (n =   29)           (March 2015)
(n = 4,096)                                       (n=168)
       │                          │                   │
       ▼                          ▼                   ▼
          Records screened (abstracts)              Records excluded
          (n = 4,125 + n=168)            ─────────► (n = 4,057 + n = 168)
                    │
                    ▼
          Full-text articles assessed for eligibility   Full-text articles excluded
          (n = 68)                              ───────► (n = 49)
                    │
                    ▼
          Studies included in cost-effectiveness synthesis   Excluded in further
          (n = 19)                               ──────────► discussion with NICE
                    │                                          (n=8)
                    ▼
          Studies included in the review
          (n=11)
```

Of the 68 full-text papers screened, 43 (63%) were academic studies published in academic journals, most of them peer reviewed. The remaining 25 (37%) are non-peer reviewed reports about specific initiatives, programmes or interventions. A majority of these reports (n=49) have been excluded because they were not economic analyses or did not present relevant cost data or because they did not measure relevant outcomes. Further 8 studies have been excluded after discussions with NICE because of differences in applying and interpreting the definitions of community engagement in the guideline scope and in the review by the O'Mara-Eves et al (2013), and the definitions of the three community engagement approaches. The list of studies is presented in Section 8.4. All the 11 studies included in the review are peer-reviewed academic papers.

4.5. Data extraction and quality assessment

To undertake our analysis we have followed the methods for reviewing economic evaluations set out in the *Methods for the development of NICE public health guidance*[19] We have located 11 studies and have extracted the relevant data into a data extraction table that was developed based in Appendix K3 "Example of evidence table for economic evaluation studies" of the same manual. One reviewer has carried out the data extraction of most papers with a small sample of papers (four) analysed by two reviewers in order to pilot the data extraction tables and ensure all the items were understood correctly. The evidence tables of included studies are presented in Appendix E.

In our review, we have also appraised the quality of 11 economic studies as per "Appendix I Quality appraisal checklist – economic evaluations" of the NICE methods manual[20]. The applicability and limitations of the studies are used to assess the quality of the studies and facilitate drawing conclusions about the cost-effectiveness of interventions. We have used the recommended checklist for each type of economic evaluation, this are the CCA, CBA, CEA and CUA checklists. NICE checklists serve to assess the methodological quality of the study in the following way:

- **Very serious limitations:** the study fails to meet one or more quality criteria and this is very likely to change the conclusions about cost-effectiveness. Such studies would usually be excluded from further consideration;
- **Potentially serious limitations:** the study fails to meet one or more quality criteria and this could change the conclusions about cost-effectiveness;
- **Minor limitations:** the study meets all quality criteria, or fails to meet one or more quality criteria but this is unlikely to change the conclusions about cost-effectiveness.

NICE checklists can also be used to judge the overall applicability of the study in the context of the guidance:

- **Not applicable:** the study fails to meet one or more applicability criteria and this is very likely to change the conclusions about cost-effectiveness. Such studies would usually be excluded from further consideration;
- **Partially applicable:** the study fails to meet one or more applicability criteria and this could change the conclusions about cost-effectiveness;
- **Directly applicable:** the study meets all applicability criteria, or fails to meet one or more applicability criteria but this is unlikely to change the conclusions about cost-effectiveness.

Based on the results of the quality appraisal, we determined the quality rating of each study. The quality rating set out in the methods guidance is as follows:

- **High (++):** all or most of the checklist criteria have been fulfilled, where they have not been fulfilled the conclusions are very unlikely to alter;
- **Moderate (+):** some of the checklist criteria have been fulfilled, where they have not been fulfilled, or not adequately described, the conclusions are unlikely to alter;
- **Low (-):** few or no checklist criteria have been fulfilled and the conclusions are likely or very likely to alter.

To increase reliability, two reviewers have assessed the quality of a small sample of studies and discussed and resolve any issues or disagreements. One reviewer has continued to assess the quality of the studies with a sample of studies (four) double-assessed by two independent reviewers. There were no disagreements because any issues arising while assessing quality were discussed among two reviewers and any disagreements

[19] National Institute of Health and Care Excellence, 2012. Methods for the development of NICE public health guidance (third edition). URL http://www.nice.org.uk/article/PMG4/chapter/1%20Introduction

[20] National Institute of Health and Care Excellence, 2012. Methods for the development of NICE public health guidance (third edition). URL http://www.nice.org.uk/article/PMG4/chapter/1%20Introduction.

resolved by consensus. The Quality Assessment checklists for all the included studies are presented in Appendix F of this report.

5. Findings

5.1. Study characteristics

5.1.1. Study design

We have included in this review 11 studies, of which 10 were primary research studies. The remaining study by Cooper et al. (2012) presented a systematic review of literature and constructed an MS Excel based economic model to evaluate the cost-effectiveness of sexually transmitted infections through school based education.

Seven papers have presented the findings of randomised controlled trials[21] . Brown et al. (2012) reported outcomes of a trial too but did not explain if the trial was randomised or not. Cooper et al. (2012) have constructed an economic model that will be reviewed in depth below. Grimes and colleagues (2011) analysed hospital claims data in relation to mental health. Moodie et al. (2013) conducted a study with a quasi-experimental design.

5.1.2. Country

Four studies were conducted in the UK[22] . Another three studies were conducted in the United States[23] . Two studies by Dukhovny et al. (2013) and Goeree et al. (2013) were based in Canada, the study by Gillespie et al. (2012) was based in Ireland, and the study by Moodie et al. (2013) was undertaken in Australia.

5.1.3. Type of economic analysis

From the selected 11 studies, six studies were cost-effectiveness analyses[24] . Four out of 11 papers reported cost-utility analyses[25] . Cost-consequence analysis was reported only in one study that evaluated the cardiovascular health awareness programme (Goeree et al. 2013).

5.1.4. Quality assessment

In terms of quality assessment, five studies have minor limitations[26]. The remaining six studies have potentially serious limitations and should be treated with caution by taking into account their limitations[27].

5.1.5. Applicability

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[21] Barton et al. 2012, Dukhovny et al. 2013, Gillespie et al. 2012, Goeree et al. 2013, Hollingworth et al. 2012, Irvine et al. 2011, and Krukowski et al. 2013.

[22] Barton et al. 2012, Cooper at al. 2012, Hollingworth et al. 2012, and Irvine et al. 2011.

[23] Brown et al. 2012, Grimes et al. 2011, and Krukowski et al. 2013.

[24] Cooper et al. 2012, Dukhovny et al. 2013, Grimes et al. 2011, Hollingworth et al. 2012, Krukowski et al. 2013, and Moodie et al. 2013.

[25] Barton et al. 2012, Brown et al. 2012, Gillespie et al. 2012, and Irvine et al. 2011.

[26] Barton et al. 2012, Brown et al. 2012, Cooper et al. 2012, Gillespie et al. 2012, and Goeree et al. 2013.

[27] Dukhovny et al. 2013, Grimes et al. 2011, Hollingworth et al. 2012, Irvine et al. 2011, Krukowski et al. 2013 and Moodie et al. 2013.

All 11 studies were regarded either as partly applicable[28] or directly applicable[29]. No studies were regarded as non-applicable.

All currencies were converted into British Pounds using the historical exchange rates from http://www.oanda.com.

A quick overview of the included studies is presented in Table 3.

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[28] Brown et al. 2012, Dukhovny et al. 2013, Goeree et al. 2013, Grimes et al. 2011, Krukowski et al. 2013, and Moodie et al. 2013.

[29] Barton et al. 2012, Cooper et al. 2012, Gillespie et la. 2012, Hollingworth et al. 2012, and Irvine et al. 2011.

Table 3: Summary table of all included studies (by alphabetical order)

Study		Type of analysis	Type of intervention	Intervention	Limitations	Applicability	Conclusion on cost-effectiveness
1	Barton et al. 2012	CUA	Peer/lay delivered	Improvement of heart-health lifestyles in deprived communities	Minor limitations (++)	Directly applicable	The intervention had a chance of 39.5% to be cost-effective (UK setting)
2	Brown et al. 2012	CUA	Peer/lay delivered	Lifestyle modification educational programme for patients with diabetes	Minor limitations (++)	Partly applicable	The intervention is cost-effective particularly for adults with high glycaemic levels (US setting)
3	Cooper et al. 2012	CEA	Peer/lay delivered	Educational and demonstrational sessions to educate pupils on sexually transmitted infections	Minor limitations (++)	Directly applicable	The teacher let intervention fell under the cost-effectiveness threshold, however, peer led was more costly due to more frequent retraining (UK Setting)
4	Dukhovny et al. 2013	CEA	Peer/lay delivered	Peers support group (PSG) - telephone based volunteer support of post-partum depression (PPD)	Potentially serious limitations (+)	Partly applicable	Authors state: "The economic advisability of such a program for the public sector will depend on local costs as well as the importance placed on the opportunity costs of parent and volunteer time" (page 639) (Canadian setting)
5	Gillespie et al. 2012	CUA	Peer/lay delivered	Group based peer support in general practice for patients with type 2 diabetes	Minor limitations (++)	Directly applicable	Authors conclude the intervention as cost-effective (Irish setting)
6	Goeree et al. 2013	CCA	Peer/lay deivered	Cardiovascular Health Awareness Programme (CHAP) – risk factor assessment and education sessions	Minor limitations (++)	Partly applicable	The intervention resulted in CVD hospitalisation cost reduction, but no reduction in overall rates or costs of hospitalisation. No conclusion has been made about cost-effectiveness of the intervention (Canadian setting)
7	Grimes et al. 2011	CEA	Collaboration between health and other statutory services and communities	The Mental Health Services Program for Youth though creating Care Planning Team with discussion with the family	Potentially serious limitations (+)	Partly applicable	The effectiveness of the intervention has been established, however, not remark is made about its cost-effectiveness (US setting)

Study		Type of analysis	Type of intervention	Intervention	Limitations	Applicability	Conclusion on cost-effectiveness
				of the patient and based on needs			
8	Hollingworth et al. 2013	CEA	Peer/lay delivered	ASSIT (A Stop Smoking In Schools Trial) informal interactions to encourage peers not to smoke	Potentially serious limitations (+)	Directly applicable	The authors consider the intervention cost-effective under assumption that smoking reduction in adolescence will lead to lower prevalence of smoking in adulthood (UK Setting)
9	Irvine et al. 2011	CUA	Peer/lay delivered	Diet and exercise advice to patients with type 2 diabetes that is not cost-effective	Potentially serious limitations (+)	Directly applicable	The intervention was not within current cost-effectiveness threshold (UK setting)
10	Krukowski et al. 2013	CEA	Peer/lay delivered	Lifestyle intervention utilizing Diabetes Prevention Programme (DPP) intervention materials adapted for group delivery	Potentially serious limitations (+)	Partly applicable	The intervention achieved weight loss. However, no statement on cost-effectiveness was made (US setting)
11	Moodie et al. 2013	CEA	Collaboration between health and other statutory services and communities	Be Active Eat Well (BAEW) – a community based capacity building demonstrating programme that promotes healthy eating and physical activity	Potentially serious limitations (+)	Partly applicable	The authors consider the intervention to be cost-effective (Australian setting)

5.2.   Summary of included studies

5.2.1.   Peer/lay delivered interventions

In their cost-utility analysis, Barton et al. (2012) assess the cost-effectiveness of using a lay 'health trainer' (LHT) to improve heart-health lifestyles in deprived communities. Seventy-two participants were randomised to a LHT, with 38 participants to a control group. Both groups received health promotion literature and LHT were also able to provide intervention participants with information, advice and support aimed at changing beliefs and behaviour. In the study, the cost-utility [incremental cost-effectiveness ratio (ICER)] of LHT was calculated and assessed in relation to the cost-effectiveness threshold of £20,000 - 30,000 per QALY. The authors also calculated the probability of LHT being cost-effective. The mean cost of the LHT intervention was £151. On average, other health and social service costs fell by £21 for controls and £75 for intervention participants giving a mean overall incremental cost of £98 for LHT. According to the authors, the mean QALY gains were 0.022 and 0.028, respectively. The reported ICER for LHT was £14,480 per QALY gained, with probability of 39.5% of being cost-effective at a £20,000/QALY threshold. Barton et al. 2012 conclude that LHT provision was cost-effective for people at risk of CVD. However, they acknowledge that a large level of uncertainty was associated with that decision. The study, conducted in the UK, is considered directly applicable and with only minor limitations.

In the CUA by Brown et al. (2012), the aim was to estimate the long-term cost-effectiveness of a lifestyle modification programme led by community health workers (CHWs). The intervention was a diabetes education and self-management programme aimed at low-income Hispanic adults with type 2 diabetes. The programme included home based CHW visits, classroom health education classes, nutrition classes, exercise classes and counselling sessions. The authors concluded that the CHW programme was cost-effective. The incremental cost-effectiveness ratio of the intervention ranged from $10,995 (£6,751 in 2010) to $33,319 (£20,458) per QALY gained when compared with usual care. The intervention was particularly cost-effective for adults with high glycaemic levels (A1c > 9%). According to the authors, the results are robust to changes in multiple parameters. Outcomes were projected 20 years into the future and discounted at a 3% rate. Sensitivity analyses were conducted to assess the extent to which our results were dependent on assumptions related to program effectiveness, time horizon, discount rates, and costs. The study, conducted in the United States, is considered partly applicable and with only minor limitations.

Cooper et al. (2012) conducted a cost-effectiveness analysis of an intervention aimed at reducing sexually transmitted infections (STI) and teenage pregnancy through health education. The study compared educational and demonstrational sessions to educate pupils on STIs delivered by peers and by teachers against standard education. The authors developed an economic model to estimate the total number of STI cases averted, the consequent gain in health related quality of life (HRQoL) and savings in medical costs, based on changes in sexual behaviour. The parameters for the model were derived from a systematic literature search on intervention effectiveness, epidemiology of STIs, sexual behaviour and lifestyles, HRQoL and health service costs. The costs of providing teacher-led and peer-led behavioural interventions were €5.16/£4.29 and €18/£14.95 (2012 costs) per pupil, respectively. The difference in the cost can be explained by the fact that the teacher/pupil education ratio is 1:61 and peer/pupil 1:9. This is to say that one teacher can educate 61 pupils, whereas one peer delivers the intervention to 9 pupils. To calculate the costs, the authors assumed that peers deliver the intervention only for one year, following which the new peers would be recruited, whereas teachers would be retrained every five years, making the peer-delivered intervention considerably more expensive that the teacher-delivered one. For a cohort of 1,000 boys and 1,000 girls aged 15 years, the model estimated that both interventions, peer or teacher-led would avert two STI cases and gain 0.35 Quality Adjusted Life Years (QALYs), but at a different cost. Compared to standard education, the ICERs of the teacher-

led and peer-led interventions were €24,268/£20,162 and €96,938/£80,536 per QALY gained, respectively. Cooper et al. conclude that school-based behavioural interventions which provide information and teach young people sexual health skills can bring about improvements in knowledge and increased self-efficacy, though these may be limited in terms of impact on sexual behaviour. The authors also add that there is uncertainty around the results due to the limited effect of the intervention on behavioural outcomes and paucity of the data for other input parameters. The study, conducted in the UK, is considered directly applicable and with only minor limitations as outcomes are only summarised for chlamydia due to its high prevalence. Other outcomes, such as number of HIV cases, gonorrhoea or genital warts are not presented.

Dukhovny et al. (2013) conducted a CEA to estimate the cost-effectiveness of peer support for the prevention of post-partum depression (PPD). The authors prospectively planned an economic evaluation alongside the clinical trial to determine the cost per case of PPD averted, using individual patient data and a societal perspective. According to the authors, the mean cost per woman was CAN$4,497 (£2,860 in 2011) in the peer support group and CAN$3,380 (£2,150) in the usual care group. There was a 95% probability that the programme would cost less than CAN$20,196 (£12,845) per case of PPD averted. Dukhovny et al. 2013 conclude that although the programme is a volunteer-based one, there is a net cost to the health system and society in implementing it, which may or may not be within the range for other accepted interventions for women at risk of PPD. The results of the study need to be treated with caution as the study is considered partly applicable and with potentially serious limitations. Authors did not use QALY outputs as a measure of effectiveness but presented ICER at value of CAN$10,009/£6,366 (per case of PPD averted). Dukhovny and colleagues (2013) also raise a concern with possible biases in resource utilisation questionnaire.

Gillespie et al. (2012) conducted a CUA to examine the cost-effectiveness of a group-based peer support intervention in general practice for patients with type 2 diabetes, including quantification of the uncertainty surrounding the incremental results. The authors conducted within trial analysis based on a cluster randomised controlled trial of 395 patients with type 2 diabetes in the east of Ireland. They also conducted beyond trial analysis using the United Kingdom Prospective Diabetes Study (UKPDS) Outcomes Model. The model uses probabilistic discrete time computer simulation based on an integrated system of parametric proportional hazards risk equations to estimate the relationship between exposure over time to glycaemia and other risk factors and the development of diabetes related complications. The authors report that, compared with the control group, the intervention was associated with an increase of 0.09 in mean QALY/patient and savings of €637.43 (£475.14 in 2008) in mean healthcare cost/patient and €623.39 (£464.67) in mean total cost/patient respectively. The likelihood of the intervention being cost-effective was appreciably higher than 80% for a range of potential willingness-to-pay cost-effectiveness thresholds on cost-effectiveness acceptability curve. Authors state that the probability of the intervention being cost-effective at a cost-effectiveness threshold value of €5,000 (£3,727) was 87%; at €15,000 (£11,181) the probability of the intervention being cost-effective was 91% and at a threshold of €30,000 (£22,362) the probability was 92%. At €45,000 (£33,543) the probability of the intervention being cost-effective was 91%. The study, conducted in Ireland, is considered directly applicable and with only minor limitations.

