

REPORT

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A systematic review of the evidence for incentive schemes to encourage positive health and other social behaviours in young people

The Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) is part of the Social Science Research Unit, Institute of Education, University of London

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CONFLICTS OF INTEREST

There were no conflicts of interest for this review.

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EXECUTIVE SUMMARY

Background

This systematic review is the third and final product of a programme of work funded by the English Department of Health. The programme is located within the larger context of the recent Public Health White Paper, *Choosing Health* (Department of Health, 2004), which emphasises the significance of individual choice in determining a wide range of health and social behaviours, and the potential of incentives to aid behaviour change. If tangible incentives are effective in helping young people to develop and maintain healthy and prosocial behaviours, this is of importance to the formulation of health promotion policies.

An initial scoping exercise (Kavanagh *et al.*, 2005) indicated that there was a considerable body of relevant evidence. A companion study (Trouton *et al.*, 2005) documented a range of current incentive schemes based both in the UK and elsewhere. This systematic review brings together the relevant research literature to examine the effectiveness or otherwise of incentives in encouraging positive health and other social behaviours in young people. It also examines ongoing incentive-based schemes in more detail. A number of systematic reviews of incentives in health care contexts with other populations have been conducted (Achat *et al.*, 1999; Giuffrida and Torgerson, 1997; Hey and Perera, 2005; Hey and Perera, 2005; Kane *et al.*, 2004), but none have examined the use of incentives with young people in health, educational and community contexts in this way.

Existing research in the fields of psychology and, to a lesser extent, economics, highlights a number of unresolved issues regarding the impact and utility of incentive schemes. One question is to what extent our behaviour is shaped by extrinsic factors, such as incentives or environmental modification, or by intrinsic factors, which are more personal in nature and possibly less amenable to external influence. It is argued by some that the use of extrinsic rewards may discourage the development of the intrinsic motivation needed if behaviour changes are to be sustained in the long term (Cameron *et al.*, 2001; Deci *et al.*, 1999). There are other unanswered questions concerning the best way of designing incentive-based schemes for different populations, settings and purposes.

Research questions

Two broad research questions drove this systematic review and provided the conceptual basis for a systematic map of relevant research in the area. The first question was about effectiveness:

What is the best available evidence of the effectiveness or otherwise of incentive schemes to improve health and other social behaviours in young people aged 11–19?

The second question focused on processes:

In what conditions are incentive schemes more or less effective?

For example:

- In which areas (e.g. health, education) do they work best?
- For which groups of young people do incentive schemes work best (e.g. at-risk young people)?
- Are universal or targeted approaches more effective?

Mapping the research

Altogether our literature searches produced 9,843 records. These were narrowed down to a total of 181 reports of 129 separate studies which were included in the first, mapping stage of the review. The majority of studies were conducted in the USA (N=88), with only 28 studies being carried out in the UK. A wide range of incentives was employed, from cash payments to entry into raffles or lotteries. Financial incentives in the form of cash payments or reduced-cost access to a range of resources were used in over half of the studies.

Many studies covered more than one topic area. Fifty studies described a focus on one or more health behaviours, 61 upon at least one educational behaviour, and 32 studies focused on one or more social behaviours.

The research in depth

A smaller number of studies were examined in more detail for the in-depth review. Sixteen outcome evaluations met our inclusion criteria and were judged to be methodologically sound. Nine were conducted in the USA, two in the UK and one each in Canada, Finland, Germany and the Netherlands. The interventions fell into three categories: nine studies which focused on a range of positive health behaviour changes; six which considered the impact of incentives on educational outcomes; and one study with other social outcomes.

Analysis of these studies showed that single or dual component incentive schemes are effective in encouraging positive health behaviours where a simple or single action is required, rather than a sustained health behaviour change. The Child Health Programme as described in the White Paper covers screening and immunisations which are single event health behaviours shown in our review as likely to benefit from the use of incentives to encourage uptake. The government target to reduce health inequalities as measured by infant mortality by 2010 focuses on interventions to improve services and support for pregnant women, new mothers and their babies. The highest rate of infant mortality is in children born to teenage mothers. We found non-financial incentives to be effective in encouraging teenage mothers to attend an early post-natal health clinic.

The interventions were also shown to be effective in reducing smoking behaviours in the context of school-based competitions. These findings are based on a small number of studies, none of which were conducted in the UK, but they are consistent with other systematic review evidence. We found no evidence that single or dual component incentive schemes are effective in improving either the levels of effort applied to educational tests or attendance levels in school.

Overall single or dual component incentive schemes do not appear to offer policy-makers or practitioners a simple route to ensuring general positive behaviour changes in young people. However, they may be useful in particular settings and for particular groups.

Process evaluations

Of the sixteen trials included in the in-depth review, only seven provided formal process evaluations. Most of these studies investigated process issues regarding participants' perceptions of the intervention, facilitators and barriers to implementation, and the accessibility and reach of the programme. Coverage of other process issues relating to the content and quality of the programmes, human resources issues and cost-effectiveness was scantier.

The following are issues for consideration when developing incentive-based interventions for piloting. Incentives do appear to be perceived favourably by participants, particularly where they are used in a straightforward way to reward a single behaviour. However, those who failed to reach targets despite their efforts sometimes had negative reactions including mention of lowered self-esteem. In designing incentive-based interventions, it is important to recognise the potential for harm, such as undesirable kinds of peer pressure, and it is important that the behaviour change required is achievable. The required behaviours need to be logged and rewarded consistently, and interventions designed to foster the required behaviour need to be implemented properly and consistently. Large-scale incentive-based schemes in particular require staff with the necessary skills and commitment to supporting young people through a scheme, and in turn such schemes require sound systems in place to support them. Consideration should be given to ensuring that the size or type of incentive on offer is sufficient to motivate change in young people.

Ongoing incentive schemes

Our earlier work (Trouton *et al.*, 2005) located and described 37 ongoing schemes which use incentives to encourage positive behaviours in young people. These schemes can be divided into three broad groups: 15 fall under the heading of health promotion, 9 are related to education, and 13 target other social behaviours. We collated information about the evaluation status of the schemes and requested copies of all available evaluations from the schemes' organisers. Evaluation is a key issue as it provides information regarding the impact of schemes on young people's behaviours and whether they achieve their stated aims. We found that the most common approaches to evaluation were either post-intervention surveys or no formal evaluation at all. Only five of the schemes have

implemented or are intending to implement evaluations using a control group design, a methodology which provides the most robust results.

Recommendations

A clear recommendation is the need to design and pilot single or dual component interventions to promote the uptake of simple or single event preventive health behaviours in young people. Such interventions could include immunisation or screening programmes, and accessing pre- and post-natal health services. We also recommend that classroom-based incentive schemes which aim to delay the onset of or reduce levels of smoking should be piloted and evaluated in well-designed RCTs.

Any future incentive-based interventions should assess, and take into account, the views of young people on what are important areas of behaviour change to them, and what types of incentive-based interventions might be acceptable to them. This is an essential first step in designing and implementing acceptable and effective interventions.

Future evaluation research in this area should prioritise the use of randomised controlled trials, as this approach to evaluation makes it easiest to attribute any observed differences in outcomes to intervention effects. Where a cluster trial design is used, researchers should present intra-cluster correlations. All evaluations should be accompanied by well designed process evaluations.

Those conducting publicly funded incentive schemes should be encouraged to conduct reliable evaluations of the interventions that they implement with young people. Funders will need to ensure that funds are ring-fenced for such evaluations and that providers have access to research support.

1. BACKGROUND

The systematic review described in this report looked at the evidence for the health-enhancing effects on children and young people of financial and other tangible incentive schemes aimed at increasing positive behaviours. It is the third and final product in a programme of work conducted by the EPPI-Centre in 2004–5, funded by the Department of Health (England), on the impact of incentives on children and young people's behaviour.

Our first report (Kavanagh *et al.*, 2005) was a 'scoping review', assessing the nature and extent of the research evidence in the area. In this, we looked at the international research literature evaluating the effectiveness of a range of different incentive schemes for children and young people aged 19 years or less; we also searched for and described ongoing projects in the UK. We found a considerable amount of literature: 94 reports describing 88 studies. About half these studies had a focus on the education system; the rest were concerned with health promotion or other social behaviours. The type of incentive varied, from direct financial reward, vouchers, and opportunities to win competitions, to social support, resource access, and environmental modification. Most of the studies took place in educational settings and were carried out in the USA. We also located 14 incentive schemes ongoing in the UK.

In our second report (Trouton *et al.*, 2005) we provided more detail on current incentive schemes, including those in the UK. We described 37 such schemes that use incentives and are aimed at promoting a range of positive behaviours in young people. Twenty seven of the schemes were based in the UK. Eleven provided direct cash incentives, and the others used a variety of different material incentives. The 37 schemes fell into three broad groups: 15 were aimed at promoting young people's health-related behaviours; 13 were directed at other social behaviours through youth work and other community-oriented approaches; and nine were designed to promote educational attendance and attainment.

All this research activity supports the view that there is considerable, and growing, interest in the possibility that providing direct incentives of one kind or another can encourage young people to adopt healthy and prosocial behaviours. This interest is driven by a long-term policy concern that improving population health in part depends on the willingness, and ability, of people to choose health-enhancing behaviours (Department of Health, 1996). The general pattern of health inequalities may be partly explained by differences in these behaviours, which are in turn closely related to structural and material inequalities (Acheson, 1998). Health-related behaviours and the factors shaping their adoption are complex; it has been clear for many years that simply telling people what is good for their health is not an effective strategy for producing sustainable behaviour change. While individuals can make choices, factors working at the community and societal levels contribute both to individual health status and to people's ability to effect health behaviour change. This is particularly the case for children and young people (Roberts, 2000). There is substantial evidence that many aspects of adult health are laid down in childhood, and that children and young people constitute a social group that are regarded as 'problematic' with respect to such behaviours as crime and drug abuse, smoking and alcohol use, low levels of school attendance, poor diet, physical inactivity, and risk-taking sexual behaviour.

The recent Public Health White Paper *Choosing Health* (Department of Health, 2004) outlines the framework for an approach to health promotion centred on the significance of individual choice. 'Consistent support, clear boundaries and incentives' are identified as helping young people to make positive health choices (p 66). The report cites evidence of incentive schemes that were used successfully in the USA; in Scotland to promote healthy eating among young people; and in England to reduce truancy and crime-related behaviour (p 70). Particular examples referred to in the report are the Karrot project in London, where 11- to 16-year-olds are provided with a range of sport, art, drama and music activities and a reward scheme, with the aim of improving school attendance and 'good citizenship'; and the Connexions Card, available to all 16- to 19-year-olds in England, which enables young people to collect points for learning and development activities that can be exchanged for rewards. The White Paper outlines the case for the systematic review of the international evidence for incentive schemes directed at children and young people which is presented in this report:

The aim is to assess which areas of public health could benefit the most and to consider some piloting work should the general approach look to be encouraging. (Department of Health, 2004, p 71)

An important aspect of the review is to examine the transferability to the public health domain of evidence about the effectiveness of incentive schemes in non-health areas.

A number of systematic reviews have been conducted that included research studies of interventions with an incentives component. However, the rationale for the review presented in this report is the absence of any review providing an evidence-based summary of the current status and effectiveness of incentive schemes to promote positive behaviour changes in children and young people. This report builds on the previous two by taking a closer look at the quality of the evidence from studies of incentive schemes: is there a convincing case for supposing that this approach is likely to be effective in improving young people's health-related behaviour? The report also examines ongoing incentive schemes. What is the range of such schemes, and what can we conclude about their likely effectiveness?

The interest in using direct incentives to change people's behaviour is not new (Ferster and Skinner, 1957; Skinner, 1976). Within psychology, for instance, there is a tradition of experimental research on incentives which stretches back a century or more, but is particularly marked from the 1970s on (Cameron *et al.*, 2001). The attempt to shape behaviour by extrinsic means which guides much of this research is grounded in behaviour modification theory. The term 'incentives' is used to describe a wide range of strategies, including direct cash payments, prizes, material support, and free or reduced cost access to resources such as leisure schemes. So far as young people are concerned, these can be, and have been, directed at different groups of young people or organisations/individuals working with them (e.g. schools, head teachers, health professionals), and can be designed to impact on a range of problem behaviours, including those in the areas of health, school absenteeism, educational achievement and crime.

Existing research highlights a number of unresolved issues about the impact of incentive schemes. There is considerable debate within psychology, for example,

about whether the use of extrinsic rewards discourages the development of the intrinsic motivation that is needed for sustained behaviour change (Cameron *et al.*, 2001; Deci *et al.*, 1999), especially, perhaps, for complex health behaviours (Kane *et al.*, 2004a; Kane *et al.*, 2004b). What is the ‘functional significance’ of incentives – how do recipients interpret their meaning in relation to their own feelings of self-determination and competence? There is a possibility that the perceived ‘paternalism’ of the incentives approach may interfere with effectiveness (Deci *et al.*, 1999). If incentives work, *how* do they work? Should incentives be given universally, or to particular groups? Incentives are commonly offered as part of multi-component interventions (Kane *et al.*, 2004a; Kane *et al.*, 2004b), but might they be better delivered as a single component in a simple intervention? What kinds of incentives are acceptable to different population groups? There is some evidence, for example, that tangible incentives may work less well for children than for other groups, perhaps by negatively affecting their intrinsic motivation. However, age effects are rarely reported (Deci *et al.*, 1999). Is there a dose effect, so that higher levels of rewards contribute to greater and more sustained behaviour change? How do incentives compare with other strategies, for example, peer support? What is their cost-effectiveness? Are incentives best used to generate short-run effects for relatively simple goals (Kane *et al.*, 2004a; Kane *et al.*, 2004b)? How important is the setting in which incentives are offered? For example, with respect to adults, some research suggest that community-based initiatives achieve more positive results than those based in workplaces (Hey and Perera, 2005a). Incentives may increase participation in a programme but have no direct impact on the target behaviours (Hey and Perera, 2005b). A crucial issue is that of cultural transferability: what works for different groups in different countries and cultures may vary widely.

These are complex questions. Answering them is made more difficult because incentives are often ill-defined, initiatives are poorly documented, attempts at evaluation can be sketchy, and periods of follow-up are short (Main and Lewis, 1992). The literature is heterogeneous, crossing many areas, and simple search strategies do not discriminate sufficiently (Kane *et al.*, 2004a; Kane *et al.*, 2004b). In this report we have done our best to extract the most relevant literature from a very diverse field, and to identify what we reliably know about the usefulness of incentives in improving the health-related behaviours of children and young people in the UK.

2. METHODS

2.1 Research questions

Two broad research questions drove this systematic review and provided the conceptual basis for a systematic map of relevant research in the area. The first question was about effectiveness:

What is the best available evidence of the effectiveness or otherwise of incentive schemes to improve health and other social behaviours in young people aged 11–19?

The second question focused on processes:

In what conditions are incentive schemes more or less effective?

For example:

- In which areas (e.g. health, education) do they work best?
- For which groups of young people do incentive schemes work best (e.g. young people who are considered at risk)?
- Are universal or targeted approaches more effective?

For the purposes of this review we defined incentives as:

any tangible benefit externally provided with the explicit intention of promoting positive pre-specified health, educational or social behavioural change(s) in the direct or indirect recipient of the intervention.

For the purposes of the review, the term ‘positive behaviour’ was taken to include a range of behaviours including health, educational and prosocial behaviours (i.e. behaviours undertaken voluntarily and intended to help or benefit another individual or group). Measures of academic achievement alone were not defined as positive behaviours unless these were accompanied by an analysis of the time and/or effort expended to achieve.

2.2 User involvement

A Consultation Group was established to inform the scope of the in-depth part of the review with the aim of increasing its relevance to policy makers and practitioners. Its members included a mixture of researchers, policy specialists and practitioners (listed at the front of this report). The Consultation Group was consulted by e-mail. Its primary task was to provide guidance on the path from the broad research questions, which provided the conceptual basis for the map of relevant research in the area, to the in-depth review topic.

2.3 Research map

2.3.1 Inclusion criteria

To be included in the systematic map of research evidence, studies had to meet the following criteria:

- Incentives were a central component of the study (i.e. research using incentives only as an adjunct to improving recruitment or participation were excluded);
- Groups or individuals targeted by incentives were aged 11–19 years;
- Studies were published from 1985 onwards;
- Studies were reported in the English language; and
- Studies either:
 - evaluated the impact of incentives interventions on health, education or other social outcomes (both outcome evaluations and systematic reviews), or
 - were process evaluations of outcome evaluations included in this review (either published in the outcome evaluations or separately); or
 - were conducted in the UK and assessed young people’s views and/or experiences of the use of incentives to effect positive changes in health, education and other social behaviours.

2.3.2 Identification of studies

Because of the challenges of searching for literature on this topic across a number of subject domains, a range of sources were used to identify reports of relevant research. These included searches of electronic bibliographic databases and registers; scanning of indexes of key journals; checking reference lists of key papers; checking for references on key websites; use of personal contacts and contact with our Consultation Group; and direct requests to key informants.

Databases and registers were selected in order to cover a range of disciplines: health care, education, social sciences, psychology, and health promotion. Broad searches were conducted in 14 commercial databases and 11 specialist registers (Table 2.1). A highly sensitive search strategy (see Appendix 1) was devised using controlled vocabulary and free-text terms to identify studies on the CINAHL database via OVID Web Gateway (<http://gateway.ovid.com/>). Terms from this search strategy were adapted for subsequent searches of other electronic sources.

Table 2.1: Details of the commercial databases and specialist registers searched*Commercial databases*

Sources	Time period of search
CINAHL (Cumulative Index to Nursing and Allied Health Literature)	January 1985–April 2005
MEDLINE	January 1985–April 2005
EMBASE	January 1985–April 2005
PsycINFO	January 1985–April 2005
SocAbs (Sociological Abstracts)	January 1985–April 2005
ASSIA (Applied Social Sciences Index and Abstracts)	January 1985–April 2005
Social Services Abstracts	January 1985–April 2005
ERIC (Educational Resource Index and Abstracts)	January 1985–April 2005
Australian Education Index	January 1985–April 2005
British Education Index	January 1985–April 2005
NCJR (National Criminal Justice Reference Service Abstracts)	January 1985–April 2005
SSCI (Social Science Citation Index)	January 1985–April 2005
IBZ (Internationale Bibliographie der Geistes- und Sozialwissenschaftlichen Zeitschriftenliteratur)	January 1985–April 2005
SOMED (SOzialMEDizin)	January 1996–April 2005

Specialist registers

Sources	Date searched
BiblioMap (the EPPI-Centre register of health promotion and public health research)	May 2005
CENTRAL (Cochrane Controlled Trials Register)	May 2005
NRR (National Research Register)	May 2005
The Cochrane Library	May 2005
C2 SPECTR (The Campbell Collaboration's Social, Psychological, Educational and Criminological Trials Register)	May 2005
HealthPromis (Health Development Agency register)	May 2005
HDA Evidence Base	May 2005
SIGLE	May 2005
British Library Integrated Catalogue	May 2005
ReFeR (Research Findings Electronic Register)	May 2005
NOD (De Nederlandse Onderzoek Databank)	May 2005

Web searches were conducted and a wide range of authors, relevant research departments and health promotion organisations were contacted to identify further research.

The contents of the following journals were screened online: *Health Education and Behaviour* (October 1997 onwards), and *Behavior Modification* (January 1999 onwards).

2.3.3 Classification of studies

All included study reports were coded using a standardised tool based on the EPPI-Centre keywording strategy for health promotion and public health research (Peersman and Oliver, 1997). Coding was done on the basis of information presented in the full report. Study reports were keyworded according to (1) topic focus, (2) country, (3) study type and design, and (4) the substantive focus of the intervention or processes studied.

Studies were further coded using a keywording tool devised specifically for this review. This covered type and domain of behaviour change; specific characteristics of the individual, group or organisation receiving the incentive; the level at which the incentive was provided; type of incentive; other features of the intervention; and features of the evaluation.

Systematically mapping the research evidence in the field of incentives provided a descriptive level overview of research relevant to answering the broad review questions described above (see page 8). Mapping the research provided the information required for the Consultation Group and researchers to choose a narrower and manageable policy and practice relevant question for in-depth review.

2.4 From mapping to in-depth review

A descriptive analysis of the first 80 studies included in the map was sent to the Consultation Group, along with a briefing and research options document. The studies were those for which the full report had been obtained, processed and descriptively coded in time for the consultation.

This exercise resulted in the choice of a narrower question related to effectiveness for in-depth review:

What is the best available evidence of the effectiveness or otherwise of single or dual component incentive schemes to improve health, educational and other social behaviours in young people aged 11–19 years of age?

This question was chosen as it provided the opportunity to consider the impact of incentives across all domains, allowing for the possibility of learning lessons about the use of incentives in fields other than health. Only including those studies where the impact of incentives could be considered alone or in combination with only one other intervention component made it more likely that any effects seen in the studies could be attributed to the impact of incentives. This would not have been the case had we included more complex intervention studies where incentives were one of many intervention components.

The Consultation Group asked that, where there was evidence, the review team should consider the impact of:

- Individual versus group delivery;
- Targeted versus universally provided incentives;

- Monetary versus other types of incentives;
- The relationship between incentives and a 'key worker' where the key worker provides the incentive; and
- Incentives and socially excluded populations.

2.5 In-depth review methods for outcome evaluations

A standardised framework was used to extract data on the development and content of the intervention evaluated, the populations involved, and the design, implementation, and quality of the outcome evaluation (Peersman *et al.*, 1997).

Authors of all outcome evaluation studies considered for inclusion at the in-depth review stage were contacted to ensure that we had obtained all the relevant papers relating to the study, including all available process data. We contacted 30 authors and retrieved ten additional papers.

The procedures and criteria used for assessing methodological quality built on those described in previous EPPI-Centre health promotion reviews (see, e.g., Oakley *et al.*, 1996; Peersman *et al.*, 1996). We used four 'core' methodological criteria to divide the outcome evaluations *initially* into two broad groups: 'sound' and 'not sound'. 'Sound' outcome evaluations were those deemed to meet the following criteria:

- Findings are reported for each outcome measure indicated in the aims of the study;
- A control/comparison group equivalent to the intervention group on socio-demographic and outcome variables was employed;
- Pre-intervention data are provided for all individuals in each group; and
- Post-intervention data are provided for each group.

However, these criteria only capture some of the known sources of bias in outcome evaluations. They do not distinguish between randomised and non-randomised trials, or between quality of method and quality of reporting. We therefore decided on a further category of studies as 'sound despite not meeting the four *core* criteria'. This category included, for example, studies in which full pre-intervention data were not presented but in which authors had either stated that there were no differences between the groups or where any baseline differences had been accounted for in data analysis.

All of the above procedures were carried out by two reviewers independently who then met to compare their findings. Disagreements were resolved through discussion.

The data on the effects of interventions from methodologically sound and 'sound despite' studies were entered into the synthesis stage of the review. Where appropriate, and if statistical tests revealed no significant statistical heterogeneity between the studies, their data were combined in a statistical meta-analysis using our specialist EPPI-Reviewer software to calculate an overall effect size. Reviewers carried out a narrative analysis of those studies or outcome measures not included in the meta-analyses.

Methods for calculating and pooling effect sizes are presented in Appendix 2.

2.6 In-depth review methods for process data

For the purposes of this review, the term 'process data' was taken to include only data identified from formal process evaluations. There are currently no established methods for assessing the quality of process evaluations, though work is being undertaken in this area (Arai *et al.*, 2003; Harden *et al.*, 2001). We did not formally judge the methodological quality of included process evaluations. Only outcome evaluations judged to be methodologically sound or 'sound despite' were entered into the synthesis stage of the review. We chose therefore to include only data from formal process evaluations relating to these studies. Data were identified and extracted by one reviewer, and then checked and confirmed by another reviewer.

All process data were entered into tables and categorised according to a range of process factors which may have affected the implementation or impact of the intervention:

- **Acceptability** of the intervention
- **Implementation**/delivery of the intervention
- **Content** of the intervention/type of incentive
- **Accessibility** of the intervention/programme reach
- **Human resources issues** associated with the intervention
- **Costs** associated with the intervention

Common themes were identified across these headings and the findings combined in a narrative synthesis.

