NICE guidance on drug misuse prevention: targeted interventions

Review of economic evidence

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December 2015

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Abbreviations

BCR	Benefit to cost ratio
NICE	National Institute for Health and Care Excellence
NIHR	National Institute for Health Research
OECD	Organisation for Economic Co-operation and Development
WSIPP	Washington State Institute of Public Policy

Executive summary

Aims and objectives

This work was undertaken to support the development of guidance on targeted drug misuse prevention interventions by the National Institute for Health and Care Excellence (NICE). We used systematic review methods to identify cost-effective interventions that prevent or delay drug use, or that prevent escalation of drug use. In line for the scope for this work the main review question addressed was: *Which targeted interventions are most cost effective in preventing drug misuse among groups of people most at risk?* Eight sub questions were also considered that addressed aspects such as the content and framing of interventions, mode of delivery, and other contextual factors.

Methods

The review was conducted in accordance with Developing NICE guidelines: the manual[1]. Searches were conducted in nine major health and health economics databases in July 2015. A search for named programmes was developed by the internal NICE team for the review of effectiveness evidence and relevant findings shared. Further references were identified using a snowball approach. Inclusion was limited to English language studies published since 1995 and search limits were applied so that only studies published since 1995 were retrieved for screening.

The relevance of each article identified was assessed according to pre-defined criteria established in the review protocol (The full protocol is provided in Appendix 2). Economic evaluations that considered both costs and consequences were eligible for inclusion. Evaluations of interventions carried out in a variety of settings were considered including social environments, fitness environments, environments where drugs may be used in a sexual context, online environments, youth clubs, education environments and health care environments. Populations eligible for inclusion were determined in line with the scope and included children, young people and adults, (i) who are most likely to start using drugs or who are already experimenting, or (ii) who use drugs occasionally or who are risk of moving onto other drugs. Studies with any objective outcomes related to drug misuse prevention were eligible for inclusion, as outlined in the scope. In addition, to be eligible for inclusion studies had to provide economic outcomes including, for example, quality of life, intervention costs and incremental cost-effectiveness ratios.

Findings

From the database searches, a total of 108 articles were identified as potentially relevant and eligible for further screening. None of the identified articles met the review inclusion criteria. Information from additional sources (checking reference lists and searches of key

[1] Manual available at https://www.nice.org.uk/article/PMG20/chapter/1%20Introduction%20and%20overview

websites) was considered. These strategies identified three reports by the Washington State Institute for Public Policy (WSIPP) that reported summary findings from the WSIPP cost-benefit model for economic evaluation of four intervention types targeted at relevant populations. The WSIPP identify evidence on effectiveness through systematic reviews of the literature and calculate cost benefit ratios for interventions. These cost benefit ratios are based upon the costs of implementing the intervention in Washington State and the benefits from outcomes such as preventing substance misuse.

The four intervention types modelled by the WSIPP were: (1) a multi-setting intervention in the United States for young adolescents, including those at risk of truancy and school dropout (CASASTART); (2) a family management intervention for parents and their children who were identified as being 'at risk' (the Family Check-Up); (3) a therapy and skills-based intervention for looked after children with emotional and behavioural problems and their foster parents (Multidimensional Treatment Foster Care); and (4) school-based student mentoring. The model identified student mentoring and Multidimensional Treatment Foster Care as promising approaches with a favourable benefit to cost ratio (BCR) reported (16.42 and 2.11 respectively). All costs were expressed in 2014 dollars. Programme benefits (benefits minus costs) over the life course were estimated at $28,003 for student mentoring and $9,126 for Multidimensional Treatment Foster Care. The findings for CASASTART (BCR unavailable, programme benefits minus costs: -$12,017) and the Family Check-Up (BCR 0.24; programme benefits minus costs: -$251) were not favourable, with both programme costs being calculated as being greater than the benefits accrued. Across all four intervention types, there were limited intervention impacts on substance use outcomes.

Evidence Statement 1

An economic evaluation based on a criminal justice orientated cost-benefit model identified that peer mentoring interventions targeting at-risk students including regular truants (benefit cost ratio 16.42; total benefits $29,819, total costs $1,816) were estimated to be cost saving. Not all peer mentoring interventions included within the cost-benefit model were targeted to a specific population. There was noted to be potentially serious to minor limitations with the model's applicability outside a criminal justice perspective and uncertainty regarding methodology. There is further uncertainty about the applicability of the model to the UK, as it is based upon policy options available in Washington State, sources for costs and resources are from the United States, and all evaluations of intervention effectiveness included in the model were from the United States.

Evidence Statement 2

An economic evaluation based on a criminal justice orientated cost-benefit model identified that an intervention targeting looked after children, Multidimensional Treatment Foster Care, (benefit cost ratio 2.11; total benefits $17,356, total costs $8,230) was estimated to be cost saving. There were noted to be potentially serious to minor limitations with the model's

applicability outside a criminal justice perspective and uncertainty regarding methodology. There is further uncertainty about the applicability of the model to the UK, as it is based upon policy options available in Washington State, sources for costs and resources are from the United States, and all evaluations of intervention effectiveness included in the model were from the United States with the exception of one evaluation from Sweden.