In their CCA, Goeree et al. (2013) evaluate the resource use and cost-consequences of a community-wide Cardio-vascular Health Awareness Program (CHAP) in a rural setting. CHAP was compared to the usual health promotion and health care services provided under health insurance system. According to the authors, CHAP was associated with a reduction in cardiovascular diseases (CVD) hospitalisation costs. The primary outcome measure of the overall study was the mean annual number of hospital admissions for acute myocardial infarction (MI), congestive heart failure (CHF), and stroke among elderly trial residents in the intervention and control communities. Secondary outcome measures included mortality among patients hospitalised for CVD and coronary artery disease, all-cause mortality, hospitalisations for stroke and coronary artery disease, and initiation of antihypertensive drug therapy. CHAP cost between CAN$11,976 (£7,150 in 2010) and CAN$57,113

(£34,096) depending on community size. Average community based costs per community were CAN$30,494/£18,205. The total cost of CHAP was CAN$1,414,178/£844,264, or about CAN$71,000/£42,387 per community, and CAN$20.20/£12.05 per elderly resident. The authors found no differences in utilisation rates or costs for overall hospitalisations, in visits to emergency rooms, physicians, or specialists, or in the use of prescription medications. Results were robust over a range of cost assumptions. Goeree et al. (2013) conclude that a community-wide CVD awareness programme can be implemented and can reduce CVD-related hospitalisation costs at the level of the community without a corresponding increase in overall healthcare costs. The study, conducted in Canada, is considered partly applicable and with only minor limitations due to number of methodological weaknesses (its applicability to urban settings; no account has been taken for community mobilisation and in-kind contributions) summarised by the authors themselves. This study is partly applicable due to country differences.

Hollingworth et al. (2012) conducted a cost-effectiveness analysis of a school-based peer-led intervention. The authors evaluated the ASSIST (A Stop Smoking In Schools Trial) programme in a cluster randomised controlled trial. The ASSIST programme trained students to act as peer supporters during informal interactions to encourage their peers not to smoke. According to Hollingworth and colleagues 59 secondary schools in England and Wales were randomised to receive the ASSIST programme or usual smoking education, reaching 10,730 students aged 12–13 years who attended participating schools. The intervention was compared to the usual smoking prevention education. The ASSIST programme cost £32 per student. The incremental cost per student not smoking at 2 years was £1,500. Students in intervention schools were less likely to believe that they would be a smoker at age 16 years. The authors conclude that the peer-led intervention reduced smoking among adolescents at a modest cost and that the intervention is cost-effective under realistic assumptions regarding the extent to which reductions in adolescent smoking lead to lower smoking prevalence and/or earlier smoking cessation in adulthood. The annual cost of extending the intervention to Year 8 students in all U.K. schools would be in the region of £38 million and could result in 20,400 fewer adolescent smokers. The study, conducted in the UK, is considered directly applicable but the results need to be considered with caution as the study has potentially serious limitations on the grounds that the model is not presented and the method used in the analysis is unclear. Also, the outcome measure is not comprehensively described and the authors did not cost peer support time.

Irvine et al. (2011) conducted a CUA assessing the impact of prolonged structured diet and exercise advice on patients newly diagnosed with type 2 diabetes or impaired fasting glucose (IFG). The intervention consisted of group based education, physiotherapy and peer support sessions, plus telephone contacts from type 2 diabetes volunteers. The control group intervention consisted of two hour sessions of exercise and diet advice (assumed to be equivalent of standard care for newly diagnosed IFG patients). The comparison group was also given pedometers to record step count. The authors monitored healthcare resource use, intervention costs, and quality of life (EQ-5D). The incremental cost per QALY gained (incremental cost-effectiveness ratio [ICER]), and cost-effectiveness acceptability curves (CEAC) were estimated. For the study, 177 participants were recruited (118 intervention, 59 controls), with a mean follow-up of 7 months. Excluding screening and recruitment costs, the mean cost was estimated to be £551 per participant in the intervention arm, compared with £325 in the control arm. The QALY gains were 0.001 and 0.004, respectively. The intervention was estimated to have an ICER of £67,184 per QALY (16% probability of being cost-effective at the £20,000/QALY threshold). Cost-effectiveness estimates were more favourable for participants with IFG and those with longer follow-up (≥4 months) (ICERs of £20,620 and £17,075 per QALY, respectively). The authors conclude that the group sessions to prevent type 2 diabetes were not within current limits of cost-effectiveness. There was also a large degree of uncertainty surrounding these estimates and further research is needed. The study has been considered directly applicable and with potentially serious limitations as QALYs were the only outcome measured. It would have been relevant to assess intervention outcomes for other health factors (e.g. BMI).

Krukowski et al. (2013) conducted a CEA examining the cost of a translation of the Diabetes Prevention Programme (DPP) lifestyle intervention for older adults in Arkansas (US) senior centres as delivered by lay health educators. For this study, the authors used data from a cluster randomised control trial (conducted in the period 2008 - 2010) in which 7 senior centres (116 participants) were randomised to implement a lay health educators-delivered 12-session translation of the DPP lifestyle intervention. The comparator is not described. Krukowski et al. (2013) compiled direct lifestyle intervention implementation costs, including training, recruitment, materials, and ongoing intervention implementation support. Weight loss data (at 4-month follow-up) were collected from participants. Participant weight loss averaged 3.7 kg at 4-months. The total estimated cost to implement the lifestyle intervention is $2,731 (£1,854 in 2009) per senior centre, or $165/£112 per participant. The implementation cost per kilogram lost is $45/£30.50. The authors conclude that the intervention is effective in achieving weight loss at low cost. The results of the study need to be considered with caution as the study is considered partly applicable and with potentially serious limitations. The intervention is not fully explained and it is not a full formal cost evaluation as it lacks consideration of participant costs nor are costs associated with extended implementation and long-term weight maintenance available.

5.2.2. Interventions delivered in collaboration between health and other statutory services and communities

Grimes and colleagues (2011) conducted a CEA assessing the cost-effectiveness of the Mental Health Services for Youth (MHSPY) in the US. MHSPY is an intensively integrated, family and community based clinical intervention targeted at youth with documented mental health need. The Clinical Care Managers review the child and family's need to create a Care Planning Team. We have classified this intervention as a collaboration between health and other statutory services and communities. Grimes et al. (2011) compared usage of various services (emergency room, inpatient and outpatient psychiatry, paediatric inpatient, ambulatory paediatrics, pharmacy) in MHSPY group to usual care. The usual care group was divided into two groups: Group A - children who had no inpatient psychiatry claims and Group B - children whose total mental health claims included at least one inpatient psychiatry admission. This study found that, possibly due to higher adherence as a result of intervention, MHSPY group claims expense was two times higher than Group A and 46% higher than Group B. A higher number of outpatient paediatric services was recorded in MHSPY group compared to Group A, but lower than among Group B. A reduction was seen in intensive service utilisation. Patients in MHSPY group had 2.5 times the emergency room expenses than in Group A, but less than in Group B. Total cost per MHSPY member per month was $761.69 (£478.57 in 2011) compared to $236.30/£148 and $1,573.18/£988 in Group A and Group B respectively. Authors have summarised a number of limitations that encompass possible biases and sampling. The limitations are summarised in the evidence table. In addition, the Optimity review team has highlighted a number of other limitations. First, authors have not assessed quality of life (including carers') related to increased/decreased admission or usual care. No cost productivity loss was considered for carers/parents. It is difficult to draw a conclusion on cost-effectiveness of the intervention due to mixed results. Due to a number of weaknesses, we think this study has potentially serious limitations and is partly applicable due to country health care service differences.

Moodie et al. (2013) examine the cost-effectiveness of Be Active Eat Well (BAEW), a large, multifaceted, community-based capacity-building demonstration programme that promoted healthy eating and physical activity. The programme was aimed at children aged 4 to 12 years. The authors conducted a quasi-experimental, longitudinal study using anthropometric data collected at baseline (N=1,001 intervention; N=1,183 comparator) and follow-up. A societal perspective was employed, with intervention resource use measured retrospectively based on process evaluation reports, school newsletters, reports, and key stakeholder interviews, and valued in 2006 Australian dollars (AUD). The outcomes were measured as Body Mass Index (BMI) units saved and Disability Adjusted Life Years (DALYs) averted over the predicted cohort

lifetime, and the results were reported in the form of incremental cost-effectiveness ratios (with 95% uncertainty intervals). The intervention cost AUD 0.34 million annually, and resulted in savings of 547 BMI units and 10.2 DALYs. This translated to modest cost offsets of AUD 27,311 or £12,276 (2006 cost) and a net cost per DALY saved of AUD 29,798/£13,394. The authors conclude that the BAEW programme was affordable and cost-effective, although at least 70% of the intervention effect would need to be retained to ensure the intervention remained cost-effective. They also assert that the intervention generated substantial spin-offs in terms of activity beyond funding levels, as every one dollar of project funding invested generated an additional AUD2.80/£1.26 worth of activity at the community level. However, spin-off activities are not specified. In addition, the model is based on the assumption of 100% maintenance of the effect of the programme. The results of the study need to be considered with caution as the study is considered partly applicable and with potentially serious limitations.

5.2.3. Detailed summary tables

Here we present the summary tables including all relevant details of the studies discussed above, grouped by the type of economic analysis.

Table 4: CCA study

Study		Intervention	Comparator	Population	Country/setting	Cost	Benefits
1	Goeree et al. 2013	Cardiovascular Health Awareness Programme (CHAP) – risk factor assessment and education sessions	Usual health promotion and health care services available to all residents	Elderly residents >65	Canada/Medium sized communities	Total cost of CHAP CAN$1,414,178/£844,264; about CAN$71,000/£42,387 per community, CAN$20.20/£12.06 per elderly resident	Annual number of hospitalisation

Table 5: CEA studies

Study		Intervention	Comparator	Population	Country/setting	Cost	Benefits
1	Cooper et al. 2012	Educational and demonstrational sessions to educate pupils on sexually transmitted infections (peer or teacher led)	Standard education	Pupils at schools	UK/Schools	€5.16/£429 teacher led, €18/£14.95 peer led per pupil; Medical cost chlamydia - €904.04/£751.08, gonorrhoea - €904.04/£751.08, genital warts - €675.13/£560.90, HIV - €490,385/£407,412. Total cost of intervention teacher led - €10,320/£8,574, peer led - €36,000/£29,909. Total medical costs averted teacher led - €1,745/£1,450, peer led - €1,745/£1,450. Net additional costs teacher led €8,575/£7,124, peer led €34,255/£28,459; Cost per case averted teacher led €4,058/£3,371, peer led - €16,210/£13,467	Number of cases averted HIV, chlamydia, gonorrhoea, genital warts and ICER
2	Dukhovny et al. 2013	Peers support group (PSG) – telephone based volunteer support of post-partum depression (PPD)	Usual care	Postpartum women	Canada/Seven health regions	Mean cost per woman $4,497/£2,860 in PSG and $3,380/£2,150 in usual care (CAN$)	Absolute reduction in PPD in PSG and ICER
3	Grimes et al. 2011	The Mental Health Services Program for Youth (MHSPY)	Usual care (two groups: Group A – children who had no inpatient psychiatry claims and Group B – children whose total mental	Youth with documented mental health need	US/Five urban communities	Total per member per month intervention $761.69/£478.57; Control Group A - $236.30/£148.47; Control Group B - $1,573.18/£988.43	Emergency room, inpatient and outpatient psychiatry, paediatric inpatient,

Study		Intervention	Comparator	Population	Country/setting	Cost	Benefits
			health claims included at least one inpatient psychiatry admission)				ambulatory paediatrics admission and pharmacy
4	Hollingworth et al. 2012	ASSIST (A Stop Smoking In Schools Trial) informal interactions to encourage their peers not to smoke by student peers	Current practice of smoking prevention education	Year 8 (12–13 years old) students in 59 schools in South East Wales and the West of England	UK/Schools	The ASSIST programme cost of £32 per student. Total cost of intervention £169,865; Median (SD) cost per school per intervention £5,662	Prevalence of weekly smoking and ICER
5	Krukowski et al. 2013	Lifestyle intervention utilizing Diabetes Prevention Programme (DPP) intervention materials adapted for group delivery	NR (costs were assessed without comparing with an alternative)	Older adults (≥60) with high rates of obesity (BMI≥30kg/m²) who had no significant memory problems	US/Rural	Total cost of $2,731/£1,854 per senior centres, $165/£112 per person	Weight loss
6	Moodie et al. 2013	Be Active Eat Well (BAEW) – a community based capacity building demonstration programme that promotes healthy eating and physical activity	Current practice – activities introduced into the school environment to address concerns about healthy eating, physical activity, or childhood obesity, over and above normal school curriculum (both for intervention and control)	Children aged 4-12 years	Australia/Rural	The intervention cost AUD$ 0.34M/£0.13M annually	BMI unites saved, Disability-Adjusted Life Years (DALYs) averted and ICER

Table 6: CUA studies

Study		Intervention	Comparator	Population	Country/setting	Cost	Benefits
1	Barton et al. 2012	Lay 'health trainer' (LHT) to improve heart-health lifestyles in deprived communities through advice and behaviour change	Both groups received health promotion literature. The control group received no further support from the research team	≥18 years with at least one risk factor for CVD	England/Five general practices	Mean cost of the intervention £151 per participant	Quality of life (EQ-5D) and cost per QALY gained

Study		Intervention	Comparator	Population	Country/setting	Cost	Benefits
2	Brown et al. 2012	Lifestyle modification program led by community health workers (CHWs) through education and self-management	Usual care	Low-income Hispanic adults (18+) with type 2 diabetes who were patients at Clinic	US/Mercy Clinic	Total home visits $80.59/£49.48 for initial home visits, and $48.16/£29.57 for follow-up	QALYs gained and ICER
3	Gillespie et al. 2013	Group based peer support in general practice for patients with type 2 diabetes	Usual care	Patients with type 2 diabetes. Mean age (SD) 63	Ireland/General Practice	Peer support recruitment total €790/£589, per practice €79/£59, per patient €4/£3. Other costs in data extraction table	QALY gained; change in HBA1c level, cholesterol, well-being score
4	Irvine et al. 2011	Diet and exercise advice to patients with type 2 diabetes – University of East Anglia Impaired Fasting Glucose programme (UEA-IFG)	A 2hr session of diet and exercise advice (was considered to be equal to usual care); also this group was given pedometers to record step count	Adults aged 45-70 with at least of the following BMI ≥25kg/m², first degree relative with type 2 diabetes, waist circumference >94cm for men or >80cm for women, history of CHD, gestational diabetes, or impaired fasting glucose	UK/NR	Intervention (I): £551, Control (C): £325; Total cost of T2Trainer programme £6,745, £57 per patient. Peer support group session £53 per patient. Mean healthcare cost I: £324.89, C: £324.26	QALYs gained and ICER

6. Discussion

There are a limited number of studies assessing the cost-effectiveness of community engagement approaches. Studies vary in quality and applicability and they present a variety of other important variables such as the type of intervention, the condition or problem they are trying to address and the target population, making comparison between interventions complex.

In this section we present the evidence from the studies from different angles, including the evidence base around the three types of community engagement approaches, the evidence base around different health topic areas and the evidence base around different target populations, including disadvantaged groups. We present the community engagement interventions reviewed as to whether there is evidence of cost-effectiveness in the studies, there is inconclusive evidence or the evidence does not support the cost-effectiveness of interventions. In the last part of the section we also present the wider evidence base by integrating to the review the 21 EPPI review (O'Mara-Eves et al. 2013) studies.

6.1. Evidence base around the three types of community engagement approaches

Looking at the economic evidence included in this review, there is evidence that at least two types of community engagement approaches identified by the EPPI review team, i.e. peer/lay delivered interventions and collaboration between health and other statutory services and communities, may be cost-effective under certain circumstances. Table 7 below presents the 11 included studies categorising the community engagement interventions according to whether 1) the interventions evaluated are cost-effective, 2) the interventions are not cost effective or 3) no conclusion on cost-effectiveness can be drawn based on the information reported in the study.

Table 7: Evidence of the cost-effectiveness of specific community engagement interventions and initiatives from 11 studies, presented by type of community engagement approach

Community engagement approach	Cost-effective	Inconclusive	Not cost-effective
Peer/lay delivered interventions	Lay 'health trainer' (LHT) to improve heart-health lifestyles in deprived communities through advice and behaviour change - Barton et al. 2012 (++) Lifestyle modification program led by community health workers (CHWs) through education and self-management -Brown et al. 2012 (++) Group based peer support in general practice for patients with type 2 diabetes - Gillespie et al.	Peers support group (PSG) - telephone based volunteer support of post-partum depression (PPD) -Dukhovny et al. 2013 (+) Cardiovascular Health Awareness Programme (CHAP) – risk factor assessment and education sessions - Goeree et al. 2013 (++) Lifestyle intervention utilising Diabetes Prevention Programme (DPP) intervention materials adapted for group delivery -	Educational and demonstrational sessions to educate pupils on sexually transmitted infections (peer or teacher led) - Cooper et al. 2012 (++) Diet and exercise advice to patients with type 2 diabetes that is not cost-effective - Irvine et al. 2011 (+)

Community engagement approach	Cost-effective	Inconclusive	Not cost-effective
	2012 (++) ASSIST (A Stop Smoking In Schools Trial) informal interactions to encourage their peers not to smoke by student peers - Hollingworth et al. 2013 (+)	Krukowski et al. 2013 (+)	
Collaboration between health and other statutory services and communities	Be Active Eat Well (BAEW) – a community based capacity building demonstration programme that promotes healthy eating and physical activity- Moodie et al. 2013 (+)	The Mental Health Services Program for Youth through creating Care Planning Team with discussion with the family of the patient and based on needs - Grimes et al. 2011 (+)	

6.2. Evidence base around different health topic areas

When looking at interventions in terms of the problems or conditions they are trying to address, there appear to be topic areas where community engagement approaches are cost-effective, although interventions within each of the topic areas are not directly comparable.

Diabetes

Brown et al. (2012), Gillespie et al. (2013), Irvine et al. (2011), and Krukowski et al. (2013) assessed various interventions aimed at patients with diabetes or at risk of developing diabetes. Brown et al. conclude that the intervention they evaluated is cost-effective, especially for adults with high glycaemic levels. The probability of interventions being cost-effective assessed by Gillespie et al. was appreciably higher than 80% for a range of potential willingness-to-pay cost-effectiveness thresholds. Lifestyle intervention through a Diabetes Prevention Programme intervention proved to be effective in weight loss (Krukowski et al. 2013). Except for Irvine et al. (2011) whose study reported a 16% probability of the intervention being cost-effective at the £20,000/QALY threshold, community engagement interventions aiming at reducing impact of diabetes have generally established cost-effectiveness. However, they are not directly comparable as interventions among these four studies vary significantly.