3. IDENTIFYING AND DESCRIBING STUDIES: RESULTS

3.1 Flow of literature through the map

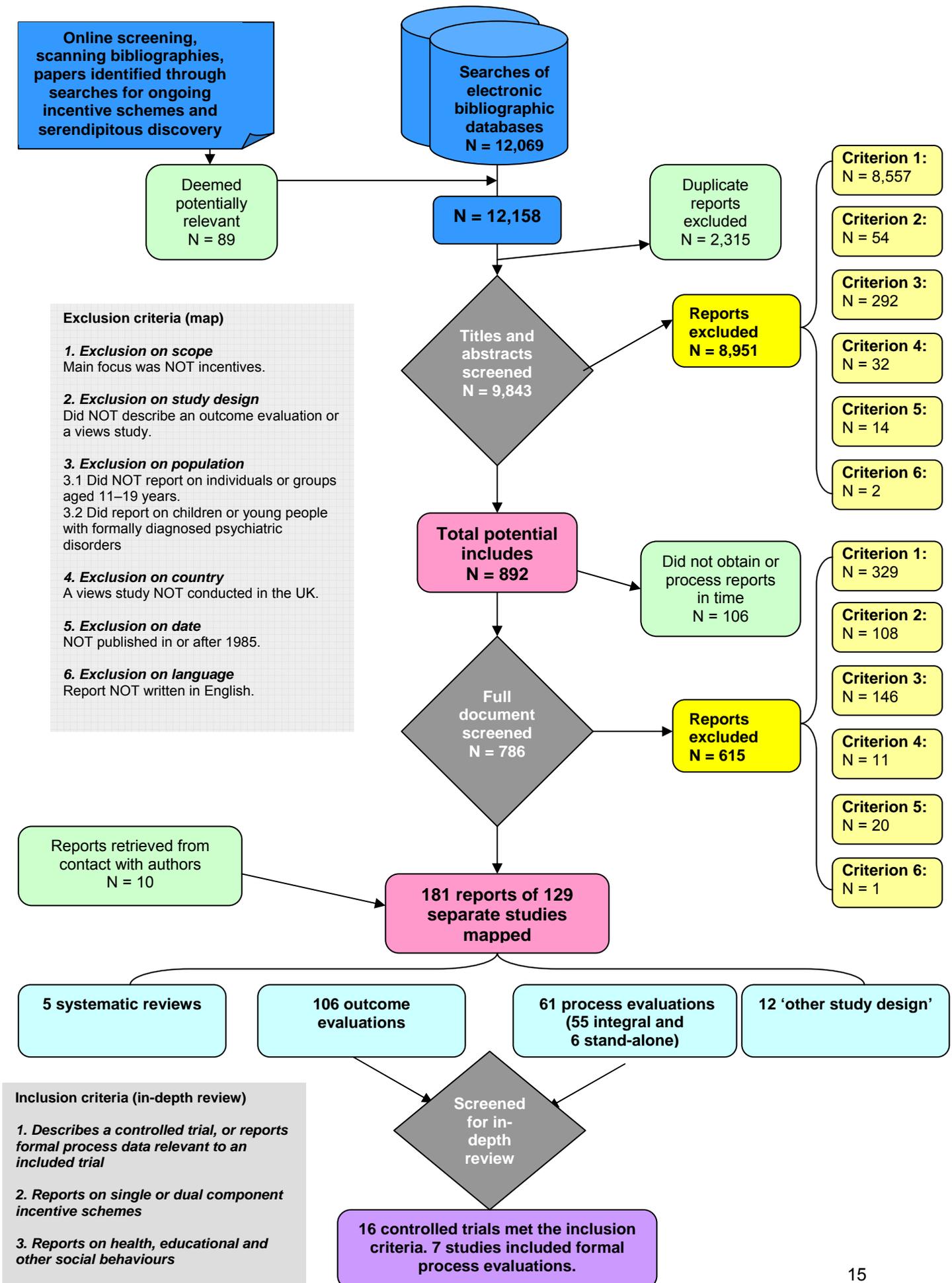
Figure 3.1 describes the flow of literature through each stage of the review. Our searches identified a total of 12,158 records: comprehensive searches of bibliographic databases identified 12,069 citations; scanning bibliographies, identification of citations from searches for ongoing schemes, online screening of full text journal indexes, contact with authors and serendipitous discovery resulted in the identification of a further 89 potentially relevant citations.

After removing 2,315 duplicates, the titles and abstracts of 9,843 records were screened. Most of these did not meet the inclusion criteria and were excluded from the map (N=8,951, 91%). A high proportion of these studies were excluded because their main focus was not incentives (N=8,557, 96%). This reflected the challenge of searching effectively for incentives studies, as indexing terms directly describing the concept were not available for most databases. To maximise retrieval of relevant literature, the search strategy employed broadly related indexing terms (e.g. motivation, behaviour modification) as well as free text terms (e.g. incentiv\$, reward\$) which identified large numbers of references. A further 292 (3%) studies were excluded because they did not study the population group relevant to this review. Fourteen views studies were excluded because they were not carried out in the UK.

A total of 892 reports were identified as being potentially relevant for inclusion in the mapping exercise. Full reports were obtained and processed for 786 (88%) of these within the timescale for the review. After the screening of full reports, 615 of the 786 were excluded. This high level of exclusion was attributable to the fact that many records had been included at the first stage of screening on the basis of limited information (e.g. title only available, no description of incentive provided). When the full paper was obtained it became apparent that the incentive was not a tangible benefit that had been externally provided. Most of the 616 reports (N=329, 53%) were excluded because the main focus was not on incentives. Other reports were excluded at this stage because they did not study the relevant population (N=147, 24%), or did not describe an outcome or process evaluation, systematic review, or views study (N=108, 18%). At in-depth review stage, a further ten studies were added following contact with authors.

A total of 181 reports of 129 separate studies were included in the map.

Figure 3.1: Flow of literature through the map



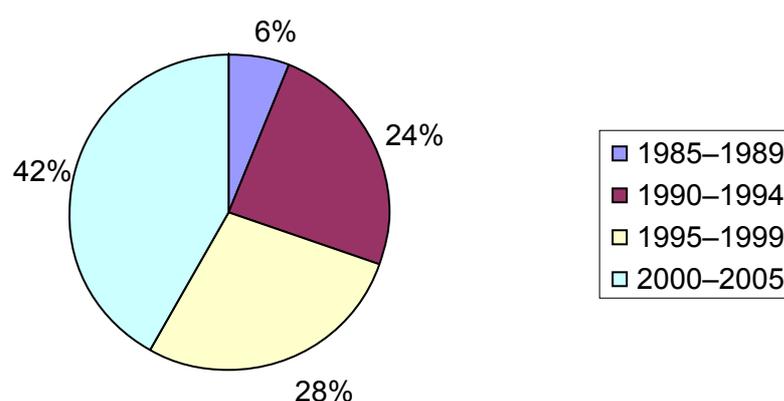
3.2 Characteristics of studies in the map

Of the 129 separate studies included in the map, 106 described outcome evaluations and 61 studies described a process evaluation. Of the process evaluations, 55 were integral to a report of an outcome evaluation and six were reports which described process evaluations only. In addition to the outcome and process evaluations, there were five systematic reviews, four non-systematic reviews, six surveys, one case control study and one intervention study reporting no outcome data.

(a) Publication date

Eight (6%) studies had publication dates between 1985 and 1989, a quarter of studies (N=31, 24%) between 1990 and 1994, a further quarter (N=36, 28%) had publication dates between 1995 and 1999, and 42% of reports (N=54) were published after 2000 (Figure 3.2).

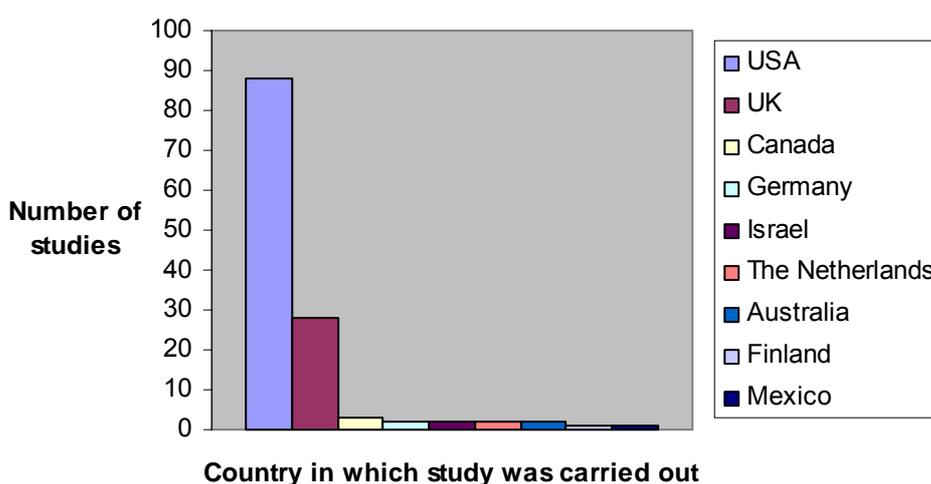
Figure 3.2: Studies included in the map by publication date (N=129)



(b) Country of origin

Most studies originated in the USA (N=88). Twenty-eight studies were carried out in the UK. Three studies were carried out in Canada. Two studies each were carried out in Germany, Israel, the Netherlands and Australia. One study each was carried out in Finland and Mexico.

Figure 3.3: Country in which study was carried out (N=129)

**(c) Population**

The majority of studies (N=107) described incentives delivered to mixed sex populations. Thirteen were delivered to females only, and nine to males only.

Because of our inclusion criteria, most studies (N=124) described incentives delivered to young people (11–21 years old). Of these, 22 were also delivered to younger children, 12 to adults and two to the general population. In five studies, incentives were delivered to general populations only. These studies were all systematic or non-systematic reviews.

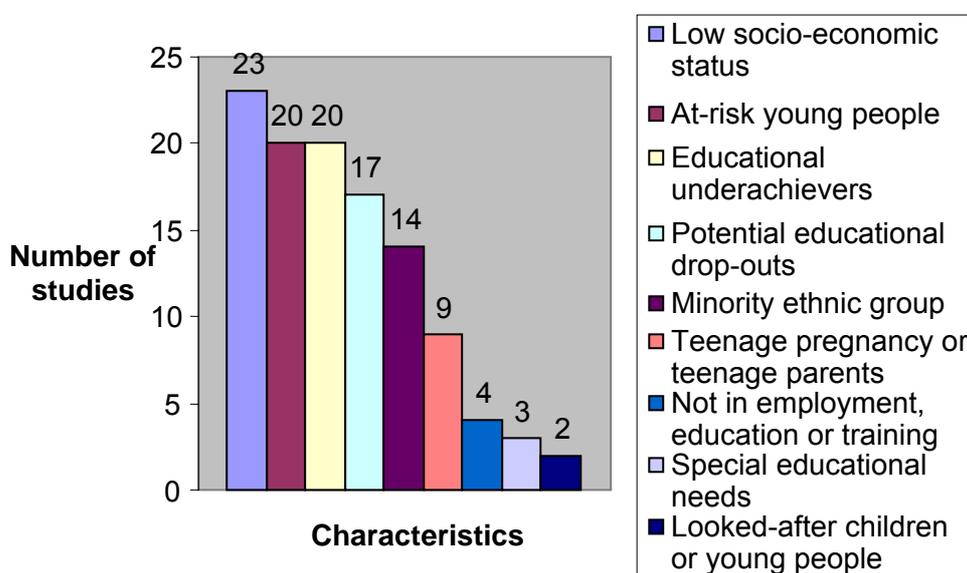
(d) Incentives and social exclusion

Of the 129 studies included in the map, 63 studies described individuals or groups at risk of social exclusion. Figure 3.4 details the characteristics of individuals or groups at risk of social exclusion. Four potential risk factors for social exclusion were predominant in these studies: low socio-economic status; educational underachievement; being considered at risk of, or already engaged in or convicted of, illegal activity; and being considered at risk of dropping out of post-compulsory education. These factors were present in 78% (N=49) of the 63 studies.

Individuals or groups included in 14 studies were from minority ethnic groups. Pregnant teenagers or teenage parents were included in nine studies, young people not in employment or training in four studies, young people with special educational needs in three studies and looked-after children or young people in two studies.

Some study participants were designated at risk of social exclusion for more than one reason.

Figure 3.4 Characteristics of individuals or groups at risk of social exclusion receiving incentives (N=63) (not mutually exclusive)



Out of 37 studies working across two or more of the three domains under study, 28 worked with groups or individuals at risk of social exclusion.

3.2.1 Outcome evaluations

(a) Evaluation design

Twenty-four (23%) of the outcome evaluation reports described the use of randomised controlled trials (RCTs), and 21 (20%) described non-randomised controlled trials (Figure 3.5). Twenty-one studies (20%) did not specify the evaluation design used. The remaining 40 (37%) described other designs, such as single-group 'pre-test/post-test' studies.

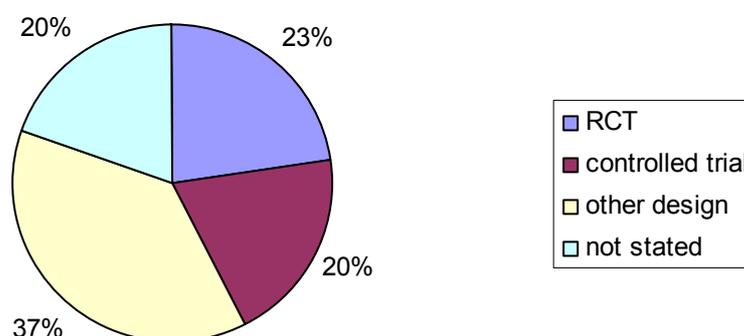
Figure 3.5: Outcome evaluations by study design (N=106)**(b) Intervention site**

Table 3.1 shows the settings described in the outcome evaluations. Each study could involve more than one setting. Reflecting the age group of interest to this review, the most frequent site of interventions (N=87, 60%) was an educational setting: sixty-nine studies were set in secondary education, nine in primary education, four in tertiary education and one in a pre-school site. Twelve (8%) studies were set either in a specialist clinic (N=9) or health care unit (N=3). Only six (4%) studies evaluated interventions provided in the home.

(c) Intervention provider

An intervention could be provided by more than one person, and in these studies there was an average of more than two intervention providers per evaluation. Given the number of interventions evaluated in educational settings, it is unsurprising that 56 (29%) studies evaluated teacher-provided interventions. Health professionals or health promotion practitioners provided the intervention in 32 (16%) of the studies, researchers in 23 (12%), and there were 7 (4%) studies of interventions with an element of peer group delivery. Parents were intervention providers in only 9 (5%) studies, reflecting the low number of interventions which were delivered in the home.

Table 3.1: Intervention sites (N=145) of outcome evaluations (N=106)

Intervention site	Number of studies
Community site	25
Specialist clinic	9
Home	6
Correctional institution	5
Other intervention site	5
Health care unit	3
Workplace site	3
Outreach	2
Education settings:	
Preschool	1
Primary education	9
Secondary education	69
Tertiary education	4
Other educational institution	4

Table 3.2: Provider of interventions (N=195) for outcome evaluations (N=106)

Intervention provider	Number of studies
Teacher	56
Community worker	23
Researcher	23
Health promotion practitioner	18
Intervention provider unspecified	15
Health professional	14
Social worker	14
Community	9
Parent	9
Peer	7
Counsellor	2
Lawyer	2
Residential worker	2
Computer	1

(d) Type of incentive

A wide range of incentives were employed, from cash payments to entry into raffles or lotteries (Table 3.3). Often more than one incentive was available to participants. Financial incentives in the form of cash payments or reduced cost access to a range of resources were used in over half of the studies (N=54, 30%). In 29 studies (16%) the opportunity to win a prize was used to motivate participants, while tokens or vouchers exchangeable for a range of goods were provided in 22 studies (12%). Experiential incentives were provided in 18 (10%)

studies. These interventions provided participants with the opportunity to experience a range of social opportunities, including free holidays, school dances and trips to the cinema. Edible treats (e.g. ice-cream, pizza) were provided in 8 (4%) studies. Twenty-two (12%) studies included recognition of the achievement by peers and others (e.g. certificates, class applause) as an incentive. Most of the studies with an element of achievement recognition also used material incentives.

Table 3.3: Type of incentive (N=183) for outcome evaluations (N=106)

Type of incentive	Number of studies
Cash payments	37
Achievement recognition	21
Experiential	18
Raffle/lottery	16
Vouchers	14
Prizes	13
Gifts	12
Edible	8
Token economy	8
Free or reduced-cost access to education/training	7
Reduced cost resources	6
Disincentives	4
Free or reduced-cost access to leisure/sports facilities	4
Access to protective resources	3
Access to employment	2
Peer recognition	1
Other	9

Other features of incentive provision were that most evaluated interventions (N=89, 72%) were given at an individual level, with only 23 (19%) being provided at the group level (Table 3.4). Some studies evaluated group versus individual level provision.

Table 3.4: Level of provision (N=123) for outcome evaluations (N=106)

Level of provision	Number of studies
Individual	89
Group	23
Organisation	9
Regional level	1
National level	1

The vast majority of incentives were conditional upon changes in behaviour (N=88). Thirty-one were provided to encourage participation in a particular programme (e.g. to encourage teenage mothers to attend post-natal clinics for

health checks). Most of the incentives were given in the context of a single- or dual-component intervention (N=75).

(e) Domain of incentives

It was not possible in all studies to define the domain of study clearly – many studies covered more than one topic area, and the keywords used to describe the studies frequently related to more than one topic area. Table 3.5 provides an indication of the proportions of studies focusing on each domain. Thirty studies crossed more than one domain. Health and education domains were combined in four studies, health and social in seven studies, education and social in twelve studies and seven studies crossed all three domains. Education was predominant (N=61, 43% of the studies), followed by health (N=50, 35%) and other social behaviours (N=32, 22%).

Table 3.5: Domain of study (N=143) for outcome evaluations (N=106)

Domain of study	Number of studies
Education	61
Health	50
Social	32

(f) Focus of incentives

Fifty studies described a focus on one or more health behaviours (Table 3.6). Parenting behaviour was the focus in eleven studies, and eight studies focused on pregnancy prevention. Eight studies each focused on drugs and tobacco. The focus of six studies was healthy eating, and four studies focused on physical activity. Four studies had accidents as their focus, and one focused on injury. Three studies focused on sexual health, and two on STDs. Ten studies focused on general health promotion and three on general health problems. Other areas described were the workplace (N=4), leisure (N=2), medical care (N=3), oral health (N=2) and child neglect (N=1).

Table 3.6: Focus (N=79) of outcome evaluations in the health domain (N=50)

Health focus	Number of studies
Parenting	11
General health promotion	10
Drugs	8
Pregnancy prevention	8
Tobacco	8
Healthy eating	6
Accidents	4
Physical activity	4
Workplace	4
General health problems	3
Sexual health	3
Leisure	2
Medical care	2
Oral health	2
STDs	2
Child neglect	1
Injury	1

A total of 61 studies focused on at least one educational behaviour. Thirty-four studies focused on improving attitudes to education and 16 studies on improving classroom behaviour. Nineteen studies focused on truancy, nine studies on attendance in compulsory education, and a further 16 studies on participation in post-compulsory education. Homework was a focus of four studies and three studies focused on other educational behaviours (e.g. drug education).

Table 3.7: Focus (N=101) of outcome evaluations in the education domain (N=61)

Education focus	Number of studies
Improved attitude to education	34
Truancy	19
Participation in post-compulsory education	16
Improved classroom behaviour	16
Attendance	9
Homework	4
Other	3

Thirty-two studies had a focus on one or more social behaviours. Eighteen studies were focused on improving social behaviour. Nine studies focused on crime prevention, three on aggression and one on racism. Nine studies described a focus on vocational training and seven studies on encouraging volunteering. Other focuses described included employment outcomes and treatment 'compliance'.

Table 3.8 Focus (N=54) of outcome evaluations in the social domain (N=32)

Social focus	Number of studies
Improved social behaviour	18
Vocational training	11
Crime prevention	9
Volunteering	7
Other	5
Aggression	3
Racism	1

3.2.2 Process evaluations

(a) Domain of incentives

As in the case of outcome evaluations, it was not possible in all process studies to define the domain of study clearly. Many studies covered more than one topic area, and the keywords used to describe the studies related to more than one domain. Table 3.9 provides an indication of the proportions of studies focusing on each domain. Twenty-two studies crossed more than one domain: health and education domains were combined in three studies, health and social in seven studies, education and social in six studies, and six studies crossed all three domains. Most of the process evaluations (N=34, 38%) fell in the health domain, but they were more evenly divided than the outcome evaluations between education (N=29, 33%) and other social behaviours (N=26, 29%).

Table 3.9: Domain of study (N=89) for process evaluations (N=61)

Domain of study	Number of studies
Health	34
Education	29
Social	26

(c) Focus of incentives in process evaluations

A total of 34 process evaluations focused on one or more areas of health behaviour. Eight studies included a focus on general health promotion and two studies on general health problems. Seven studies focused on pregnancy prevention and five on parenting. Six studies focused on drugs, five on tobacco and one study on alcohol use. Healthy eating was the focus of five studies and physical activity of three studies. Three studies included a focus on sexual health and one study on STDs. Other areas covered included accidents (N=1), workplace health promotion (N=4) and oral health (N=1).

Table 3.10: Focus (N=54) of process evaluations in the health domain (N=34)

Health focus	Number of studies
General health promotion	8
Pregnancy prevention	7
Drugs	6
Healthy eating	5
Parenting	5
Tobacco	5
Workplace	4
Physical activity	3
Sexual health	3
General health problems	2
Accidents	1
Alcohol	1
Leisure	1
Medical care	1
Oral health	1
STD	1

A total of 29 studies focused on one or more education behaviours. Eighteen studies focused on improving attitudes to education and five on improved classroom behaviour. Eleven studies each focused on participation in post-compulsory education and truancy and four studies focused on attendance. Two studies focused on homework.

Table 3.11: Focus (N=51) of process evaluations in the education domain (N=29)

Education focus	Number of studies
Improved attitude to education	18
Participation in post-compulsory education	11
Truancy	11
Improved classroom behaviour	5
Attendance	4
Homework	2

A total of twenty-six studies focused on one or more social behaviours. Fifteen studies included a focus on improved social behaviour, eight studies focused on crime prevention, and one each on aggression and racism. Eleven studies included a focus on vocational training, and six on volunteering.

Table 3.12: Focus (N=45) of process evaluations in the social domain (N=26)

Social focus	Number of studies
Improved social behaviour	15
Vocational training	11
Crime prevention	8
Volunteering	6
Other	3
Aggression	1
Racism	1

3.2.3 Systematic and non-systematic reviews

Nine reviews were included in the map, five systematic and four non-systematic.

Each of the five systematic reviews (Achat *et al.*, 1999; Giuffrida and Torgerson, 1997; Hey and Perera, 2005a; Hey and Perera, 2005b; Kane *et al.*, 2004b) was conducted on an important aspect of public health. Achat and colleagues in Australia carried out a systematic review of the international evidence about the use of material rewards given to parents and providers to encourage uptake of childhood immunisations (Achat *et al.*, 1999). They included eight studies published in the English language. They do not report what study designs were used, nor whether they undertook quality appraisal of the studies. Only one of the eight studies included in their review was subsequently included in the in-depth review stage (Unti *et al.*, 1997) as the studies were not addressing the same target populations. Achat and colleagues found that both monetary and non-monetary incentives could improve childhood immunisation uptake.

The two systematic reviews by Kane *et al.* (2004a; 2004b), and Giuffrida and Torgerson (1997) addressed the impact of economic incentives (e.g. cash, vouchers, lottery tickets, gifts) on a wide range of health issues. Giuffrida and Torgerson's review included eleven RCTs, all of which were conducted in the USA. They concluded that ten out of the eleven studies showed that the incentives 'promoted compliance better than any other alternative' (Giuffrida and Torgerson, 1997, p 5). Three of these eleven studies have been included in our in-depth review (Morisky *et al.*, 2001; Smith *et al.*, 1990; Stevens-Simon *et al.*, 1994). The Giuffrida and Torgerson review did not focus on the use of incentives with young people.