Evidence Statement 3

Economic evaluations based on a criminal justice orientated cost-benefit model identified that for two multicomponent interventions targeting at risk children, CASASTART (benefit cost ratio unavailable, total benefits -$4,979, total costs $7,038) and the Family Check Up (benefit cost ratio 0.24; total benefits $77, total costs $328) costs outweighed benefits. CASASTART targeted children in 'high risk' neighbourhoods including, but not exclusively, truants and school drop outs. Family Check-Up targeted children identified as being 'at-risk' by their teachers. There were noted to be potentially serious to minor limitations with the model's applicability outside a criminal justice perspective and uncertainty regarding methodology. There is further uncertainty about the applicability of the model to the UK, as it is based upon policy options available in Washington State, sources for costs and resources are from the United States, and all evaluations of intervention effectiveness included in the model were from the United States.

Conclusions

This review has identified that there is a lack of evidence from English language studies published since 1995 to determine the cost-effectiveness of targeted interventions that aim to prevent or delay drug use, or escalation of drug use. Limited evidence was identified from economic modelling undertaken by the WSIPP, which indicates that student mentoring interventions and a comprehensive therapy and skills-based intervention for looked after children (Multidimensional Treatment Foster Care) may be cost saving. While there have been advances in the drug prevention evidence base, the findings of our review highlight a need for more research to be carried out on targeted interventions that aim to prevent or delay drug use. This research needs to include an economic component so that decision makers can, in future, base decisions on the best available evidence of effectiveness and cost effectiveness. Taking into the account the limitations of the WSIPP model, however, the approach taken shows that it is possible to model return on investment from prevention programmes.

1 Introduction

1.1 Aims and objectives

This work was undertaken to support the development of guidance on targeted drug misuse prevention interventions through undertaking a systematic review to identify cost-effective interventions that prevent or delay drug use, or that prevent escalation of drug use.

1.2 Research questions

The key research questions were adapted from the protocol for the concurrent review of effectiveness evidence being carried out alongside this review by NICE. In line with the scope for this work the main review question was:

Which targeted interventions are most cost effective in preventing drug misuse among groups of people most at risk?

Eight sub questions were:

- How does cost-effectiveness vary according to the content and framing of any message?
- How does cost-effectiveness vary according to mode of delivery?
- How does cost-effectiveness vary according to who delivers it?
- How does cost-effectiveness vary according to where it is delivered?
- How does cost-effectiveness vary according to intensity/duration of the intervention?
- How does cost-effectiveness vary according to intended recipient?
- What is the most cost-effective way for prevention interventions to be delivered using existing resources?
- What is the threshold for the cost of interventions for them to be cost effective?

2 Background

Although general population prevalence of substance use seems to be falling from the historic highs reported in the late 1990s (Home Office Statistics Unit, 2014), misuse of drugs remains a public health priority. Use in England remains particularly high in young people (Home Office Statistics Unit, 2014), and in international comparison studies with European counterparts (Hibbell et al., 2011). Furthermore, the proportion of young people (aged 16-24) in England and Wales classed as frequent drug users is increasing, and such users tend to be concentrated in more deprived areas (CSEW, 2014), indicating a source of health inequality. The overall number of drug related deaths increased sharply between 2012 and

2014, with 2014 representing the highest rate of drug related deaths since comparable records began in 1993 (39.9 deaths per million population) (ONS, 2015). The rate of Hepatitis C infection in people who inject drugs in England is estimated to be around 50% (PHE, 2014). Whilst the drug treatment population is generally ageing, the proportion of young clients requesting treatment relating to cannabis use is increasing, and 60% of young service users also present with a range of complex additional needs, including self-harm, offending behaviour, educational disengagement, and being looked after (PHE, 2015).

In response to the changing profile of substance use in the UK, over the previous decade there have been developments with regards to drug prevention policy and practice, and in the prevention science that underpins it. A recent paper (2015) published by the Advisory Council on the Misuse of Drugs (ACMD) highlighted important changes in the visibility and priority of prevention activities in national policy and strategy. Briefly, although drug prevention *per se* has become less visible in national policy (e.g. UK Drugs Strategy 2010, and subsequent Annual Reviews), a clear emphasis has been placed on embedding preventative actions within a life course approach to health and wellbeing. Furthermore, an emphasis has also been placed on 'recovery' from drug dependence in national and local action plans. Meanwhile, a focus on prevention has involved shifting away from classic universal and programmed approaches, to concentrate on more generic support for early years, as well as multidomain support in those groups considered at most risk from the harmful effects of drug use. This shift has been partly based on changes in political priority, but also reflects emerging evidence that actions targeting multiple risk factors may be a cost effective way of addressing multiple health compromising behaviours. However, targeted, drug-specific prevention interventions remain a valid approach, particularly for individuals considered to be at a high risk of drug related harm. For example, the emergence of new and novel psychoactive substances (so called 'legal highs'), presents unique challenges to drug services. Notably, the greatest burden of harm is predominately, although not exclusively, within existing service users and those drug users who have historically not received/required intervention.