Cardiovascular diseases

Two studies (Barton et al. 2012, Goeree et al. 2013) assessed the impact of various interventions on cardiovascular diseases (CVDs). An intervention assessed by Barton et al. (2012) proved to be cost-effective for people at risk of CVD. The intervention consisted of information provision and support aimed at changing beliefs and behaviour. Goeree et al. (2013) assessed the Cardiovascular Health Awareness Program (CHAP) delivered by trained volunteers and concluded that CHAP was associated with a reduction in CVD hospitalisation costs. Both studies have only minor limitations.

Healthier lifestyles

Two studies address lifestyle related issues such as the smoking reduction intervention assessed by Hollingworth et al. (2012). According to Hollingworth and colleagues, the ASSIST programme is cost-effective with an incremental cost of £1,500 per student at 2 years. Moodie et al. (2013) examine the cost-effectiveness of the programme Be Active Eat Well (BAEW) to promote healthy eating and physical activity between children aged 4 to 12. The intervention resulted in savings of 547 BMI units and 10.2 DALYs.

An overview of the cost-effectiveness evidence of the interventions discussed above is presented in

Table 8.

Table 8: Evidence of the cost-effectiveness of community engagement interventions and initiatives from 8 studies, presented by healthtopic area

Health topic	Cost-effective	Inconclusive	Not cost-effective
Diabetes	Brown et al. 2012 [++] Gillespie et al.2013 [++]	Krukowski et al. 2013 [+]	Irvine et al. 2011 [+]
CVD	Barton et al. 2012 [++]	Goeree et al. 2013 [++]	
Healthier Lifestyle	Hollingworth et al. 2012 [+] Moodie et al. 2013 [+]		
Sexual health			Cooper et al. 2012 (++)
Maternal health (post-partum depression)		Dukhovny et al.2013 [+]	
Mental health		Grimes et al. 2011[+]	

6.3. Evidence base around different target populations, including disadvantaged groups

When looking at the included interventions in terms of their target population, the evidence base is also variable and the diversity of interventions and target populations does not allow for direct comparison within each grouping of interventions.

Low income populations

One interventionaimed at deprived communities (Barton et al. 2012) and one intervention aimed at low income patients (Brown et al. 2012) are cost-effective.

Women

The intervention assessed by Dukhovny et al. (2013) is aimed at women, in this case new mothers at risk of post-natal depression, although not specifically from deprived groups. The authors conclude that there is a net cost to the health system and society in implementing it, which, depending on the context, may be within the range for other accepted interventions for women at risk of PPD.

Age groups

A set of interventions assessed by Cooper et al. (2012), Hollingworth et al. (2012), Moodie et al. (2013) and Grimes et al. (2011) target children and young people. The studies by Goeree et al. (2013) and Krukowsky et al. (2013) analyse interventions aimed at older people. Out of these studies, two (Hollingwoth et al. (2012) and Moodie et al. (2013)) report having found evidence of cost-effectiveness of the interventions.

6.4.   Evidence from high quality studies (++)

As the summary quality rating of individual studies is restricted to a three level classification of high, moderate and low quality and, as there may be some ambiguity over the quality rating of studies (particularly as between moderate and high quality), it was thought useful to summarise briefly those studies given a high quality (++) rating. These studies are identified Table 9 by their theoretical approach to community engagement and their findings on the cost-effectiveness of the intervention concerned (cost-effective, not cost-effective or inconclusive). The table indicates a spread of studies across two theoretical approaches to community engagement but a concentration in the cost-effective column (three of five studies). In the study which did not draw a conclusion on cost-effectiveness (Goeree et al., 2013), total costs were found to be only marginally higher in the intervention group than the control group. Since savings in hospitalisation costs related to acute myocardial infarction, congestive heart failure or stroke were achieved in the intervention compared with the control group, it seems likely that the community engagement approach was cost-effective. Therefore, limiting the sample of studies to those rated as high quality paints an overall picture of community engagement interventions being cost-effective. In the study which found community engagement not be cost-effective, Cooper et al. (2013) evaluated educational and demonstrational sessions to educate pupils on sexually transmitted infections delivered either by peer-led or teacher-led. While the two methods of delivery were found to be equally effective (compared with standard education), peer-led education was found to be four times as costly as teacher-led education, taking the incremental cost-effectiveness ratio relative to standard education well above the £30,000 per QALY benchmark.

Table 9: high quality studies according to theoretical approach and cost-effectiveness findings

Type of Community Engagement	Cost-effective	Inconclusive	Not cost-effective
Peer/lay-delivered	Barton et al. 2012 Gillespie et al. 2012		Cooper et al. 2012
Collaboration	Brown et al. 2012	Goeree et al. 2013	

6.5. Comparators

This section provides more detail on the comparators identified in the evidence tables to assess the extent to which community engagement was used as a means of enhancing an underlying base intervention rather than a self-standing approach in its own right. Table 10 categorises the 11 studies in the review according to the type of comparator and the study conclusion on the cost-effectiveness of the community engagement intervention being evaluated (cost-effective, not cost-effective and inconclusive). In terms of the comparator, studies were grouped as follows:

* The community engagement approach being investigated was evaluated as an add-on (in which the intervention and comparator groups received the same underlying intervention);
* The community engagement intervention was compared with standard or usual care;
* Alternative community engagement interventions were compared with one another.

6.5.1. Add-on interventions (standard care plus community engagement vs standard care alone)

Studies were classified in this group only if the study clearly indicated that a common underlying intervention was provided to both the intervention and control groups. It is worth noting that all four studies in this group used data from randomized controlled trials (RCTs), in which some care was presumably taken to define the alternative interventions.

6.5.2. Standard or usual care comparator

Those studies in which standard or usual care is explicitly identified as the comparator, or in which it was likely that some form of provision was available to the comparator group, were categorised accordingly. For example, in evaluating Be Active Eat Well (BAEW), a healthy eating and physical activity programme introduced in one town in Victoria, Australia, Moodie et al. (2013) state that:

"The costs and benefits of the BAEW intervention were incrementally assessed against current practice in 12 primary schools across Victoria's Barwon South Western Region, in which no specific intervention was offered. Current practice covered any initiatives (which may or may not have been school-specific) introduced into the school environment to address concerns about healthy eating, physical activity, or childhood obesity over and above normal school curriculum activities (such as physical education classes) which are common to all schools (both intervention and control)".

6.5.3. Community engagement versus an alternative community engagement intervention

Only one study compared two interventions which could both be classified as community engagement interventions. Krukowski et al. (2013) compared lifestyle and attention control (memory improvement) interventions, both delivered by lay health educators, for the achievement of weight loss in sixteen centres across one rural state of the USA.

6.5.4. Summary and study findings

As Table 10 indicates, the most common intervention against which community engagement approaches have been compared is standard or usual care (six of the 11 studies). The findings of these studies were split between finding the community engagement approach cost-effective (two studies), not cost-effective (two

studies) and not being able to draw a conclusion on cost-effectiveness (two studies). There is relatively little evidence on the cost-effectiveness of community engagement as a supplement to an underlying base intervention although, given the nature of the interventions being investigated, and their community settings, it is possible that both intervention and comparator groups, in some studies where the comparator has been defined as standard care, have similar access to standard or usual care. In the four studies where community engagement was clearly a supplement to usual care, it was found to be cost-effective in three out of four cases (Barton 2012, Gillespie 2012 and Hollingworth 2013), in one of which it was the dominant approach in the base case (Gillespie 2012). This small sample of studies therefore give an indication that community engagement approaches can prove cost-effective when used as an addition to standard or usual forms of intervention.

Table 10: Classification of studies by comparator and cost-effectiveness findings

Cost-effectiveness	Add-on to standard care	Community engagement vs standard care	Alternative community engagement approaches
Cost-effective	Barton et al. 2012 Gillespie et al. 2012 Hollingworth et al. 2013	Brown et al. 2012 Moodie et al. 2013	
Inconclusive	Goeree et al. 2013	Dukhovny et al. 2013 Grimes et al. 2011	Krukowski et al. 2013
Not cost-effective		Cooper et al. 2012 Irvine et al. 2011	

6.6. The wider evidence base: integrating with the review of the 21 EPPI review (O'Mara-Eves et al. 2013) studies

If we consider the 11 interventions reviewed in this study and the 21 interventions included in the EPPI review together (N=32), it allows us to present a more complete picture of community engagement initiatives, even though there is variation in terms of the cost-effectiveness evidence supporting community engagement approaches. Below we present the evidence around different groupings of interventions in terms of conditions or problems they are trying to achieve or their target population. Out of the 33 studies analysed between the two reviews, 14 interventions are considered to be cost-effective. Across health topic areas and community engagement approaches, although peer/lay delivered interventions (eight studies) are the majority, compared to collaboration (four studies) and empowerment interventions (two studies).

Table 11: All reviewed interventions (33 studies)

Health topic	Cost-effective	Inconclusive	Not cost-effective
Diabetes	Lifestyle modification program led by community health workers (CHWs) through education and self-management – Brown et al. 2012 (++) – Peer/lay delivered. Group based peer support	Diabetes education with cultural component – Brown et al. 2002 (+) - Collaboration Compressed diabetes educational sessions – Brown et al. 2005 (+) - Collaboration	Diet and exercise advice to patients with type 2 diabetes – Irvine et al. 2011 (+) – Peer/lay delivered

Health topic	Cost-effective	Inconclusive	Not cost-effective
	in general practice for patients with type 2 diabetes – Gillespie et al. 2012 (++) – Peer/lay delivered	Lifestyle intervention utilizing Diabetes Prevention Programme (DPP) intervention materials adapted for group delivery – Krukowski et al. 2013 (+) – Peer/lay delivered	
CVD and other chronic conditions related interventions	Lay 'health trainer' (LHT) to improve heart-health lifestyles in deprived communities through advice and behaviour change – Barton et al. 2012 (++) – Peer/lay delivered Chronic disease self-management programme - Richardson et al. 2008 (++) – Peer/lay delivered Decrease to exposure to indoor asthma triggers (high intensity group) – Krieger et al. 2005 (+) - Empowerment	Cardiovascular Health Awareness Programme (CHAP) – risk factor assessment and education sessions – Goeree et al. 2013 (++) – Peer/lay delivered	
HIV and sexual health related interventions	HIV risk reduction - Pinkerton et al. 1998 (++) – Peer/lay delivered	Peer led HIV prevention at schools – Borgia et al. 2005 (-) – Peer/lay delivered	Educational and demonstrational sessions to educate pupils on sexually transmitted infections (peer-led intervention) - Cooper et al. 2012 (++) – Peer/lay delivered
Maternal and neonatal health related interventions	Improved parent-infant interaction – McIntosh et al. 2009(++) – Peer/lay delivered	Peers support group (PSG) - telephone based volunteer support of post-partum depression (PPD) – Dukhovny et al. 2013 (+) – Peer/lay delivered Increased duration of breastfeeding – Pugh et al. 2002 (+) – Peer/lay delivered Breastfeeding promotion – Long et al. 1995 (+) = Peer/lay deivered	

Health topic	Cost-effective	Inconclusive	Not cost-effective
Women's health	Mammography promotion – Andersen et al. 2002 (+) – Peer/lay delivered	Abnormal cervical screen follow-up – Ell et al. 2002 (+) – Peer/lay delivered Mammography promotion – Paskett et al. 2006 (+) – Peer/lay delivered	
Healthier lifestyle	ASSIST (A Stop Smoking In Schools Trial) informal interactions to encourage their peers not to smoke by student peers – Hollingworth et al. 2013 (+) –Peer/lay deivered Be Active Eat Well (BAEW) – a community based capacity building demonstration programme that promotes healthy eating and physical activity – Moodie et al. 2013 (+) - Collaboration Intervention to help women quit smoking - Secker-Walker, 1996 (+) – Collaboration	Smoking prevention in adolescence – Campbell et al. 2008 (+) – Peer/lay delivered Health promotion – Kumpusalo et al. 1996 (+) - Empowerment Promotion of health and physical activity – Reijneveld et al. 2003 (+) - Collaboration	
Other interventions	Promotion of hepatitis B vaccinations – Zhou et al. 2003 (+) - Collaboration Injury prevention – Lindqvist et al. 2001 (+) - Collaboration Neighbourhood Wardens Scheme – Office of the Deputy Prime Minister 2004 (+) - Empowerment	The Mental Health Services Program for Youth – Grimes et al. 2011 (+) - Collaboration	Older volunteers providing help for public elementary school – Frick et al. 2004 (++) – Peer/lay delivered

7.   Evidence statements

In summarising the balance of evidence across the 11 studies included in the review, mixed evidence is used to indicate that some studies are positive (conclude that an intervention is cost-effective) and some negative (conclude that an intervention is not cost-effective).

Question 1: How cost-effective are community engagement approaches at improving health and wellbeing and reducing health inequalities?

Evidence statement 1: Overall, there is mixed evidence on the cost-effectiveness of community engagement approaches in improving health and reducing health inequalities.
Five studies concluded that community engagement approaches are cost-effective. The evidence on cost-effectiveness is presented in E.S. 1.1 below. Evidence from two studies suggests that community engagement approaches are not cost-effective. The evidence is presented in E.S. 1.2 below. Finally, evidence from four remaining studies does not allow conclusions to be drawn in regards to the cost-effectiveness of community engagement approaches. The evidence is presented in E.S. 1.3 below.
E.S. 1.1. There is evidence from five high and moderate quality studies suggesting that community engagement approaches are cost-effective. Evidence of cost-effectiveness has been broken down according to three different theoretical approaches to community engagement:
4.   Peer/lay delivered interventions:
There is evidence from three high quality studies (one UK, one US, one Ireland) and one moderate quality study (UK) suggesting that the peer/lay delivered interventions under investigation are cost-effective: ● A lay health trainer (LHT) intervention compared with no LHT (with both groups receiving health promotion literature) to improve heart-health lifestyle resulted in 0.007 Quality Adjusted Life Year (QALY) gains with an incremental cost of £98. The Incremental cost-effectiveness ratio (ICER) was £14,480 per QALY gained[30], within NICE's £20,000 benchmark. Although, in the base case, the probability of the intervention being cost-effective was only 39.5% at a £20,000 per QALY threshold and 40.1% at a £30,000 per QALY threshold, in sensitivity analysis, ICERs ranged between dominant and £22,347. The authors highlight this uncertainty in their conclusions (Barton et al. 2012 [++]). ● One diabetes lifestyle modification programme led through community health workers proved to be cost-effective at a cost of $33,319 per QALY (£20,458 in 2010) gained across the whole population, compared with standard care, a figure around the NICE benchmark of £20,000 per QALY at exchange rates prevailing in recent years (Brown et al. 2012 [++]). ● An intervention targeting diabetic patients through group-based peer support plus standardized diabetes care versus standard diabetes care alone was associated with an incremental 0.09 QALY gain per patient while saving €637.43 (£475.14 in 2008) in mean lifetime healthcare costs per patient. The intervention was therefore dominant on the basis of mean costs and effects (Gillespie et al. 2012 [++]). In health economics, when comparing two interventions, an option that is more effective and costs less is said to be dominant[31]. ● ASSIST (A Stop Smoking In Schools Trial), a peer/lay delivered programme aimed at reducing smoking

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[30] In general, interventions with an ICER of less than £20,000 per QALY gained are considered to be cost effective

(http://www.nice.org.uk/article/pmg4/chapter/6-incorporating-health-economics#economic-evidence-and-guidance-recommendations)

[31] Definition of "Dominance" according to the NICE Glossary: https://www.nice.org.uk/Glossary?letter=D

prevalence and introduced in addition to usual smoking education was delivered at £32 per student and resulted in an incremental cost of £1,500 per student not smoking at two years compared with usual smoking education alone. There was a 2.1% reduction in smoking prevalence at two years follow-up (Hollingworth et al. 2013 [+]).

5.   Collaboration between health and other statutory services and communities

There is evidence from one moderate quality study (Australia) suggesting that a collaboration intervention is cost-effective:

- The Be Active Eat Well programme, delivered through collaboration, was associated with a reduction in body mass index (BMI) units and in the disability-adjusted life year (DALY) burden. The intervention resulted in modest cost offsets (AUD$27,311 or £12,276 in 2006). The net cost per DALY saved was AUD$29,798 (£13,394 in 2006) compared with current practice (Moodie et al. 2013 [+]).

6.   Interventions centred on the concept of empowerment

No interventions centred on the concept of empowerment have been included in the review.

E.S. 1.2. There is evidence from one high quality study (UK) and one moderate quality study (UK) of community engagement approaches suggesting that they are not cost-effective:

- At a Willingness To Pay (WTP) threshold of £20,000 per QALY gained, the probability of the peer/lay delivered University of East Anglia Impaired Fasting Glucose programme being cost-effective was 16%. The intervention was associated with a mean loss of 0.001 QALYs over the follow-up period compared with a loss of 0.004 QALYs in the control group (usual care). The intervention had an ICER of £67,184 per QALY gained and was not considered to be cost-effective. However, the authors highlight the need for future research (Irvine et al. 2011 [+]).
- Peer and teacher-led educational and demonstrational sessions to educate pupils on sexually transmitted infections (STI). Using evidence from the literature, the study modelled the impact of behaviour changes due to the intervention on the occurrence of sexually transmitted infections. Compared with standard education, the ICERs of the teacher led and peer led interventions (peer/lay delivered) were €24,268 (£20,162 in 2012) and €96,938 (£80,536) per QALY gained, respectively. Both interventions resulted in a 0.35 QALY gain. However, the peer led intervention was nearly four times as expensive as the teacher delivered one (Cooper et al. 2012 [++]).

E.S. 1.3: Evidence from four moderate and high quality studies (two Canada, two US) does not allow conclusions to be drawn on the cost-effectiveness of community engagement approaches:

- A peer/lay delivered intervention aiming to reduce postpartum depression resulted in an 11% absolute reduction in rates of depression at a cost of CAN$4,497 (£2,860 in 2011)) per woman compared with usual care. The base case incremental cost per case of postpartum depression (PPD) prevented was $10,009 (£6,366). The authors concluded that there was a 95% probability of the cost per case of PPD prevented being less than $20,196 (£12,845). The authors offered no conclusion about the cost-effectiveness of the programme (Dukhovny et al. 2013 [+]).