Kane *et al.* (2004a; 2004b) conducted a substantial systematic review of the effect of economic incentives on consumers' preventive behaviours. They considered the different impact of incentives when directed towards simple and complex preventive behaviours, and did not include studies which had a multi-component intervention. They defined simple behaviours as 'actions that could be directly accomplished, usually with a single visit (e.g. immunization)', and complex behaviours as requiring sustained behaviour change (e.g. a healthy diet) (p 328). Forty-seven RCTs met their inclusion criteria, only two of which were included in our in-depth review (Smith *et al.*, 1990; Stevens-Simon *et al.*, 1994). Kane and colleagues' review included studies across all age groups. They did not conduct a meta-analysis, but grouped studies according to health topic and counted how

many had a positive impact. They concluded that a positive result was achieved 73% of the time (74% for simple behaviours and 72% for complex).

Hey and Perera (2005a; Hey and Perera, 2005b) conducted two systematic reviews for the Cochrane Collaboration: one on the impact of competitions and incentives for smoking cessation (Hey and Perera, 2005b), and the other of the international 'Quit and Win' contests for smoking cessation (Hey and Perera, 2005a). The first of these included 11 RCTs of interventions directed towards adult smokers, and as such none of these could be included in our review as they addressed the wrong age range. They concluded that incentives and competitions do not appear to enhance long-term cessation rates. The second review included four studies again with adult smokers which compared 'Quit and Win' groups with a control group. Results suggested that the contests deliver quit rates above baseline community rates (with three of the four studies demonstrating significantly higher quit rates in the competition group). However, Hey and Perera noted that the population-level impact was relatively low.

We did not identify any systematic reviews which studied the use of incentives to improve educational or other social behaviours. There was little overlap between any of the five reviews we identified.

4. THE IMPACT OF INCENTIVES ON POSITIVE BEHAVIOUR CHANGES

Chapter three described the findings of the first stage of the review process, namely the results of a systematic and broad descriptive mapping of the 129 relevant studies identified. This chapter describes the second stage of the review process, the findings of an in-depth review and synthesis of the quality and findings of a subset of studies relevant to answering the narrower in-depth review question chosen during the electronic consultation process (see page 11). The in-depth review question was:

What is the best available evidence of the effectiveness or otherwise of single or dual component incentive schemes to improve health, educational and other social behaviours in young people aged 11–19?

Our answer to this question is based on the findings from controlled trials which examine the impact of single or dual component incentive-based interventions. The findings are based on studies we judged methodologically sound and which described behavioural outcomes.

Where possible and appropriate we combined the findings of studies in statistical meta-analyses; otherwise we conducted a narrative synthesis. The findings of a number of studies are discussed individually as they were not comparable with those of other studies. Where there were more than two follow-up time periods, we used the first and last outcome measure. In those studies where there was more than one incentive group, we used the group with the most intensive intervention (e.g. incentive plus peer support rather than incentive alone). Where data were available we considered the impact of the following aspects of the interventions:

- Individual versus group delivery;
- Targeted versus universally provided incentives;
- Financial versus non-financial incentives;
- The relationship between incentives and a 'key worker', where a key worker provides the incentive;
- Single event outcomes (e.g. attending health appointment) versus complex behavioural outcomes (e.g. teenage pregnancy prevention); and
- Incentives and socially excluded populations.

Heterogeneity is a common issue in pooling the findings of different studies. It refers to differences between studies in their estimates of the effect of an intervention. We predicted that such differences might be explained by study type (randomised vs. non-randomised controlled trial) and/or study quality (sound vs. 'sound despite'), or by the differences in aspects of the interventions listed above. Where statistical tests confirmed that data from the studies were heterogenous, these possible explanations were explored.

Where only dichotomous data are pooled the combined effect size is presented as a risk ratio (RR). Where continuous data are used, the combined effect size is presented as the standardised mean difference (SMD). Risk ratios and standardised mean differences are interpreted differently. A risk ratio with a value bigger than 1.0 favours the experimental group rather than the control group. For example, a risk ratio of 1.25 means that the experimental group is 25% more likely to have the outcome of interest compared to the control group. The standardised mean difference can be interpreted as the percentage of the control group's average score that is exceeded by the average score of the experimental group. For example, an SMD of 0.8 means that the score of the average person in the experimental group is higher than the scores of 80% of the control group.

Details of the methods used for calculating effect sizes and pooling studies are provided in Appendix 2.

4.1 Which interventions are effective?

4.1.1 Overview of studies

Sixteen outcome evaluations met our inclusion criteria and were judged to be methodologically sound; they were published between 1990 and 2005 and evaluated a range of incentive-based interventions. The majority (N=9) were conducted in the USA, two in the UK and one each in Canada, Finland, Germany and the Netherlands. The interventions fell into three categories: those focused on a range of positive health behaviour changes (N=9); those which considered the impact of incentives on educational outcomes (N=6); and one study with a range of other social outcomes. Of the 16 interventions, half provided a financial incentive, four provided gifts, two gave tokens or vouchers exchangeable for gifts, two allowed entry to a raffle or competition, two gave edible rewards (pizzas, ice-creams, etc.), and one involved a contingency contract with parents (the young person and her/his parents agreed upon an incentive to be provided by the parents contingent on an agreed achievement by the young person). Seven of the interventions were targeted at specific groups of individuals judged to be at risk of social exclusion. Most interventions gave incentives to individuals (N=12), though three provided incentives on a group basis (e.g. to an entire class or school) and one gave incentives to organisations (orthodontist practices).

4.1.2 Methodological quality of studies

All of the 20 studies considered for inclusion in the effectiveness synthesis employed a control or comparison group. Four studies were deemed not to be of sufficient quality, mainly because of their non-equivalent control and intervention groups; their findings were excluded from the effectiveness synthesis (Elder *et al.*, 1989; Fashimpar, 1991; Fishbein, 1992; Geiger, 1996). Twelve of the sixteen included studies used randomisation to allocate individuals or clusters of individuals to intervention and control groups. All but three of the sixteen studies were judged to be sound (Middleton *et al.*, 2005; Unti *et al.*, 1997; Vartiainen *et al.*, 1996). In all three studies deemed to be sound despite discrepancies equivalence between the intervention and control groups was judged to be unclear.

Summaries of the sound outcome evaluations along with information about reviewers' judgements of their overall quality are presented in a table in Appendix 3.

4.1.3 Characteristics of sound studies

Health behaviours

Of the nine studies that evaluated interventions with health behaviour outcomes, three looked at interventions provided to young mothers (Smith *et al.*, 1990; Stevens-Simon *et al.*, 1994; Stevens-Simon *et al.*, 1997); two evaluated the use of gifts as incentives to encourage young women to attend early post-partum clinic appointments (Smith *et al.*, 1990; Stevens-Simon *et al.*, 1994); and the other evaluated the use of incentives plus peer support meetings with teenage mothers to reduce future teenage pregnancies (Stevens-Simon *et al.*, 1997).

Three studies dealt with interventions designed to either delay the onset or reduce the prevalence of smoking. Hovell *et al.* (1996) evaluated an intervention conducted in orthodontist practices which provided 50¢ per anti-smoking prescription delivered to young people. The studies by Vartiainen *et al.* (1996) and Wiborg and Hanewinkel (2002) both described competitions that aimed to encourage whole classes to remain smoke free.

The final three studies in this category focused on different health problems. Morisky *et al.* (2001) evaluated incentives and peer support to encourage completion of treatment for latent tuberculosis in young people. Class incentives were used in a study reported by Unti *et al.* (1997) to encourage young people to return parental consent forms and participate in a school-based hepatitis B vaccination programme. Richter *et al.* (1998) provided gifts and tokens to young people who maintained a high level of involvement in a range of orthodontic treatments.

Educational behaviours

Six studies evaluated interventions with educational outcomes (Baumert and Demmrich, 2001; Leuven *et al.*, 2003; Licht *et al.*, 1991; Middleton *et al.*, 2005; O'Neil *et al.*, 1996; Reid *et al.*, 1995). These studies measured either effort expended on passing exams or attendance at classes.

Social behaviours

Only one study (Morris and Michalopoulos, 2003) considered behavioural outcomes that were broader than either health or education. The Self Sufficiency Project (SSP) was a large-scale Canadian intervention which provided single parents with extra money if they chose to return to work. This study measured a wide range of outcomes in families eligible for SSP, including several behavioural outcomes for young people (helping around the house, employment and drug taking).

4.1.4 Effects of incentives on health behaviours

Of the nine included studies that examined the impact of incentives on health behaviours, seven used random allocation to select control and intervention

groups; three of these randomised groups of individuals. The nine studies varied in the health behaviour outcomes that they measured: smoking prevalence (three studies); attendance at post-partum clinic (two studies); reduction in repeat teenage pregnancy (one study); completion of TB treatment (one study); compliance with orthodontic treatments (one study); and obtaining parental consent for a vaccination programme (one study).

When outcomes data from all nine studies were pooled in a meta-analysis, the overall effect showed incentives to have a statistically significant and positive impact (SMD 0.17 (CI 0.07, 0.27)). This shows that on average incentive-based health promotion interventions do work. However, as would be expected in pooling studies with a wide range of intervention characteristics, there was considerable statistical heterogeneity.

The meta-analyses presented below did not have statistically significant levels of heterogeneity. However, all of these meta-analyses are based on a small number of studies, some of which have small sample sizes and wide confidence intervals. The lack of heterogeneity may reflect the similar results of the studies; another intervention which employed the same techniques might get different results in a different setting.

Effect of incentives on health behaviour(s)

We conducted separate meta-analyses on those studies which investigated the impact of incentives on single health behaviour outcomes and those which assessed more complex health behaviours. We also separately analysed studies that measured the impact of incentives on smoking.

Single event health behaviours

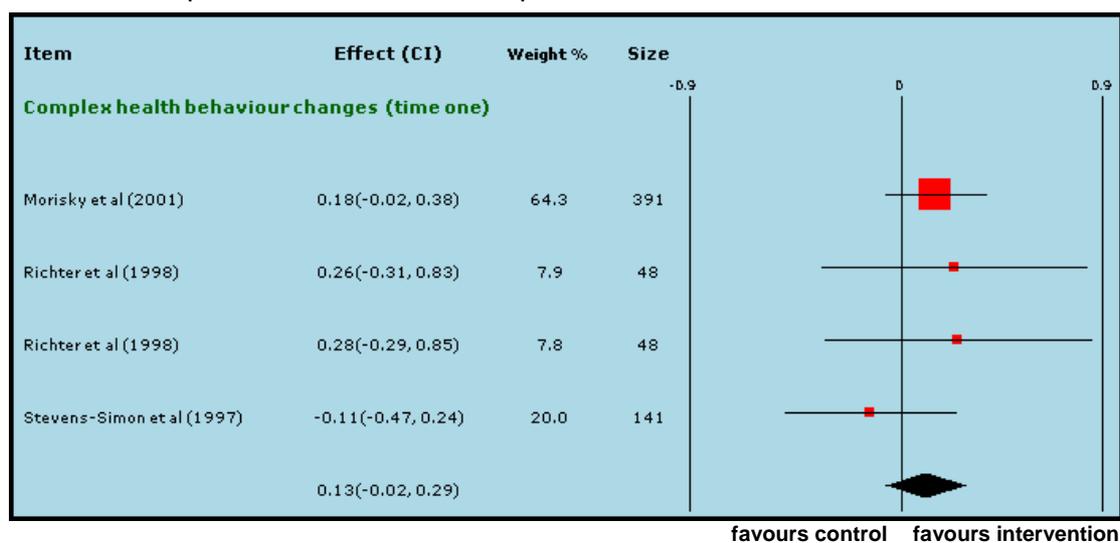
Three studies examined the impact of incentives on single health behaviours. Two evaluated the offer of gifts to teenage mothers to encourage attendance at early post-partum health clinics. Smith *et al.* (1990) randomised 534 young women to either a control group with no incentive or to one of two intervention groups with the offer of either vouchers for baby milk or an item of costume jewellery. We combined the results of both intervention groups for the meta-analysis. The outcome measure was attendance at a post-partum clinic within four to six weeks of giving birth. Stevens-Simon *et al.* (1994) randomised 240 young women to a control group with no incentive, or to an intervention group which was offered a 'Gerry Cuddler' (baby sling). The outcome measure was attendance at a post-partum clinic within eight weeks of giving birth. In a three-year long evaluation, Unti *et al.* (1997) randomised four schools (1,429 young people) to a no-incentive control group or an intervention group with 'peer incentives' to motivate students to return signed parental consent or refusal forms for a hepatitis B vaccination programme. Peer incentives were designed to create peer pressure among students to return the forms within five days of parent information packs being distributed. Classes in which all students returned signed forms within this period received pizza or ice-cream coupons.

Figure 4.1 shows that the pooled effect sizes demonstrate that incentives significantly increased the rates of these positive health behaviours (Risk Ratio 1.23 (CI 1.06, 1.43)). When the data from Unti *et al.* were removed from the meta-analysis, to explore the impact of two highly homogenous interventions on

every day they were not pregnant at a monthly pregnancy test); a weekly support group with 10-15 peers and two adults where discussions on a range of issues which concerned the group took place (e.g. contraception, education, training, careers); incentives plus peer support; or a usual post-partum care group. The intervention group data used for this meta-analysis were taken from the incentive plus peer support group.

Figure 4.2 shows that incentives had no overall effect when the results of these studies were pooled (SMD 0.13 (CI -0.02, 0.29)).

Table 4.2: Impact of incentives on complex or multi-event health behaviours



Smoking behaviours

Three studies evaluated the use of incentives to either delay the onset of smoking or reduce levels of smoking among young people. Hovell *et al.* (1996) conducted a randomised cluster trial in 154 orthodontic practices involving 14,775 young people. Practitioners were issued with anti-tobacco 'prescriptions' to be given to eligible adolescents, which were pre-printed with anti-tobacco messages and included a space for the patient's name and the signature of the issuing professional. Offices received 50¢ per prescription provided, and orthodontists and were encouraged to counsel young people against smoking. The intervention lasted for two years with outcome measures taken at both baseline and two year follow-up. The outcome measures were the reported initiation of tobacco use in the previous 30 days, and smoking on more than 100 occasions within the previous 30 days. For the meta-analysis we chose to use the latter as being closer to a measure of daily smoking as used in the other two studies which analysed smoking behaviours.

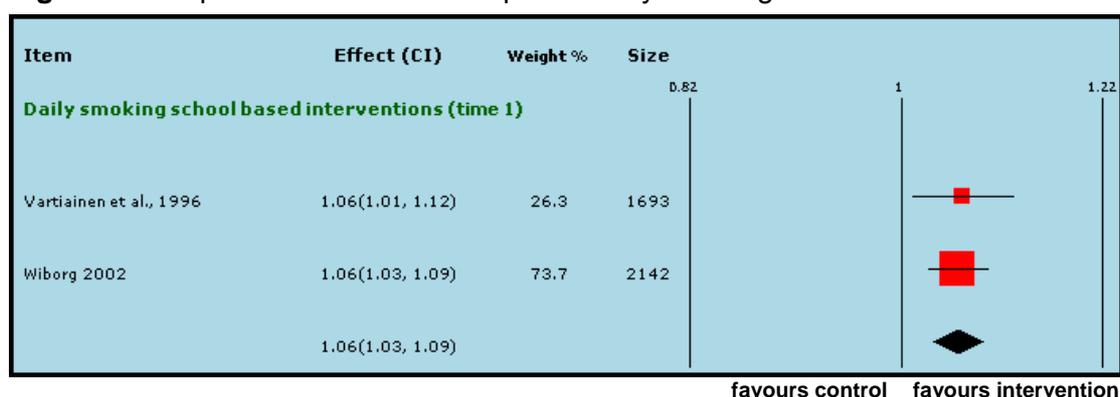
Vartiainen *et al.* (1996) reported a controlled cluster trial design to evaluate 'The No Smoking Class Competition' which has been organised annually in Finland for 8th Grade (14-year-old) pupils since 1989. Each class decides whether to participate. The target is for the class to desist from smoking over the duration of the competition. They sign a commitment form and complete a follow up form

each week over the period of the intervention. If someone starts smoking and cannot quit, the whole class has to drop out. Each class has a contact teacher who assists the class during the competition and organises health education sessions. If all members of a class are successful in not smoking over the competition period they are entered into a lottery with financial prizes. (In the competition reported in the paper, there were four prizes of US\$2,000 and ten second prizes of US\$200.) A total of 97 classes (1,693 pupils) participated in both baseline and follow-up measures one month and one year after the competition.

Wiborg and Hanewinkel (2002) used a controlled cluster trial design to evaluate the international ‘Smokefree Class Competition’. Classes which register for the competition are provided with a class contract for the pupils to sign committing themselves to remaining smoke free for the following six months. The class is responsible for monitoring its progress and they can remain in the competition if they are smoke free (defined as less than 10% of the class smoking in the previous week). Teachers help with the administration of the project. Classes which remain in the scheme for six months are eligible to participate in a prize draw with a number of attractive prizes, the main prize being a trip to one of the other participating countries. A total of 89 classes (1,495 pupils) in the intervention group and 42 classes (647 pupils) in the comparison group participated in the study and completed baseline and six and twelve month post-test measurements.

Our initial meta-analysis showed that incentives had no overall effect when the results of these studies were pooled (RR 1.04 (CI 1.00,1.08)). This analysis was of the first follow-up period, and results were the same at the second follow up period (RR 1.03 (CI 1.00, 1.06)). However, there was a high level of heterogeneity within both these analyses which makes the pooled effect size a possibly unreliable estimate of effectiveness. We therefore conducted a sensitivity analysis, and pooled the results of the data taken from the two school-based anti-smoking competitions. The results of this are shown in Figure 4.3. The intervention had a statistically significant and positive impact on reported daily smoking rates at the first follow up (RR 1.06 (CI 1.03, 1.09)). This effect was the same at the second follow up at one year (RR 1.05 (CI 1.02, 1.08)).

Figure 4.3: Impact of incentives on reported daily smoking rates



While these findings are impressive in terms of the public health agenda, it is important to remember that they are based only on two studies, both of which rely on the veracity of self-reports of smoking behaviour. It is possible that there might

have been a greater 'incentive' for the intervention groups to under-report their levels of smoking. Also with outcomes such as smoking there is the possibility that 'social desirability bias' may come into play when people are asked to recount their participation in behaviours that are not considered to be socially desirable. Individuals who are regular smokers but could recall one day when they had not smoked might have described themselves as not being daily smokers. It is also possible that both studies have been affected by selection bias. Both studies involve classes volunteering to abstain from smoking; one study compares these to non-volunteers, and the other study uses schools from an area not running the competition. There is a clear potential for classes that are likely to smoke not to volunteer. The classes that do volunteer may be less likely to smoke even without the competition. In order to determine the effect of the competition, it would have been better to have compared smoking rates in the whole intervention area (volunteer classes and non-volunteers) with those in the control area.

4.1.5 Effect of incentives on educational behaviour(s)

Six studies considered the effectiveness of incentives in improving educational behaviours (Baumert and Demmrich, 2001; Leuven *et al.*, 2003; Licht *et al.*, 1991; Middleton *et al.*, 2005; O'Neil *et al.*, 1996; Reid *et al.*, 1995). These studies all examined the impact of incentives on either effort applied to school/college work, or attendance levels. As is noted in Chapter 2, we did not include impact on educational achievement. One study, an evaluation of the Educational Maintenance Allowance (EMA) scheme (Middleton *et al.*, 2005) was not included in a statistical meta-analysis with the other studies, as it did not measure comparable outcomes.

Effort applied to work

Three studies considered the impact of incentives on reported levels of effort or time spent on school work or studies. Baumert and Demmrich (2001) conducted an RCT to evaluate the use of incentives to improve effort and achievement in a German national mathematics test with 15-year-olds. In this four-arm trial, students were administered a test in mathematical literacy, with each group being given a different set of test instructions. Only one of the groups was offered tangible incentive. This was a financial reward of DM10 if they correctly solved more items than expected on the basis of their prior mathematics grades. Outcome data from the reward group (N=80) and the control group (N=75) which received standard test instructions were entered into our meta-analysis.

O'Neil *et al.* (1996) conducted a similar RCT on two separate groups of students in Grades 8 and 12, to test the impact of financial rewards on effort and achievement in an American national mathematics test. The Grade 8 students were told they would get \$1 per correct item, to a maximum of \$41, and Grade 12 students were told they would get \$1 per correct item, to a maximum of \$44. Both reward groups had separate control groups which were not offered an incentive, and were given standard test instructions. In Grade 12 there was an extra incentive group which was offered a certificate of accomplishment if successful, but no cash incentive. Data from the cash incentive groups were entered into the meta-analysis.

of £5 per week. Termly retention and course achievement bonuses are also payable. While the scheme is funded by the Department for Education and Skills (DfES), it is administered and payments are made by Local Education Authorities (LEAs).

Before the national implementation of the EMA in 2004, extensive piloting was undertaken and many evaluations were conducted and have now been published (Allen, 2003; Ashworth, 2002; Dearden *et al.*, 2005; Dobson, 2003; Feinstein, 2005; Fletcher and Clay, 2002; Knight and White, 2003; Legard *et al.*, 2001; Maguire and Maguire, 2004; Middleton, 2003; Middleton *et al.*, 2003; Middleton *et al.*, 2005). The main quantitative evaluation is described as a 'controlled longitudinal cohort study' (Middleton *et al.*, 2005). Its design is that of a controlled cluster trial: it was conducted prospectively, and involves an experimental intervention and a matched control group. We have based our analysis on data taken from this evaluation.

The impact of EMA on destinations after post-compulsory education varied at the four different times it was measured. The outcome measures examined were: full-time education; work with training; work without training; and 'not in education, employment or training' (NEET). In urban areas EMA had a statistically significant positive effect on the number of young people in full-time education at 18 years of age (3.5% more in the intervention than control areas). This impact was most noticeable on the percentage of young men still in education (an increase of 7.7% of young men compared to -0.7% of young women). There was a significant reduction in the percentage of urban young people who were in full-time work with training (-5.1%) and in full-time work without training (-5.4%). There was little difference in the percentage who were NEET. There was no evidence of effect demonstrated for the impact of EMA in rural areas, although it is worth noting that EMA was only introduced into one rural area (Cornwall). These findings did not remain significant for urban men or women when they followed up at age 19.

4.1.6 Effect of incentives on social behaviour(s)

Only one of the included studies examined the impact of incentives on other social behaviours in young people (Morris and Michalopoulos, 2003). The Self-Sufficiency Project (SSP) was a Canadian anti-poverty initiative targeting single parent welfare recipients. It was evaluated in a large scale RCT with 5,686 single parents (primarily mothers) in British Columbia and New Brunswick who had been randomly selected from parents who had been on income assistance for at least one year. Those in the intervention group were offered a financial supplement to increase their earnings, which made work pay better than welfare. Those who worked for 30 weeks or more were paid a supplement on top of their employment earnings for up to three years. The programme was structured in such a way that the supplement equalled half the difference between a participant's earnings and a 'benchmark' (equivalent to Can\$30,000 in New Brunswick and Can\$37,000 in British Columbia). This meant that the gross income of people on a minimum wage was approximately twice what it would have been without the supplement.

A wide range of outcomes for all members of the family were measured, and the findings have been published in a number of reports (Michalopoulos *et al.*, 2002; Morris and Michalopoulos, 2000; Morris and Michalopoulos, 2003). The outcomes of interest to our systematic review are those which relate to the behaviour and emotional well-being of young people who were aged 12 to 18 years at a 36-

month follow-up, and aged 14 to 20 years at 54-month follow-up. There were no differences between the two groups on any measures of health (risk for depression, average health, any long-term problems) at 36 or 54 months. Small but significant unfavourable effects were found in some measures of behaviour and emotional well-being at 36 months. Young people in the SSP group reported significantly higher levels of alcohol intake (effect size 0.20, $p < 0.05$) and drug use (effect size 0.12, $p < 0.01$). In young people aged 15 to 18 years the frequency of minor 'delinquent' behaviour significantly increased (0.21, $p < 0.05$), though this effect was not seen in younger children aged 12 to 14. None of these behaviours were serious or criminal. They involved such activities as staying out late at night, or all night, and were likely to reflect a lack of parental supervision. The authors state that none of the unfavourable effects remained significant at 54-month follow-up, although data were not presented. At 36 months, young people in the SSP group were significantly more likely to be working 20 or more hours per week (effect size 0.25, $p < 0.05$). This outcome was not reported at 54 months. Young people in the SSP group were also more likely to report higher levels of involvement in household chores, though this did not reach a statistically significant level. These two findings may reflect a relationship between maternal employment and adult modes of behaviour and responsibility in young people.