Since the publication of NICE Public Health guideline 4 in 2007, there have been advances in the drug prevention evidence base. In addition to primary research, several Cochrane and other systematic reviews have been published which have identified promising approaches. Other work has described those structures and systems necessary for the delivery of evidence based prevention (e.g. Brotherhood and Sumnall, 2011). In addition to establishing evidence regarding the effectiveness of prevention approaches, it is also important to identify whether these approaches are cost-effective. Economic evaluations help understanding on the costs of implementing interventions and the financial benefits associated with intervention outcomes. Drug use is associated with a range of economic costs for individuals, families, communities and societies. For example, drug use can involve negative impacts upon healthcare, crime, antisocial behaviour and the criminal justice system, as well as loss

of earnings and productivity (Fordham et al, 2007). There are clear benefits, therefore, of implementing interventions that reduce drug use. Drug prevention interventions may also be associated with a range of costs including primarily the direct costs from implementation and delivery, but also the indirect and intangible costs related to the impact on the individual receiving the intervention (Fordham et al, 2007). It is therefore important to identify and consider the relative economic costs and benefits associated with implementing drug preventions.

3 Methods

3.1 Search strategy

The search approach taken for the review was comprehensive and aimed to identify all potentially relevant studies. All searches were conducted in accordance with Developing NICE guidelines: the manual[2].

3.2 Electronic sources

The following major health and health economics databases were searched in July 2015:

- Medline & Medline in-process
- PsycINFO
- Embase
- Econlit
- NHS Economic Evaluation Database
- Health Technology Assessment Database
- NIHR HTA Programme
- Social Care Online
- Social Policy & Practice

Search strategies were adapted to be run within each database from the search strategies developed by NICE for the concurrent review of effectiveness evidence. An example Medline strategy is presented in Appendix 1. A search for named programmes was developed by the NICE team for the review of effectiveness evidence, and adapted in each database by NICE with cost-effectiveness filters applied. Findings from this search were shared with the research team.

3.3 Additional sources

Further references were identified using a snowball approach whereby references of articles identified were checked as a means of identifying further sources of evidence including published and unpublished (‘grey’) literature. The snowballing technique incorporated searches of:

[2] Manual available at https://www.nice.org.uk/article/PMG20/chapter/1%20Introduction%20and%20overview

- Reference lists of retrieved articles meeting the inclusion criteria;
- Bibliographies of relevant literature;
- Reference lists of previous systematic reviews, review articles and other literature summaries
- Publications lists and libraries from key websites (detailed below)

The following websites were identified and searched for relevant articles in July 2015:

- NIHR Public Health Research Programme
- Advisory Council on the Misuse of Drugs
- European Monitoring Centre for Drugs and Drug Addiction
- UN Office on Drugs & Crime
- Organization of American States
- National Institute on Drug Abuse
- Substance Abuse and Mental Health Services Administration
- OECD iLibrary
- Washington State Policy Bureau

3.4 Inclusion and exclusion criteria

Inclusion in the review was limited to English language studies and search limits were applied so that only studies published since 1995 were retrieved for screening.

Two reviewers independently screened all titles and abstracts. Any discrepancies were resolved through discussion. Full titles of any titles/abstracts that were considered relevant by both reviewers were obtained for further screening. The relevance of each article was originally assessed according to pre-defined criteria established in the review protocol (The full protocol is provided in Appendix 2)

Types of studies

Economic evaluations conducted alongside trials, modelling studies and analyses of administrative databases were considered. Only full economic evaluations that compared two or more options (including comparison with a 'do nothing' alternative or controlled before and after studies) and considered both costs and consequences (including cost-benefit, cost-effectiveness, cost-utility, cost-minimisation analyses and before and after studies with an economic element) were eligible for inclusion.

Non-comparative costing studies, burden of disease studies and cost of illness studies were excluded, alongside studies that did not meet the minimum criteria for applicability and methodological quality.

Types of settings

Studies were eligible for inclusion if they evaluated interventions in a variety of settings as outlined in the scope including social environments, fitness environments, environments

where drugs may be used in a sexual context, online environments, youth clubs, education environments and health care environments. Interventions set in the workplace, in prisons and young offender institutions and universal school based interventions were excluded.

Types of populations

Populations eligible for inclusion were determined in line with the scope and included children, young people and adults who are most likely to start using drugs or who are already experimenting or who use drugs occasionally or who are risk of moving onto other drugs. Only the following population groups were included:

1. people who have mental health problems
2. people involved in commercial sex work or are being sexually exploited
3. people who are lesbian, gay, bisexual or transgender
4. people not in employment, education or training (including children and young people who are excluded from school or are regular truants)
5. children and young people whose parents use drugs
6. looked after children and young people
7. children and young people who are in contact with young offending team but not in secure environments (prisons and young offender institutions)
8. people who are considered homeless
9. people who attend nightclubs and festivals.
10. people who are known to use drugs occasionally / recreationally

Studies that focused on pregnant women were excluded from this review.

Types of interventions

Evaluations of interventions with a stated and measured aim of enhancing personal and social skills, improving self-confidence, increasing knowledge and awareness about the risks of drug use and/or increasing knowledge and awareness about how to reduce the risks and harms of drug use were eligible for inclusion.

Types of outcome measure

Studies with any objective outcomes related to drug misuse prevention were eligible for inclusion, as outlined in the scope. In addition, to be eligible for inclusion, studies had to provide economic outcomes including, for example, quality of life, intervention costs and incremental cost-effectiveness ratios.

3.5 Revisions to the inclusion criteria

Due to the lack of published economic evidence identified, inclusion criteria were modified to allow consideration of additional economic data. Types of populations were extended to include interventions targeting ‘at risk’ populations that were likely to include the populations discussed in 3.4.