- A community-wide cardiovascular health awareness programme (CHAP) delivered through collaboration between health and other statutory services and communities led to a lower absolute rate of hospitalisations for cardiovascular diseases (CVD) (a mean reduction of 2.90 hospitalisations/1,000) at a cost of $11,976 - $57,113 (£7,150 - £34,096 in 2010) depending on community size compared with no CHAP (with usual health promotion and health care services being available in both groups). The intervention was successful in mobilising community support. No conclusion has been offered about the cost-effectiveness of the intervention (Goeree et al. 2013

	[++], Canada).
	• An integrated family- and community-based intervention for young people with mental health needs delivered through collaboration between health and other statutory services and communities was associated with reduced claims expenses for emergency rooms and inpatient psychiatry (32% and 74% lower, respectively, compared to the usual care group) and cost $761.69 (£478.57 in 2011) per month per member. No comment is made about its cost-effectiveness (Grimes et al. 2011 [+], US).
	• A peer/lay delivered intervention (lifestyle or attention control intervention delivered by lay health educators) was associated with the achievement of weight loss after four months of the lifestyle intervention at low cost among older adults in rural US (on average 3.7kg per participant at a cost of US$165 or £112 per person; 2009 prices). No conclusion was stated on cost-effectiveness. (Krukowski et al. 2013 [+], US).
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Applicability	Five of the 11 studies are considered directly applicable (Barton et al. 2012, Cooper et al. 2012, Gillespie et la. 2012, Hollingworth et al. 2012, Irvine et al. 2011,). The other six studies (Brown et al. 2012, Dukhovny et al. 2013, Goeree et al. 2013, Grimes et al. 2011, Krukowski et al. 2013, and Moodie et al. 2013) are regarded as partly applicable. No studies were regarded as non-applicable.

Question 2: How cost-effective are community engagement approaches at encouraging people to participate in activities to improve their health and wellbeing and realise their capabilities – particularly people from disadvantaged groups?

Evidence statement 2: There is evidence that community engagement approaches aimed at encouraging people, particularly from disadvantaged groups, to participate in activities to improve their health and well-being are cost-effective.

E.S. 2.1. There is evidence from two high quality studies (one UK, one US) suggesting that community engagement approaches targeting low income groups and families are cost-effective:

- A study explored the cost-effectiveness of heart-health lifestyle interventions in deprived communities. A lay health trainer (LHT) intervention compared with no LHT (with both groups receiving health promotion literature) to improve heart-health lifestyle resulted in 0.007 Quality Adjusted Life Year (QALY) gains with an incremental cost of £98. The Incremental cost-effectiveness ratio (ICER) was £14,480 per QALY gained[32], within NICE's £20,000 benchmark. Although, in the base case, the probability of the intervention being cost-effective was only 39.5% at a £20,000 per QALY threshold and 40.1% at a £30,000 per QALY threshold, in sensitivity analysis, ICERs ranged between dominant and £22,347. The authors highlight this uncertainty in their conclusions (Barton et al. 2012 [++]).

- A study by Brown et al. 2012 estimated the long-term cost-effectiveness of a lifestyle modification programme in a low-income Hispanic population with type two diabetes. The programme led through community health workers proved to be cost-effective at a cost of $33,319/£20,458 per QALY gained across the whole population, compared with standard care, a figure around the NICE benchmark of £20,000 per QALY at exchange rates prevailing in recent years (Brown et al. 2012 [++]).

[32] In general, interventions with an ICER of less than £20,000 per QALY gained are considered to be cost effective
(http://www.nice.org.uk/article/pmg4/chapter/6-incorporating-health-economics#economic-evidence-and-guidance-recommendations)

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Applicability	One study is considered directly applicable (Barton et al. 2012) and one study (Brown et al. 2012), is regarded as partly applicable. No studies were regarded as non-applicable.

Question 3: What impact does the health topic have on the cost effectiveness of different interventions?

Evidence statement 3: Overall, there is mixed evidence on the impact that the health topic has on the cost effectiveness of different interventions

E.S. 3.1 There is mixed evidence on the cost-effectiveness of community engagement interventions aimed at patients with or at risk of type 2 diabetes.

There is evidence from two high quality studies (one US, one Ireland) suggesting that community engagement interventions aimed at patients with or at risk of type 2 diabetes are cost-effective:

- One diabetes lifestyle modification programme led through community health workers proved to be cost-effective at a cost of $33,319/£20,458 per QALY gained across the whole population, compared with standard care, a figure around the NICE benchmark of £20,000 per QALY at exchange rates prevailing in recent years (Brown et al. 2012 [++]).
- An intervention targeting diabetic patients through group-based peer support plus standardized diabetes care versus standard diabetes care alone was associated with an incremental 0.09 QALY gain per patient while saving €637.43/£475.14 in mean lifetime healthcare costs per patient. The intervention was therefore dominant on the basis of mean costs and effects (Gillespie et al. 2012 [++]).

There is evidence from one moderate quality study (UK) suggesting that a community engagement intervention aimed at patients with or at risk of type 2 diabetes is not cost-effective:

- At a Willingness To Pay (WTP) threshold of £20,000 the probability of the peer/lay delivered University of East Anglia Impaired Fasting Glucose programme being cost-effective was 16%. The intervention was associated with a mean 0.001 QALY loss over follow-up compared with a 0.004 QALY loss in the control group (usual care). The intervention had an ICER of £67,184 per QALY gained. The intervention was not considered to be cost-effective. However, the authors highlight the need for future research (Irvine et al. 2011 [+]).

Evidence from one moderate quality study (US) does not allow conclusions to be drawn on the cost-effectiveness of community engagement interventions aimed at patients with or at risk of type 2 diabetes:

- A peer/lay delivered lifestyle intervention was associated with the achievement of weight loss after four months of the intervention at low cost among older adults in the rural US (on average 3.7kg per participant at a cost of US$165/£112 per person). No conclusion has been offered on cost-effectiveness (Krukowski et al. 2013 [+], US).

E.S. 3.2. There is mixed evidence of the cost-effectiveness of community engagement interventions aimed at patients with or at risk of cardiovascular diseases (CVD).

There is evidence from one high quality study (UK) suggesting that community engagement interventions aimed at patients with or at risk of CVD are cost-effective:

- A lay health trainer (LHT) intervention compared with no LHT (with both groups receiving health promotion literature) to improve heart-health lifestyle resulted in 0.007 Quality Adjusted Life Year

(QALY) gains with an incremental cost of £98. The Incremental cost-effectiveness ratio (ICER) was £14,480 per QALY gained[33], within NICE's £20,000 benchmark. Although, in the base case, the probability of the intervention being cost-effective was only 39.5% at a £20,000 per QALY threshold (and less than 50% at all levels of the threshold), in sensitivity analysis, ICERs ranged between dominant and £22,347. The authors highlight this uncertainty in their conclusions (Barton et al. 2012 [++]).

Evidence from one high quality study (Canada) does not allow conclusions to be drawn on the cost-effectiveness of community engagement interventions aimed at patients with or at risk of CVD:

- A community-wide cardiovascular health awareness programme (CHAP) delivered through collaboration between health and other statutory services and communities led to a lower absolute rate of hospitalisations for CVD (a mean reduction of 2.90 hospitalisations/1,000) at a cost of $11,976 - $57,113 (£7,150 - £34,096) depending on community size compared with no CHAP (with usual health promotion and health care services being available in both groups). The intervention was successful in mobilising community support. No conclusion has been made about the cost-effectiveness of the intervention (Goeree et al. 2013 [++], Canada).

E.S. 3.3. Evidence from two moderate quality studies (one UK, one Australia) suggests that community engagement approaches to promote healthier lifestyles are cost-effective:

- ASSIST (A Stop Smoking In Schools Trial), a peer/lay delivered programme aimed at reducing smoking prevalence and introduced in addition to usual smoking education was delivered at £32 per student and resulted in an incremental cost of £1,500 per student not smoking at two years compared with usual smoking education alone. There was a 2.1% reduction in smoking prevalence at two years follow-up (Hollingworth et al. 2013 [+]).
- The Be Active Eat Well programme, delivered through collaboration, was associated with a reduction in BMI units and in the DALY burden. The intervention resulted in modest cost offsets (AUD$27,311/£12,276). The net cost per DALY saved was AUD$29,798/£13,394 compared with current practice, a figure around or below the NICE benchmark of £20,000 per QALY gained when converted at recent exchange rates (Moodie et al. 2013 [+]).

Evidence from one high quality study (US) suggests that a community engagement intervention aimed at improving sexual health is not cost-effective:

- Peer and teacher-led educational and demonstrational sessions to educate pupils on sexually transmitted infections (STI). Using evidence from the literature, the study modelled the impact of behaviour changes brought due to the intervention on the occurrence of sexually transmitted infections. Compared with standard education, the ICERs of the teacher led and peer led interventions (peer/lay delivered) were €24,268/£20,162 and €96,938/£80,536 per QALY gained, respectively. Both interventions resulted in a 0.35 QALY gain. However, the peer led intervention was nearly four times as expensive as the teacher delivered one (Cooper et al. 2012 [++]).

Applicability:	Five of the studies are considered directly applicable (Barton et al. 2012, Cooper et al. 2012, Gillespie et la. 2012, Hollingworth et al. 2012, Irvine et al. 2011). The other four studies (Brown et al. 2012, Goeree et al. 2013, Krukowski et al. 2013, and Moodie et al. 2013,) are regarded as partly applicable. No studies were regarded as non-

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[33] In general, interventions with an ICER of less than £20,000 per QALY gained are considered to be cost effective

(http://www.nice.org.uk/article/pmg4/chapter/6-incorporating-health-economics#economic-evidence-and-guidance-recommendations)

7.1. Conclusions

The extent to which conclusions can be drawn on the cost-effectiveness of community engagement approaches as a whole is limited by the broad spectrum of community engagement approaches studied and by the inclusion of only 11 cost-effectiveness studies in this review.

It is worth noting that most studies considered a community engagement intervention either added to usual care (four out of 11 studies) or, more commonly, as an alternative to usual care (six out of 11 studies). The remaining study compared two interventions which could both be classified as community engagement interventions.

The evidence reviewed here suggests that community engagement can generate additional benefit over and above usual care, in many cases at reasonable cost, although it is generally unclear how cost-effective usual care is in comparison with a do nothing option. Less frequent were studies which looked at different modes of delivery of a distinctively community-orientated intervention. In one study, a teacher-led behavioural intervention was found to be less costly than but to have similar effectiveness to the same intervention delivered on a peer-led basis. There is no clear indication of the relationship between the intensity or type of community engagement and cost-effectiveness. Where particular health conditions are concerned, we can tentatively suggest that community engagement among those with or at risk of diabetes is relatively cost-effective. This review has also found evidence of cost-effectiveness around other health areas such as cardiovascular diseases and healthier lifestyles.

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Five out of 11 studies included in the review consider the interventions assessed to be cost-effective to varying degrees. Overall, there is evidence on the cost-effectiveness of two types of community engagement – peer/lay delivered (four out of seven studies), and collaboration (one out of two studies). In terms of the methodological quality of these studies, five peer/lay delivered interventions were considered to have minor limitations, whereas the rest (four peer/lay delivered and two collaborative interventions) were considered to have potentially serious limitations and the results need to be considered with caution. In only two studies could it be concluded that the community engagement intervention was not cost-effective while, in four studies, no conclusion could be drawn.

In terms of the cost-effectiveness of community engagement approaches aimed at encouraging people, particularly from disadvantaged groups, to participate in activities to improve their health and well-being, the findings in this review suggest that there is positive evidence on the cost-effectiveness of interventions targeting low income groups and families (two out of two studies).

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9. Appendices

9.1. Appendix A: Literature sources

9.1.1. List of included databases

Table 12: List of electronic databases

Database	Description
NHS EED[34]	NHS EED (NHS Economic Evaluation Database) focuses primarily on the economic evaluation of health care interventions and aims to help decision makers interpret an increasingly complex and technical literature. Economic evaluations are studies in which a comparison of two or more interventions or care alternatives is undertaken and in which both the costs and outcomes of the alternatives are examined. This includes cost-benefit analyses, cost-utility analyses, and cost-effectiveness analyses
EconLit	EconLit hosts economic research in all fields of economics, including capital markets, country studies, econometrics, economic, government regulations, labour economics and urban economics.
Health Economic Evaluations Database (HEED)	Health Economic Evaluations Database (HEED) contains information on studies of cost-effectiveness and other forms of economic evaluation of medicines and other treatments, as well as medical interventions, from around the world.
Social Policy and Practice (SPP)	SPP brings together information from five of the UK's leading collections of social policy and practice resources: Centre for Policy on Ageing, Greater London Authority, Idox Information Service, National Children's Bureau, Social Care Institute for Excellence.

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[34] Contractors undertaking stream 1 have already run a search in this database but from 2011 and not 2010. We will review their results to determine whether a new search is required for our study for the years 2011-2014, in addition to a search for the year 2010-2011 required for our study.

9.1.2. List of websites browsed by Stream 2 contractors

UK government (gov.uk) portal;	Health Together;
NICE Evidence (including NICE website and former Health Development Agency documents);	Public Health England;
Public health observatories;	UCL Institute of Health Equity;
Open Grey;	UK Faculty of Public Health;
healthevidence.org;	BIG Lottery wellbeing evaluation;
locality.org.uk;	NESTA;
The King's Fund;	Community development exchange;
Joseph Rowntree Foundation;	Community development foundation;
Altogether Better;	NIHR School for Public Health Research www.sphr.nihr.ac.uk;
Well London;	People's Health Trust

9.2.   Appendix B: Search strategies for all databases

NHS-EED (28/08/2014)

#1   (disadvantage* or disparities or disparity or equalit* or equit* or gap or gaps or gradient or gradients or "health determinant" or "health determinants" or "health education" or "health inequalities" or "health promotion" or "healthy people program*" or inequalities or inequality or inequit* or "preventive health service*" or "preventive medicine" or "primary prevention" or "public health" or "social medicine" or "community medicine" or "community health" or unequal or variation*)
#2   MeSH descriptor: [Socioeconomic Factors] explode all trees
#3   #1 or #2
#4   ("change agent*" or citizen* or communit* or champion* or collaborator* or disadvantaged or "lay communit*" or "lay people" or "lay person" or member* or minorit* or participant* or patient* or peer* or public or representative* or resident* or "service user*" or stakeholder* or user* or volunteer* or vulnerable or "lay worker" or "lay health")
#5   MeSH descriptor: [Community Health Workers] explode all trees
#6   MeSH descriptor: [Volunteers] explode all trees
#7   #4 or #5 or #6
#8   ("capacity building" or coalition* or collaboration* or committee* or compact or control or co-production or council* or "delegated power*" or "democratic renewal" or development or empower* or engagement or forum* or fora or governance or "health promotion" or initiative* or "intervention guidance" or involvement or juries or jury or "local area agreement*" or mobilisation or mobilization or "neighborhood committee*" or "neighborhood manager*" or "neighborhood renewal" or "neighborhood warden*" or "neighbourhood committee*" or "neighbourhood manager*" or "neighbourhood renewal" or "neighbourhood warden*" or networks or network or organisation* or organization* or panel* or participation or "participatory action" or partnership* or pathway* or "priority setting*" or "public engagement" or "rapid participatory assessment" or regeneration or relations or support)
#9   MeSH descriptor: [Consumer Participation] explode all trees
#10   MeSH descriptor: [Community Networks] explode all trees
#11   MeSH descriptor: [Social Support] explode all trees
#12   #8 or #9 or #10 or #11
#13   #3 and #7 and #12 Publication Year from 2011 to 2014, in Economic Evaluations

EconLit (Ovid) (21/08/2014)

1. (D63 or I14 or I31 or I32 or I18).cc.
2. (disadvantage* or disparities or disparity or equalit* or equit* or gap or gaps or gradient or gradients or "health determinant" or "health determinants" or "health education" or "health inequalities" or "health promotion" or "healthy people program*" or inequalities or inequality or inequit* or "preventive health service*" or "preventive medicine" or "primary prevention" or "public health" or "social medicine" or "community medicine" or "community health" or unequal or variation*).ti,ab.
3. 1 or 2
4. ("change agent*" or citizen* or communit* or champion* or collaborator* or disadvantaged or "lay communit*" or "lay people" or "lay person" or member* or minorit* or participant* or patient* or peer* or public or representative* or resident* or "service user*" or stakeholder* or user* or volunteer* or vulnerable or "lay worker" or "lay health").ti,ab.

5. ("capacity building" or coalition* or collaboration* or committee* or compact or control or co-production or council* or "delegated power*" or "democratic renewal" or development or empower* or engagement or forum* or fora or governance or "health promotion" or initiative* or "intervention guidance" or involvement or juries or jury or "local area agreement*" or mobilisation or mobilization or "neighborhood committee*" or "neighborhood manager*" or "neighborhood renewal" or "neighborhood warden*" or "neighbourhood committee*" or "neighbourhood manager*" or "neighbourhood renewal" or "neighbourhood warden*" or networks or network or organisation* or organization* or panel* or participation or "participatory action" or partnership* or pathway* or "priority setting*" or "public engagement" or "rapid participatory assessment" or regeneration or relations or support).ti,ab.

6. 3 and 4 and 5

7. (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or "pharmaco economic*" or budget*).ti,ab.

8. ((monte adj carlo) or markov or (decision adj2 (tree$ or analys$))).ti,ab.

9. (value adj2 (money or monetary)).ti,ab.

10. ("quality of life" or "quality adjusted life" or qaly* or qald* or qale* or qtime* or "quality of wellbeing" or "quality of well-being" or "willing* to pay" or "standard gamble*" or "time trade off*" or "time tradeoff*").ti,ab.

11. (disability adjusted life or daly).ti,ab.

12. "health* year* equivalent*".ti,ab.

13. (sf36 or sf 36 or "short form 36" or "shortform 36" or "sf thirtysix" or "sf thirty six" or "shortform thirtysix" or "shortform thirty six" or "short form thirtysix" or "short form thirty six").ti,ab.

14. (sf6 or sf 6 or "short form 6" or "shortform 6" or sf six or sfsix or "shortform six" or "short form six").ti,ab.

15. (sf12 or sf 12 or "short form 12" or "shortform 12" or "sf twelve" or sftwelve or "shortform twelve" or "short form twelve").ti,ab.

16. (sf16 or sf 16 or "short form 16" or "shortform 16" or "sf sixteen" or sfsixteen or "shortform sixteen" or "short form sixteen").ti,ab.