While this was a well-conducted large-scale RCT, the response rate for the older group of young people was only 64% at 36 months and even lower at 54 months. Although the authors found no evidence of a response bias, the results should be interpreted with caution.

Conclusion

Single or dual component incentive schemes can be effective in encouraging positive health behaviours when a simple or single action is required, as opposed to a sustained health behaviour change. They are also effective at reducing smoking behaviours in the context of school-based competitions. However, these findings are based on a small number of studies, none of which were conducted in the UK, and, while consistent with other systematic review evidence, should be treated with caution. We found no evidence of incentives having a beneficial effect on complex health behaviours requiring sustained levels of change.

Single or dual component incentive schemes have not been shown to be effective in improving either the levels of effort applied to educational tests, or attendance levels in school. In one study there was some impact on numbers of young people remaining in post-compulsory education. Incentives given to single parents returning to work had a mixed impact on the social and emotional outcomes of their teenage children. Sustained behaviour changes relating to effort and attendance in education may require more complex multi-component schemes providing pupils with additional support in order to achieve the required behaviour.

5. PROCESS EVALUATION

Formal process evaluation provides a context for understanding the results of experimental or policy interventions more fully. It is designed to describe what goes on rather than to establish whether it works or not, and may lead to suggestions of ways in which the programme design and implementation could be improved, especially where the intention is to move towards implementation on a larger scale. Process evaluation is crucial in investigating the gap between efficacy – how something should work in theory or under rigorously controlled conditions – and effectiveness – how something actually works in practice. Process issues make a vital, and sometimes underestimated, contribution to the effectiveness and sustainability of a programme. This is particularly the case where an intervention is designed for mainstream use in complex and busy working environments such as schools and colleges, youth clubs, or health care settings, where a highly controlled approach to the administration of incentive schemes is often difficult and all kinds of unintended variability may affect their reception and operation.

Process evaluation examines factors such as:

Acceptability (e.g. What were the views of the participants/providers of the intervention? How motivating did they find the incentive?);

Implementation (e.g. What were the barriers/facilitators to successful implementation? Were there any unforeseen consequences?);

Content of programme and quality of its materials (e.g. If incentives are being used to encourage attendance/participation in a programme, is the programme achieving its stated objectives?);

Accessibility (e.g. Who participated in the intervention? Were any key groups under-represented and why?);

Human resources issues such as collaboration, partnerships, management and responsibility; and skills and training (e.g. Who was involved in delivering the intervention? Was it adequately supported by senior decision-makers and other stakeholders? Were staff adequately trained and confident in delivering the scheme?);

Cost (e.g. Did financial incentives enhance compliance in a cost-effective manner? Are such incentives sustainable in the longer term?);

All of these questions provide a context for considering the actual outcome of the intervention, and possible ways to maximise benefits it may deliver if and when it is implemented again.

In the studies which we looked at in our review, formal process evaluation was the exception rather than the rule. Out of the sixteen studies discussed in the previous chapter, only seven had formal process evaluations. Three of these were in the field of health (Hovell *et al.*, 1996; Unti *et al.*, 1997; Wiborg and Hanewinkel, 2002) and four in education (Baumert and Demmrich, 2001; Leuven *et al.*, 2003; Middleton *et al.*, 2005; Reid *et al.*, 1995). Four of these seven evaluations were

published as separate papers and the rest were included in the outcome evaluation reports.

Hovell *et al.* (1996) detailed the outcome of a clinical trial (Smiles Plus) which incentivised orthodontists to offer a programme to prevent smoking in their teenage patients. Three adherence studies were conducted (Hovell *et al.*, 1995; Russos *et al.*, 1997; Russos *et al.*, 1999), which were based on a range of quantitative measures and observations. Wiborg and Hanewinkel (2002) evaluated the impact of the Smokefree Class Competition; the process evaluation consisted of a survey of the views of a representative sample of the 30 classes that had participated in the competition and of all the teachers involved (Savolainen, 1998). Unti *et al.* (1997) looked at the impact of using incentives to encourage the quick return of hepatitis B immunisation consent forms. In their main paper they reported a short survey conducted with a sample of staff and pupils, and two separate papers describing these process data were also produced: Woodruff *et al.* (1996) and Boyer-Chuanroong and Woodruff (1997). The former was based upon a survey of all participating parents regardless of whether they had returned forms, and the latter provided an overview of the implementation of the vaccination programme.

The Educational Maintenance Allowance (EMA) pilots were comprehensively evaluated and an annual implementation evaluation was produced for each of the four years they ran. The most recent evaluation has been drawn on for this discussion (Maguire and Maguire, 2004). The data reported in this paper were collected by means of 'round-table' discussions conducted in the pilot areas, and individual interviews with a sample of stakeholders. Data relating to the demographic reach of the project are provided in the final outcome evaluation (Middleton *et al.*, 2005). Cost effectiveness data are available in Dearden *et al.* (2005) who based their study on data obtained from the first cohort in the EMA pilots. Baumert and Demmrich (2001), examining the impact of cash incentives on test achievement, collected data on motivation, anxiety, and ego and task orientation before and after the intervention. Leuven *et al.* (2003), looking at the effect of financial incentives, explored self-reported effort, number of hours allocated to study, and the impact of demographic variables. Reid *et al.* (1995), again looking at the impact of financial incentives on school performance, elicited students' views and feelings about the intervention after it had been completed using pre- and post-intervention surveys.

Most of the other reports did provide some sort of informal process data in the form of brief critical reflection on process issues in their discussion sections. Such reflections were generally prompted by consideration of the factors that had diminished the effectiveness of the intervention and sometimes led to suggestions for enhancing the effect of the intervention in subsequent experimental trials or in the field. As might be expected, the briefer and more focused experimental interventions threw up fewer process issues than more complex ones rolled out over a longer time period.

The focus of this chapter is the process information provided by the seven formal process evaluations we identified. We discuss this under the thematic headings listed at the beginning of the chapter. Different process issues often develop during the course of a project and it is not always easy to disentangle them. For instance, a problem with the consistent and effective implementation of a scheme may arise for a host of reasons: lack of training, lack of commitment to the scheme on the part of participants or providers, lack of time and resources, poor

quality programme materials, and so on. The process themes discussed in depth and supported by data are summarised in Table 5.1. As this table shows, none of the studies addressed process issues comprehensively, although Hovell *et al.* (1995) went a long way towards doing so.

Table 5.1: Process themes

STUDY	PROCESS THEMES					
	Acceptability	Accessibility	Content of programme	Human resources	Implementation	Cost
Health						
Hovell <i>et al.</i> (1996)	X		X	X	X	
Wiborg and Hanewinkel (2002)	X		X		X	
Unti <i>et al.</i> (1997)	X		X		X	
Education						
Baumert and Demmrich (2001)	X					
Leuven <i>et al.</i> (2003)	X	X				X
Middleton <i>et al.</i> (2005)	X	X		X	X	X
Reid <i>et al.</i> (1995)	X	X		X	X	

Perceptions, understanding and acceptability of the use of incentives

All the studies provided some direct information about the views of participants and/or providers regarding the use of incentives. In three studies it is specifically stated that incentives were perceived favourably by participants and providers (Hovell *et al.*, 1996; Middleton *et al.*, 2005; Unti *et al.*, 1997). In Hovell *et al.* (1996), the incentive was an apparently slight one – 50¢ paid to an orthodontist's office for each anti-tobacco 'prescription' dispensed to an adolescent patient. The authors consider that this may have been insufficient to encourage full compliance with the experimental schedule, but staff appeared to regard it as adequate and reported that the money was used to fund staff lunches and other 'treats' that rewarded the team collectively. In the project described by Unti *et al.* (1997), the incentive was a group one – coupons for pizza and ice cream provided to classes of 11–12-year-olds who were successful in returning a hepatitis B immunisation consent form within five days. A lesson about hepatitis B was also delivered to enable informed consent. Questionnaires were administered to a representative sample of children and staff. Over half the children thought that they would not have returned the forms within five days if there had not been the incentive; 94% of staff indicated that the incentive facilitated a quicker return, with only 31% believing pupils would have been motivated to return the form without an incentive. Parents indicated broad support for the programme and 52% reported

taking their child's advice as a reason for accepting vaccination. Maguire and Maguire (2004) report that parents, Learning Centres and young people welcomed the Educational Maintenance Allowance (EMA); however, at least one LEA representative noted that, as the scheme became more familiar, there had been a 'culture change' such that some students began to perceive EMA as a right rather than as a reward for attendance and observation of the learning agreement. This had organisational implications for the Learning Centres in terms of tightening up and clarifying procedures.

Wiborg and Hanewinkel (2002) carried out a survey of the participating groups in the Smokefree Class Competition and their teachers which had a 70% return rate (Savolainen, 1998). Based on this, they state that the idea of the competition and its rules met with both teachers' and pupils' approval. Over 70% of pupils and teachers believed that participation had an impact in terms of often delaying smoking. Smaller numbers (40%), however, reported that smoking had often been reduced. Fifty-seven percent of pupils said that they took the competition seriously or very seriously, although, interestingly, there were clear differences between seventh and eighth grade pupils in their view of the competition. Only 30% of the older pupils believed that participation in the competition had reduced the incidence of smoking often or very often, whilst 48% of the younger classes were of that view. Thirty nine percent of younger pupils took the competition very seriously, while only 22% of the older pupils did. In the light of these findings, Wiborg and Hanewinkel suggest that the competition may be more suitable as a primary prevention project, targeting younger children who have not yet experimented with smoking.

Three of the educational studies studied the impact of financial incentives on motivation. In the German trial (Baumert and Demmrich, 2001) there was no evidence of the incentive impacting on motivation. Leuven *et al.* (2003) trialled incentives for university students. There was initial opposition from student leaders and some staff, as the ethics of paying only some of the students were questioned. The Dean of the Faculty, however, supported the initiative. Although the students who were offered incentives reported putting more effort into their studies, and those offered the higher incentive perceived their effort as greater, this was not borne out by the reported number of hours spent studying.

In Reid *et al.* (1995), a trial of incentives for secondary school girls at risk of dropping out of school, those who had been able to earn rewards for smaller improvements were happier with the service received and their contract outcome, and showed a small gain in school-related self-esteem. Across both groups, only 14% agreed with the statement that 'Getting paid in school was enough of an incentive for me to improve my school performance' and 44% agreed with statement that 'I like the idea of getting paid to do well in school but I wish that the project person had been able to help me with the school problems that I was having' (p 337).

Incentives do appear to be perceived favourably, particularly where they are used in a straightforward way to reward a single behaviour. However, two of these evaluations (Baumert and Demmrich, 2001; Leuven *et al.*, 2003) suggest that self-perceived motivation does not necessarily translate into specifiable improvements in the targeted behaviours. It is also important that the requirements be achievable, and, where necessary, help and support is available to develop them. Incentives alone cannot provide young people with the skills and resources to achieve the requisite behaviours.

Two of the studies show that there can also be negative appraisal of incentives (Maguire and Maguire, 2004; Reid *et al.*, 1995). If the participants are not paid because of failure to reach targets, this can arouse negative reactions and lower self-esteem, rather than simply being accepted as a just consequence leading to a sturdy resolution to try harder. Baumert and Demmrich's study (2001) of incentivising German university students shows that when incentives are targeted at some groups and not others, this can be perceived as inequitable and unethical. This does not appear to have been an issue with the EMA, based as it was on means testing of household income. EMA is unusual in that it is both an incentive and a redistributive measure.

Implementation: barriers and facilitators and unintended consequences

The core of any intervention deploying an incentive is that a given behaviour be rewarded. For this to be successful the behaviour needs to be clearly specified and achievable and its occurrence logged so that rewards are given consistently. Failure to do so can undermine the initiative. In the case of large-scale and long-term interventions such as EMA, this can be an administratively complex, labour- and resource-intensive process. Most of the studies provided useful data about such issues in operationalising incentive schemes.

Incentivisation in terms of single behaviours such as the achievement of a certain mark in a test (Baumert and Demmrich, 2001) or return of a consent form (Unti *et al.*, 1997) can appear very straightforward. This is, indeed, true of the former as it was a brief and self-contained intervention. However on a larger scale, as Boyer-Chuanroong and Woodruff (1997) describe, the activity required, especially at start up, is intensive, needing a high degree of co-ordination of personnel, materials, provision of information to young people and their parents, and negotiation with schools. The use of an incentive in collecting immunisation consent forms within a given time period did help provide a systematic administrative framework for collecting in the forms (whether consent was given or not) and harnessed peer pressure in a benign way; however, it cannot be considered in isolation from the other organisational and facilitating activities. As the authors summed up: 'Giving shots is the easy part' (p 271). Even in the presence of the incentive, Unti *et al.* (1997) noted that differences in terms of commitment and organisation in schools, and also in the populations they served, possibly contributed to differing rates of return.

Where interventions are rolled out over longer time periods or target more complex behaviours, however, there is more scope for these human differences to emerge. One example of this is the use of peer pressure: several of the schemes, recognising the importance of harnessing social learning, attempt to use it to create group norms favourable to the required behaviour(s). In principle this is a desirable synergy: Russos *et al.* (1997) noted that where more staff in orthodontic offices were involved in the implementation of the anti-tobacco scheme, this seemed to create a 'team-oriented atmosphere which reinforces compliance' (p 50).

The Smokefree Class Competition asks whole classes, which have chosen to enter the competition, to refrain from smoking for the six-month period of the competition and regularly to confirm non-smoking status. Although staff and students questioned (Savolainen, 1998) endorsed the rules of the competition, concern remains that bullying of smokers by non-smokers may emerge as a problem. The threshold for smoking was set at 10% to try to prevent this.

However it is significant that although 89% of pupils said they told the truth about their smoking habits, only 34% thought that their peers did. Twenty one percent reported that pressure was sometimes applied by non-smokers to smokers. It is possible to see some slippage here, which may well undermine the intended aims of the intervention. More recent informal evaluation (Moore *et al.*, 2005) suggests that future outcome evaluations should make use of biochemical verification, which might well be counter-productive in that it could convey the message that the students are not to be trusted. It would also be complex and would incur costs: one of the benefits Wiborg and Hanewinkel (2002) note is that the competition is perceived by teachers as straightforward to run within the context of a busy school. This lack of formal demands, although convenient, means that there may be considerable variation in the support and attention that schools give to the scheme.

A generic problem with deploying incentives, hinted at above in the example of peer pressure, is the tendency for unintended consequences to emerge, particularly in more complex schemes. For instance, Reid *et al.* (1995) noted that the more flexible of their incentive structures, which rewarded small improvements in grades and attendance, allowed the girls to choose to concentrate on one or two subjects in order to obtain a reward and to let others slide without penalty. Although they did not find direct evidence that this strategy had been deliberately employed, the girls' behaviour over time was consistent with this.

Another related generic issue is the use of incentives to reward attendance. The programme which is attended needs to attain its ends; for this to happen, the young people need to make an effort to co-operate, learn and achieve. All these are self-initiated activities that require at least some degree of intrinsic motivation. This important issue is noted in discussion of the EMA. Providers stated that, although the scheme had been beneficial in tightening up and developing systems for monitoring and recording attendance, the learning agreement between the individual and the Learning Centre, rather than attendance, needed to be the principal focus. Attendance does have the benefit of being relatively clear-cut behaviour to log, although even here Learning Centres discovered considerable variation in the way that different members of staff interpreted authorised and unauthorised absence (Maguire and Maguire, 2004, p 26).

Although the focus of incentives is on changing the behaviour of a target group, successful implementation of an incentives scheme also makes demands on those providing it. The required behaviours of the target group need to be logged and rewarded consistently, and interventions designed to foster the required behaviour need to be implemented properly and consistently. In Hovell *et al.* (1996), there was stringent evaluation of the compliance of orthodontists who were offered a small incentive to issue 'anti-tobacco prescriptions' and counselling to all their adolescent patients. Hovell and colleagues found that only 64% of the prescriptions were dispensed, and only 25% (3% amongst controls) reported offering anti-tobacco use counselling. Further analysis of compliance (Russos *et al.*, 1997) suggested that more prescriptions were issued where the initiative had been more deeply embedded within the office culture, as exemplified by features such as development of efficient tracking and reminder systems, and the involvement of more staff in discussions with patients about preventing and stopping smoking and handing out prescriptions. They noted that offices with a higher proportion of staff who smoked were more sceptical about the usefulness of the initiative and less likely to report positive feedback from patients and their parents. They found, in fact, that one of the strongest predictors of compliance

was praise and positive feedback from clients and within the staff group itself. The lack of protocol compliance in offering preventative counselling is striking and the authors attribute this to the practitioners' lack of confidence in offering counselling to adolescents, particularly where there was no clear evidence of tobacco use.

One lesson from this is that incentive schemes need to be designed and implemented with care, and while this may be straightforward for short-term or single interventions, the use of incentives over the longer term to encourage changes in more complex behaviours can be quite laborious to maintain. Successful management of such schemes can make heavy organisational demands upon the providers, although if this results in the development of sustainable and workable systems, these may well help in their own right in to reinforce the required behaviours. In designing incentive-based interventions, it is also important to ensure that there are no unhelpful side effects, such as undesirable kinds of peer pressure, or indeed 'perverse' results such as a good level of attendance at an educational course but a failure to complete the terms of the learning agreement.

Content of programme and quality of its materials

It is possible to appraise a programme and its materials from the point of view of researchers, providers and participants. In the studies analysed here, there was surprisingly little attention to these features of the programme. This may have been because incentives were offered, for the most part, to enhance motivation to participate in education or routine health care and these activities were not questioned. This is clearly an important issue, particularly where incentives are provided for attendance, as if the programme fails to attain its ends, the resources utilised by the incentives will have been wasted.

The most thoroughgoing consideration of these issues is offered by Hovell *et al.* (1996). Unlike many of the programmes discussed in our review, they set out to test an intervention grounded in explicit theory derived from social learning and behavioural-ecological models. The researchers were concerned to see how these approaches were put into practice, and they visited the participating offices quarterly. The programme did not only involve the provision of anti-tobacco prescriptions and counselling, but also aimed to support this message by creating smoke-free environments and the display of anti-tobacco materials.

Although this meticulous approach may not be so easy outside research contexts with a plentiful supply of graduate students, it is important when refining and improving programmes better to achieve their ends. There may often be a very considerable discrepancy between a programme as it is described on paper, and as it is delivered and experienced in practice. Notably, apart from the evaluation described above, none of the other papers provided this kind of detailed information.

Accessibility of programmes

Accessibility is an important issue, as it concerns how successful an initiative is in reaching its intended population. However good an initiative might be in theory, if there is a low rate of take-up or a high rate of drop-out, it cannot deliver its benefits. A related issue is the demographic profile of the participants served. If, for instance, an intervention is designed to target social exclusion but those who

appear to benefit most are not in this category, health or educational inequalities are not being effectively addressed.

Take-up and drop-out are often fundamental issues with adult populations in community contexts. This does not apply to the interventions in our review as five of them were delivered in educational settings (Baumert and Demmrich, 2001; Hovell *et al.*, 1996; Reid *et al.*, 1995; Unti *et al.*, 1997; Vartiainen *et al.*, 1996; Wiborg and Hanewinkel, 2002) and another dealt with young people undergoing orthodontic treatment where there was parental support for attendance at appointments (Hovell *et al.*, 1996). EMA, however, was delivered in a post-compulsory educational setting so did not quite have the 'captive audiences' of the other studies.

One study (Leuven *et al.*, 2003) undertook a sub-group analysis to look at the impact of student ability and demographic background in order to explore the profile of those who benefited from the incentive. This was a universal scheme in that the students in the intervention group, who were offered cash rewards if they were successful in passing their courses, were drawn from an entire first year university cohort studying economics and business. Leuven and colleagues found that students with higher ability in mathematics (based on their secondary school mathematics grades) and from a more favourable social background (as measured by their father's level of education) responded to the reward condition more powerfully than both their counterparts in the control group and the students with lower ability in maths or from poorer social backgrounds. The authors describe the effects as monotonic and substantial, and conclude 'only students for whom the reward requirement is feasible respond to the incentives' (p 24).

The only other study to consider the demographic reach of the initiative was the evaluation of EMA (Middleton *et al.*, 2005). This was a targeted incentive, in that only those from households with an income under £30,000 were eligible to apply, and further focused in that those from poorer households were eligible for higher payments (up to £30 per week). The authors report that the effect was particularly strong among young men in urban areas and that the largest effect was on young people from socio-economic groups IV and V (semi-skilled and unskilled workers and those not in work). They also report that EMA had a noticeable impact on young people who had been 'low' or 'moderate' achievers at the end of Year 11. This resulted in a reduction in the numbers who might otherwise have been not in education, employment or training (NEET). Several points should be noted about accessibility issues with the EMA and similar large scale schemes. To work, schemes need to be well-publicised, and procedures and personnel need to be in place to ensure that the most vulnerable, who are often best placed to gain from it, are helped to complete application forms. This depends upon well-organised systems on the part of the providers. In the case of the EMA, local variation in organisational competence may have acted to inhibit or encourage take-up and drop-out levels. There is also some evidence that age may be a factor to consider in thinking about how an intervention deploying incentives is received and acted on. Wiborg and Hanewinkel reported that the Smokefree Class Competition was viewed as more influential by younger children (grade seven as compared to grade eight).

These examples highlight important issues for those designing incentive-based initiatives. If incentive-based schemes are intended to play a role in addressing disadvantage, it is important to make sure that they are accessible to their target

group, developmentally appropriate, that there are good rates of take-up and little drop-out, and finally that they do not ratify existing inequalities.

Human resources

Only two of the evaluations (Hovell *et al.*, 1996; Middleton *et al.*, 2005) provided any substantial discussion about the human resource issues involved in implementing the intervention. This is partly explained by the fact that many of the interventions occurred in settings where staff had not been specifically recruited and trained to implement them. Two authors (Unti *et al.*, 1997; Wiborg and Hanewinkel, 2002) make the important point that there may be considerable variation in staff and school commitment, organisation and skill in fostering the desired behaviours, which could lead to differences in outcome. Unti *et al.* (1997) note a human resource relevant issue: prompt return of a high proportion of forms, thanks to the incentive scheme, saved a considerable amount of staff time.

In the Smiles Plus study, Russos *et al.* (1997) looked more closely at clinician compliance and office organisation. They concluded that the level of adherence (an average of 64% prescriptions requested) might have been lower if it had not been for the fact that clinicians had self-selected themselves into the trial and had received support from participating in it. Clinicians also provided less than the anticipated amount of anti-tobacco counselling. The authors concluded that most orthodontists 'were not comfortable' in adopting this more preventive role, especially where there was no clear evidence that the young people smoked. They consider that this could be remedied by effective training. The researchers also collected data on office and staff characteristics, reinforcement, prompting, and staff attitudes. They found that effective implementation of the scheme was facilitated through the establishment of office-wide tracking procedures, praise from patients and among staff, and involvement of a greater number of staff in delivering the preventive service.

The bureaucratic structure of EMA seems to set it somewhat apart from the other interventions. However, the themes that emerge regarding human resource issues do tally with some of the process issues noted in other studies. Support was seen as crucial, both in helping the young people (particularly the most vulnerable) find their way around the system, and also for those involved in administering it to be adequately trained and resourced. Communication was also singled out: there is a need for effective publicity and marketing, good inter-agency links between those involved in the scheme, and clear communication of expectations to the young people particularly as to what is expected of them in terms of their learning agreement. Related to this is the need for Learning Centres to be clear as to what constitutes authorised and unauthorised absence.