3.6 Data extraction and quality assessment

Data relating to both study design and quality were scheduled to be extracted by one reviewer into a predesigned table in Word and independently checked for accuracy by a

second reviewer. The same reviewer who undertook extraction would assess the quality of the individual studies which would be checked by a second reviewer for accuracy with disagreements resolved through discussion. The quality of the studies was scheduled to be assessed according to criteria set out in Developing NICE guidelines: the manual.

4 Summary of evidence identified

4.1 Study selection flow chart

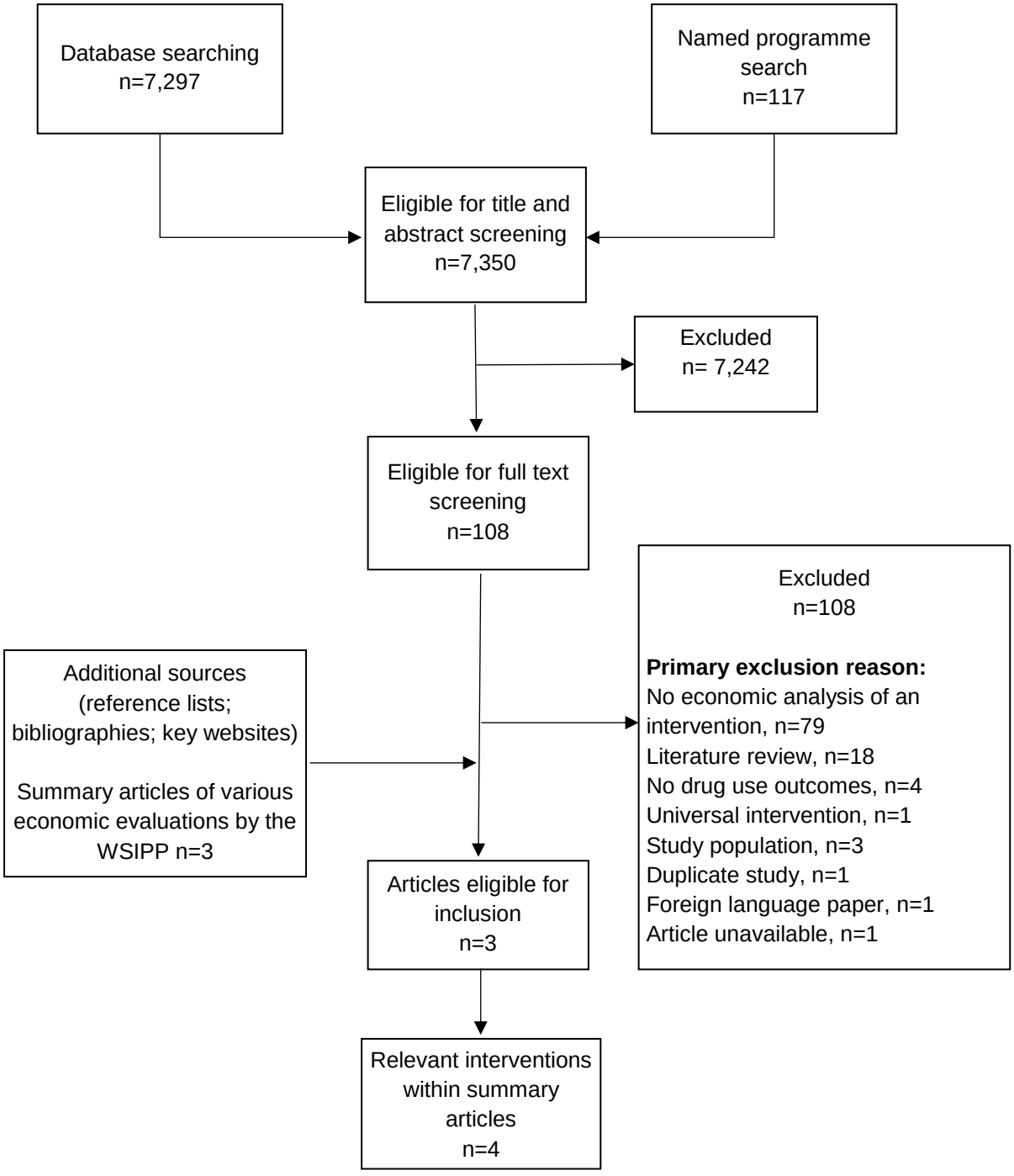

Figure 1: Flow chart of study selection

5 Findings

5.1 Summary of evidence

There were no published economic evaluation studies identified that were eligible for inclusion in this review, as described in Section 4.

Although no published economic evaluation studies were identified, through the searches of additional sources three summary reports of economic evaluations, conducted alongside a modelling study, were identified. While lacking the completeness required for a full appraisal of quality and applicability (though this was attempted) they are considered here in order to support the subsequent development of an economic model. The three reports available on the WISPP website (Aos et al., 2004; Hanley & Aos, 2014; Lemon et al., 2014) reported findings from economic analyses of various substance use and prevention interventions undertaken using the WSIPP's cost-benefit model. From this range of interventions we identified four that targeted populations relevant to this guidance and reported substance misuse and economic outcomes. In the following sections we examine this model and the outcomes reported in more detail using NICE methods for reviewing economic evaluations.