17. (sf20 or sf 20 or "short form 20" or "shortform 20" or "sf twenty" or sftwenty or "shortform twenty" or "short form twenty").ti,ab.

18. (euroqol or "euro qol" or eq5d or "eq 5d").ti,ab.

19. D61.cc.

20. or/7-19

21. (((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab.

22. 20 not 21

23. 6 and 22

24. limit 23 to yr="2011 -Current"

HEED (EBSCO) (08/09/2014)

(disadvantage* OR disparities OR disparity OR equalit* OR equit* OR gap OR gaps OR gradient OR gradients OR "health determinant" OR "health determinants" OR "health education" OR "health inequalities" OR "health promotion" OR "healthy people program" OR "healthy people programme" OR "healthy people programs" OR "healthy people programmes" OR inequalities OR inequality OR inequit* OR "preventive health service" OR "preventive health services" OR "preventive medicine" OR "primary prevention" OR "public health" OR "social medicine" OR "community medicine" OR "community health" OR unequal OR variation*)
AND

("change agent*" or citizen* or communit* or champion* or collaborator* or disadvantaged or "lay communit*" or "lay people" or "lay person" or member* or minorit* or participant* or patient* or peer* or public or representative* or resident* or "service user*" or stakeholder* or user* or volunteer* or vulnerable or "lay worker" or "lay health")
Published Date limited to 2011 to current

Social Policy & Practice (Ovid) (28/08/2014)

1. (disadvantage* or disparities or disparity or equalit* or equit* or gap or gaps or gradient or gradients or "health determinant" or "health determinants" or "health education" or "health inequalities" or "health promotion" or "healthy people program*" or inequalities or inequality or inequit* or "preventive health service*" or "preventive medicine" or "primary prevention" or "public health" or "social medicine" or "community medicine" or "community health" or unequal or variation*).ti,ab.
2. (Disadvantage or Inequality or Discrimination or "Social Exclusion" or "Equal Opportunities" or Neglect or Poverty).sh.
3. 1 or 2
4. ("change agent*" or citizen* or communit* or champion* or collaborator* or disadvantaged or "lay communit*" or "lay people" or "lay person" or member* or minorit* or participant* or patient* or peer* or public or representative* or resident* or "service user*" or stakeholder* or user* or volunteer* or vulnerable or "lay worker" or "lay health").ti,ab.
5. (citizen* or representative or "community leadership").sh.
6. 4 or 5
7. ("capacity building" or coalition* or collaboration* or committee* or compact or control or co-production or council* or "delegated power*" or "democratic renewal" or development or empower* or engagement or forum* or fora or governance or "health promotion" or initiative* or "intervention guidance" or involvement or juries or jury or "local area agreement*" or mobilisation or mobilization or "neighborhood committee*" or "neighborhood manager*" or "neighborhood renewal" or "neighborhood warden*" or "neighbourhood committee*" or "neighbourhood manager*" or "neighbourhood renewal" or "neighbourhood warden*" or networks or network or organisation* or organization* or panel* or participation or "participatory action" or partnership* or pathway* or "priority setting*" or "public engagement" or "rapid participatory assessment" or regeneration or relations or support).ti,ab.
8. (Communities or Neighbourhood or Regeneration or "Community Cohesion" or Activities or Participation or "Early Intervention" or "Intervention Programmes" or Safeguarding or "Community consultation" or "Public participation").sh.
9. 7 or 8
10. 3 and 6 and 9
11. (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or "pharmaco economic*" or budget*).ti,ab.
12. ((monte adj carlo) or markov or (decision adj2 (tree$ or analys$))).ti,ab.
13. (value adj2 (money or monetary)).ti,ab.
14. ("quality of life" or "quality adjusted life" or qaly* or qald* or qale* or qtime* or "quality of wellbeing" or "quality of well-being" or "willing* to pay" or "standard gamble*" or "time trade off*" or "time tradeoff*").ti,ab.
15. (disability adjusted life or daly).ti,ab.
16. "health* year* equivalent*".ti,ab.
17. (sf36 or sf 36 or "short form 36" or "shortform 36" or "sf thirtysix" or "sf thirty six" or "shortform thirtysix" or "shortform thirty six" or "short form thirtysix" or "short form thirty six").ti,ab.

18. (sf6 or sf 6 or "short form 6" or "shortform 6" or sf six or sfsix or "shortform six" or "short form six").ti,ab.

19. (sf12 or sf 12 or "short form 12" or "shortform 12" or "sf twelve" or sftwelve or "shortform twelve" or "short form twelve").ti,ab.

20. (sf16 or sf 16 or "short form 16" or "shortform 16" or "sf sixteen" or sfsixteen or "shortform sixteen" or "short form sixteen").ti,ab.

21. (sf20 or sf 20 or "short form 20" or "shortform 20" or "sf twenty" or sftwenty or "shortform twenty" or "short form twenty").ti,ab.

22. (euroqol or "euro qol" or eq5d or "eq 5d").ti,ab.

23. ("Cost effectiveness" or "Economic evaluation" or "Quality of Life" or QALY or Costs or "Economic impact" or "Cost Benefit").sh.

24. or/11-23

25. (((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab.

26. 24 not 25

27. 10 and 26

28. limit 27 to yr="2011 -Current"

9.3. Appendix C: Results of the database searches and of grey literature searches

Table 13: Results of database searches

Database	Date of the search	Number of records retrieved
NHS EED	28/08/2014	3,316
EconLit	21/08/2014	1,927
Health Economic Evaluations Database (HEED)	08/09/2014	603
Social Policy and Practice (SPP)	28/08/2014	1,029
Total		6,875

Table 14: Additional literature

Source (e.g. organisation or work stream 1 or 2)	Number of studies screened (abstract and full-text)	Number of studies included in review
Stream 1	9	1
Stream 2	20	0 (1 report was subsequently excluded in discussion with NICE)
Total	*33*	*1*

9.4. Appendix D: Screening checklist

Table 15: Draft screening checklist

1.	Is the study relevant to community engagement?	YES/UNCLEAR – go to Q2	NO – exclude **1_EX Topic**
2.	Is the study published after 1st January 2011?	YES/UNCLEAR – go to Q3	NO – exclude **2_EX Date**
3.	Was the study conducted in an OECD country? [35]	YES/UNCLEAR – go to Q4	NO – exclude **3_EX Country**
4.	Is the study report published in English?	YES/UNCLEAR – go to Q5	NO – exclude **4_EX Language**
5.	Is the study design a: • cost-benefit analysis; • cost-effectiveness study; • cost-utility analysis; • cost analysis; primary research study including relevant economic information (e.g. unit costs)	YES/UNCLEAR – go to Q6	NO – exclude **5_EX Study**
6.	Is the main focus of the study a community engagement activity, as per the guideline scope (4.2.1)?	YES/UNCLEAR – go to Q7	NO – exclude **6_EX Intervention**
7.	Is the study relevant for at least one community or group as per the guideline scope (4.1.1)?	YES/UNCLEAR – go to Q8	NO – exclude **7_EX Population**
8.	Does the study measure and report health or intermediate outcomes as per the guideline scope (4.3.1)?	YES/UNCLEAR	NO – exclude **8_EX Outcome**
9.			YES – include **9_IN Include**

For cases where inclusion is unclear, code as **Q_QUERY** and save to discuss with screening team.

[35] OECD countries include: Australia; Austria; Belgium; Canada; Chile; Czech Republic; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Israel; Italy; Japan; Korea; Luxembourg; Mexico; Netherlands, Norway; New Zealand; Poland; Portugal; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Turkey; United Kingdom.

9.5. Appendix E: Evidence tables of all included studies

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Barton et al. **Year:** 2012 **Bibliographic reference:** Barton, G. R., Goodall, M., Bower, P., Woolf, S., Capewell, S., & Gabbay, M. B. (2012). Increasing heart-health lifestyles in deprived communities: economic evaluation of lay health trainers. Journal of Evaluation in Clinical Practice, 18(4), 835–840. doi:10.1111/j.1365-2753.2011.01686.x **Type of economic analysis:** Cost-utility analysis **Overall quality assessment:** Minor limitations [++] **Study design:** Randomized Randomised trial **Aim of the study/research question:** To assess the cost-effectiveness of using	**Source population:** ≥18 years with at least one risk factor for CVD (hypertension, raised cholesterol, diabetes, BMI>30 or current smoker); mean age 52.7 years **Country:** England **Setting:** 5 General Practices **Data sources:** Primary research	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> Both groups received health promotion literature; LHT were also able to provide intervention participants with information, advice and support aimed at changing beliefs and behaviour • <u>By whom:</u> LHT recruited from the same community • <u>To whom:</u> Adults with CHD risk factors • <u>How delivered:</u> See below • <u>When/where:</u> ideally via a face-to-face meeting at a place of the client's choosing (with additional telephone support, where appropriate) • <u>How often:</u> Every 2 weeks, 6 times in total; each contact was assumed to last for an hour • <u>How long for:</u> NR **Comparator:** Both groups received health promotion literature, including British Heart Foundation patient booklets and were asked to complete a food diary (at baseline and 6-month follow-up). The control group received no further support	**Outcomes:** Quality of life <u>Outcome evaluation:</u> EQ-5D at baseline and at 6 months <u>Method of analysis:</u> The York A1 tariff was used to assign scores to each EQ-5D health state description <u>Time horizon:</u> 6 months follow-up <u>Discount rates:</u> • Benefits: NR • Costs: NR <u>Economic perspective:</u> NHS and PSS <u>Measures of uncertainty:</u> Cost-effectiveness acceptability curve (CEAC) for each group. The CEAC depicts the probability that an intervention is cost-effective at different levels of λ <u>Modelling method and assumptions:</u> NR	**Primary results:** • <u>Benefits:</u> EQ-5D score at baseline – intervention group 0.833, control – 0.829; after 6 months intervention 0.946, controls 0.915. Estimated QALY gain for intervention was 0.007 • <u>Costs:</u> Mean cost of intervention £151 per participant. The total professional time associated with advertisement, selection and training of the six recruited LHTs was 222 hours, each of which required a CRB check costing £36 each. Supervision time constituted 15 hours in total. Assuming provision by a dietician (at £26.00 per hour) this constituted a cost of £6,378. LHT hourly wage rate £7.61 with an hourly employment cost of £11.50 (table 1 in Barton et al. 2012) • <u>ICER (for CUA, CEA);</u> LHT	**Limitations identified by author:** Patient recruitment cost was not included; A further limitation was the incomplete costs and QALY data, although analysis based on complete data resulted in a more favourable ICER than the base-case. The 6-month viewpoint could also be considered a limitation, although support for within trial analysis is provided by the fact that changes in behaviour may not be maintained and that presented data can inform longer term decision analytic models **Limitations identified by review team:** As above **Evidence gaps and/or recommendations for future research:** NA **Source of funding:** Medical Research Council (MRC) National

a lay 'health trainer' (LHT) to improve heart-health lifestyles in deprived communities **Applicability:** Directly applicable		from the research team **Sample sizes:** • Total N= 110 (initially 114 individuals were recruited, but 4 intervention participants were recruited too late to be allocated to LHT and were subsequently excluded from all analyses) • Intervention N= 72 • Control N= 38 **Type of community engagement intervention:** Peer/lay delivered interventions		£14,480 (£97.85/0.007) (yet there was a 60.5% chance of making the wrong decision at a £20 000/QALY threshold. This means that the probability of the intervention being cost-effective was only 39.5% at a £20,000 per QALY threshold) • <u>B:C ratio (for CBA):</u> NA • <u>Separate B and C for each consequence of CCA:</u> NA • <u>Other measures to be confirmed with NICE for each topic:</u> Health and social care costs fell by £21 for controls and £75 for intervention. Overall incremental cost £98. Mean QALY gain 0.022 and 0.028 for controls and interventions respectively **Secondary analysis:** Sensitivity analyses around various costs (table 2 in Barton et al. 2012) **Attrition details:** NR **Main results/conclusion:** LHT provision was estimated to be cost-effective for people at risk of CVD. Although, in the base case, the probability of the intervention being	Prevention Research Initiative **Other:** After checking dominance was not apparent (this would occur if one intervention were less costly and more effective than another), the incremental cost per QALY gain (ICER) associated with the intervention was calculated (mean incremental cost/mean incremental QALY gain). In line with NICE guidance authors compared the ICER with a cost-effectiveness threshold (λ) of £20 000– 30 000 per QALY

| | | | | cost-effective was only 39.5% at a £20,000 per QALY threshold (and less than 50% at all levels of the threshold), in sensitivity analysis, ICERs ranged between dominant and £22,347. However, a large level of uncertainty was associated with that decision | |

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Brown et al. **Year:** 2012 **Bibliographic reference:** Brown, H. S., Wilson, K. J., Pagán, J. A., Arcari, C. M., Martinez, M., Smith, K., & Reininger, B. (2012). Cost-Effectiveness Analysis of a Community Health Worker Intervention for Low-Income Hispanic Adults with Diabetes. Preventing Chronic Disease, 9. doi:10.5888/pcd9.120074 **Type of economic analysis:** Cost-utility analysis **Overall quality assessment:** Minor limitations [++] **Study design:** Trial **Aim of the study/research question:** To estimate the long-term cost-effectiveness of a lifestyle modification program led by community health workers	**Source population:** Low-income Hispanic adults (18+) with type 2 diabetes who were patients at Clinic **Country:** Laredo, Texas, US **Setting:** At Mercy Clinic **Data sources:** Primary research combined with simulated controlled clinical trials	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> Diabetes education and self-management programme (The University of Texas Community Outreach (UTCO) intervention) • <u>By whom:</u> Community health workers • <u>To whom:</u> Diabetic patients • <u>How delivered:</u> Home based CHW visits, classroom health education classes, nutrition classes, exercise classes and counselling sessions • <u>When/where:</u> Patient homes • <u>How often:</u> At least 1 home visit • <u>How long for:</u> 18 months **Comparator:** Usual care **Sample sizes:** • Total N= See below • Intervention N= Original sample of 30. Simulated - 6,551 • Control N= Simulated - 6,551 **Type of community engagement intervention:** Collaboration between health and other statutory services and communities	**Outcomes:** A1c levels. Myocardial infarction (MI), foot ulcers, foot amputations <u>Outcome evaluation:</u> EQ-5D from nationally representative sample of 38,678 adults <u>Method of analysis:</u> NR <u>Time horizon:</u> 20 years <u>Discount rates:</u> • Benefits: 3% • Costs: 3% <u>Economic perspective:</u> Societal perspective <u>Measures of uncertainty:</u> Sensitivity analysis <u>Modelling method and assumptions:</u> Archimedes model; Authors applied Archimedes Cardio-Metabolic Risk (CMR) dataset, which includes data from simulated US representative sample of 100,000 people aged 30-85; Texas minimum wage for	**Primary results:** • <u>Benefits:</u> All ages -life years 413.52, undiscounted QALYs 563.64, discounted 394.92. By age group in table 4 (in Brown et al. 2012) • <u>Costs:</u> ($2010) Initial home visit $80.59; follow-up visits $48.16. Trial scenario cost: educational classes $15,995, exercise classes $4,524, counselling sessions $2,247, and home visits $12,242. Real world scenario costs are also included in table 1 in Brown et al. 2012 Cost per QALY 20yrs – all ages, $33,319, 10yrs - $56,009, 5yrs - $130,271 (table 4 in Brown et al. 2012) • <u>ICER (for CUA, CEA):</u> $10,995 to $33,319 per QALY • <u>B:C ratio (for CBA):</u> NA • <u>Separate B and C for each consequence of CCA:</u> NA • <u>Other measures to be confirmed with NICE for</u>	**Limitations identified by author:** NR **Limitations identified by review team:** NA **Evidence gaps and/or recommendations for future research:** NA **Source of funding:** Texas Department of State Health Services, Texas Diabetes Council, National Institute on Minority Health and Health Disparities **Other:** NA

(CHWs) **Applicability:** Partly applicable			cost calculations	<u>each topic:</u> A1a levels fell by 7%; risk of MI by 2.6%; foot ulcer risk by 5.6%, foot amputations by 3.5% in 18 months. A1a levels will fall by 11.7% in 20yrs. Absolute difference over 20yrs in disease outcomes in table 3 (in Brown et al. 2012) **Secondary analysis:** Sensitivity analyses around discount rate, programme effectiveness and annual costs **Attrition details:** NR **Main results/conclusion:** The CHW program was cost-effective. The intervention was particularly cost-effective for adults with high glycemic levels (A1c > 9%)	

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Cooper et al. **Year:** 2012 **Bibliographic reference:** Cooper, K., Shepherd, J., Picot, J., Jones, J., Kavanagh, J., Harden, A. Price, A. (2012). An economic model of school-based behavioral interventions to prevent sexually transmitted infections. International Journal of Technology Assessment in Health Care, 28(4), 407–414. doi:10.1017/S0266462312000475 **Type of economic analysis:** Cost-effectiveness analysis **Overall quality assessment:** Minor limitations [++] **Study design:** Economic model constructed in MS Excel **Aim of the study/research question:** To evaluate the cost-effectiveness of reducing sexually transmitted infections (STI) and	**Source population:** Pupils **Country:** UK **Setting:** Schools **Data sources:** Systematic review findings	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> Educational and demonstrational sessions to educate pupils on sexually transmitted infections (STIs) • <u>By whom:</u> Peer led or teacher • <u>To whom:</u> Pupils • <u>How delivered:</u> Teacher led - active learning, leaflets, development skills, primarily through videos and role play. Peer led – sessions covered relationships, sexually transmitted infections, and use of condoms and contraception • <u>When/where:</u> At schools • <u>How often:</u> Teacher led – 20 sessions over 2yrs at ages 13-14 (10 sessions) and 14-15 (10 sessions). Peer led – 3 sessions, lasting 1hr, over one school term • <u>How long for:</u> See above **Comparator:** Standard education **Sample sizes:** • Total N= NR	**Outcomes:** Number of cases averted HIV, chlamydia, gonorrhoea, genital warts <u>Outcome evaluation:</u> HRQoL <u>Method of analysis:</u> Bernoulli statistical model that estimates the effect of changes in sexual behaviour in terms of STIs averted <u>Time horizon:</u> 1 year <u>Discount rates:</u> • Benefits: NR • Costs: NR <u>Economic perspective:</u> UK NHS and PSS <u>Measures of uncertainty:</u> Sensitivity analysis around all	**Primary results:** • <u>Benefits:</u> Teacher led intervention would avert extra 2 STI cases with a corresponding quality of life gain of 0.35 QALY compared with standard sex education. Peer led – also 2 cases averted at higher cost • <u>Costs:</u> €5.16 teacher led, €18 peer led per pupil. Medical cost (STI complications) chlamydia - €904.04, gonorrhoea - €904.04, genital warts - €675.13, HIV - €490,385. Total cost of intervention teacher led - €10,320, peer led - €36,000. Total medical costs averted teacher led - €1,745, peer led - €1,745. Net	**Limitations identified by author:** See the assumptions **Limitations identified by review team:** Outcomes are only presented for chlamydia as it is most prevalent **Evidence gaps and/or recommendations for future research:** By authors – often data are presented for the 18- to 25-year-old age group in national surveys, and we recommend that the age groups used are extended **Source of funding:** NIHR Health Technology Assessment Programme