Both the Smile Plus trial and EMA used incentives to try to produce long-term changes in complex behaviours. The evidence from these process evaluations reminds us of the importance of the wider human context: the need for staff (at all levels) to be skilled and committed to the scheme, and for sound systems to be in place to support them.

Costs associated with the intervention

Apart from information about the actual sums involved in any cash incentives, there is surprisingly little detailed consideration given to issues of cost-effectiveness in any of the studies. Relevant costs can be thought of as indirect

(such as staff numbers and staff time involved in implementing the intervention) and direct (the cost of the actual incentive, whether it be a tangible one or cash). Several of the authors indicated that the costs involved in running their schemes were not substantial, as they could be fitted into routine practice (Hovell *et al.*, 1996; Wiborg and Hanewinkel, 2002), or were one-off occurrences (Baumert and Demmrich, 2001; Unti *et al.*, 1997). Unti *et al.* (1997) estimate that when incentives were not used, staff spent 20–28 hours following up families whose consent form had not been returned, and only obtained an additional 71 forms. It seems possible in this case that the comparatively modest incentive might pay for itself. Hovell *et al.* (1996), however, did speculate that one of the reasons for low clinician compliance in dispensing anti-tobacco prescriptions might have been the small reimbursement (50¢). The overall cost of the incentives for the Smokefree Class Competition is also low, as the prize is access to a lottery with cash prizes.

The largest and most ambitious of the schemes, the Educational Maintenance Allowance (EMA) pilot, was recently evaluated by Dearden *et al.* (2005) who set out to see if means-tested grants paid to secondary school students are an effective way of reducing the proportion of students who drop out of education. They offer what they describe as ‘a back of the envelope costs–benefit calculation’ concluding that, given the greater effect of the programme on those who would not have been in education, employment or training, the programme may just be at the ‘break even point’ (p.28). They also speculate that there might be other cost-relevant benefits such as students making greater effort in their education, as it is less necessary for them to engage in concurrent paid work. However, as Dearden *et al.* later point out, a ‘key policy question here is the extent to which this extra education is valuable’ to those who have acquired it (p 29).

Leuven *et al.* (2003) did justify the level of their incentive on the grounds that a low student pass-rate affects the funding received by the university concerned, so that if incentives were to prove successful, it would be economically viable for the university to implement the scheme on a larger scale. Reid *et al.* (1995) began their research by asking ‘Can money replace services in preventing school failure?’ They point out that commonly used strategies for helping at-risk students involve a considerable number of people such as social workers, teachers, counsellors and parents, and that this is costly in terms of their paid time, often with meagre results. If financial incentives provided directly to the young person brought about behavioural changes at least as effectively, this would be cheaper, as well as directing financial resources to those likely to be in need.

One other question related to cost-effectiveness is whether there is any kind of ‘dose response effect’ (i.e. that outcomes may vary according to the level of the incentive). Three papers explored aspects of this: Leuven *et al.* (2003) found that 37% of students assigned to the higher level of reward reported increased effort as compared to 26% of those assigned to the lower level; Hovell *et al.* (1996) reported that multivariate analysis showed that those who received more anti-tobacco prescriptions had a lower incidence of smoking (10%) as compared to those who had received few or none (14%); and Dearden *et al.* (2005) looked at the impact of EMA on year 12 destinations according to whether they were eligible for a full award or a partial award. They found that those who were eligible to receive the full payment were more responsive to the incentive than those who only received it in part. It should be noted that this payment (£30 per week) was substantially greater than most of the financial incentives evaluated in other studies, which were often little more than nominal.

Conclusions

Some of the implications of the findings reported here are further discussed in the next chapter. One important point to note here is that relative to outcome evaluation, formal comprehensive process evaluation is surprisingly scarce and, when present, patchy in its coverage. Informal process evaluation, though often interesting and thought-provoking, is frequently *post hoc* in nature and by definition unsystematic, so unlikely to produce reliable findings.

Although most of the studies did look at issues of acceptability, implementation and accessibility, this was often quite limited in scope. Much less attention was paid to the content and quality of the programme, human resource issues and cost-effectiveness. The most thorough and detailed consideration of all these issues was offered by the Smiles Plus project (Hovell *et al.*, 1995; Russos *et al.*, 1997; Russos *et al.*, 1999). This was a large-scale experimental trial conducted under naturalistic conditions. The authors found that conditions on the ground have a marked impact on the outcome of the intervention. None of the other studies presented any data that contradict this conclusion.

Our review suggests that consideration and analysis of process issues is not an optional extra, but should be regarded as intrinsic to any programme which sets out with the aim of changing young people's behaviour in a particular direction. In its absence, it is hard to see how such programmes can be adequately accountable, how they can be developed and improved, and how good practice can be disseminated (World Health Organization, 2000).

6. ONGOING INCENTIVE SCHEMES

Chapter five provided an analysis of implementation-related issues raised by data collected in process evaluations of the included studies. This chapter provides an overview of the evaluation status of ongoing UK-based incentive schemes, and what information is available about the effects of these schemes on young people.

The evidence drawn on in the review described in this report includes a number of ongoing incentive schemes aimed at encouraging positive behaviours in young people. We listed and discussed all those schemes we had been able to find in our searches in a previous report (Trouton *et al.*, 2005). Our criteria for including schemes were that they should have incentives as a central operating component; target health or other social behaviours; be aimed at children and/or young people aged 19 or younger; and be currently in operation, completed in 2004, or planned to start in 2005. The previous report described 37 incentive schemes: 27 based in the UK, five in the USA, two in Australia, one in New Zealand and two with an international scope. Most of the 37 schemes are aimed at young people aged 11–19; eight are designed for preschool/primary school age children, and another eight work across the primary and secondary school age range. All the schemes claim to address inequalities in health or access to education and leisure, and to provide opportunities for personal development.

The 37 schemes fell into three broad groups: those aimed primarily at promoting positive health outcomes (N=15); those using incentives to improve attendance and other education-related behaviours (N=9); and schemes targeted at other prosocial behaviours (N=13). Table 6.1 lists the schemes under these three headings, showing information about location, time period over which the schemes run, and type of incentive used.

Details about the development and operation of most of these incentive schemes were provided in our earlier report. Many of the reports of the schemes provide useful data about the *processes* involved in planning and implementing the incentives approach. The focus of this chapter is the extent to which information is available about the *impact* of the schemes on young people's reported or actual behaviours. The key question is whether the ongoing schemes appear to work in achieving their targets of measurable improvements in young people's behaviour. Of course, some schemes have not reached the point at which such evaluation data are available, but in these cases it is important to know what kind of evaluation is planned.

Evaluation is a complex activity, and its difficulties are increased with multi-component programmes and when multi-site operations are involved, both of which are the case for many incentive schemes. Many of the published and unpublished reports on the schemes that have contributed to our review reflect on these methodological issues; we include in this chapter a brief summary of some of these themes.

Evidence of impact

Table 6.2 shows data on the evaluation status of all the schemes. The first question is whether or not an evaluation has been undertaken, is in progress, or is planned. The second question is whether any evaluation data are available. Third, it is important to distinguish between evaluations which are essentially monitoring or descriptive in nature and those which offer harder evidence about impact. From this point of view, the design of the evaluation is crucial. An evaluation which surveys target populations after an incentives scheme has been implemented is less persuasive in terms of judging impact than one which sets post-intervention information against data collected at baseline before the intervention. Both these are less reliable approaches to evaluation than a design which includes control groups (of individuals or communities), so allowing for a comparison between what happens to groups which are offered the incentives scheme and those which are not. Random assignment to intervention and control groups is the most efficient way of generating socially similar groups; if the groups are not similar, these pre-existing differences, rather than the incentives scheme itself, may explain any observed differences in outcome. In health promotion and other areas, these different approaches to evaluation design have been shown to yield systematically different patterns of conclusions about effectiveness. Reliance on designs without control groups and the use of selective qualitative data are both likely to overestimate effectiveness compared to the more judicious approach of examining what happens following an intervention against the standard of measures taken from one or more control communities (Guyatt *et al.*, 2000; Juni *et al.*, 2001; Peersman *et al.*, 1998; Peersman *et al.*, 1999).

The information on evaluation status shown in Table 6.2 comes from the reports located in our searches, and from personal contact with the administrators of the schemes. Those schemes the evaluation status was unclear were sent a short questionnaire with an accompanying letter in September 2005. This asked scheme leaders to describe the objectives of their project; whether they considered it to be successful; to what extent they saw the incentives element as critical; whether there had been any particular difficulties or unforeseen consequences from using incentives; and whether a formal evaluation was planned. They were also asked for a brief description of any such evaluations, and schemes which were not planning an evaluation were asked how and why the decision not to undertake an evaluation was reached. The one-page questionnaire was sent to 22 schemes. If there was no response, two reminders were sent. We received seven replies (column 5 in table 6.2). Four of these provided information on evaluation; in the other cases, the scheme organizers queried eligibility, explained that the scheme had not been implemented as planned, or were otherwise unable to give further help.

A number of conclusions can be drawn from the data shown in Table 6.2. The first is that relatively few of the ongoing schemes have conducted or are conducting or planning reliable evaluations of their effectiveness. The most common situation was that the evaluation status of the project was unknown or unclear (N=14, 38%) – 11 (30%) schemes used post-intervention surveys. Three schemes (8%) described pre- and post-intervention comparisons, and three (8%) other designs. Only six (16%) of the schemes have implemented, or are implementing evaluations using a control group design (either randomised or using some other method of selection). Four of these (Smokefree Class Competition, Educational Maintenance Allowances, Star Project, and Casastart) were included in our

effectiveness review. These are described in detail in Chapter 4. A fifth scheme (Fun, Food and Fitness project) was excluded from the effectiveness review on grounds of the age of the participants.

Some of the schemes that were not undertaking any type of process or impact evaluation were carrying out internal monitoring designed to record aspects of the scheme's implementation, but this is not the same as formal impact or process evaluation. Examples of different approaches to evaluation are given below.

(i) Formal impact evaluation using a randomised control group

An approach to lowering smoking rates among young people using school-based class 'smoke free' competitions with prize draws has been tried in a number of countries. Crone and colleagues (Crone *et al.*, 2003) report a cluster randomised trial in the Netherlands. Twenty-six schools were randomly assigned to intervention and control groups; the intervention consisted of three lessons on knowledge, attitudes and social influence, followed by a class agreement not to start smoking or to stop smoking for the next five months. There were competition prizes ranging from € 220–450 for six classes with less than 10% smokers. Questionnaire data were collected from students in both intervention and control schools before and after the intervention. Smoking was significantly lower post-intervention in schools that had received the incentives programme, though this effect was not maintained over time.

(ii) Single group pre- and post-intervention evaluation

The Food Dude Healthy Eating Programme is a peer modelling and rewards-based intervention aimed at increasing children's consumption of fruit and vegetables. Six schools in Wales took part in an evaluation, three using a Lunch-Only version of the programme and three a Snack/Mini-Lunch version. Children's consumption of fruit and vegetables was measured before the introduction of each programme; in three schools it was also measured 6 and 16 months afterwards. On the basis of these data it was concluded that the Food Dude programme significantly increases children's consumption of fruit and vegetables. The evaluation recommended further larger-scale evaluation using control schools (Lowe and Horne, 2003).

(iii) Single group post-intervention evaluation

Fitbods is a project run by the Salford and Trafford local education authority which aims to increase activity levels among primary school children by providing supervised activities and games during school lunchtimes; increased activity is rewarded with certificates, badges and other small prizes. An evaluation undertaken in 2002 collected questionnaire data from 193 pupils and 11 teachers in 10 schools who were all involved in the Fitbods programme. Most were enthusiastic about the programme, and thought that it made children fitter and healthier (Waker, 2002).

Reflecting on evaluation issues

Evaluating an intervention which is being introduced into a complex social context such a school or a community is notoriously difficult (Campbell *et al.*, 2000). There are problems to do with standardisation and 'quality control' of the intervention,

which is often dependent on the work and goodwill of local practitioners who are not directly involved. Especially where there is no control comparison, considerable 'background noise' – for example, local organisational changes and other initiatives in place at the same time – may complicate the identification of intervention effects. Low response rates and programme attrition can both make it difficult to isolate a stable target group whose characteristics are known before and after exposure to the intervention. Programmes may only reach a proportion of their target groups, and reasons for this may include programme unacceptability; however, this tends to remain unrecorded. Experimental testing of a programme may not translate into sustainability over a longer time period, and measuring outcomes of interest can in any case be difficult. For example, assessing the take-up of free swimming among young people is relatively easy compared to the task of measuring the impact of free swimming on longer-term fitness outcomes. In a report on free swimming schemes to the Department of Health, Barker (2004) notes that some such schemes did not even have baseline data against which the impact of free swimming provision could be assessed; only one scheme, in Plymouth, was seeking to demonstrate health impact by monitoring heart rates (the rest of the schemes used participation as a proxy measure).

New incentive schemes

Since we completed the survey of ongoing incentive schemes reported in this chapter, three further UK-based schemes utilising incentives have come to our attention.

The first scheme, the Youth Opportunity Card, was announced in the recent Government Green Paper *Youth Matters*. The scheme involves

support for Local Authorities to pilot 'opportunity cards' to get more young people involved in positive activities. The cards would provide discounts on a range of activities, and could also be topped up by young people and their parents with money to spend on sports and other constructive activities. Pilots would also look at giving all new cardholders up to £12 worth of credit to spend, as well as giving younger teenagers from families on low incomes, who find it hardest to access activities, an additional monthly allowance of up to £12. Top-ups could also be used to reward young people for volunteering or for making a contribution in other ways. Opportunity cards would be suspended or withdrawn from young people committing anti-social behaviour or crime. (DfES, 2005)

Expressions of interest in piloting Youth Opportunity Cards had to be received at the Department for Education and Skills by early November 2005. The first pilots will run in 2006.

The second additional scheme has been developed by the Millennium Foundation which is based in Birmingham. It is designed to reach out to socially disadvantaged young people and has two main aims: to build a community-based resource for education, technology, business and the arts; and to help socially excluded young people reach their potential by implementing an incentive system based on Personal Incentive Points (PIPS). These points are used to reward participation, achievement and co-operation, and young people choose the incentives they can obtain from collecting them. A pilot was carried out in 2004

with eight young people and funding is currently being sought to expand the scheme.

The third scheme supplies free condoms to young people and is well established under the name of 'C-Card'. This scheme has been running for a number of years in Edinburgh and East Lothian, and all local authorities in the North East region are running a version of the C-Card scheme, which is delivered by a range of health and community based outlets. It would appear that there are C-Card schemes operating in many areas of the country, and a similar scheme is starting in the London Borough of Brent. A 'C-Card' is a card which is a passport to using local C-Card services and collecting free condoms. Young people need to register confidentially and are provided with a C-Card with an individual number on it. These can be used at a number of outlets to obtain free condoms and there is also the opportunity to talk to a trained C-Card worker in privacy. Other sexual health services including pregnancy testing may also be available in C-Card outlets. A qualitative exploration of the views of young people of the Newcastle C-Card scheme and how it may have impacted on young people's attitudes, behaviour and relationships is currently being conducted at Newcastle University. This PhD project funded by the ESRC and a local PCT is due for completion in early 2008. Despite its widespread use and potential public health importance we did not identify any controlled evaluation studies which could provide evidence of the impact of the C-Card scheme.

Conclusion

The energy and commitment that exists among many current providers of incentive schemes across education, health and other policy and practice areas is impressive. Believing in the value of such schemes is perhaps an essential qualification for being involved in them, but unfortunately provider enthusiasm is not a substitute for persuasive evidence of impact. Most of the ongoing incentive schemes we found in our review lack evaluations capable of contributing to the overall picture of effectiveness. Unless this picture changes, we are unlikely to know whether such schemes offer a useful way of improving young people's behaviour. More of the schemes included in our review may well be undertaking or planning evaluations, but lack of response to our questionnaire makes it impossible for us to say whether or not this is the case.

A major constraint, mentioned in many reports of these schemes, is lack of funding for evaluation. For example, less than 1.5% of the total budget of the Karrot reward scheme for reducing offending and increasing social exclusion among young people was available for evaluation (Pettersson, 2004). This meant that the evaluation was largely restricted to collecting post-scheme qualitative data. Since many of the schemes are publicly funded, this deficit is likely to reflect the lack of importance attached by funders to formal evaluation.

Table 6.1: Ongoing incentive schemes

No.	Project	Location	Time period	Target behaviour	Incentives
HEALTH-PROMOTING SCHEMES					
3.1.1	Contingency Management for Adolescents	US	Pilot conducted in 2004; larger RCT ongoing	Remaining drug free	Gift vouchers for adolescents; prize draws for participating parents
3.1.2	Fitbods	UK	Began in 2000 and ongoing	Physical activity	Certificate and small gifts
3.1.3	Fit to Succeed	UK	Pilot conducted 2000	Physical activity	Free taster sessions, discounts and money off vouchers at leisure centres for children, families and teachers
3.1.4	Food Dudes	UK	Programme originated in 1992	Eating fruit and vegetables	Small gifts
3.1.5	Free Nicotine Replacement Therapy (NRT)	Australia	Began Feb 2005 and will run for approx. one year	Stopping smoking	Free nicotine patches, gum or lozenges
3.1.6	Free Swimming	UK	Ongoing in Glasgow and Wales; run in London Easter 2005	Swimming	Free entry to swimming sessions
3.1.7	Fuelzone	UK	Ongoing	Healthy food choices in school cafeterias	Points collected by smart card exchangeable for gifts and vouchers
3.1.8	Fun, Food and Fitness Project	US	Eight week project run in 2004	Taking part in internet-based physical fitness programme	Gift vouchers
3.1.9	Hampshire School Meals Service Rewards Scheme	UK	Began in Sept 2003; ongoing	Ordering school meals above a target number (rather than children having packed lunches)	Points collected that can be exchanged for a wide range of healthy life-style opportunities
3.1.10	Lewisham Step-o-meter Challenge	UK	Conducted in May 2005	Increasing distance walked	Free step-o-meters; prizes for winning teams
3.1.11	Maternal Immunisation Allowance	Australia	Began 1997; ongoing	Completing infant immunisation schedule	Financial
3.1.12	Quit and Win	World-wide	Conducted every two years since 1994	Stopping smoking	Prize draw with cash prizes
3.1.13	Simon and Sinita Programme	UK	Project no longer funded	Eating fruit and vegetables	Small gifts

No.	Project	Location	Time period	Target behaviour	Incentives
3.1.14	Smokefree Class	Europe	Organised annually since 1989	Delaying/preventing onset of smoking	Prize draw with cash prizes and a first prize of a trip to another participating country
3.1.15	Supermarket Health Outcomes Project (SHOP)	New Zealand	Feasibility study being conducted during 2005 for possible larger RCT	Buying more fruit and vegetables	12.5% discount on fruit and vegetables
EDUCATIONAL SCHEMES					
3.2.1	100% Attendance Club	UK	Began 1998; ongoing	Good/improved school attendance	Rewards such as tickets to sporting occasions and entertainments
3.2.2	Bolton Educational Achievement Scheme	UK	Began 2002; ongoing	Educational achievement by looked-after children	Financial
3.2.3	Bristol City Academy Achievement Scheme	UK	Began 2002; ongoing	Reaching target examination grades	Financial
3.2.4	Connexions Smart Card	UK	Began 2001 ongoing	Attendance/ achievement in post-compulsory education	Points collected by smart card exchangeable for goods, vouchers, and experiential rewards
3.2.5	Education Maintenance Allowance scheme (EMA)	UK	Piloted 1999 to 2002; implemented nationally from 2004	Participation in post-compulsory education	Financial
3.2.6	Karrot	UK	Began 2002; ongoing (incentives element is less as budget has decreased)	Good/improved school attendance and citizenship	Vouchers, activities, trips, award ceremonies
3.2.7	Kauffman Scholars	US	Began 2003; ongoing	Educational achievement	Financial assistance for education-related expenses
3.2.8	Star Project	US	Long-standing programme; ongoing	Educational achievement	Financial assistance for education-related expenses
3.2.9	Swansea Club 95	UK	Began 2004; ongoing	Good/improved school attendance	Free swimming and entry to prize draws

No.	Project	Location	Time period	Target behaviour	Incentives
OTHER SOCIAL SCHEMES					
3.3.1	Burnley Wish List	UK	Began 2002; ongoing	Making a positive contribution to the community	Instant rewards, e.g. McDonald Happy Meal, entry to cinema, ten-pin bowling, swimming
3.3.2	Casastart (aka Children at Risk)	US	Programme first implemented in 1992 and has run in a range of settings since	Reinforcing positive participation in programme for at-risk young people	Points exchangeable for small gifts and enjoyable activities
3.3.3	Community Merit Scheme	UK	Pilot ran 2002–2004	Reinforcing positive participation in programme for at-risk young people	Vouchers, trips, activities, gifts
3.3.4	Dream-scheme	UK	Idea of programme developed from 1995 onwards; now operates as a framework that schemes can join	Community-based work projects	Points exchangeable for trips and activities chosen by the young people
3.3.5	Dudley Lifeskills Partnership	UK	Ongoing youth work project	Reinforcing positive participation in programme for at-risk young people	Vouchers, prize draws, certificates, award ceremonies.
3.3.6	Positive Activities for Young People (PAYP): Suffolk	UK	National scheme began in 2003	Reinforcing positive participation in programme for at-risk young people	Gift vouchers
3.3.7	Promoting Young People's Positive Contribution to their Communities	UK	Began 2004; ongoing	Making a positive contribution to the community	Points exchangeable for gift voucher and leisure activities
3.3.8	Sure Start: Tilbury	UK	Began in 2000; ongoing, although as budget has been cut reward scheme will not continue	Attending activities and doing voluntary work in the project	Points awarded that can be exchanged for services, goods and appropriate gifts for parents and children
3.3.9	Tumbler Youth Centre	UK	Incentives scheme not implemented due to staff shortages	Participation in Centre activities	Points exchangeable for rewards

No.	Project	Location	Time period	Target behaviour	Incentives
3.3.10	Young People's Development Programme: Ascent @themill	UK	Pilot began 2004; ongoing	Meeting behavioural requirements of activity-based youth project	Group activities such as cinema; ice-skating; show-boarding or quad biking
3.3.11	Young People's Development Programme: Passport to Health	UK	Pilot began 2004; ongoing	Attendance at activity-based sessions delivered by youth inclusion team	Points collected in 'passport' exchangeable for gift vouchers and group activities
3.3.12	Young Volunteer Challenge	UK	Piloted 2002–2005	Volunteering	Financial
3.3.13	Youth Justice Board: Referral Orders	UK	Piloted 2000–2001; implemented nationally 2002	Completing all requirements of a Referral Order	Offence regarded as 'spent' (unless by its nature it is exempted)

Table 6.2: Ongoing incentive schemes: evaluation

No	Project	Evaluation undertaken or planned?	Evaluation available?	Report obtained?	Letter and questionnaire sent? Response?	Evaluation design	Evaluation included in SR
HEALTH-PROMOTING SCHEMES							
3.1.1	Contingency Management for Adolescents	Yes: RCT will be analysed and written up upon completion	Yes – of pilot Kamon <i>et al.</i> , 2005 (pub)	Yes	Yes; copy of published evaluation sent	Pilot; descriptive study	No (excluded on design)
3.1.2	Fitbods	Yes	Yes Waker, 2002 (unpub)	Yes	Yes; no response	Post-intervention survey	No (excluded on age)
3.1.3	Fit to Succeed	Yes	Yes Balding, 2001; Balding, 2000; Balding and Regis, 2003 (all pub)	Yes	Yes; no response	Pre- and post-intervention survey in 19 schools	No (excluded on design)
3.1.4	Food Dudes	Yes	Yes Lowe and Horne, 2003	Yes	N/A	Pre- and post-intervention survey in six schools	No (excluded on age)
3.1.5	Free Nicotine Replacement Therapy (NRT)	Planned: project will be evaluated after completion in Feb 2006	No	N/A	Yes; no response	Not known	N/A
3.1.6	Free Swimming	Yes	Yes Parsons, 2004 (pub)	Yes	N/A	Post-intervention survey	No (excluded on design)
3.1.7	Fuelzone	No	N/A	N/A	Yes; questionnaire returned	N/A	N/A
3.1.8	Fun, Food and Fitness Project	Planned	Not known	No	Yes; no response	Controlled trial using waiting list controls	No (excluded on age)