5.2 WSIPP cost-benefit model

5.2.1 Overview of the WSIPP model

The WSIPP model aims to provide a list of evidence-based and cost-effective public health programmes for the state of Washington, USA. The model calculates an expected return on investment for each programme analysed and the odds that an investment will have benefits at least as great as the costs of implementing it. Evidence of effectiveness is identified through systematic reviews of the literature around specific public health outcomes, for example reduction in teenage pregnancy, substance use or criminal activity. The model utilises a cost-benefit approach. A value is calculated for any outcomes that the evidence demonstrates are improved and then this value is compared to the costs of implementing the programme to provide an estimated return on investment. Key components of the model are summarised in Table 2.

Table 1. Overview of WSIPP model parameters

Model Details	Model Characteristics	Methods and outcomes
Authors: Washington State Institute for Public Policy **Year:** 2015**.** Estimates are regularly reviewed and updated. **Type of economic**	**Topics:** The model is used to undertake analysis on topics including: • Criminal justice • Education • Child welfare • Substance use • Mental health • Public health • Employment	**Time Horizon:** The model uses projected life-cycle costs and benefits of programs. **Perspective:** The model incorporates four perspectives to provide an overall cost-benefit view for policy makers in Washington State regarding delivery of public services. Costs and benefits are calculated for: i) programme participants, ii) taxpayers, iii) human capital

analysis: Cost-benefit analyses **Source of funding:** Not applicable **Quality score:** Limited applicability/ Minor limitations	• Health care • General prevention **Data Sources:** Evidence for the model is sourced through systematic reviews of the literature to identify high quality studies. Meta-analysis is undertaken to calculate average effects from all high quality studies available on a programme or approach. **Setting:** The model includes international evidence with a focus on studies from the US. The model is designed to calculate what will work to improve outcomes and make cost-beneficial improvements in the State of Washington in terms of public service delivery systems.	outcomes, iv) net changes in the value of a statistical life and net changes in the deadweight costs of taxation **Measures of uncertainty:** Risk and uncertainty is modelled using a Monte Carlo simulation to estimate the riskiness of benefit-cost results through running multiple versions of the model. In each version different estimates of Programme Effect Sizes, Linked Effect Sizes and Discount Rates are used in the simulation. **Cost estimates:** Estimates are derived from a range of United States national sources and data for Washington State. To estimate the monetary value of changes in substance use the model utilises an incidence-based approach i.e. how much benefit in the future may there be from reducing substance use. Costs and benefits included in the model relating to substance use include: earnings relating to morbidity and mortality, costs of medical care, crime costs, traffic collision costs, treatment costs and labour market gains. **Discount rate**: The model uses low (2%), modal (3.5%), and high (5%) discount rates.

5.2.2 Quality assessment of the WSIPP model

The methodology underpinning the WSIPP model[3] was assessed using the NICE quality appraisal checklist for economic evaluations, and is summarised in Table 3. Overall the model outputs were assessed to be partially applicable to the UK: the model is based upon policy options available in Washington State, USA, and sources for costs and resources are from the USA. The model was first developed to consider a range of policy options with a focus on criminal justice programmes, which is reflected in model outcomes. Overall the model was considered to have minor limitations. However potentially serious limitations arise because of the generic structure of the model, which originates from a criminal justice perspective, and the model may therefore not be consistent with theories relating to the prevention and reduction of drug use. Additional limitations of the model relate to the estimates of treatment effects and of costs and resource use associated with the interventions examined. Although reportedly based on meta-analyses the summaries provided do not allow the rigour with which these are conducted to be assessed. In practice

[3] A full technical overview of WSIPP methodology is available at: http://www.wsipp.wa.gov/TechnicalDocumentation/WsippBenefitCostTechnicalDocumentation.pdf

it is notable that some effect sizes are based on single studies only. Sources of resource use and programme costs are poorly defined and are unlikely to have applicability beyond a policy setting of Washington. Finally, although sensitivity analyses are conducted these are not described in detail in the technical documentation and we cannot be certain that key uncertainties are explored.

Table 2: Assessment of WSIPP model quality

Part 1: Model applicability			
1.1 Appropriateness of study population	1.2 Appropriateness of interventions	1.3 Similarity to UK	1.4 Clear statement of perspective
Yes	Yes	Partly	Yes
1.5 Inclusion of direct health effects	1.6 Appropriateness of discounting of future costs and outcomes	1.7 Expression of value of health effects in QALYs	1.8 Appropriateness of costs and outcomes from other sectors
Yes	No	No	Partly
Overall assessment of applicability: Partially applicable			
Part 2: Model limitations			
2.1 Model structure reflects topic	2.2 Time horizon sufficiently long	2.3 Important and relevant outcomes included	2.4 Estimates of baseline outcomes from best source
Partly	Yes	Partly	Yes
2.5 Estimates of 'treatment' effects from best source	2.6 Important and relevant costs included	2.7 Estimates of resource use from best source	2.8 Unit costs of resources from the best source
Partly	Yes	Partly	Partly
2.9 Incremental analysis presented or calculable	2.10 Sensitivity analysis on parameters with uncertain values	2.11 Potential conflict of interest	
Yes	Unclear	No	
Overall assessment of study limitations: Potentially serious to minor limitations			