teenage pregnancy through health education **Applicability:** Directly applicable		• Intervention N= Cohort of 1000 boys and 1000 girls • Control N= NR **Type of community engagement intervention:** Peer/lay delivered intervention	values of the STIs were conducted. The paper only presents for chlamydia (table 4 in Cooper et al. 2012) Modelling method and assumptions: The same effect of both interventions (teacher led or peer led) was assumed. Data for <16 ages was not available, therefore authors used the data from older teens	additional costs teacher led €8,575, peer led €34,255. Cost per case averted (all STIs) teacher led €4,058, peer led - €16,210 • ICER (for CUA, CEA): Incremental cost per QALY gained teacher led €24,268, peer led €96,938 • B:C ratio (for CBA): NA • Separate B and C for each consequence of CCA: NA • Other measures to be confirmed with NICE for each topic: See above **Secondary analysis:** Sensitivity analyses was conducted; see measures of uncertainty **Attrition details:** NR **Main results/conclusion:** Compared to standard education, the incremental cost-effectiveness of the	**Other:** NA

				teacher-led and peer-led interventions was €24,268 and €96,938 per QALY gained, respectively	

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Dukhovny et al.	**Source population:** Postpartum women	**Interventions:** *Describe in detail, including:*	**Outcomes:** Depression reduction	**Primary results:**	**Limitations identified by author:** Because of resource limitations, authors did not use QALY as a measure of effectiveness. EPDS scores, traditionally are used for screening rather than diagnosis. The resource utilisation questionnaire may be associated with some recall bias
Year: 2013	**Country:** Ontario, Canada	• <u>What delivered:</u> Peers support group (PSG) – telephone based volunteer support	**Outcome evaluation:** Edinburgh Postnatal Depression Scale (EPDS)	• <u>Benefits:</u> 11% absolute reduction in PPD in PSG (incremental effect 0.1116)	
Bibliographic reference: Dukhovny, D., Dennis, C.-L., Hodnett, E., Weston, J., Stewart, D. E., Mao, W., & Zupancic, J. A. F. (2013). Prospective economic evaluation of a peer support intervention for prevention of postpartum depression among high-risk women in Ontario, Canada. American Journal of Perinatology, 30(8), 631–642. Doi:10.1055/s-0032-1331029	**Setting:** Seven health regions **Data sources:** Primary research	• <u>By whom:</u> Volunteers • <u>To whom:</u> Postpartum women • <u>How delivered:</u> Telephone • <u>When/where:</u> NR • <u>How often:</u> NR • <u>How long for:</u> 12 weeks **Comparator:** Usual care group (UCG) **Sample sizes:**	**Method of analysis:** Prospectively planned economic evaluation **Time horizon:** 12 weeks **Discount rates:** • Benefits: NR • Costs: NR	• <u>Costs:</u> (CAN$ 2011) Mean cost per woman $4,497 in PSG and $3,380 in UCG (table 3 in Dukhovny et al. 2013) • <u>ICER (for CUA, CEA):</u> $10,009 per case of PPD averted • <u>B:C ratio (for CBA):</u> NA	**Limitations identified by review team:** As above **Evidence gaps and/or recommendations for future research:** NA
Type of economic analysis: Cost-effectiveness analysis **Overall quality assessment:** Potentially serious limitations [+]		• Total N= 610 • Intervention N= 296 • Control N= 314 **Type of community engagement intervention:** Peer/lay delivered interventions	**Economic perspective:** Societal perspective **Measures of uncertainty:** Sensitivity analysis **Modelling method and assumptions:** NR	• <u>Separate B and C for each consequence of CCA:</u> NA • <u>Other measures to be confirmed with NICE for each topic:</u> Health service utilisation, rehospitalisation, family/friend and partner time off work, hired child care help and hired help by the family is presented in table 2 (in Dukhovny	**Source of funding:** Canadian Institutes of Health Research **Other:** Discounting of costs and effects was not required given the

				et al. 2013) both for intervention and control	short time horizon. Study protocol has been published before
Study design: Multivariate, randomised clinical trial with economic evaluation **Aim of the study/research question:** To determine the cost-effectiveness of peer support for prevention of post-partum depression (PPD) **Applicability:** Partly applicable				**Secondary analysis:** Sensitivity analyses around costs of the resources used by patients **Attrition details:** NR **Main results/conclusion:** There was a 95% probability that the programme would cost less than $20,196 per case of postpartum depression averted	

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Gillespie et al. **Year:** 2012 **Bibliographic reference:** Gillespie, P., O'Shea, E., Paul, G., O'Dowd, T., & Smith, S. M. (2012). Cost effectiveness of peer support for type 2 diabetes. International Journal of Technology Assessment in Health Care, 28(1), 3–11. Doi:10.1017/S0266462311000663 **Type of economic analysis:** Cost-utility analysis **Overall quality assessment:** Minor limitations [++] **Study design:** A cluster randomised controlled trial **Aim of the study/research question:** To examine the cost-effectiveness of a group-based peer support intervention in general practice for patients with type 2 diabetes	**Source population:** Patients with type 2 diabetes. Mean age (SD) 63 **Country:** Ireland (east of Ireland) **Setting:** At General Practice **Data sources:** Primary research and beyond trial analysis was conducted using UK Prospective Diabetes Study (UKPDS). UKPDS was used to extend the time horizon of the evaluation	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> A group based peer support in addition to standard diabetes care • <u>By whom:</u> Peer supporters • <u>To whom:</u> Patients with type 2 diabetes • <u>How delivered:</u> Meetings • <u>When/where:</u> At patient own General Practices • <u>How often:</u> 3-6 months with annual audit of risk factors, 9 meetings • <u>How long for:</u> 2 years **Comparator:** Standard diabetes care **Sample sizes:** • Total N= 395 • Intervention N= 192 • Control N= 203 **Type of community engagement intervention:** Peer/lay delivered interventions	**Outcomes:** Primary clinical outcomes: HBA1c, systolic blood pressure (SBP), cholesterol, well-being score <u>Outcome evaluation:</u> Incremental health care costs and QALYs <u>Method of analysis:</u> See modelling methods and assumptions below <u>Time horizon:</u> 40 years (model) <u>Discount rates:</u> • Benefits: 3.5% • Costs: 3.5% <u>Economic perspective:</u> Both the healthcare provider and the patient was adopted (a human capital approach)	**Primary results:** • <u>Benefits:</u> Mean health care reduction due to intervention €527.83. Lifetime saving per patient €637.43 in healthcare cost and €623.39 in total costs compared with control • <u>Costs:</u> (€2008) Peer support recruitment total €790, per practice €79, per patient €4; GP, phone calls, postage & packaging total cost €5,836, per practice €584, per patient €26; Venues, refreshments etc. total cost €28, 308, per practice €2,831, per patient 128; GP implementation total cost €14,718, per practice €1,471, per patient €67;	**Limitations identified by author:** Not all the complications of diabetes are included in the model; the potential for reduced incidence in these outcomes from peer support and the resulting benefits in terms of health-related quality of life and reduced treatment costs are, therefore, not captured in the analysis; lack of available evidence for some model input parameters, including the history of diabetes related complications and ethnicity, which were not collected in the trial; the approach overestimates the true opportunity cost of work time as, in reality, additional

				Measures of uncertainty: Sensitivity analysis	Patient recruitment total cost €1,154, per practice €115, per patient €5; Annual social event total cost €3,650, per practice €365, per patient €17; Intervention set up cost (base-case analysis) total cost €54,457, per practice €5,446, per patient €246 (table 1, 2 & 3 in Gillespie et al. 2012)	work can be undertaken by co-workers during the period of absence; QALY estimates do not include impacts on health related quality of life over the course of the trial, as the measurement instrument adopted could not be transformed into utility weights
Applicability: Directly applicable				Modelling method and assumptions: Generalized Estimating Equations (GEE) multivariate regression model was used to estimate the input parameters of interest in each case. A Gamma variance function was adopted for analysis. Model run for 40 years. For the base-case analysis, a conservative approach was adopted that assumed no additional treatment effect beyond the end of the trial	• ICER (for CUA, CEA): Average increase in QALYs 0.09 per patient compared with control (lifetime QALY I:6.76, C 6.67 • B:C ratio (for CBA): NA • Separate B and C for each consequence of CCA: NA • Other measures to be confirmed with NICE for each topic: HBA1c I: 7.06%, C:7.12%; SBP I: 136mmHg, C: 136mmHg;	**Limitations identified by review team:** NA **Evidence gaps and/or recommendations for future research:** See limitations section **Source of funding:** Health Research Board **Other:** NA

				Cholesterol I 3.99 mmol/l, C:4.32mmol/l; Well-being score I 23.7, c: 23.2
				Secondary analysis: Sensitivity analyses around costs of intervention
				Attrition details: NR
				Main results/conclusion: Compared with the control, the intervention was associated with an increase of 0.09 in mean QALY/patient and savings of €637.43 in mean healthcare cost/patient and €623.39 in mean total cost/patient respectively. The likelihood of the intervention being cost-effective was appreciably higher than 80% for a range of potential willingness-to-pay cost-effectiveness thresholds

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Goeree et al. **Year:** 2013 **Bibliographic reference:** Goeree, R., von Keyserlingk, C., Burke, N., He, J., Kaczorowski, J., Chambers, L., Zagorski, B. (2013). Economic appraisal of a community-wide cardiovascular health awareness program. Value in Health: The Journal of the International Society for Pharmacoeconomics and Outcomes Research, 16(1), 39–45. Doi:10.1016/j.jval.2012.09.002 **Type of economic analysis:** Cost-consequence analysis **Overall quality assessment:** Minor limitations [++] **Study design:** A cluster randomised controlled trial **Aim of the study/research question:** To evaluate the	**Source population:** Elderly residents >65 **Country:** Ontario, Canada **Setting:** 39 medium sized rural communities (cities/towns), community-dwelling with populations between 10,00 and 60,000; total population was 973,246, residents >65 140,642 **Data sources:** Primary research	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> A Cardiovascular Health Awareness Program (CHAP) – CVD risk factor assessment and education sessions • <u>By whom:</u> Trained volunteers • <u>To whom:</u> Elderly >65 • <u>How delivered:</u> Educational sessions and copy of a report, along with cardiovascular health education materials and a list of local resources supporting lifestyle changes • <u>When/where:</u> In local pharmacies • <u>How often:</u> NR • <u>How long for:</u> 10 weeks **Comparator:** Usual health promotion and health care services available to all residents **Sample sizes:** • Total N= 39 communities • Intervention N= 20 CHAP • Control N= 19	**Outcomes:** The primary outcome measure of the overall study was the mean annual number of hospital admissions for acute myocardial infarction (MI), congestive heart failure (CHF), and stroke among trial elderly residents in intervention and control communities. Secondary outcome measures included mortality among patients hospitalised for CVD and coronary artery disease, all-cause mortality, hospitalisations for stroke and coronary artery disease, and initiation of antihypertensive drug therapy **Outcome evaluation:** The above was measured using	**Primary results:** • <u>Benefits:</u> CHAP minus control utilisation difference – CHAP hospitalisations -2.90, all hospitalisation -8.46, visits to hospital emergency departments 4.71, family physician claims -95.37, specialist claims 15.10, prescription drug claims 263.07 (table 2 in Goeree et al. 2013) • <u>Costs:</u> (CAN$2010) CHAP $11,976 - $57,113 depending on community size. Average community based costs per community $30,494. Total cost of CHAP was $1,414,178, about $71,000 per community, $20.20 per elderly resident • <u>ICER (for CUA, CEA):</u>	**Limitations identified by author:** CHAP is a bundled intervention with many components. As such, it is not possible to determine the independent contribution of each component of the bundled intervention. Another limitation is that these results apply to medium-sized rural communities and it is uncertain whether CHAP would be as successful in urban settings or with diverse populations. Third, although individual patient-level analysis would have some advantages compared with cluster community analyses, the individual patient-level analysis was not possible for CHAP because of the large

resource use and cost-consequences of a community-wide Cardio-vascular Health Awareness Program(CHAP) **Applicability:** Partly applicable		**Type of community engagement intervention:** Collaboration between health and other statutory services and communities	province-based linked administrative database <u>Method of analysis:</u> Regression models; ordinary least squares (OLS); Shapiro-Wilk test <u>Time horizon:</u> 1 year <u>Discount rates:</u> • Benefits: NA • Costs: NA <u>Economic perspective:</u> Publicly financed universal health insurance system <u>Measures of uncertainty:</u> Sensitivity analysis was conducted <u>Modelling method and assumptions:</u> See method of analysis	NA • <u>B:C ratio (for CBA):</u> NA • <u>Separate B and C for each consequence of CCA:</u> See above • <u>Other measures to be confirmed with NICE for each topic:</u> See above **Secondary analysis:** Sensitivity analysis around utilisation rates and costs **Attrition details:** NR **Main results/conclusion:** CHAP was associated with a reduction in CVD hospitalisation costs. There were no differences in utilisation rates or costs for overall hospitalisations, in visits to emergency rooms, physicians, or specialists, or in the use of prescription medications. Results were robust over a range of cost assumptions	scope of the study (i.e., more than 140,000 elderly residents) and the fact that the individual patient-level consent required to access and analyse linked patient administrative health records was not feasible or approved for the study. And finally, CHAP was successful in mobilising significant community support for the intervention communities and for the most part this volunteer assistance and the in-kind contributions from the local lead organisations within the CHAP communities have not been accounted for in the analysis of implementation costs **Limitations identified by review team:** NA **Evidence gaps and/or**

					recommendations for future research: NA **Source of funding:** Canadian Stroke Network; Ontario Ministry of Health Promotion; Institute for Clinical Evaluative Sciences (ICES); Ontario Ministry of Health and Long-Term Care (MOHLTC) **Other:** Note from the authors - and because of the short time horizon of the cost analysis (i.e., 1 year), discounting of costs in future years was not required

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Grimes et al. **Year:** 2011 **Bibliographic reference:** Grimes, K. E., Schulz, M. F., Cohen, S. A., Mullin, B. O., Lehar, S. E., & Tien, S. (2011). Pursuing cost-effectiveness in mental health service delivery for youth with complex needs. The Journal of Mental Health Policy and Economics, 14(2), 73–83. **Type of economic analysis:** Cost-effectiveness analysis **Overall quality assessment:** Potentially serious limitations [+] **Study design:** Claims analysis **Aim of the study/research**	**Source population:** Youth aged 3-18, average age 11, 2:1 ratio of males to females **Country:** Boston, USA **Setting:** Five urban communities **Data sources:** Primary research	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> The Mental Health Services Program for Youth (MHSPY). This programme involves family engagement; Clinical Care Managers works with the family to create a Care Planning Team, including a parent/guardian; school and health professionals; mental health and state agency service providers, if any; as well as individuals the family or youth identify as natural social supports, "real world" context rather than institutions • <u>By whom:</u> Clinical Care Managers and other services • <u>To whom:</u> Youth with documented mental health need including at least six months of significant clinical impairment as measured by the Child and Adolescent Functional Assessment Scale or CAFAS • <u>How delivered:</u> NR • <u>When/where:</u> At homes and other institutions • <u>How often:</u> NR	**Outcomes:** Admission rates per 1,000 at baseline and then at 12 months (emergency room (ER), inpatient and outpatient psychiatry, paediatric inpatient, ambulatory paediatrics, pharmacy) <u>Outcome evaluation:</u> Medicaid claims <u>Method of analysis:</u> Claims analysis; propensity score matching <u>Time horizon:</u> 12 months <u>Discount rates:</u> • Benefits: NR • Costs: NR <u>Economic perspective:</u> Medicaid <u>Measures of uncertainty:</u> NR Modelling method and	**Primary results:** • <u>Benefits:</u> See below • <u>Costs:</u> Total per member per month intervention $761.69; Control Group A - $236.30 Control Group B - $1,573.18 (Age adjusted for groups A and B). Some other costs in Table 4, pg. 79 (in Grimes et al. 2011) • <u>ICER (for CUA, CEA):</u> NR • <u>B:C ratio (for CBA):</u> NA • <u>Separate B and C for each consequence of CCA:</u> NA • <u>Other measures to be confirmed with NICE for each topic:</u> Possibly due to increased treatment adherence, Intervention outpatient mental health claims expense was 2 times higher	**Limitations identified by author:** The absence of a body of child mental health cost-effectiveness literature limits our ability to provide context for this study and comparison groups findings. Also, although the comparison group sample size is robust, the intervention study sample size was restricted, due to state Medicaid constraints, thus authors were unable to perform significance testing on some measures. Also prior service use data for each of the 100 MHSPY subjects is taken from chart review, unlike the claims data collected during program enrolment, so that numbers of prior placement and

question: To examine the cost-effectiveness of an intensively integrated, family and community-based clinical intervention for youth with mental health needs in comparison to 'usual care' **Applicability:** Partly applicable		• How long for: 12 months **Comparator:** Usual care. Here authors define two groups. Group A - children who had no inpatient psychiatry claims and Group B - children whose total mental health claims included at least one inpatient psychiatry admission **Sample sizes:** • Total N= 20,283 • Intervention N= 100 • Control N= 20,183 (reference population) **Type of community engagement intervention:** Collaboration between health and other statutory services and communities	assumptions: NR	than Group A and 46% than Group B. Intervention 15% more outpatient paediatric services than Group A, but 40% fewer than Group B. For more intensive services, MHSPY youth required 23% fewer inpatient paediatric admissions than Group A, and 94% fewer inpatient paediatric admissions than Group B. ER use is often correlated with hospital admission, so these findings are consistent with the fact that the MHSPY group had 2.5 times the amount of ER expense as those in Group A (usual care youth without psychiatric hospitalisations), but 32% less than their counterparts in Group B. For acute residential treatment, MHSPY youth	hospitalisation are likely to under represent actual pre-enrolment hospital utilisation. There is an eligibility requirement of IQ≥70 for MHSPY participants and no IQ information available for the reference population. This could potentially interfere with extrapolation of results for a broader population. Also, ''real world'' context in which the work takes place which did not provide clinical measures for subjects in usual care, nor allow random assignment into the MHSPY group vs. usual care group. Also due to propensity score matching residual biases and confounding may still remain. Propensity score analyses is limited in other respects, above and beyond the issue of bias. This approach