No	Project	Evaluation undertaken or planned?	Evaluation available?	Report obtained?	Letter and questionnaire sent? Response?	Evaluation design	Evaluation included in SR
3.1.9	Hampshire School Meals Service Rewards Scheme	No	N/A	N/A	Yes; no response	N/A	N/A
3.1.10	Lewisham Step-o-meter Challenge	No	N/A	N/A	Yes; no response	N/A	N/A (would be excluded on age)
3.1.11	Maternal Immunisation Allowance	No	No	Yes	No	N/A	N/A
3.1.12	Quit and Win	No UK evaluation. International evaluations available.	Yes Bains <i>et al.</i> , 2000; International evaluations e.g. Hahn <i>et al.</i> , 2004; McAlister <i>et al.</i> , 2000 **	Yes	No	RCTs	No (excluded on age)***
3.1.13	Simon and Sinita Programme	Yes	Yes Conway, 2002 (unpub)	Yes	N/A	Post-intervention survey	No (excluded on age)
3.1.14	Smokefree Class Competition	Yes	Yes Wiborg and Hanewinkel, 2002 (pub)	Yes	N/A	RCT	Yes; outcome evaluation
3.1.15	Supermarket Health Outcomes Project (SHOP)	Planned	Not yet	No	Yes; no response	Not known	N/A
EDUCATIONAL SCHEMES							
3.2.1	100% Attendance Club	No	No	N/A	Yes; questionnaire returned	N/A	N/A
3.2.2	Bolton Educational Achievement Scheme	Yes	Yes BYPASS Advocacy Service (unpub)	Yes	Yes; no response	Post-intervention survey	No (excluded on design)

6. Ongoing incentive schemes

No	Project	Evaluation undertaken or planned?	Evaluation available?	Report obtained?	Letter and questionnaire sent? Response?	Evaluation design	Evaluation included in SR
3.2.3	Bristol City Academy Achievement Scheme	Yes	Yes Cousins, 2005 (unpub)	Yes	Yes; questionnaire returned	Post-intervention survey	No (excluded on design)
3.2.4	Connexions Smart Card	Yes	Yes Rodger <i>et al.</i> , 2005 (pub on DfES website, as are earlier interim evaluations)	Yes	No	Pre- and post-intervention survey	No (excluded on design)
3.2.5	Education Maintenance Allowance scheme (EMA)	Yes: a substantial programme of published evaluations of aspects of the pilots	Yes All publicly available on DfES website: most recent is Middleton <i>et al.</i> , 2005	Yes	No	Controlled trial	Yes; outcome evaluation; separate process evaluations (Legard <i>et al.</i> , 2001; Maguire and Maguire, 2004)
3.2.6	Karrot	Yes: one completed and one ongoing	Yes Pettersson, 2004 (unpub)	Yes	Yes; no response	Post-intervention survey	No (excluded on design)
3.2.7	Kauffman Scholars	Yes	No	N/A	Yes; no response	Not known	N/A
3.2.8	Star Project	Yes	Yes Spencer <i>et al.</i> , 2005 (pub)	Yes	No (no contact details for actual scheme)	Randomised controlled trial	Yes (excluded from in-depth review on focus which is purely academic (grades); some relevant process data)
3.2.9	Swansea Club 95	Not known	No	No	Yes; no response	N/A	N/A

No	Project	Evaluation undertaken or planned?	Evaluation available?	Report obtained?	Letter and questionnaire sent? Response?	Evaluation design	Evaluation included in SR
OTHER SOCIAL BEHAVIOURS							
3.3.1	Burnley Wish List	No	No	No	Yes; unable to give further help	N/A	N/A
3.3.2	Casastart	Yes	Yes Harrell <i>et al.</i> , 1999 (pub)	Yes	No	Randomised controlled trial	Yes (excluded from in-depth review as multi-component intervention)
3.3.3	Community Merit Scheme	Yes	Yes Youth Justice Board for England and Wales, 2005 (pub)	Yes	No (no longer ongoing)	Post-intervention survey	Yes (excluded from in-depth review as not trial)
3.3.4	Dream-scheme	Yes: planned for 2006	No	N/A	No	Not known	N/A
3.3.5	Dudley Lifeskills Partnership	No	No	N/A	Yes; no response	N/A	N/A
3.3.6	Positive Activities for Young People (PAYP): Suffolk	Yes: national evaluation of PAYP also being conducted	Yes Connexions Suffolk, 2005 (unpub)	Yes	No	Post-intervention survey	N/A
3.3.7	Promoting Young People's Positive contribution to their Communities	Yes: planned after project finishes at end of 2005	No	N/A	Yes; no response	Not known	N/A

No	Project	Evaluation undertaken or planned?	Evaluation available?	Report obtained?	Letter and questionnaire sent? Response?	Evaluation design	Evaluation included in SR
3.3.8	SureStart: Tilbury	Local evaluation undertaken annually; national evaluation of Sure Start also being conducted	No	N/A	Yes; questionnaire returned	Post-intervention survey	No (excluded on age)
3.3.9	Tumbler Youth Centre	No	No	N/A	Yes; unable to implement incentive scheme because of staffing problems	N/A	N/A
3.3.10	Young People's Development Programme: Ascent@themill	Yes: large-scale national evaluation of YPDP due for completion in 2007	No	N/A	Yes; no response	Matched controlled cohort study; process and economic evaluations	N/A
3.3.11	Young People's Development Programme: Passport to Health	Yes: large-scale national evaluation of YPDP due for completion in 2007	No	N/A	Yes; no response	Matched controlled cohort study; process and economic evaluations	N/A
3.3.12	Young Volunteer Challenge	Yes	Yes GHK, 2005 (unpub)	Yes	No	Post-intervention survey	Yes (excluded from in-depth review as not trial)
3.3.13	Youth Justice Referral Orders	Yes: 11 pilot schemes evaluated	Yes Newburn <i>et al.</i> , 2002 (pub)	Yes	No	Post-intervention survey	Yes (excluded from in-depth review as not trial)

* Systematic review on use of incentives in immunisation available (Achat *et al.*, 1999)

** These included in systematic review (Hey and Perera 2005b).

*** Systematic review discussed in Section 3.2.2

Note: 'post intervention survey' includes case studies, interviews/questionnaires with stakeholders and/or participants, and project monitoring

7. DISCUSSION AND RECOMMENDATIONS

7.1 Discussion

At the beginning of this report we asked: ‘what is the best available evidence of the effectiveness of incentive schemes to improve health and other behaviours in young people?’ We also hoped to answer the further question: ‘Under what conditions are incentive schemes more or less successful?’ These broad questions drove the review and provided the conceptual basis for the systematic map of research in the area (see Chapter 3). Responding to suggestions from our Consultation Group, we went on to ask narrower questions which we hoped to answer with an in-depth review of the relevant studies. Do single or dual component incentive-based interventions work? If so, **what works?** What is the evidence that financial incentives are more effective than non-financial; that higher value incentives are more effective than those of a lower value; that the effects of incentives may be short- rather than long-term; and that incentives are less likely to be successful with complex behaviours than single behaviours? If incentives work, **who do they best work with?** What is the evidence that incentives have a greater impact if targeted at particular groups (e.g. those at risk of social exclusion), rather than provided universally, or if groups rather than individuals are the recipients of the incentive? Other questions arise around **processes of intervention design and delivery**. Do incentives work better when given in different settings (e.g. school, home), or when provided by different people (e.g. a key worker, a parent)? What are the costs and benefits of incentives, and are they acceptable or accessible to young people? Most importantly, we asked which areas of public health can benefit from incentives and what interventions should be piloted.

We found evidence to answer some but not all of these questions by looking at the available research evidence on the impact of incentives and the processes involved in implementing incentives-based interventions. No studies directly evaluated the use of incentives provided by key workers, or the cultural transferability of incentives. Other questions were either directly or indirectly addressed.

Incentives: Impact, perceptions and acceptability

In relation to the impact of financial incentives, we found with the health studies that those interventions which provided a non-financial incentive (N=6) were more successful than those which provided a financial incentive (N=3). However, the studies differed across a number of dimensions and not just on whether the incentive was financial or not. All of the studies targeting a single event health behaviour used non-financial incentives, and it is possible that it is the relative success of incentives which target single event behaviours which is behind this finding. All the health studies which targeted a specific group (N=3) were aimed at young people at risk of social exclusion, and the effects in these studies were greater than those which were universally provided (N=6). Again it is possible that this finding is driven by the fact that two of the three studies targeted single-event health behaviours. These findings are suggestive rather than conclusive as they are based on meta-analyses which displayed considerable heterogeneity, and the evidence comes from a small number of studies some of which have small

sample sizes and wide confidence intervals. They were not replicated in our meta-analyses of the five education studies.

Only one study looked at whether higher value incentives were more effective than lower value incentives for the same behaviour, and this found no significant difference (Leuven *et al.*, 2003). An analysis of the means-tested EMA reported that those young people who received EMA at the full payment level were more likely to be drawn into post-compulsory education than those who were entitled to partial payment.

It is clear that, in relation to health behaviours, incentives appear to be successful in encouraging non-complex single health behaviour changes. This could have important public health consequences where a single behaviour has a long-term impact on health (e.g. immunisation, sexual health screening). We know from the process evaluation that accompanied Unti *et al.*'s (1997) report of the study of school-based hepatitis B vaccination programmes that the incentive was perceived favourably by participants and providers, and that parents supported the programme. However, the same pattern did not emerge in the education studies. While incentives were perceived favourably when used to reward a single behaviour such as effort applied during a school test, this did not translate into an improvement in overall levels of effort.

Incentives used in both education and health sectors to change more complex behaviours had mixed effects. Complex or multi-event health behaviours were not improved by using single or dual component incentive-based interventions. When we considered the use of incentives to delay the onset of or reduce smoking in young people, itself a complex behaviour to change, we found that incentives had a beneficial effect. While there was evidence that giving orthodontists incentives to discourage smoking in young people had no impact, giving incentives to an entire class to remain smoke free for a period of time did appear to be beneficial at both short and long term (one year) follow-up. Interestingly, perceptions of the Smokefree Class Competition varied by age. Twice as many younger pupils said that they took the competition very seriously, and half were of the view that participation in the competition had reduced the incidence of smoking, compared to less than a third of the older pupils. In the light of these findings, the authors suggested that the competition may be more suitable for younger children who have not yet experimented with smoking. Teachers perceived the competition to be straightforward to run within the context of a busy school. The cost of the incentive (entry to a lottery with cash prizes) was described as low. However, there were concerns that bullying of smokers by non-smokers could occur, and that not all pupils were honest about their smoking.

Attendance at school is a multi-event outcome, more complex than being given an incentive prior to a test. Only two studies directly measured this outcome, and single or dual component incentive-based interventions were shown to be ineffective in improving attendance. The study by Reid *et al.* (1995) investigated the use of financial incentives to improve grades and attendance among teenage girls considered to be at risk of school failure. The girls had mixed views on the acceptability of the incentives. Those who were provided with incentives for small improvements showed a small gain in school-related self-esteem, while there was a slight decline for the girls who had to show large and consistent improvements to earn their rewards. Nearly half liked the idea of being given incentives, but also said they would have liked to have had personal support with their school difficulties as well. The EMA had a positive impact on the number of young people

remaining in post-compulsory education at age 18. However, Learning Centres, with whom the young people enter into a learning agreement, found that procedures and monitoring of attendance had to be tightened up, as some young people began to see EMA as a right, rather than reward for maintaining attendance and observing the learning agreement.

The evidence about the differential impact of incentives in single event versus complex or multi-event behaviour change may reflect the greater ease of achieving the rewards in the single event studies. Where more complex changes are required, additional support may be needed for incentives to be effective. In complex situations, and in particular in the context of educational behaviours, it would appear that incentives as part of a single or dual component intervention cannot provide young people with the skills and resources needed to achieve the requisite behaviours. While the anti-smoking initiatives and the EMA both deal with quite complex behaviours, their participants also possibly benefited from support from peers or others. It is important to note that, where incentives are not received because targets have not been met, this can lead to negative reactions and low self-esteem amongst participants (Maguire and Maguire, 2004; Reid *et al.*, 1995).

There is a debate as to whether or not extrinsic incentives inhibit the development of intrinsic motivation. Some claim that rewards may have a negative effect in that they forestall self-regulation and that this may have negative effects over the longer term (Deci *et al.*, 1999). Few of the studies that we looked at had a sufficiently long period of follow up to support or counter this view. Of the three studies with follow-up periods of 12 months or more, one showed no effect at either short or long term (Hovell *et al.*), another found that the positive results at two years had diminished at three years (Middleton *et al.*, 2005), and one found negative findings at three years which had also diminished at five years (Morris and Michalopoulos, 2003).

Incentives: Implementation, organisation and costs

A key message that emerges from the process studies is that incentive-based interventions require behaviours to be logged and rewarded consistently. A failure to do this can undermine an initiative. Whether small or large scale, long or short term, all the incentive-based interventions we looked at required a high degree of co-ordination of personnel and materials. Differences in the administrative efficiency, commitment, and organisational skills of the intervention providers can all have an impact on the success or failure of a programme.

This is particularly the case for large-scale long-term interventions such as EMA, where successful management of the scheme makes heavy organisational demands upon the provider, and where poor organisation can have a detrimental impact upon the recipient. Such schemes, which target groups identified as being at higher risk of social exclusion, need to be well-publicised, and procedures should be put in place to ensure that they are fully accessible and that take-up is high amongst the most vulnerable. Help may be needed in order to encourage young people to apply for such schemes. Support may be needed, not just for young people to navigate their way around a scheme, but also for those administering it in relation to adequate provision of training and resources. If incentives are to be delivered universally, those who are already more favoured by demographic factors and/or personal attributes should not be able to obtain the incentive more easily than those who are less advantaged.

There was little information about issues of cost-effectiveness in the studies that we looked at. Cost and sustainability are crucial issues, so it is important to think through the consequences of offering young people tangible incentives for particular behaviours. If it is intended to continue such an initiative on a long-term basis, will funding be available? Evidence from several of the ongoing projects where the use of incentives has had to cease (for instance, Karrot, Tilbury Sure Start, the Burnley Wish List) suggests that an incentives component in a scheme can be highly vulnerable in a world of competing priorities.

Incentives and public health

An important policy question we set out to answer is which areas of public health might benefit from incentives. The 2004 Public Health White Paper identifies a range of public health concerns relating to the health behaviours of children and young people (Department of Health, 2004). The prime objective noted in the White Paper is halting the growth in obesity. This is likely to require sustained behaviour changes in the areas of healthy eating and physical activity. From the published evidence we have reviewed here, single or dual component incentive-based interventions are unlikely to contribute to that change. It is disappointing that of the eight UK-based ongoing incentive schemes directed at changing healthy eating and physical activity behaviours included in our review, not one has to date conducted or intends in the future to produce a reliable evaluation of the effectiveness or otherwise of the scheme. The White Paper also highlights the Government's *Teenage Pregnancy Strategy* which includes encouraging the use of contraception and condoms by young people who choose to be sexually active, and providing them with accessible contraceptive and sexual health advice services. It is disappointing therefore that there appears to be no rigorous control group evaluation of the ongoing C-Card scheme despite its apparently widespread use.

The Child Health Programme as described in the White Paper aims to 'ensure health and well being for children and young people from birth to adulthood' (Department of Health, 2004, p 44). In particular, the programme covers screening and immunisations which are single event health behaviours shown in our review as likely to benefit from the use of incentives to encourage uptake. The government target to reduce health inequalities as measured by infant mortality by 2010 focuses on interventions to improve services and support for pregnant women, new mothers and their babies. The highest rate of infant mortality is in children born to teenage mothers. We found incentives to be effective in encouraging teenage mothers to attend an early post-natal health clinic. Delaying the onset of and reducing levels of smoking are also aims included in the White Paper. We found evidence of the effectiveness of school-based non-smoking class competitions in reducing these behaviours.

7.1.1 Limitations of the research and the evaluation of ongoing schemes

Involving young people in research

Health is shaped by many different social, cultural and economic factors which impact on young people's lives. Appropriate strategies for promoting their health and well-being and the development of research findings relevant to policy and practice are only likely to occur when the views of young people are taken into

account (Mayall and Foster, 1989; Oliver, 1997; Thomas *et al.*, 2004). Considering the views of the public in the development and delivery of services is a commitment of the NHS (Department of Health, 1999). This is reflected in the 2004 White Paper which says that guidance and practical support for young people and others will be 'provided in ways that are designed to meet their individual needs and be accessible to everyone' (Department of Health, 2005, p 41).

Significantly, none of the 16 evaluations included in our review reported interventions based on young people's views about which areas of behaviour change are important to them, or the acceptability of different types of incentive-based interventions. Nearly all of the interventions were based on the needs of young people as identified by experts (e.g. researchers, teachers, health educators, policy-makers). While the Karrot scheme was designed after a needs survey had been conducted with local young people, we are not aware of any evidence that the other ongoing incentive schemes were developed in the light of information on young people's views.

Few studies explained why a particular incentive had been chosen or why it might have a motivating effect. The views of participants are important here. In attempting to change patterns of behaviour which may become entrenched, finding better ways of aligning incentives so that they facilitate development of the required behaviour may well be useful.

The quality of the research evidence

In order for research findings to be useful, they must be reliable and based on well-conducted studies. Twelve of the sixteen studies included in our review which examined the impact of incentives used random allocation of individuals or groups of individuals to a control or intervention group, and so were likely to provide higher quality evidence. However, problems with the reporting of statistics in five of the six cluster trials meant that information for these studies was less useful than it might have been. We included in our review studies we judged to be 'sound despite' some reporting problems; sensitivity analyses showed that including these studies did not alter the effect sizes. All these considerations mean that we can have reasonable confidence in the findings of this part of our review, which are based on a sizeable body of research evidence.

It is disappointing that of the sixteen included studies only five had conducted a formal process evaluation. Examining the processes involved in the implementation of interventions is crucial in any area, but is particularly so when the question is how young people will respond to incentive schemes. Analysis of process issues is not an optional extra, but is intrinsic to any programme which sets out to change young people's behaviour in a particular direction.

Most of the ongoing incentive schemes lack evaluations capable of contributing to the overall picture of effectiveness. They will not therefore provide us with additional evidence about what works or is acceptable to young people in relation to incentive-based initiatives. A major constraint, mentioned in many reports of these schemes, is lack of funding for evaluation. Since many of the schemes are publicly funded, this deficit is likely to reflect the lack of importance attached by funders to formal evaluation. Unless this picture changes, we are unlikely to know whether such schemes offer a useful way of improving young people's behaviour.

7.1.2 Strengths and limitations of this review

A potential limitation of our review is the absence of young people's views in framing our research questions, and assessing the recommendations we present. Our review of the evidence relating to the behavioural impact of incentive schemes has taken a systematic and transparent approach to the lessons of existing research. We found five other systematic reviews in this area in our searches. However, ours is distinctive in including process and qualitative data and in focusing on the use of incentives with young people.

Other potential limitations of this review are that we included only studies published in the English language from 1985 onwards. We also limited our in-depth review to an analysis of only single or dual component interventions. Our findings and recommendations therefore need to be interpreted in the light of the absence of an analysis of multiple component interventions.

7.2 Principal findings

Effect of incentives on health behaviours

Our review of the effectiveness studies found that incentives are effective at improving some health behaviours, but ineffective for others. We did not find any of the incentive-based interventions we examined to be significantly harmful. When data from all studies with health outcomes were combined, a significant improvement was seen in the health behaviours of those groups which received an incentive.

We found that single health behaviours were significantly improved by the introduction of incentives. For complex behaviours we found no overall impact.

The impact of incentives on smoking behaviours was mixed. A large two-year study showed no positive benefit (Hovell *et al.*, 1996). However, when data from two studies of school-based anti-smoking competitions were combined, we found a significant reduction in daily smoking rates immediately after the intervention and at one year follow-up. While this is a promising finding in terms of the public health agenda, it is based on only two studies, and thus needs to be treated with some caution.

Our findings are not dissimilar to those of the five systematic reviews described in Chapter 2, all of which were of incentive-based interventions in the health domain. They all addressed somewhat different research questions, and had different inclusion criteria. All included a younger or older study population than our target population of 11–19-year-olds, and only one excluded studies of multi-component interventions. Our overall finding that incentives have a beneficial effect is consistent with two reviews which looked at a range of health interventions (Giuffrida and Torgerson, 1997; Kane *et al.*, 2004b). Giuffrida and Torgerson (1997) considered the use of incentives to enhance 'patient compliance'. They included eleven reports of RCTs, ten of which showed improvements in patient compliance with treatment. A systematic review of the effect of incentives on 'consumers' preventive behaviour' reached a similar conclusion. Kane *et al.* (2004b) included 47 RCTs and found that incentives worked 73% of the time, and were most effective 'in the short-run for simple preventive care' (p 327). Achat *et*

al. (1999) evaluated the use of incentives in childhood immunisations. They included eight studies and concluded that 'groups receiving the incentives were up to three times more likely to be immunised and had overall immunisation rates up to 17% higher than comparison groups' (Achat *et al.*, 1999, p 285). Our findings of a positive effect on smoking behaviours in young people are in keeping with one of two high-quality systematic reviews. One review of competitions and incentives for smoking cessation found no evidence of effect (Hey and Perera, 2005b), while the other which evaluated 'Quit and Win' contests found significantly higher quit rates for the intervention group, though it noted that the population impact of the contests was relatively low (Hey and Perera, 2005a).

Effect of incentives on education behaviours

Three educational studies evaluated the impact of financial incentives on effort or time spent on tests or exams (Baumert and Demmrich, 2001; Leuven *et al.*, 2003; Reid *et al.*, 1995). When data from these studies were pooled they showed that incentives had no impact on reported levels of effort.

Two studies evaluated the impact of incentives on young people's attendance levels in schools (Licht *et al.*, 1991; Reid *et al.*, 1995); they showed incentives to have no impact on attendance levels. The impact of the means-tested EMA on post-compulsory education destinations at 18 years of age was shown to be beneficial in relation to the overall numbers of urban young people who were in full-time education, an impact most noticeable in young men. This was matched by a significant reduction in the number of urban young people who were in full-time work, with or without training. These findings were not significant at follow-up at age 19. However, EMA was not shown to have any significant impact on young people in the one rural area in which it was piloted.

Effect of incentives on other social behaviours

The evaluation of the Self-Sufficiency Project, a Canadian anti-poverty initiative offering a financial supplement to single parents returning to work, found no differences between groups of young people in families eligible for SSP on any measures of health. Small but significant unfavourable effects were found in some measures of behaviour and emotional well-being at 36 months. Young people in the SSP group reported significantly higher levels of alcohol intake and drug use. In young people aged 15 to 18 years the frequency of minor 'delinquent' behaviour significantly increased, though this effect was not seen in younger children aged 12 to 14. None of the unfavourable effects remained significant at 54-month follow-up. At 36 and 54 months young people in the SSP group were significantly more likely to be working 20 or more hours per week.

7.3 Conclusions and recommendations

7.3.1 Conclusions

There are few well-conducted UK studies of the effects of single or dual component incentive schemes to encourage positive health or other social behaviours in young people. Those studies that have been done mostly do not

provide any data on process issues. Where process data are presented, they can often be difficult to interpret due to the diversity of issues addressed.

Publicly funded incentive-based intervention schemes in the UK are not routinely evaluating the effectiveness of their work with young people, despite the fact that the potential benefits and harms of this approach remain unknown, and that some such as the C-Card scheme are in widespread use.

There is little evidence about how young people view incentive-based interventions and how acceptable they are to them. We do not know whether the beliefs and experiences of young people lead them to have the same personal behaviour-change goals as policy-makers, researchers, health educators and other experts have for them.

Single or dual component incentive schemes are effective in encouraging positive health behaviours where a simple or single action is required, rather than a sustained health behaviour change. These interventions are also effective in reducing smoking behaviours in the context of school-based competitions. These findings are based on a small number of studies, none of which were conducted in the UK, but they are consistent with other systematic review evidence.