5.2.3 Economic evaluations conducted with the WSIPP model

The WSIPP model has been used to examine the costs and benefits of a large range of policy options and programmes. In the domain of substance abuse, a variety of policy and intervention measures have been assessed using the model, including the costs and

benefits of four interventions that are targeted towards populations relevant to this review. The interventions examined by the WSIPP model that are included here are:

- CASASTART[4]: a multi-setting intervention in the United States for young adolescents including those at risk of truancy and school drop-out;
- Family Check-Up[5]: a family management intervention for parents and their children identified as being at risk;
- Multidimensional Treatment Foster Care[6]: an intensive therapeutic foster care programme that provides alternative care to placement within institutions for young people with behavioural problems; and
- Student mentoring interventions[7]: a range of school-based mentoring interventions such as the Big Brothers and Big Sisters programme.

Details of these interventions are provided in Table 4. The WSIPP methodology specifies that evaluations must (i) have a control or comparison group and meet WSIPP standards regarding demonstration of intention to treat samples, (ii) have no difference in baseline measures between samples (in non-randomised studies), and (iii) have sufficient data to calculate effect sizes. Effect sizes for each of the programmes assessed by the WSIPP model are estimated by pooling data across multiple evaluations using a meta-analytic framework. Pooled effect sizes are adjusted to reflect what is termed 'real-world implementation'. Full details of these adjustments are provided in the technical documentation[1]. In addition to directly measured outcomes from the evaluations included in the meta-analysis, the WSIPP model uses other sources of evidence to derive data linkages to what are termed "indirectly measured" outcomes.

The four programmes were analysed using the WSIPP cost-benefit model as described in Section 5.2.1. All costs and benefits are expressed in 2014 dollars. Substance use outcomes and the corresponding pooled unadjusted effect sizes are presented in Table 4. Only one of the four programmes examined, Multidimensional Treatment Foster Care, showed a statistically significant effect on drug use in the most recent meta-analyses conducted by the WSIPP.

[4] Model results available at: http://www.wsipp.wa.gov/BenefitCost/ProgramPdf/137/CASASTART (accessed December 2015)
[5] Model results available at: http://www.wsipp.wa.gov/BenefitCost/Program/380 (accessed December 2015)
[6] Model results available at: http://www.wsipp.wa.gov/BenefitCost/ProgramPdf/20/Multidimensional-Treatment-Foster-Care (accessed December 2015)
[7] Model results available at: http://www.wsipp.wa.gov/BenefitCost/ProgramPdf/365/Mentoring-for-students-school-based-with-volunteer-costs (accessed December 2015)

CASASTART

CASASTART was a comprehensive case management strategy for preventing drug use and delinquency for small groups of high-risk adolescents living in highly distressed neighbourhoods (Table 4). Effect size estimates calculated for the WSIPP model were based on data from two evaluations (Harrell et al, 1999; Mihalic et al, 2011). The later evaluation of CASASTART found no effects of the programme, and some iatrogenic effects for girls (Mihalic et al., 2011). Sources of benefits included in the model were: crime, grade year repetition, labour market earnings (based on high school graduation), property loss (based on alcohol abuse/dependence), health care (based on illicit drug abuse/dependence), health care (based on educational attainment), and adjustment for the deadweight cost of the programme. The poor outcomes for CASASTART resulted in the estimated benefits for the programme being calculated as negative (Table 5). For example, while monetary benefits were accrued in the domain of healthcare arising from substance use, from the perspective of participants, taxpayers and others, these were outweighed by the negative benefits estimated to taxpayers and others in the domain of crime.

Family Check-Up

The Family Check-Up was a family-based and ecological preventive intervention for children at-risk for problem behaviour (Table 4). Effect sizes calculated for the WSIPP model were based on estimates from single studies but with outcomes drawn from five evaluations published between 2007 and 2012 (Connell & Dishion, 2008; Connell et al. 2007; Stormshak et al, 2009; Stormshak et al, 2011; Van Ryzin & Dision, 2012). Sources of benefits included in the model were: crime, property loss (alcohol abuse/dependence), labour market earnings (based on major depression), health care (based on major depression) and adjustment for the deadweight cost of the programme. The costs of the programme were calculated as greater than the benefits, resulting in a benefit to cost ratio (BCR) of 0.24 (Table 5).

Multidimensional Treatment Foster Care

Multidimensional Treatment Foster Care (MTFC) was an intensive therapy intervention provided to young people and their foster parents as an alternative to placing young people in a foster care institution. The effect size estimates calculated for the WSIPP model were based on data from three evaluations published between 2010 and 2014 (Rhoades et al, 2014; Smith et al, 2010; Westermark et al, 2011). Programme effects for substance use were based on the outcomes of a single, small randomised controlled trial of 79 boys (Smith et al., 2010), which found significant effects of MTFC intervention on substance use outcomes (Table 4). Sources of benefits included in the model were: crime, labour market earnings (based on high school graduation), property loss (based on alcohol abuse/dependence), health care (based on disruptive behaviour disorder) and adjustment for the deadweight cost of the programme. The benefits of the programme were calculated as greater than the costs, giving a BCR of 2.11 (Table 5). Total benefits were estimated at

$17,356 – largely from the benefits accrued in relation to crime - with programme costs estimated at $8,230 (Table 5).