| | | | | incurred $15.96 PMPM vs. $50.03 PMPM for youth in comparison Group B. Total pharmacy claims expense was nearly 5 times larger for the intervention group than for Medicaid youth with outpatient mental health claims only (Group A) and still 15% higher than for comparison youth with inpatient psychiatry claims (Group B). But inpatient psychiatry claims expense for MHSPY study group enrolees was 73% lower ($270 PMPM vs. $1010 PMPM) than inpatient psychiatry expense for youth in Group B, resulting in a net differences of $721.34 PMPM fewer dollars spent on MHSPY youth than comparison youth in usual care. The MHSPY study group showed an | allows to account only for observed variables; there may be other, latent and unobserved variables that contribute to potential differentials in the propensity for treatment that cannot be included in such models. Also, the longer the time period of study, the more potential bias will be introduced in the propensity score analysis

Limitations identified by review team: As above. Also, no improvements in quality of life is presented or impact of higher possible adherence (e.g. outpatient mental health claims expense) and impact on parents or carers of children; productivity loss cost

Evidence gaps and/or recommendations for |

matrix
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				average 22 point improvement in total CAFAS scores, from an average baseline score of 111 at the time of enrolment in the intervention, down to an average score of 89 at 12 months follow-up. This total improvement includes a 60% decrease in Risk of Self-Harm **Secondary analysis:** NR **Attrition details:** NR **Main results/conclusion:** The intervention group used lower intensity services and had substantially lower claims expense (e.g. 32% lower for emergency room, 74% lower for inpatient psychiatry) than their matched counterparts in the usual care group. Intervention youth were consistently maintained in least restrictive settings, with	**future research:** See limitations. Also randomisation and follow-up is proposed by authors **Source of funding:** Department of Psychiatry at Cambridge Health Alliance **Other:** The MHSPY study sample is a more psychiatrically impaired population than the usual care group, despite being matched by diagnosis and prior hospital use. One of the indicators of this is the MHSPY rate of 14.1/1,000 for combined psychiatric hospital and acute residential treatment (ART) in 12 months prior to intervention. The comparable rate for the usual care sample is 11.3/1,000. Although the results were not statistically significant,

				over 88% of days spent at home and showed improved clinical functioning on standard measures	these trends suggest that when comparable morbidity is involved, pharmacy and inpatient psychiatry expense may be lower, rather than higher, in the intervention group

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Hollingworth et al. **Year:** 2012 **Bibliographic reference:** Hollingworth, W., Cohen, D., Hawkins, J., Hughes, R. A., Moore, L. A. R., Holliday, J. C., Campbell, R. (2012). Reducing smoking in adolescents: cost-effectiveness results from the cluster randomised ASSIST (A Stop Smoking In Schools Trial). Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco, 14(2), 161–168. Doi:10.1093/ntr/ntr155 **Type of economic analysis:** Cost-effectiveness analysis **Overall quality assessment:** Potentially	**Source population:** Year 8 (12–13 years old) students **Country:** England **Setting:** 59 schools in South East Wales and the West of England **Data sources:** Used primary that has been published previously	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> ASSIST (A Stop Smoking In Schools Trial) informal interactions to encourage their peers not to smoke • <u>By whom:</u> Student peers • <u>To whom:</u> Students at schools • <u>How delivered:</u> Informal interactions • <u>When/where:</u> At schools • <u>How often:</u> NR • <u>How long for:</u> 10 weeks **Comparator:** Current practice of smoking prevention education **Sample sizes:** • Total N= 10,730 (59 schools) • Intervention N= 5,358 (30 schools) • Control N= 5,372 (29 schools) **Type of community engagement intervention:** Peer/lay delivered interventions	**Outcomes:** Smoking behaviour – primary outcome was prevalence of weekly smoking <u>Outcome evaluation:</u> Saliva sample at the baseline; questionnaire <u>Method of analysis:</u> Simple random imputation; bootstrap imputation <u>Time horizon:</u> 2 years follow-up. Data was collected at baseline, at 1 and 2 years <u>Discount rates:</u> • Benefits: NR • Costs: NR <u>Economic perspective:</u> A public sector perspective was taken in the analysis, including costs to Local Authorities and the National Health	**Primary results:** • <u>Benefits:</u> OR want to give up smoking completely 1.17; think they will be smoking when 16yrs old 0.80; think ≤50% of people their age smoke 1.24 • <u>Costs:</u> The ASSIST programme cost of £32 per student. Total cost of intervention £169,865; Median (SD) cost per school per intervention £5,662 (table 2 in Hollingworth et al. 2012) • <u>ICER (for CUA, CEA):</u> Incremental cost per student not smoking £1,500 • <u>B:C ratio (for CBA):</u> NR • <u>Separate B and C for each consequence of CCA:</u> NR • <u>Other measures to be confirmed with NICE for each topic:</u> 2.1% reduction in smoking	**Limitations identified by author:** The opportunity cost of peer supporter's time was not quantified. As peer training was provided during school hours, it was at the expense of other education **Limitations identified by review team:** The intervention has been described elsewhere and was not fully replicated here. Outcome measure is not comprehensively described. Authors did not cost peer supporter time **Evidence gaps and/or recommendations for future research:** From authors - Future research should explore whether these benefits can be

serious limitations [+] **Study design:** A cluster randomised controlled trial **Aim of the study/research question:** To evaluate the ASSIST (A Stop Smoking In Schools Trial) programme **Applicability:** Directly applicable			Service (NHS) Measures of uncertainty: Sensitivity analysis around cost of ASSIST trainers. They were replaced by the cost of privately contracted trainers (£38). If the intervention was delivered by ASSIST trainers cost would feel by £6 (table 5 in Hollingworth et al) Modelling method and assumptions: ASSIST trainers were employed by the university during the trials. It was assumed that they would be NHS employees in practice	prevalence at 2years **Secondary analysis:** See measures of uncertainty **Attrition details:** NR **Main results/conclusion:** Incremental cost per student not smoking at 2 years was £1,500	replicated when ASSIST is implemented in other settings and its relative effectiveness compared with other school-based smoking prevention programmes **Source of funding:** UK Medical Research Council **Other:** The intervention occurred during one school year, and costs were not discounted

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Irvine et al. **Year:** 2011 **Bibliographic reference:** Irvine, L., Barton, G. R., Gasper, A. V., Murray, N., Clark, A., Scarpello, T., & Sampson, M. (2011). Cost-effectiveness of a lifestyle intervention in preventing Type 2 diabetes. International Journal of Technology Assessment in Health Care, 27(4), 275–282. doi:10.1017/S0266462311000365 **Type of economic analysis:** Cost-utility analysis **Overall quality assessment:** Potentially serious limitations [+] **Study design:** Trial **Aim of the study/research question:** Impact of prolonged structured diet and exercise advice on newly diagnosed patients with type 2 diabetes and impaired fasting glucose (IFG)	**Source population:** Adults aged 45-70 with at least of the following BMI ≥25kg/m², first degree relative with T2DM, waist circumference >94cm for men or >80 for women, history of coronary heart disease, gestational diabetes, or IFG **Country:** Norfolk, UK **Setting:** NR **Data sources:** Primary data	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> University of East Anglia Impaired Fasting Glucose programme (UEA-IFG) • <u>By whom:</u> Diabetes Prevention Facilitators (DPF) with aim to promote 7% weight loss within 6 months using both diet and exercise interventions • <u>To whom:</u> See source population • <u>How delivered:</u> Educational sessions in the first 3 months and physiotherapist-led exercise group sessions; also, diet diaries and pedometer records. This group also received telephone peer-support from volunteers (referred to as T2Trainers) who themselves had been diagnosed with T2DM	**Outcomes:** QALY gains <u>Outcome evaluation:</u> EQ-5D <u>Method of analysis:</u> STATA 10 multiple imputation methods was applied <u>Time horizon:</u> 7.28 months mean follow up for intervention arm, 6.69 months for control arm <u>Discount rates:</u> • Benefits: NR • Costs: NR <u>Economic perspective:</u> UK NHS and personal social services (PSS) <u>Measures of uncertainty:</u> See	**Primary results:** • <u>Benefits:</u> The QALY gains were −0.001 in intervention arm and −0.004 in control arm • <u>Costs:</u> I: £551, C:£325. Total cost of T2Trainer programme £6,745, £57 per patient. Peer support group session £53 per patient. Mean healthcare cost I £324.89, C £324.26 • <u>ICER (for CUA, CEA):</u> UEA-IFG ICER 367,163 per QALY. At a threshold £20,000/QALY there was a 16% probability that the intervention was cost-effective • <u>B:C ratio (for CBA):</u> NA • <u>Separate B and C for each consequence</u>	**Limitations identified by author:** NR **Limitations identified by review team:** QALYs measured was the only outcome measured. It would be interesting to see intervention outcome on other health factors (e.g. BMI) **Evidence gaps and/or recommendations for future research:** See above **Source of funding:** NIHR **Other:** This study assesses the combination of

Applicability: Directly applicable		for at least 2 years • When/where: NR • How often: NR • How long for: See above **Comparator:** A 2hr session of diet and exercise advice (was considered to be equal to usual care); also this group was given pedometers to record step count **Sample sizes:** • Total N= 177 • Intervention N=118 • Control N= 59 **Type of community engagement intervention:** Peer/lay delivered interventions	secondary analysis Modelling method and assumptions: NR	of CCA: NA • Other measures to be confirmed with NICE for each topic: NR **Secondary analysis:** Sensitivity analyses was conducted around cost of screening, participant **Attrition details:** Attendance rate at core session 97%, peer support sessions 80%, physiotherapist led session 56% **Main results/conclusion:** The QALY gains were −0.001 and −0.004, for intervention and for the control arm respectively. The intervention was estimated to have an ICER of £67,184 per QALY (16 percent probability of being cost-effective at the £20,000/QALY threshold). Cost-effectiveness estimates were more favourable	interventions, therefore, results should be treated with caution

				for IFG participants and those with longer follow-up (≥4 months) (ICERs of £20,620 and £17,075 per QALY, respectively)	

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Krukowski et al. **Year:** 2013 **Bibliographic reference:** Krukowski, R. A., Pope, R. A., Love, S., Lensing, S., Felix, H. C., Prewitt, T. E., & West, D. (2013). Examination of costs for a lay health educator-delivered translation of the Diabetes Prevention Program in senior centers. Preventive Medicine, 57(4), 400–402. doi:10.1016/j.ypmed.2013.06.027 **Type of economic analysis:** Cost-effectiveness analysis **Overall quality assessment:** Potentially serious limitations [+] **Study design:** Cluster randomised study **Aim of the study/research question:** To examine the cost of lay health educators delivered translation of the Diabetes Prevention Programme (DPP)	**Source population:** Older adults (≥60) with high rates of obesity (BMI≥30kg/m²) who had no significant memory problems **Country:** US **Setting:** Rural **Data sources:** Primary research	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> Lifestyle intervention utilising DPP intervention materials adapted for group delivery • <u>By whom:</u> Lay health educators • <u>To whom:</u> Older adults with high rates of obesity in rural areas • <u>How delivered:</u> 12 sessions • <u>When/where:</u> Senior centres • <u>How often:</u> NR • <u>How long for:</u> 4 months **Comparator:** NR (cost were assessed without comparing with an alternative) **Sample sizes:** • Total N= NR • Intervention N= 116 • Control N= NR **Type of community engagement intervention:** Peer/lay delivered interventions	**Outcomes:** Weight loss <u>Outcome evaluation:</u> NR <u>Method of analysis:</u> NR <u>Time horizon:</u> 2008-2010 <u>Discount rates:</u> • Benefits: NR • Costs: NR <u>Economic perspective:</u> NR <u>Measures of uncertainty:</u> NR <u>Modelling method and assumptions:</u> NR	**Primary results:** • <u>Benefits:</u> Participants lost 492.2kg or on average 3.7kg per participant. The implementation cost per kg lost is $45 (table 1 in Krukowski et al. 2013) • <u>Costs:</u> ($2008-2009) Total cost of $2,731 per senior centres, $165 per person • <u>ICER (for CUA, CEA):</u> NA • <u>B:C ratio (for CBA):</u> NR • <u>Separate B and C for each consequence of CCA:</u> NA • <u>Other measures to be confirmed with NICE for each topic:</u> NR **Secondary analysis:** NR **Attrition details:** NR	**Limitations identified by author:** Similar to other available reports on cost estimates of DPP translations, this is not a full formal cost evaluation with consideration of participant costs nor are costs associated with extended implementation and long-term weight maintenance available **Limitations identified by review team:** The intervention is not fully explained **Evidence gaps and/or recommendations for future research:** See above **Source of funding:** Centers for Disease Control and

				Main results/conclusion: A LHE-delivered DPP translation in senior centres is effective in achieving weight loss at low cost and offers promise for the dissemination of this evidence-based intervention	Prevention **Other:** NA
lifestyle intervention **Applicability:** Partly applicable					

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

Evidence table/Data extraction template for economic studies

Study details	Population and setting	Intervention / comparator	Outcomes and methods of analysis	Results	Notes
Authors: Moodie et al. **Year:** 2013 **Bibliographic reference:** Moodie, M. L., Herbert, J. K., de Silva-Sanigorski, A. M., Mavoa, H. M., Keating, C. L., Carter, R. C., Swinburn, B. A. (2013). The cost-effectiveness of a successful community-based obesity prevention program: the be active eat well program. Obesity (Silver Spring, Md.), 21(10), 2072–2080. Doi:10.1002/oby.20472 **Type of economic analysis:** Cost-effectiveness analysis **Overall quality assessment:** Potentially serious limitations [+] **Study design:** A quasi-experimental, longitudinal design	**Source population:** Children aged 4-12 years **Country:** Australia **Setting:** Rural (Colac Area Health (CAH)) **Data sources:** Primary research	**Interventions:** *Describe in detail, including:* • <u>What delivered:</u> Be Active Eat Well (BAEW); Provision of opportunities, resources and support to achieve positive changes in communities, children and their families • <u>By whom:</u> CAH as well as other organisations such as • <u>To whom:</u> The whole community, in particular focused on primary school – 6 primary schools and 4 preschools Colac Otway Shire and Colac Neighborhood Renewal, were also involved in the design, planning and implementation through the provision of in-kind support • <u>How delivered:</u> NR • <u>When/where:</u> NR • <u>How often:</u> NR • <u>How long for:</u> 3 years **Comparator:** Current practice – activities introduced into the school environment to address concerns about healthy eating, physical activity, or childhood obesity, over and above normal school curriculum	**Outcomes:** Body mass index (BMI) units saved, disability adjusted life years (DALYs) averted over lifetime of the cohort <u>Outcome evaluation:</u> Children's measured anthropometric and demographic data were collected at baseline and intervention completion, using a quasi-experimental, longitudinal design <u>Method of analysis:</u> See below <u>Time horizon:</u> Life-time (until cohorts aged reached 100) <u>Discount rates:</u> • Benefits: 3% • Costs: 3% <u>Economic perspective:</u> Societal perspective; opportunity cost principle	**Primary results:** • <u>Benefits:</u> 547 BMI unites saved and 10.2 DALYs averted • <u>Costs:</u> (AUS$2006) The intervention cost AUD0.34M annually • <u>ICER (for CUA, CEA):</u> Cost offsets of $27,311 (-$1803; $58 242) and a net cost per DALY saved of $29,798 (dominated; $0.26M) • <u>B:C ratio (for CBA):</u> NA • <u>Separate B and C for each consequence of CCA:</u> NA • <u>Other measures to be confirmed with NICE for each topic:</u> See above **Secondary analysis:** Sensitivity analyses around health benefits, costs, ICERs **Attrition details:** Was assumed 10% up take **Main results/conclusion:**	**Limitations identified by author:** Assumption of 100% maintenance of the effect **Limitations identified by review team:** As above **Evidence gaps and/or recommendations for future research:** NA **Source of funding:** National Health and Medical Research Council; authors also acknowledge funders of their salaries (not listed here) **Other:** The intervention strategies and activities were detailed in the BAEW Action Plan (June 2006) and process evaluation reports

		(both for intervention and control)		BAEW was affordable and cost-effective, and generated substantial spin-offs in terms of activity beyond funding levels. Elements fundamental to its success and any potential cost efficiencies associated with scaling-up now require identification
Aim of the study/research question: To examine the cost-effectiveness of Be Active Eat Well (BAEW), a large, multifaceted, community-based capacity-building demonstration program that promoted healthy eating and physical activity

Applicability: Partly applicable | | **Sample sizes:**
• Total N= 2184
• Intervention N= 1001
• Control N= 1183

Type of community engagement intervention:
Collaboration between health and other statutory services and communities | <u>Measures of uncertainty:</u> Sensitivity analysis

<u>Modelling method and assumptions:</u> A retrospective cost-effectiveness evaluation; simulation methods using the @RISK software and Monte Carlo simulations; 100% of the effect size was assumed to be maintained, however, alternative decay of effect scenarios were tested under sensitivity analyses | |

Please complete for all headings and note where data is 'Not reported' or 'Not applicable'.

9.6. Appendix F: Quality Assessment of all included studies

Study identification Include author, title, reference, year of publication	Barton et al. 2012		
Guidance topic		**Question No.**	
Checklist completed by	KR		
Section 1: Applicability (relevance to specific review questions and the NICE reference case as described in section 7.5) This checklist should be used first to filter out irrelevant studies.	Yes/partly/no/unclear/NA		Comments
1.1 Is the study population appropriate for the review question?	Yes		
1.2 Are the interventions appropriate for the review question?	Yes		
1.3 Is the social care system in which the study was conducted sufficiently similar to the current UK social care context?	Yes		
1.4 Are the perspectives clearly stated and what are they?	Yes		
1.5 Are all direct effects on individuals included, and are all other effects included where they are material?	No		
1.6 Are all future costs and outcomes discounted appropriately?	No		
1.7 Is QALY used as an outcome? If not, describe rationale and outcomes used in line with analytical perspectives taken (item 1.4 above).	Yes		
1.8 Are costs and outcomes from other sectors (including the value of unpaid care, where relevant) fully and appropriately measured and valued?	Yes		
1.9 Overall judgement: Directly applicable/partially applicable/not applicable There is no need to use section 2 of the checklist if the study is considered 'not applicable'.			