Single or dual component incentive schemes are not effective in improving either the levels of effort applied to educational tests, or attendance levels in school. In one study they had an impact upon the numbers of young people remaining in post-compulsory education. When incentives were given to single parents returning to work, they were shown to have a mixed impact on the social and emotional outcomes of their teenage children.

Overall, single or dual component incentive schemes do not appear to offer policy-makers or practitioners a simple route to ensuring general positive behaviour changes in young people. However, there is evidence that they are useful when targeted at changing single-event health behaviours, and in classroom based competitions aimed at changing smoking behaviours.

7.3.2 Recommendations

A clear recommendation is the need to design and pilot single or dual component interventions to promote the uptake of simple or single-event preventive health behaviours in young people. Such interventions could include immunisation or screening programmes, and accessing pre- and post-natal health services.

We also recommend that classroom based incentive schemes which aim to delay the onset of or reduce levels of smoking, such as the Smokefree Class Competition, should be piloted and evaluated in well-designed RCTs, which avoid the potential for selection bias. Young people's views should be taken into account to ensure the acceptability of any interventions and incentives. Care should be taken in designing and validating reliable measures of smoking. Researchers should investigate whether there is a differential impact on different age groups.

Any future incentive-based interventions should assess, and take into account, the views of young people on what areas of behaviour change are important to them, and what types of incentive-based interventions they would find acceptable.

This is an essential first step in designing and implementing acceptable and effective interventions.

Future evaluation research in this area should prioritise the use of randomised over non-randomised controlled trials, as this approach to evaluation makes it easier to attribute any observed differences in outcomes to intervention effects. Where a cluster trial design is used, researchers should present intra-cluster correlations. All evaluations should be accompanied by well-designed process evaluations.

Those implementing publicly funded incentive schemes should be encouraged to conduct reliable evaluations of the interventions that they implement with young people. Funders will need to ensure that funds are ring-fenced for such evaluations and that providers have access to appropriate research support.

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Appendix 1: Search strategy

Cinahl Search Strategy 19/04/05

OVID

- 1 motivation/ (3351)
- 2 "Reinforcement (Psychology)"/ (261)
- 3 reward/ (212)
- 4 behavior modification/ (494)
- 5 Student Assistance Programs/ (59)
- 6 social marketing.mp. (157)
- 7 incentiv\$.mp. [mp=title, subject heading word, abstract, instrumentation] (1746)
- 8 reward\$.mp. [mp=title, subject heading word, abstract, instrumentation] (2219)
- 9 prize\$.mp. [mp=title, subject heading word, abstract, instrumentation] (247)
- 10 lotter\$.mp. [mp=title, subject heading word, abstract, instrumentation] (98)
- 11 raffle\$.mp. [mp=title, subject heading word, abstract, instrumentation] (5)
- 12 voucher\$.mp. [mp=title, subject heading word, abstract, instrumentation] (77)
- 13 token economy.mp. [mp=title, subject heading word, abstract, instrumentation] (16)
- 14 stipend\$.mp. [mp=title, subject heading word, abstract, instrumentation] (20)
- 15 gift\$.mp. [mp=title, subject heading word, abstract, instrumentation] (843)
- 16 contingency management.mp. (42)
- 17 ((financial or cash or money) adj2 (pay\$ or paid or benefit\$)).mp. [mp=title, subject heading word, abstract, instrumentation] (438)
- 18 ((free or reduc\$) adj2 (resource\$ or access or entry or entrance or cost or costs or price\$)).ti,ab. (2116)
- 19 operant conditioning.mp. (29)
- 20 sticker\$.mp. (35)
- 21 inducement.mp. (22)
- 22 or/1-20 (11527)
- 23 exp Health Promotion/ (9655)
- 24 exp Health Education/ (35041)
- 25 exp Preventive Health Care/ (53912)
- 26 exp Mental Health/ (2639)
- 27 exp Primary Prevention/ (0)
- 28 attitude to health/ or health beliefs/ (7316)
- 29 Health Knowledge/ (5016)
- 30 Life Style Changes/ (808)
- 31 Health Behavior/ (6772)
- 32 Adolescent Health Services/ (713)
- 33 Child Health Services/ (1674)
- 34 Community Health Services/ (5096)
- 35 exp School Health Services/ (6434)
- 36 ((prevent\$ or reduc\$ or promot\$ or increas\$ or educat\$) adj3 health\$).ti,ab. (21653)
- 37 ((program\$ or campaign\$ or interven\$) adj2 (health\$ or lifestyle\$)).mp. [mp=title, subject heading word, abstract, instrumentation] (32967)
- 38 preventative health care.mp. (22)
- 39 Disruptive Behavior/ (458)
- 40 Social Behavior Disorders/ (534)
- 41 social isolation/ or social alienation/ (992)
- 42 Social Problems/ (581)

- 43 Aggression/ (1172)
 44 Bullying/ (395)
 45 Anger/ (1088)
 46 Violence/ (3472)
 47 Deception/ (201)
 48 Juvenile Delinquency/ (323)
 49 crime/ (990)
 50 Juvenile Offenders/ (273)
 51 Gangs/ (36)
 52 Verbal Abuse/ (330)
 53 Student Dropouts/ (320)
 54 Academic Failure/ (114)
 55 (anti-social\$ or anti social\$ or antisocial\$).mp. [mp=title, subject heading word, abstract, instrumentation] (290)
 56 truan\$.mp. [mp=title, subject heading word, abstract, instrumentation] (38)
 57 ((absen\$ or dropout\$ or drop-out\$ or non-attend\$ or nonattend\$ or attend\$) adj3 (school\$ or class\$ or lesson\$ or educat\$ or college\$ or student\$ or pupil\$)).mp. [mp=title, subject heading word, abstract, instrumentation] (2105)
 58 ((problem adj behavior) or (problem adj behaviour)).mp. [mp=title, subject heading word, abstract, instrumentation] (461)
 59 ((young or youth) adj2 offend\$).mp. [mp=title, subject heading word, abstract, instrumentation] (67)
 60 (social\$ adj (exclu\$ or disadvantag\$)).mp. [mp=title, subject heading word, abstract, instrumentation] (199)
 61 exp Adolescent Behavior/ (1534)
 62 Child Behavior/ (1717)
 63 Cooperative Behavior/ (412)
 64 Behavioral Objectives/ (546)
 65 Behavioral Changes/ (2002)
 66 Psychological Well-Being/ (2055)
 67 Social Conformity/ (52)
 68 Social Attitudes/ (1143)
 69 Social Values/ (1609)
 70 Social Skills/ (200)
 71 Social Skills Training/ (301)
 72 Social Behavior/ (1189)
 73 Interpersonal Relations/ (5424)
 74 Socialization/ (984)
 75 self concept/ or confidence/ or self-actualization/ or self disclosure/ or self-efficacy/ or self transcendence/ (8289)
 76 Personality Development/ (104)
 77 Behavior Therapy/ (1693)
 78 Empowerment/ (2640)
 79 Confidence/ (626)
 80 Student Attitudes/ (3712)
 81 academic performance/ or academic achievement/ (1503)
 82 learning/ or "conditioning (psychology)"/ or personal growth/ or brainstorming/ or skill acquisition/ or skill retention/ (3195)
 83 academic performance/ or academic achievement/ or academic failure/ (1588)
 84 (self esteem or self-esteem).mp. [mp=title, subject heading word, abstract, instrumentation] (2880)
 85 (pro-social\$ or pro social\$ prosocial\$).mp. [mp=title, subject heading word, abstract, instrumentation] (15)
 86 (classroom adj (behavior or behaviour)).mp. [mp=title, subject heading word, abstract, instrumentation] (26)
 87 exp SPORTS/ (11004)

- 88 Physical Fitness/ (2607)
 89 Exertion/ (1285)
 90 Physical Activity/ (3847)
 91 exercise/ or aerobic exercises/ or anaerobic exercises/ or group exercise/ or muscle strengthening/ or walking/ (13519)
 92 Life Style, Sedentary/ (426)
 93 Recreation/ (362)
 94 exp Leisure Activities/ (8403)
 95 exp "Physical Education and Training"/ (388)
 96 sedentary.mp. [mp=title, subject heading word, abstract, instrumentation] (1215)
 97 inactiv\$.mp. [mp=title, subject heading word, abstract, instrumentation] (1299)
 98 ((physical\$ or sport\$ or exercis\$ or game or games) adj3 (activit\$ or exercis\$ or exert\$ or fit or fitness\$ or game or games or endurance or endure\$ or child\$ or inactiv\$ or educat\$ or train\$)).ti,ab. (25815)
 99 NUTRITION/ (4141)
 100 Adolescent Nutrition/ (372)
 101 Child Nutrition/ (1551)
 102 Weight Control/ (1387)
 103 Weight Reduction Programs/ (309)
 104 Diet/ (7557)
 105 exp Eating Behavior/ (3597)
 106 Drinking Behavior/ (214)
 107 exp OBESITY/ (6467)
 108 exp Eating Disorders/ (2776)
 109 (food adj2 (choice or choose or chosen)).mp. [mp=title, subject heading word, abstract, instrumentation] (97)
 110 (overweight or over-weight).mp. [mp=title, subject heading word, abstract, instrumentation] (4903)
 111 ((school\$ or eat\$) adj3 (dinner\$ or lunch\$ or food\$ or meal\$ or snack\$ or junk)).ti,ab. (860)
 112 (health\$ adj1 (eat or eating or diet\$ or food\$ or snack\$)).ti,ab. (1341)
 113 exp Substance Abuse/ (8884)
 114 exp Substance Dependence/ (13170)
 115 Alcohol Drinking/ (3384)
 116 Behavior, Addictive/ (473)
 117 Smoking Cessation/ (2732)
 118 exp "Substance Use Rehabilitation Programs"/ (1944)
 119 Family Planning/ (1029)
 120 pregnancy in adolescence/ or "maternal age 14 and under"/ (1765)
 121 Adolescent Mothers/ (455)
 122 Adolescent Fathers/ (71)
 123 ((teen\$ or adolescen\$ or young\$ or juvenile\$ or youth\$ or girl\$ or boy\$) adj (mother\$ or father\$ or mum or dad or parent\$ or pregnan\$)).ti,ab. (1584)
 124 exp ADOLESCENCE/ (59011)
 125 exp Generation Y/ (13)
 126 Students, High School/ (1729)
 127 Students, Middle School/ (481)
 128 (youth\$ or teenage\$ or teen or student\$ or pupil\$).ti,ab. (31208)
 129 (young\$ adj1 (people\$ or person\$ or woman or women or man or men or adult\$)).ti,ab. (6515)
 130 (juvenile\$ or adolescen\$).mp. [mp=title, subject heading word, abstract, instrumentation] (61262)
 131 ((school age or older) adj1 (child\$ or boy\$ or girl\$)).mp. [mp=title, subject heading word, abstract, instrumentation] (5095)
 132 or/23-38 (117260)
 133 or/39-60 (12548)

134 or/61-86 (37035)
 135 or/87-98 (47333)
 136 or/99-112 (27422)
 137 or/113-118 (24995)
 138 or/119-123 (3635)
 139 or/132-138 (228444)
 140 or/124-131 (89262)
 141 22 and 139 and 140 (945)
 142 community merit scheme.ti,ab. (0)
 143 Connexions card.ti,ab. (1)
 144 (dreamscheme or dream scheme).ti,ab. (0)
 145 education maintenance allowance.ti,ab. (0)
 146 Fit to Succeed.ti,ab. (2)
 147 Fitbods.ti,ab. (0)
 148 (Food Dudes or FoodDudes).ti,ab. (0)
 149 FuelZone.ti,ab. (0)
 150 Karrot.ti,ab. (0)
 151 Young Volunteer Challenge.ti,ab. (0)
 152 Casastart.ti,ab. (0)
 153 "Food Fun and Fitness".ti,ab. (1)
 154 Kauffman Scholars.ti,ab. (0)
 155 (Quantum Opportunities Program\$ or QOP).ti,ab. (0)
 156 (Second Chance and pregnan\$.mp. [mp=title, subject heading word, abstract, instrumentation] (6)
 157 "Quit and Win".ti,ab. (9)
 158 Smokefree Class.ti,ab. (2)
 159 Supermarket Health Outcomes.ti,ab. (0)
 160 Free Nicotine Replacement Therapy.ti,ab. (3)
 161 Free Swimming.ti,ab. (4)
 162 school meal\$ reward\$.ti,ab. (0)
 163 step-o-meter challenge.ti,ab. (0)
 164 100% attendance club.ti,ab. (0)
 165 educational achievement scheme.ti,ab. (0)
 166 star project.ti,ab. (1)
 167 club 95 reward scheme.ti,ab. (0)
 168 Burnley wish list.ti,ab. (0)
 169 Dudley lifeskills partnership.ti,ab. (0)
 170 positive activities for young people.ti,ab. (0)
 171 young people's development program\$.ti,ab. (0)
 172 "passport to health".ti,ab. (6)
 173 young volunteer challenge.ti,ab. (0)
 174 referral order scheme.ti,ab. (0)
 175 or/142-174 (35)
 176 141 or 175 (978)
 177 limit 176 to yr=1985-2005 (971)
 178 from 177 keep 1-971 (971)

Appendix 2: Methods for calculating and pooling effect sizes

The methods used for calculating and pooling effect sizes in this review are much the same as those used in an earlier EPPI-Centre review on healthy eating in children (Thomas *et al.*, 2003). A more detailed description, including the statistical formulae for calculating effect sizes, is included in the appendices to that report. The description of methods contained in this appendix duplicates much of that by Thomas *et al.* (2003), and the authors of this review are grateful for their permission to reproduce them.

2.1 Definitions

Mean: The average value, calculated by adding all the observations and dividing by the number of observations.*

Standard deviation: A measure of dispersion or variation and the most widely used measure of dispersion of a frequency distribution. It is equal to the positive square root of the variance. The mean tells where the values for a group are centred. The standard deviation is a summary of how widely dispersed the values are around this centre.*

Standard error: The standard deviation of an estimate after adjusting for sample size. Used to calculate confidence intervals.

Standardised mean difference: The difference between two means divided by an estimate of the within-group standard deviation. When an outcome (such as pain) is measured in a variety of ways across studies (using different scales) it may not be possible directly to compare or combine study results in a systematic review. By expressing the effects as a standardised value the results can be combined since they have no units.*

Pooled: Combined.*

Effect size: A measure of the difference in outcome between the groups in a study.

*These are taken from Clarke and Oxman (2002) and Last (2000).

2.2 Methods

A supplementary framework was used to extract data on the outcome variables from each evaluation in order to calculate effect sizes for the meta-analysis. In order for the results of different studies that used different measurement tools to be combined, their results need to be standardised in some way. For this review, the standardised mean difference was selected: this is essentially the difference in means between the two groups in the evaluation divided by their pooled

standard deviation. A measure of uncertainty, the standard error, accompanies the standardised mean difference. In order to calculate this effect size all that is needed is the number of people in each group, their post-test means (adjusted for baseline measures if necessary) and their standard deviations. Unfortunately, these data are not always reported and further calculation from the data presented becomes necessary before an effect size can be found. Our specialised review software, EPPI-Reviewer, was adapted to calculate effect sizes from the range of data encountered. By combining the effect sizes from all of the included studies statistically, it is possible to estimate an overall measure of effect for the interventions included.

The included studies presented outcome measures with both dichotomous and continuous data. We applied the Hedges's adjusted g formula to calculate effect sizes with continuous data, and when combining continuous data with dichotomous data. Hedges's adjusted g is a standardized mean difference which adjusts for small sample sizes (Egger *et al.*, 2001). For dichotomous data we chose to use risk ratios (RR) as our effect measure. We adopted a random effects model, as this incorporates an estimate of between-study heterogeneity. The Der Simonian and Laird method was used to compute this.

One complicating factor is the issue of studies in which groups of individuals (for example, classes or schools) are assigned to intervention and comparison conditions, rather than individuals. In these 'cluster trials', outcomes may have been measured at the individual level but allocation occurred at the group level. Methods for analyzing cluster trials are still developing and methods for including such studies in meta-analyses are still emerging. However, it is possible to extract outcome data and calculate the standardized mean difference from the reports of these studies for use in a meta-analysis. Detailed methods for this are reported in a paper by White and Thomas (2005). If a study has analysed clusters of individuals and presented standard errors, these standard errors need to be converted into standard deviations taking the *design effect* of the study into account (Murray, 1998). Methods for computing the design effect require data on both the cluster sizes and intra-class correlation (ICC). Few trials present data on the ICC: in this review, only one study did (Hovell *et al.*, 1996). We therefore imputed an ICC of 0.02 for those cluster trials where ICC data were not reported. Data from cluster trials were also entered into EPPI-Reviewer, which has been adapted to calculate effect sizes from cluster trials where cluster-size and ICC data are available.

If no significant heterogeneity was found, the results of the studies were pooled and a final effect size was calculated. If significant heterogeneity was found, possible reasons for the differences between studies were explored through sensitivity analyses of sub-groups of studies. In order to prevent this procedure from becoming an exercise in 'data dredging', the categorical variables which identified the sub-groups used in this exercise were specified in advance of the meta-analysis. These categories were: study type (RCT, CT); study quality (sound/sound despite); and the feature of the study population and intervention referred to in Chapter 4.

For further information on the methods used in statistical meta-analysis see Cooper and Hedges (1994), Egger *et al.* (2001), and Lipsey and Wilson (2001).

Appendix 3: Details of reports of effectiveness studies relevant to in-depth review

Key

Quality of study reporting for outcome evaluations

A: Equivalent study groups at baseline

B: Pre-intervention data reported

C: Post-intervention data reported

D: Impact of the intervention reported for all outcomes

SOUND STUDIES

Baumert and Demmrich (2001)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT; process evaluation

Location: Germany (a suburban area of Hanover)

Setting: Educational institution (secondary education)

Region type: Urban

Sample number: 307

Gender: Mixed: 139 male, 168 female

Age range: 15 years

Socio-economic status: Not stated

Ethnicity: Not stated

Aim

There was concern that students may perform sub-optimally in national tests of student achievement in mathematics as they perceive them to be of no direct relevance (they do not count towards grades). The aim of the intervention was to see if using incentives would improve students' performance.

Content of the intervention package

Students were administered a test in mathematical literacy. There were four conditions; students in each condition were given different instructions prior to the test.

1. Information feedback: students were told that after the test the teacher would give them individual feedback telling them how many items they had got right. It was expected that this would 'increase the salience value of the attainment value of performing well in the test' (p 449).
2. Grading: students were told that the results of the test would count towards their grades and that their Maths teacher would grade the test.
3. Financial reward: students were told that they would receive a financial reward (DM 10) if they solved more items than expected on the basis of their prior mathematics grades.
4. Control group: students were given the standard with no attempt at additional motivation, bar a general injunction to 'do your best' (p 449).

Groups 3 and 4 were included in in-depth review (N=155).

Hovell *et al.* (1996)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: Cluster RCT; process evaluation

Location: USA (California)

Setting: Orthodontic offices

Region type: Not stated

Sample number: 154 orthodontic offices (N=14,775 individuals)

Gender: Mixed

Age range: 11–18 years

Socio-economic status: Not stated

Ethnicity: Caucasian: 73%; Hispanic: 12%; Asian: 9%; Black: 3%; Unreported: 3%

Aim

To test the effectiveness of a programme designed to help orthodontists to prevent tobacco use among students who attend their offices.

Content of the intervention package

Offices assigned to the experimental condition were provided with 1.5 hours of tobacco prevention training including instruction in promoting a tobacco-free environment within the office/waiting room. Practitioners were issued with anti-tobacco 'prescriptions' which were to be given to eligible adolescents, and offices received 50¢ per prescription provided. The prescriptions were pre-printed with anti-tobacco messages.

Adolescents were interviewed at baseline and two years later regarding their smoking practices.

Leuven *et al.* (2003)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT; Process evaluation

Location: The Netherlands (Amsterdam)

Setting: Educational institution (University)

Region type: Urban

Sample number: 165

Gender: Mixed

Age range: First year students at the University of Amsterdam

Socio-economic status: No data on class – however, authors collected data on parental education: 53% had a father who had undergone higher education; 37% had mothers with higher educational levels

Ethnicity: Not stated

Aim

To test the effectiveness of incentives to motivate students to greater efforts and increase exam achievement.

To test the effect of a high and a low reward condition.

Content of the intervention package

In a year-long trial, different levels of incentive were provided to two groups of students to pass their first year course; the third group was not offered an incentive. The high reward group was offered € 681, and the lower reward group € 227.

Licht *et al.* (1991)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT (randomised matched pair design)

Location: USA

Setting: Educational institution (high school)

Region type: Semi-rural

Sample number: 20

Gender: Mixed: 11 male, 9 female

Age range: 14–18 years

Socio-economic status: Lower to lower-middle working class

Ethnicity: 13 black, 7 white

Other information provided by authors: All were students with a range of special educational needs.

Aim

To evaluate an incentives-based programme designed to improve the attendance and punctuality of high school students with special educational needs.

Content of the intervention package

Students were randomly allocated to intervention and control groups. Those in the intervention group were provided with social and tangible reinforcement. This was done by means of a point system. Students were given 5 points for each class that they attended and a further 5 for arriving on time. Points were totalled on a weekly basis and converted to a percentage as some students were enrolled in more classes than others. At a weekly meeting, points could be exchanged for gifts such as fast food vouchers, movie tickets, clothing and school supplies. Students' achievement was also recognised at these meetings and they received praise and encouragement.

Middleton *et al.* (2005)

Quality criteria met: B, C, D

Final judgement by reviewers: Sound despite discrepancies with quality criteria. Equivalence between the two groups was unclear.

Study design: Controlled cluster trial

Location: UK

Setting: Post-compulsory education

Region type: Urban and rural

Sample number: 21 Local education authorities

Gender: Mixed

Age range: 16–19 years

Socio-economic status: Low

Ethnicity: Not stated

Aim

The aim of the Education Maintenance Allowance (EMA) is to improve rates of participation in post-compulsory education, particularly amongst young men and those from lower socio-economic groups.

Content of the intervention package

Means-tested payments were made directly to young people who stay on in education, whether academic or vocational, after post-compulsory education. Payments were made every week of the course as long as students turn up to classes and show commitment to the course. Those from families with an income of £13,000 or less receive the whole amount of £30 per week. For those with incomes above £13,000 but below £30,000, the weekly allowance was progressively reduced to a minimum of £5 per week. Termly retention and course achievement bonuses were also payable. Whilst the scheme was funded by the Department for Education and Skills (DfES), administration of the scheme and actual payments were made by Local Education Authorities (LEAs).

Morisky *et al.* (2001)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT

Location: USA (Los Angeles)

Setting: Two tuberculosis Clinics

Region type: Urban

Sample number: 794

Gender: Mixed: 51% female, 49% male

Age range: 11–19 years (mean 15.2, standard deviation 1.9)

Socio-economic status: Not stated

Ethnicity: Hispanic: 77.8%; Asian: 9.4%; African-American: 8.1%; white or other: 4.7%

Other information provided by authors: Adolescents had all been referred after tuberculosis was detected at a school medical.

Aim

To develop and test the effectiveness of peer counselling and contingency contracting on treatment completion rates in adolescents with latent tuberculosis, as it is commonly recognised that many do not complete the six-month treatment.

Content of the intervention package

After participants completed a baseline they were randomised to one of four groups. These were:

1. Peer counselling intervention only: adolescents who had already completed treatment for latent TB infection were assigned as counsellors to new patients. They were contacted by telephone during first week. The first contact was introductory and designed to establish a rapport, explain the role of the peer educator, and stress the importance of adherence to the treatment. Further contact made every two weeks.
2. Parent-participant contingency contract: the adolescent and a parent, with the support of clinic staff, negotiated an incentive (such as a special meal, new clothing, movie or video rental, or anything agreeable to parent and child) to be provided for treatment adherence.
3. Interventions 1 and 2 combined.

4. Control group: usual care

Groups 3 and 4 were included in the in-depth review (N=391).