Student mentoring

Analysis of student mentoring interventions using the WSIPP model included a number of named interventions. Effect size estimates were calculated on the basis of five evaluations published between 1985 and 2009 (Bernstein et al, 2009; Converse & Lignugaris-Kraft, 2008; DeSocio et al, 2007; Flaherty, 1985; Karcher, 2008). As noted with the other interventions examined, effect sizes for substance use outcomes were based on estimates from single studies. Sources of benefits included in the model were: crime, labour market earnings (based on high school graduation), labour market earnings (based on test scores), health care (based on educational attainment), and adjustment for the deadweight cost of programme. The student mentoring interventions appeared to be promising approaches with a favourable BCR of 16.42. Total benefits from implementation over the life course were estimated at $29,819 - largely from the benefits accrued in relation to labour market earnings - and the costs of implementing programmes estimated at $1,816 (Table 5).

5.2.4 Summary and evidence statements

No evidence was found from high quality English language studies published since 1995 to determine the cost-effectiveness of targeted interventions that aim to prevent or delay drug use, or escalation of drug use. Based on a criminal justice orientated cost-benefit model (the WSIPP model) it appears that two intervention approaches that target a range of behaviours in addition to drug use - peer mentoring interventions in school settings and Multidimensional Foster Care Treatment - may be worthwhile investments as monetary benefits are greater than costs. The costs of two other programmes, CASASTART and the Family Check Up, outweighed any monetary benefits accrued. It is important to note that the model on which these judgements were based was only partially applicability to a UK setting and had minor to potentially serious limitations.

All of the evidence statements from this evidence review, evidence review 1, evidence review 2 and the health economic modelling are presented in the paper Evidence statements from all reviews.

Evidence Statement 1

An economic evaluation based on a criminal justice orientated cost-benefit model identified that peer mentoring interventions targeting at-risk students including regular truants (benefit cost ratio 16.42; total benefits $29,819, total costs $1,816) were estimated to be cost saving. Not all peer mentoring interventions included within the cost-benefit model were targeted to a specific population. There was noted to be potentially serious to minor limitations with the model's applicability outside a criminal justice perspective and uncertainty regarding methodology. There is further uncertainty about the applicability of the model to the UK, as it is based upon policy options available in Washington State,

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An economic evaluation based on a criminal justice orientated cost-benefit model identified that an intervention targeting looked after children, Multidimensional Treatment Foster Care, (benefit cost ratio 2.11; total benefits $17,356, total costs $8,230) was estimated to be cost saving. There were noted to be potentially serious to minor limitations with the model's applicability outside a criminal justice perspective and uncertainty regarding methodology. There is further uncertainty about the applicability of the model to the UK, as it is based upon policy options available in Washington State, sources for costs and resources are from the United States, and all evaluations of intervention effectiveness included in the model were from the United States with the exception of one evaluation from Sweden.

Evidence Statement 3

Economic evaluations based on a criminal justice orientated cost-benefit model identified that for two multicomponent interventions targeting at risk children, CASASTART (benefit cost ratio unavailable, total benefits -$4,979, total costs $7,038) and the Family Check Up (benefit cost ratio 0.24; total benefits $77, total costs $328) costs outweighed benefits. CASASTART targeted children in 'high risk' neighbourhoods including, but not exclusively, truants and school drop outs. Family Check-Up targeted children identified as being 'at-risk' by their teachers. There were noted to be potentially serious to minor limitations with the model's applicability outside a criminal justice perspective and uncertainty regarding methodology. There is further uncertainty about the applicability of the model to the UK, as it is based upon policy options available in Washington State, sources for costs and resources are from the United States, and all evaluations of intervention effectiveness included in the model were from the United States.

Table 3: Description of identified interventions included in the WSIPP model

Programme Details	Programme Characteristics	Intervention/ comparator	Substance use outcomes included in the model (unadjusted effect size, p value)	Other outcomes	Studies used in meta-analysis	Notes
Programme: CASASTART (Striving Together to Achieve Rewarding Tomorrows) **Model updated:** 2015 **Setting:** Home/ schools/ community	**Aim:** To reduce drug and alcohol use, incidence of disruptive behaviour at school, reduce drug-related crime and violence; and promote positive behaviour including school performance and prosocial activities **Population:** 11-13 year olds in high-risk neighbourhoods including truants and dropouts.	The intervention includes case management, after-school activities and law enforcement. The comparison groups receive no treatment or treatment as usual.	• Drug use before end of middle school (-0.30, p=0.18) • Drug use (-0.03, p=0.90) • Alcohol use before end of middle school (-0.14, p=0.39)	• Crime (0.07, p=0.74) • School year repetition (-0.18, p=0.31) • Truancy (0.38, p=0.03)	Harrell et al, 1999; Mihalic et al, 2011	Participants recruited from narrowly defined, severely distressed neighbourhoods.
Programme: Family Check-Up **Model updated:** 2015 **Setting:** Schools, community	**Aim:** To promote family management and address child and adolescent problem behaviour through a parent-centred intervention **Population:** The targeted component includes students and their parents identified by teachers as being at-risk. Also includes universal components.	Includes a universal component (establishment of family resource centre and 6-week prevention curriculum) followed by targeted assessment and brief motivational interview component for at-risk students and their parents and directing of parents of substance using children to treatment, parenting groups and family therapy. The comparison group received no treatment or treatment as usual.	• Cannabis use before end of middle school (-0.31, p=0.14) • Cannabis use in high school (-0.13, p=0.41) • Alcohol before end of middle school (-0.35, p=0.09) • Alcohol in high school (-0.05, p=0.74) • Smoking before end of middle school (-0.73, p=0.001) • Smoking in high school (-0.15, p=0.34)	• Crime (-0.04, p=0.93) • Major depressive disorder (-0.30, p=0.53) • Externalising behaviour symptoms (-0.01, p=0.94) • School grade point average (-0.06, p=0.69)	Connell & Dishion, 2008; Connell et al. 2007; Stormshak et al, 2009; Stormshak et al, 2011; Van & Dision, 2012	Also known as Positive Family Support, Adolescent Transitions Program High risk youths identified by teachers and targeted: it is unclear on what basis they are identified as high risk