Other comments: NA (directly applicable)			
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/partly/no/unclear/NA		Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear		Model is not presented
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear		6 months
2.3 Are all important and relevant outcomes included?	Unclear		
2.4 Are the estimates of baseline outcomes from the best available source?	Yes		
2.5 Are the estimates of relative intervention	Yes		

effects from the best available source?		
2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Yes	
2.8 Are the unit costs of resources from the best available source?	Yes	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	NR	
2.12 Overall assessment: Minor limitations/potentially serious limitations/very serious limitations		
Minor limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Brown et al. 2012		
Guidance topic	Community engagement	Question No.	
Checklist completed by	KR		

Section 1: Applicability (relevance to specific review questions and the NICE reference case as described in section 7.5) This checklist should be used first to filter out irrelevant studies.	Yes/partly/no/unclear/NA	Comments
1.1 Is the study population appropriate for the review question?	Yes	
1.2 Are the interventions appropriate for the review question?	Yes	
1.3 Is the social care system in which the study was conducted sufficiently similar to the current UK social care context?	Partly	US
1.4 Are the perspectives clearly stated and what are they?	Yes	
1.5 Are all direct effects on individuals included, and are all other effects included where they are material?	Yes	
1.6 Are all future costs and outcomes discounted appropriately?	Yes	
1.7 Is QALY used as an outcome? If not, describe rationale and outcomes used in line with analytical perspectives taken (item 1.4 above).	Yes	QALYs
Yes	Yes	

1.9 Overall judgement: Directly applicable/partially applicable/not applicable There is no need to use section 2 of the checklist if the study is considered 'not applicable'.
Other comments: NA

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/partly/no/unclear/NA	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear	Model is not presented
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Yes	18 month intervention, 20 years outcome
2.3 Are all important and relevant outcomes included?	Yes	
2.4 Are the estimates of baseline outcomes from the best available source?	Yes	
2.5 Are the estimates of relative intervention effects from the best available source?	Unclear	
2.6 Are all important and relevant costs included?	Unclear	

2.7 Are the estimates of resource use from the best available source?	Unclear	
2.8 Are the unit costs of resources from the best available source?	Unclear	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	No	
2.12 Overall assessment: Minor limitations/potentially serious limitations/very serious limitations		
Minor limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Cooper et al. 2012		
Guidance topic	Community engagement	**Question No.**	
Checklist completed by	KR		

Section 1: Applicability (relevance to specific review questions and the NICE reference case) This checklist should be used first to filter out irrelevant studies.	Yes/ partly/ no/ unclear/ not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Yes	
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes	
1.6 Are all future costs and outcomes discounted appropriately?	No	
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	Yes	
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly	Data is from systematic reviews
1.9 Overall judgement: directly applicable/partially applicable/not applicable There is no need to use section 2 of the checklist if the study is considered 'not applicable'.		
Comments: NA		

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/ partly/ no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear	Model is not presented
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear	1 year time horizon
2.3 Are all important and relevant outcomes included?	Unclear	
2.4 Are the estimates of baseline outcomes from the best available source?	Unclear	Data is from systematic reviews
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Unclear	Data is from systematic reviews
2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Unclear	Data is from systematic reviews

2.8 Are the unit costs of resources from the best available source?	Unclear	Data is from systematic reviews
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	No	
2.12 Overall assessment: minor limitations/potentially serious limitations/very serious limitations		
Minor limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion
- answer 'partly' if the study largely meets the criterion but differs in some important respect
- answer 'no' if the study deviates substantively from the criterion
- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion
- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Dukhovny et al. 2013		
Guidance topic		Question No.	
Checklist completed by	KR		
Section 1: Applicability (relevance to specific review questions and the NICE reference case) This checklist should be used first to filter out irrelevant studies.	Yes/ partly/ no/ unclear/ not applicable		Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes		
1.2 Are the interventions appropriate for the topic being evaluated?	Yes		
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Partly		Canada
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes		
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	Yes		
1.6 Are all future costs and outcomes discounted appropriately?	No		12 weeks only
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No		No enough data
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Partly		The resource utilisation questionnaire may be associated with some recall bias
1.9 Overall judgement: directly applicable/partially applicable/not applicable There is no need to use section 2 of the checklist if the study is considered 'not applicable'.			
Partly applicable			
Comments: Study protocol has been published elsewhere			
Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/ partly/ no/ unclear/ not applicable		Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear		Model is not presented
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear		12 weeks. Trial was 24 weeks but women with high depression score were referred to seek help
2.3 Are all important and relevant outcomes included?	Yes		
2.4 Are the estimates of baseline outcomes from the best available source?	Yes		

2.5 Are the estimates of relative 'treatment' effects from the best available source?	Yes	
2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Yes	
2.8 Are the unit costs of resources from the best available source?	Yes	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	NR	
2.12 Overall assessment: minor limitations/potentially serious limitations/very serious limitations		
Potentially serious limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Gillespie et al. 2012		
Guidance topic	Community engagement	Question No.	
Checklist completed by	KR		

Section 1: Applicability (relevance to specific review questions and the NICE reference case as described in section 7.5) This checklist should be used first to filter out irrelevant studies.	Yes/partly/no/unclear/NA	Comments
1.1 Is the study population appropriate for the review question?	Yes	
1.2 Are the interventions appropriate for the review question?	Yes	
1.3 Is the social care system in which the study was conducted sufficiently similar to the current UK social care context?	Partly	Ireland, using UKDPS analysis
1.4 Are the perspectives clearly stated and what are they?	Yes	
1.5 Are all direct effects on individuals included, and are all other effects included where they are material?	Yes	
1.6 Are all future costs and outcomes discounted appropriately?	Yes	3.5%
1.7 Is QALY used as an outcome? If not, describe rationale and outcomes used in line with analytical perspectives taken (item 1.4 above).	Yes	
1.8 Are costs and outcomes from other sectors (including the value of unpaid care, where relevant) fully and appropriately measured and valued?	Unclear	

1.9 Overall judgement: Directly applicable/partially applicable/not applicable

There is no need to use section 2 of the checklist if the study is considered 'not applicable'.

Other comments: Directly applicable

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/partly/no/unclear/NA	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear	Model is not presented
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Yes	2yrs of intervention and 40yrs of model
2.3 Are all important and relevant outcomes included?	Yes	
2.4 Are the estimates of baseline outcomes from the best available source?	Yes	
2.5 Are the estimates of relative intervention effects from the best available source?	Unclear	

2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Yes	
2.8 Are the unit costs of resources from the best available source?	Yes	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	No	
2.12 Overall assessment: Minor limitations/potentially serious limitations/very serious limitations		
Minor limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion
- answer 'partly' if the study largely meets the criterion but differs in some important respect
- answer 'no' if the study deviates substantively from the criterion
- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion
- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Goeree et al. 2013		
Guidance topic	Community engagement	Question No.	
Checklist completed by	KR		

	Yes/Partly/No/Unclear/NA	Comments
1 Is there a well-defined question?	Yes	
2 Is there a comprehensive description of alternatives?	No	
3 Was one of the alternatives designated as the comparator against which the intervention was evaluated?	No	Usual care
4 Is the perspective stated?	Yes	
5 Who determined the set of outcomes that were collected to act as consequences?	Authors	
6 Are all important and relevant costs and outcomes for each alternative identified?	Yes	
7 Has effectiveness been established in each of the dimensions under consideration?	Yes	
8 Are outcomes in each dimension and costs measured accurately?	Yes	
9 Are outcomes in each dimension and costs valued credibly?	Yes	
10 Have all important and relevant outcomes in each dimension and costs for each corresponding alternative been quantified? • If not, state which items were not quantified. • Were they still used in the CCA and how were they used	Yes	
11 Are all costs and outcomes adjusted for differential timing?	No	1 year only
12 Were any assumptions of materiality made to restrict the number of consequences considered?	NA	
13 Was any analysis of correlation between consequences carried out to help control for double counting?	No	
14 Was there any indication of the relative importance of the different consequences by a suggested weighting of them? Was the weighting scheme a validated one?	No	
15 Were there any theoretical relationships between consequences that could have been taken into account in determining weights?	NA	
16 Were the consequences considered one by one to see if a decision could be made based on a single consequence?	No	
17 Were the consequences considered in subgroups of all the consequences in the analysis to see if a decision could be made based on a particular subgroup of consequences?	Yes	
18 Was an MCDA or other published method of aggregation of consequences attempted?	No	

19 Were all assumptions reasonable in the circumstances in which they were made, and were they justified?	NA	
20 Were sensitivity analyses conducted to investigate uncertainty in estimates of cost or benefits?	Yes	
21 How far do study results include all issues of concern to users?	Unclear	
22 Are the results generalisable to the setting of interest in the review? • Country differences. • Question of interest differs from the CCA question being reviewed.	Partly	Canada, elderly
Overall assessment: Minor limitations/Potentially serious limitations/Very serious limitations		
Minor limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Grimes et al. 2011		
Guidance topic	Community engagement	Question No.	
Checklist completed by	KR		

Section 1: Applicability (relevance to specific review questions and the NICE reference case) This checklist should be used first to filter out irrelevant studies.	Yes/ partly/ no/ unclear/ not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Partly	US, Medicaid
1.4 Was/were the perspective(s) clearly stated and what were they?	Unclear	Medicaid enrolees
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	No	
1.6 Are all future costs and outcomes discounted appropriately?	No	
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Unclear	

1.9 Overall judgement: directly applicable/partially applicable/not applicable There is no need to use section 2 of the checklist if the study is considered 'not applicable'.
Partly applicable
Comments: NA

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/ partly/ no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear	Model is not included
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear	12 months
2.3 Are all important and relevant outcomes included?	Partly	No quality of life outcome
2.4 Are the estimates of baseline outcomes from the best available source?	Unclear	Various biases summarized in the limitations
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Yes	
2.6 Are all important and relevant costs included?	Partly	No productivity loss cost

2.7 Are the estimates of resource use from the best available source?	Unclear	
2.8 Are the unit costs of resources from the best available source?	Unclear	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	No	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	No	
2.12 Overall assessment: minor limitations/potentially serious limitations/very serious limitations		
Potentially serious limitations		
Other comments: Number of limitations are summarized by the Optimity reviewer along with limitations listed by paper authors		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Hollingworth et al. 2012	
Guidance topic	Community engagement	Question No.
Checklist completed by	KR	

Section 1: Applicability (relevance to specific review questions and the NICE reference case) This checklist should be used first to filter out irrelevant studies.	Yes/ partly/ no/ unclear/ not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Yes	
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	No	
1.6 Are all future costs and outcomes discounted appropriately?	No	The intervention occurred during one school year, and costs were not discounted
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Yes	

1.9 Overall judgement: directly applicable/partially applicable/not applicable

There is no need to use section 2 of the checklist if the study is considered 'not applicable'.

Directly applicable

Comments: This intervention has been described in detail elsewhere

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/ partly/ no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear	Model is not presented. Also, the method used is not very clear
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear	2 years follow-up
2.3 Are all important and relevant outcomes included?	Partly	Smoking prevalence only
2.4 Are the estimates of baseline outcomes from the best available source?	Yes	Saliva samples
2.5 Are the estimates of relative 'treatment' effects from the best available source?	NA	

2.6 Are all important and relevant costs included?	Partly	Authors did not cost peer supporter time
2.7 Are the estimates of resource use from the best available source?	Yes	
2.8 Are the unit costs of resources from the best available source?	Unclear	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Partly	Only incremental cost per student not smoking at 2 years
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	Unclear	RC and LARM are directors of a not-for-profit company, DECIPHer Impact Limited, set up to enable organisations to obtain a license to use the ASSIST programme and to receive training, support, and quality assurance to ensure fidelity of programme implementation. All other authors declare that they have no conflict of interest
2.12 Overall assessment: minor limitations/potentially serious limitations/very serious limitations		
Potentially serious limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Irvine et al. 2011		
Guidance topic	Community engagement	Question No.	
Checklist completed by	KR		
Section 1: Applicability (relevance to specific review questions and the NICE reference case as described in section 7.5) This checklist should be used first to filter out irrelevant studies.	Yes/partly/no/unclear/NA		Comments
1.1 Is the study population appropriate for the review question?	Yes		
1.2 Are the interventions appropriate for the review question?	Partly		This study assesses the combination of interventions, therefore, results should be treated with caution
1.3 Is the social care system in which the study was conducted sufficiently similar to the current UK social care context?	Yes		
1.4 Are the perspectives clearly stated and what are they?	Yes		
1.5 Are all direct effects on individuals included, and are all other effects included where they are material?	No		Only QALYs measured. No other outcomes
1.6 Are all future costs and outcomes discounted appropriately?	No		
1.7 Is QALY used as an outcome? If not, describe rationale and outcomes used in line with analytical perspectives taken (item 1.4 above).	Yes		
1.8 Are costs and outcomes from other sectors (including the value of unpaid care, where relevant) fully and appropriately measured and valued?	Unclear		

1.9 Overall judgement: Directly applicable/partially applicable/not applicable

There is no need to use section 2 of the checklist if the study is considered 'not applicable'.

Other comments: Directly applicable

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/partly/no/unclear/NA		Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear		Model is not presented
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear		Over 7 months follow-up
2.3 Are all important and relevant outcomes included?	No		See 1.2

2.4 Are the estimates of baseline outcomes from the best available source?	Yes	
2.5 Are the estimates of relative intervention effects from the best available source?	Yes	
2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Yes	
2.8 Are the unit costs of resources from the best available source?	Yes	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	No	
2.12 Overall assessment: Minor limitations/potentially serious limitations/very serious limitations		
Potentially serious limitations		
Other comments:		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Krukowski et al. 2003		
Guidance topic	Community engagement	Question No.	
Checklist completed by	KR		

Section 1: Applicability (relevance to specific review questions and the NICE reference case) This checklist should be used first to filter out irrelevant studies.	Yes/ partly/ no/ unclear/ not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	
1.2 Are the interventions appropriate for the topic being evaluated?	Unclear	Diabetes Prevention Programme (DPP)
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Partly	US
1.4 Was/were the perspective(s) clearly stated and what were they?	No	
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	No	BMI outcome only
1.6 Are all future costs and outcomes discounted appropriately?	No	
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Unclear	

1.9 Overall judgement: directly applicable/partially applicable/not applicable There is no need to use section 2 of the checklist if the study is considered 'not applicable'.
Partly applicable
Comments: NA

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/ partly/ no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear	
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Unclear	2 years
2.3 Are all important and relevant outcomes included?	No	Only BMI reduction
2.4 Are the estimates of baseline outcomes from the best available source?	Unclear	
2.5 Are the estimates of relative 'treatment' effects from the best available source?	NA	
2.6 Are all important and relevant costs included?	NA	
2.7 Are the estimates of resource use from the best available source?	NA	

2.8 Are the unit costs of resources from the best available source?	Unclear	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	No	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	No	
2.12 Overall assessment: minor limitations/potentially serious limitations/very serious limitations		
Potentially serious limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

Study identification Include author, title, reference, year of publication	Moodie et al. 2013		
Guidance topic	Community engagement	Question No.	
Checklist completed by	KR		

Section 1: Applicability (relevance to specific review questions and the NICE reference case) This checklist should be used first to filter out irrelevant studies.	Yes/ partly/ no/ unclear/ not applicable	Comments
1.1 Is the study population appropriate for the topic being evaluated?	Yes	
1.2 Are the interventions appropriate for the topic being evaluated?	Yes	
1.3 Is the system in which the study was conducted sufficiently similar to the current UK context?	Partly	Australia
1.4 Was/were the perspective(s) clearly stated and what were they?	Yes	
1.5 Are all direct health effects on individuals included, and are all other effects included where they are material?	No	
1.6 Are all future costs and outcomes discounted appropriately?	Yes	
1.7 Is the value of health effects expressed in terms of quality-adjusted life years (QALYs)?	No	DALYs
1.8 Are costs and outcomes from other sectors fully and appropriately measured and valued?	Yes	

1.9 Overall judgement: directly applicable/partially applicable/not applicable There is no need to use section 2 of the checklist if the study is considered 'not applicable'.
Partly applicable
Comments: NA

Section 2: Study limitations (the level of methodological quality) This checklist should be used once it has been decided that the study is sufficiently applicable to the context of the guideline	Yes/ partly/ no/ unclear/ not applicable	Comments
2.1 Does the model structure adequately reflect the nature of the topic under evaluation?	Unclear	Model is not presented
2.2 Is the time horizon sufficiently long to reflect all important differences in costs and outcomes?	Yes	Lifetime
2.3 Are all important and relevant outcomes included?	Unclear	
2.4 Are the estimates of baseline outcomes from the best available source?	Yes	
2.5 Are the estimates of relative 'treatment' effects from the best available source?	Yes	
2.6 Are all important and relevant costs included?	Yes	
2.7 Are the estimates of resource use from the best available source?	Yes	

2.8 Are the unit costs of resources from the best available source?	Yes	
2.9 Is an appropriate incremental analysis presented or can it be calculated from the data?	Yes	
2.10 Are all important parameters whose values are uncertain subjected to appropriate sensitivity analysis?	Yes	
2.11 Is there any potential conflict of interest?	No	
2.12 Overall assessment: minor limitations/potentially serious limitations/very serious limitations		
Potentially serious limitations		
Other comments: NA		

For all questions:

- answer 'yes' if the study fully meets the criterion

- answer 'partly' if the study largely meets the criterion but differs in some important respect

- answer 'no' if the study deviates substantively from the criterion

- answer 'unclear' if the report provides insufficient information to judge whether the study complies with the criterion

- answer 'NA (not applicable)' if the criterion is not relevant in a particular instance.

For 'partly' or 'no' responses, use the comments column to explain how the study deviates from the criterion.

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