Morris and Michalopoulos (2003)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT

Location: Canada (British Columbia and New Brunswick)

Region type: Urban and rural

Sample number: 5,686

Gender: Mixed

Age range: Adults; Children, 4–10 years; Young people, 11–18 years

Socio-economic status: The sample consisted of unemployed single parents (principally mothers) who were receiving welfare assistance

Ethnicity: First Nations Ancestry: 8.5%; Asian Ancestry: 5%; French speaking: 12% (data as provided by the authors)

Aim

The Self Sufficiency Project was a demonstration project that aimed to test a policy change in two Canadian Provinces. The policy was designed to make work a viable alternative to welfare for low income parents with a financial supplement.

Content of the intervention package

Single parents who had been on income assistance for at least one year were randomly selected. They were divided into two groups: program and control. Those in the program group who worked for 30 weeks or more were paid a supplement on top of their employment earnings for up to three years. This was structured in such a way that it equalled half the difference between a participant's earning and an earnings 'benchmark' (equivalent to Can\$30,000 in New Brunswick and Can\$37,000 in British Columbia). This meant that for a person working at the minimum wage, their gross income was double what it would have been without the supplement.

O'Neil *et al.* (1996)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT

Location: USA (Southern California)

Setting: Educational institution (secondary schools)

Region type: Not stated

Sample number: 1,468

Gender: Mixed

Age range: 13–14 and 17–18 years

Socio-economic status: Not stated

Ethnicity: White: 326; Black: 369; Latino: 496; Asian: 277

Aim

This was an intervention with students taking the National Assessment of Educational Progress (NAEP) mathematics test. Its aim was to increase the effort expended by pupils on a range of test items by manipulating different conditions of motivation including a financial reward.

Content of the intervention package

The intervention was studied in two different year groups, both of which were allocated to an intervention or control group. All groups were given different test instructions prior to test.

Students in Grade 8 were divided into four groups:

1. Financial reward group: pupils were instructed that they would get \$1 per correct item, to a maximum of \$41.
2. Ego-involved instructions: pupils were instructed that their individual results would be compared with other students in their class, school, school district and around the world. Results would be reported back to students, the school, teachers, and parents. Students were told that how well they did in the test would indicate how good they were at that kind of test.
3. Task-involved instructions: pupils were instructed that they might perform better if they approached test items (particularly difficult new ones) as a challenge and tried very hard. Students were encouraged to see it as a challenge and to enjoy mastering it.
4. Control: pupils received standard NAEP maths test instructions. The results were not fed back to the student, school, teacher or parents.

The reward and control groups were included in in-depth review (N= 354).

The students in grade 12 were divided into five groups: the same four experimental groups as grade 8, plus a 'certificate of accomplishment' award group, who were given the same instruction as the ego-involved group, but were also told that the top 10% of students would receive a UCLA certificate of accomplishment, which could be used for job interviews or college applications. The financial reward group were instructed that they would get \$1 per correct item, to a maximum of \$44.

The reward and control groups were included in the in-depth review (N= 296).

Reid *et al.* (1995)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT; process evaluation

Location: USA (Burlington, Vermont)

Setting: Educational institution (two middle schools and one high school)

Region type: Urban

Sample number: 112

Gender: Female

Age range: 11–17 years, median age 14

Socio-economic status: The girls were white and primarily from low-income families, the majority of which were headed by single parents.

Ethnicity: White

Other information provided by authors: To be referred to the study, girls had to have problems with grades, attendance or both.

Aim

The aim of the intervention was to motivate teenage girls at risk of school failure through the use of financial incentives, to improve both their grades and attendance.

Content of the intervention package

Teenage girls at risk of school failure were randomly assigned to a control condition or to one of two year-long experimental conditions aimed at improving their academic work and attendance.

1. Payment program: students were only given monetary incentives for improved performance.
2. Case-management program: teachers, girls, their parents and social workers worked together to devise strategies to help the girls improve.
3. Control group: no intervention.

Group 1 and Group 3 were included in the in-depth review (N=79).

Rewards were dispensed in two ways. One group ('All or nothing') received \$50 a month contingent upon a 15% improvement in either attendance or in grades for the three subjects in which the student was performing most poorly. An additional 15% improvement was required for next \$50 and so on until a grade B was recorded or there were no more than two absences a month. These levels then had to be maintained to continue to get the reward. In the other group ('Incremental') a girl could earn smaller amounts of money for partial accomplishments (e.g. a half grade improvement in her four worst subjects) and the scheme was designed so it was possible to earn \$50 dollars a month like the other condition.

The case management program was based on a task-centred approach that focused on the specific problems of grades and attendance, and involved team members in developing and carrying out tasks to solve the problems. The case management group met fortnightly to discuss progress, and meetings with the girls and their parents normally took place in the alternate weeks and focused on problem-related tasks and obstacles.

Richter *et al.* (1998)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: Controlled trial

Location: USA

Setting: Orthodontist clinic

Region type: Not stated

Sample number: 144

Gender: Mixed: 63 male, 81 female

Age range: Between 9 years 6 months and 17 years 6 months

Socio-economic status: Not stated

Ethnicity: Not stated

Aim

The aim of the intervention was to increase orthodontic treatment compliance (dental hygiene, keeping appointments, wearing orthodontic appliances, etc.).

Content of the intervention package

Prior to allocation to one of three arms of the trial adolescents were identified as those with high or low compliance with orthodontist's instructions and split accordingly.

1. A control group which received only standard instructions

2. A group which received instructions and a written evaluation of their compliance.
3. A group which received compliance instructions and a report card and were eligible for a reward for adherent behaviour.

The adherence of all of the participants was evaluated at monthly appointments.

The promised rewards were both short-term and longer-term. Patients in the reward group were given a coupon for an ice-cream sundae if they achieved 90% compliance as assessed at the monthly visit. A patient who obtained 90% or more at two consecutive visits was eligible to be entered into a two-monthly prize draw for a CD. Those who obtained 90% or more for four months or more were entered into a draw for a wrist watch.

Smith *et al.* (1990)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT

Location: USA

Setting: Family planning and teen health clinic in a county general hospital

Region type: Urban

Sample number: 534

Gender: Female

Age range: 12–19 years, mean age 15.7 +/- 1.6

Socio-economic status: Authors describe the young women as 'indigent'

Ethnicity: Black: 43%; Hispanic: 45%; Caucasian: 12%

Other information provided by authors: All were teenage parents, of whom 74% were single

Aim

The aims of the study were to examine the compliance patterns among adolescents attending a post-partum family planning clinic, and to explore the role that incentives play in enhancing their clinic attendance.

Content of the intervention package

1. Group A were the control. They received appointment slips for post-partum examinations with no mention of an incentive.
2. Group B received appointment slips for post-partum examinations together with a coupon redeemable for baby formula.
3. Group C received appointment slips for post-partum examinations mentioning a free gift for the mother when they came to their clinic appointment.

The free gift was selected by a group of adolescents and consisted of costume jewellery.

Data from Groups B and C were combined and compared to Group A for the in-depth review.

Stevens-Simon *et al.* (1997)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT

Location: USA (Denver, Colorado)

Setting: Not stated

Region type: Urban

Sample number: 179

Gender: Female

Age range: Below the age of 18 years

Socio-economic status: Not stated

Ethnicity: At enrolment the population was: White: 44%; Black: 25%; Hispanic: 29%; Minority ethnic: 2%

Other information provided by authors: The young mothers recruited only had one child; the child had to be under the age of five months; the majority were enrolled in CAMP (a comprehensive, multi-disciplinary, adolescent oriented pre- and post-natal infant care program).

Aim

The Dollar a Day Program aimed to prevent repeat pregnancies in teenage mothers by promoting the consistent use of reliable contraceptive methods and future-oriented family and career planning. It used incentives and peer support as strategies.

Content of the intervention package

Participants were randomly allocated to one of four groups.

1. Monetary incentive: participants received a dollar a day for every day they were not pregnant. There was a monthly pregnancy test and bus ticket tokens were provided for attending this test.
2. Peer support: participants met weekly in groups composed of 10–15 peers and two adults. There was a monthly pregnancy test and bus ticket tokens and other assistance with transportation were provided. Sessions were used to use discuss issues of concern to the young women.
3. Conditions 1 and 2 combined.
4. Control group: routine post-partum care and a six-monthly pregnancy test.

Groups 3 and 4 were included in the in-depth review.

Stevens-Simon *et al.* (1994)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: RCT

Location: USA

Setting: Specialist clinic (Colorado Adolescent Maternity Program)

Region type: Urban

Sample number: 240

Gender: Female

Age range: 12–19 years, mean 17.2 +/- 1.2

Socio-economic status: 'Poor, pregnant 12–19 year olds'

Ethnicity: Incentive group: White: 50%; Black: 26.8%; Hispanic: 22.2%; Other: 1%. Control group: White: 56.8%; Black: 27.2%; Hispanic: 17%; Other: 3% (Data provided by group)

Other information provided by authors: 88% were on Medicaid

Aim

To test the hypothesis that incentives would enhance compliance with post-partum appointments among teenage mothers.

Content of the intervention package

Pregnant teenagers were randomly allocated to incentive and non-incentive groups.

1. The incentive group were told that if they returned for an examination within 8–12 weeks of the birth they would receive a ‘Gerry cuddler’ (a sling for carrying a newborn baby).
2. The non-incentive group were offered an examination, but not offered an incentive for attending.

The health reasons for a post-partum examination were explained to both groups, and a Gerry Cuddler (a type of baby carrier) was shown to those in the incentive group who were unfamiliar with it.

Unti *et al.* (1997)

Quality criteria met: B, C, D

Final judgement by reviewers: Sound despite discrepancy with quality criteria (equivalence between the two groups was unclear)

Study design: Cluster RCT; process evaluation

Location: USA

Setting: Secondary education (7th grade)

Region type: Not stated

Sample number: Four schools (N=1,429 students)

Gender: Mixed

Age range: Grade 7 (13–14 years)

Socio-economic status: Not stated

Ethnicity: Not stated

Aim

This study examines the use of incentives to motivate students to obtain written parental consent for and complete the entire three-dose hepatitis B vaccine series, in a school-based vaccination program.

Content of the intervention package

Incentives were offered to encourage students to participate in a school-based hepatitis B vaccination program, which required the return of signed parental consent forms.

1. Control group: students received education about hepatitis B through classroom lessons and a school-wide assembly which presented additional information on hepatitis B, administration of vaccine doses, and the consent process. They also received parental information packs.
2. Incentives group: students received the same education as the control group. Plus, peer and individual incentives were used to motivate students to return signed consent or refusal forms within five days after parent packs were distributed, and to return for each vaccine dose. Classes in which all students returned signed forms within this period received pizza or ice cream coupons. No distinction was made between children of consenting and refusing parents. Individual incentives were given to students returning signed forms (extra scholastic credits).

All students were given an incentive for receiving each vaccination dose (individual pencils, erasers and folders), and completing the entire vaccine series (attendance at a school social event).

Vartiainen *et al.* (1996)

Quality criteria met: B, C, D

Final judgement by reviewers: Sound despite discrepancy with quality criteria (equivalence between the two groups was unclear)

Study design: Cluster trial

Location: Finland

Setting: Secondary education

Region type: Not stated

Sample number: 97 classes (N=1,693 individuals)

Gender: Mixed

Age range: Pupils were mainly in the 8th Grade (14 years); however, in the most recent year of the competition reported, 7th grade pupils were included.

Socio-economic status: Not stated

Ethnicity: Not stated

Aim

The Smokefree Class Competition aims to prevent or delay the onset of smoking in young people.

Content of the intervention package

The Smokefree Class competition has been organised annually in Finland for 8th Grade (14-year-old) pupils since 1989. Each class decides whether to participate. This requires the whole class to desist from smoking over the duration of the competition. They sign a commitment form and complete a follow-up form each week over the period of the intervention. If someone starts smoking and cannot quit, the whole class has to drop out. Each class has a contact teacher who assists the class during the competition and organises health education sessions. If all members of a class are successful in not smoking they are entered for a lottery with financial prizes. In this competition, there were four prizes of US\$2,000 and ten second prizes of US\$200. Classes can decide themselves how to use the money. There is quite extensive media coverage.

Wiborg and Hanewinkel (2002)

Quality criteria met: A, B, C, D

Final judgement by reviewers: Sound

Study design: Cluster trial; process evaluation

Location: Germany (intervention schools in Hamburg and Berlin and control schools in Hanover)

Setting: Educational institution (secondary education)

Region type: Urban

Sample number: 131 classes (N=2,142 individuals)

Gender: Mixed sex

Age range: 11–14 years

Socio-economic status: Not stated

Ethnicity: Not stated

Aim

The Smokefree Class Competition aims to prevent or delay the onset of smoking in secondary school aged pupils taking up smoking.

Content of the intervention package

Classes who register for the competition (at least 90% want to opt in) are provided with a folder containing a class contract for the pupils to sign committing themselves to remaining smoke-free for the following six months. The class is responsible for monitoring the extent to which they remain smoke-free (defined as less than 10% of the class smoking in the previous week). The classes send a monthly postcard confirming they are still part of the scheme and they are sent two newsletters. Teachers help with the administration of the project. If they participate in the scheme for six months, they become eligible to participate in a prize draw with a number of attractive prizes, the main one being a trip to one of the other participating countries.

UN SOUND STUDIES

Elder et al. (1989)

Quality criteria met: B, C, D

Final judgement by reviewers: Not sound (study groups were not equivalent at baseline on the primary outcome behaviour)

Study design: RCT; informal process evaluation

Location: USA

Setting: Educational institution (secondary education)

Region type: Not stated

Gender: Mixed

Age range: 12–13 years

Socio-economic status: Not stated

Ethnicity: Not stated

Other information provided by authors: Pre-intervention rates of smoking were different (3.5% in the control schools and 7.3% in the lottery intervention group).

Aim

The tobacco industry has had some success in encouraging a switch from cigarette smoking to smokeless tobacco use. The aim of project SHOUT was to counteract this trend by using successful psychosocial intervention techniques adapted from previous smoking prevention programmes elsewhere.

Content of the intervention package

1. Skills and education group:
 - a. Incentives – raffle tickets for participating in group discussions, completing homework and good behaviour; prizes consisted of hats, notebooks, movie passes, pizzas, ice-cream, albums, passes for video arcades, skateboard rentals, etc.
 - b. Education about the health consequences of tobacco use
 - c. Education about methods used to advertise tobacco products
 - d. Skills training in methods of resisting peer pressure
 - e. Work with small groups
 - f. Role-play simulating situations of tobacco use
2. Lottery group: participants with validated self-report of not smoking in the previous week were rewarded with small prizes. These included duffle bags, posters, folders,

pens and sports equipment. The class that demonstrated the greatest reduction in tobacco use during the lottery program received a prize for the group to share.

3. Control group: no education, no skills training or incentives.

Fashimpar (1991)

Quality criteria met: B, C, D

Final judgement by reviewers: Not sound (study groups were not equivalent at baseline)

Study design: Trial

Location: USA

Setting: Community

Region type: Texas

Sample number: 92

Gender: Mixed: 86 male, 6 female

Age range: 11–16 years

Socio-economic status: Not stated

Ethnicity: Not stated

Other information provided by authors: Most had committed criminal offences

Aim

The intervention aims to rehabilitate young offenders and prevent further offending.

Content of the intervention package

The relative effectiveness of several programs intended to rehabilitate juvenile delinquents was compared.

1. Probation
2. Probation plus involvement in a recreation program
3. Probation plus membership in a mini bike club
4. Non-intervention control group

Fishbein (1992)

Quality criteria met: B, C, D

Final judgement by reviewers: Not sound (study groups were not equivalent)

Study design: Trial; informal process evaluation

Location: USA

Setting: Educational institution (secondary education)

Region type: Not stated

Sample number: 90

Gender: Not stated

Age range: Young people, approx. 15–16 years of age.

Socio-economic status: Not stated

Ethnicity: Not stated

Other information provided by authors: At risk of dropping out of education

Aim

The aim of this intervention was to prevent at-risk students dropping out.

Content of the intervention package

The Exemplary Youth Needs Based Subsidy Program (EYNBSP) involved at risk students in grades 9–11. The school's administration identified 90, of whom 45 chose to participate.

Students who chose to participate were eligible to receive a stipend of \$25 per week conditional upon: good attendance; good punctuality; school work; preparation for class; participation in class; demonstration of self-discipline; passing all tests and quizzes.

Geiger (1996)

Quality criteria met: C

Final judgement by reviewers: Not sound (study groups were not equivalent; pre-intervention data were not reported; the impact of the intervention was not reported for all outcomes)

Study design: Trial; informal process evaluation

Location: USA

Setting: Educational institution (secondary education)

Region type: Urban

Sample number: 67

Gender: Not stated

Age range: 6th, 7th and 8th graders (11–13 years)

Socio-economic status: Not stated

Ethnicity: Not stated

Other information provided by authors: Students attended a private school in the Capital District of New York

Aim

The aim was to demonstrate the effectiveness of providing extra playtime for junior secondary school students as a reinforcing reward for appropriate classroom behaviour and satisfactory completion of class work.

Content of the intervention package

A substitute teacher covering a class for an absent colleague made a contingency contract with two of the three classes she was teaching. This stated that if they finished their work in time they could have an extra ten minutes in the playground. The contract also specified which behaviours they had to achieve. The conditions were that everyone had to have finished their work; students could, with the teacher's approval, work in twos to achieve this; work could not be untidy and the teacher would check several assignments randomly before giving permission; they had to make their way to the play ground quietly. The control group was simply told that they could have some quiet time in the room if they finished their work a bit early.

Appendix 4: Controlled trials included in map but not in-depth review

The reason(s) that studies were not included in the in-depth review are highlighted in bold.

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Aber <i>et al.</i> (1995)	USA	RCT Process evaluation	Education Incentives Parent training Skill development	Cash payments Disincentives	Not applicable	Participation in post-compulsory education Academic achievement Truancy Attendance	Vocational training Inequalities	Multiple component intervention Incentive given to participate
Baranowski <i>et al.</i> (1990)	UK	RCT Process evaluation	Activity Education Incentives	Achievement recognition Cash payments Free or reduced-cost access to leisure/sports facilities	Inequalities Physical activity	Not applicable	Not applicable	Multiple component intervention Incentive given to participate

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Bos (1997)	USA	RCT Process evaluation	Incentives Legislation	Cash payments Disincentives	Inequalities Pregnancy prevention	Participation in post-compulsory education. Academic achievement Improved attitude to education Attendance	Other Employment outcomes	Multiple component intervention Incentive given contingent on behaviour change
Crone <i>et al.</i> (2003)	Holland	RCT Process evaluation	Education Incentives	Prizes	Tobacco	Not applicable	Not applicable	Multiple component intervention Incentive given contingent on behaviour change
Fulkerson <i>et al.</i> (2004)	USA	RCT Process evaluation	Education Environmental modification Incentives	Prizes Edible Raffle/lottery	Healthy eating	Not applicable	Not applicable	Multiple component intervention Incentive given to participate

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Hahn (1994)	USA	Trial Process evaluation	Advice	Cash payments	Delinquency	Participation in post-compulsory education	Crime prevention	Mentoring
			Education	Free or reduced-cost access to education/training	Drugs	Academic achievement	Improved social behaviour	Multiple component intervention Incentive given to participate
			Incentives		Inequalities	Improved attitude to education	Vocational training	
			Service access		Pregnancy prevention	Truancy	Volunteering	
			Skill development					
social support								
Harrell <i>et al.</i> (1999)	USA	RCT	Incentives	Cash payments	Drugs	Academic achievement	Aggression	Mentoring
			Parent training	Edible		Improved attitude to education	Crime prevention	Multiple component intervention Incentive given to participate Incentive given contingent on behaviour change Negotiated incentive
			Resource access	Experiential		Attendance	Improved social behaviour	
			Service access	Reduced-cost resources			Volunteering	
			Social support	Vouchers			Parenting Inequalities	

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Harris <i>et al.</i> (2001)	USA	RCT	Incentives Social support	Disincentives	Not applicable	Participation in post-compulsory education Attendance Inequalities	Not applicable	Multiple component intervention Incentive given contingent on behaviour change
Jones and Monday (1990)	USA	Trial	Education Incentives Social support	Achievement recognition Gifts Vouchers	Child neglect Inequalities Parenting Pregnancy prevention	Not applicable	Not applicable	Multiple component intervention Incentive given to participate
Krahe (2005)	Germany	RCT	Incentives	Raffle/lottery	Sexual health	Not applicable	Not applicable	Single or dual component intervention No behaviour change measured

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Penton (2000)	USA	Trial	Counselling Incentives Parent training	Achievement recognition	Not applicable	Participation in post-compulsory education Academic achievement Improved attitude to education Improved classroom behaviour Attendance Inequalities	Not applicable	Multiple component intervention Incentive given contingent on behaviour change
Price <i>et al.</i> (1992)	USA	Trial	Education Incentives Skill development	Prizes	Tobacco	Not applicable	Not applicable	Multiple component intervention
Rourke (1994)	Canada	Trial	Activity Education incentives resource access	Prizes Access to protective resources	Accidents Injury	Not applicable	Not applicable	Multiple component intervention Incentive given contingent on behaviour change

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Sallis <i>et al.</i> (2003)	USA	RCT Process evaluation	Activity Education Environmental modification Incentives	Cash payments Raffle/lottery	Healthy eating	Not applicable	Not applicable	Multiple component intervention Incentive given to participate Incentive given contingent on behaviour change
Schinke <i>et al.</i> (2000)	USA	Trial Process evaluation	Activity Education Incentives Skill development	Achievement recognition Experiential Free or reduced-cost access to education/training Reduced-cost resources	Not applicable	Academic achievement Homework Improved attitude to education inequalities	Not applicable	Mentoring Multiple component intervention Incentive given to participate
Schirm (2003)	USA	RCT Process evaluation	Activity Education Incentives Skill development Social support	Achievement recognition Cash payments	Drugs Inequalities Pregnancy prevention	Participation in post-compulsory education Academic achievement Improved attitude to education Truancy	Crime prevention Improved social behaviour Vocational training Volunteering	Multiple component intervention Incentive given to participate Incentive given contingent on behaviour change

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Schissel (1991)	USA	Trial Process evaluation	Education Incentives	Raffle/lottery	Not applicable	Academic achievement Truancy Improved classroom behaviour Inequalities	Not applicable	Multiple component intervention Incentive given contingent on behaviour change
Scott (1999)	USA	Trial Process evaluation	Education Incentives	Prizes	Not applicable	Academic achievement	Not applicable	Single or dual component intervention Incentive given contingent on behaviour change No relevant behaviour change outcome

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Smyer and Bliss (1991)	USA	Trial	Activity Education Incentives Parent training Resource access	Cash payments Experiential Vouchers	Not applicable	Participation in post-compulsory education Academic achievement Improved attitude to education Truancy Attendance Inequalities	Not applicable	Multiple component intervention Incentive given contingent on behaviour change
Spencer <i>et al.</i> (2005)	USA	RCT Process evaluation	Education Incentives	Cash payments	Not applicable	Academic achievement Inequalities	Not applicable	Single component intervention No relevant behaviour change measured
St Pierre and Kaltreider (1997)	USA	Trial Process evaluation	Education Incentives Skill development Social support	Prizes Achievement recognition Edible Experiential	Drugs Inequalities Parenting	Not applicable	Not applicable	Multiple component intervention Incentive given contingent on behaviour change

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Veerkamp (2002)	USA	Trial Process evaluation	Education Incentives	Raffle/lottery	Not applicable	Academic achievement	Not applicable	Single or dual component intervention Incentive given contingent on behaviour change No relevant behaviour change measured
Wolfe <i>et al.</i> (1986)	USA	Trial	Education Incentives	Achievement recognition Gifts	Not applicable	Academic achievement	Not applicable	Single or dual component intervention Incentive given contingent on behaviour change No relevant behaviour change measured

Item	In which country was the study carried out?	What type of study does this report describe?	Type(s) of intervention	What type of incentive is provided?	What type of health behaviour is the study focused on?	What type of educational behaviour change is the study focused on?	What type of social behaviour change is the study focused on?	Features of the intervention
Yueh and Alessi (1988)	USA	Trial	Education Incentives Social support	Gifts	Education system	Academic achievement	n/a	Single or dual component intervention Incentive given contingent on behaviour change No relevant behaviour change measured

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