Programme Details	Programme Characteristics	Intervention/ comparator	Substance use outcomes included in the model (unadjusted effect size, p value)	Other outcomes	Studies used in meta-analysis	Notes
Programme: Mentoring for students **Model updated:** 2015 **Setting:** Schools	**Aim:** To provide mentoring support to improve outcomes including substance use, crime rates and school performance. **Population:** School students across various interventions including truants, at-risk students and universal approaches.	Includes a range of school-based mentoring programmes for one-to-one relationship building and guidance. Programmes included Big Brothers Big Sisters, Project CHANCE, SMILE, the US Student Mentoring Program and other local programmes. Mentors including students, school staff or adult volunteers are paired with at risk middle and high school students and meet weekly for relationship building and guidance. The comparison groups receive no treatment or treatment as usual.	• Drug use before end of middle school (0.11, p=0.32)	• Crime (0.01, p=0.79) • High school graduation (0.69, p=0.03) • School grade point average (0.03, p=0.41) • School attendance (0.12, p=0.06) • School office discipline referrals (-0.51, p=0.14) • Academic test scores (-0.03, p=0.50)	Bernstein et al, 2009; Converse & Lignugaris-Kraft, 2008; DeSocio et al, 2007; Flaherty, 1985; Karcher, 2008	Different interventions including targeted and universal approaches are grouped together.

Programme Details	Programme Characteristics	Intervention/ comparator	Substance use outcomes included in the model (unadjusted effect size, p value)	Other outcomes	Studies used in meta-analysis	Notes
Programme: Multidimensional Treatment Foster Care **Model updated:** 2015 **Setting:** Home, schools	**Aim:** To enable children to function in family and school settings through reinforcing prosocial behaviours, improving parenting skills, reducing family conflict and improving relationship skills. **Population:** Fostered children and families who are in need of increased support due to high levels of behavioural problems, delinquency or incidence of abuse or neglect.	The programme consists of a series of comprehensive interventions. Activities include skills training and therapy for young people based on home and school life, as well as behavioural parent training and support for foster parents and to biological parents, with support provided during transition from foster to permanent home (where this occurs). The comparison groups in the two studies from the US received group care programs largely based upon positive peer cultures and prosocial norms. Additionally characteristics were individual therapy and family therapy. In the study set in Sweden, the comparison group received treatment as usual including residential care, home-based interventions and foster care placements. In the WSIPP model, the intervention cost estimate is compared with an alternative cost for youth in group homes.	• Cannabis use in high school (-0.34, p=0.02) • Illicit drug use in high school (-0.13, p=0.28) • Alcohol use in high school (-0.13, p=0.60) • Smoking in high school (-0.19, p=0.43)	• Crime (-0.54, p=0.09) • Under 18 pregnancy (-0.54, p=0.004) • Externalising behaviour symptoms (-0.63, p=0.07) • Internalising symptoms (-0.43, p=0.22)	Rhoades et al, 2014 ; Smith et al, 2010 ; Westermark et al, 2011	

Table 4: Summary of economic outcomes from the WSIPP model

Programme	Programme benefits	Cost estimates	Cost-benefit calculation
CASASTART (Striving Together to Achieve Rewarding Tomorrows) [in 2014 dollars]	• **Participants**: $251 • **Taxpayers**: -$50 • **Other (1)[1]:** -$1,607 • **Other (2)[2]**: -$3,574[3] **Total: -**$4,979	**Programme costs:** $7,038 **Comparison costs:** $0 **Total:** $7,038	**Benefits minus costs:** -$12,017 **Benefit to cost ratio**: unavailable[4] **Probability of a positive net present value[5]**: 21 %
Family Check-Up [in 2014 dollars]	• **Participants**: $0 • **Taxpayers**: $52 • **Other (1)[1]:** $162 • **Other (2)[2]** -$137 **Total:** $77	**Programme costs:** $328 **Comparison costs:** $0 **Total:** $328	**Benefits minus costs:** -$251 **Benefit to cost ratio**: 0.24 **Probability of a positive net present value[5]**: 47%
Mentoring for students [in 2014 dollars]	• **Participants**: $14,712 • **Taxpayers**: $8,926 • **Other (1)[1]:** $5,831 • **Other (2)[2]**: $351 **Total:** $29,819	**Programme costs:** $1,816 **Comparison costs:** $0 **Total:** $1,816	**Benefits minus costs:** $28,003 **Benefit to cost ratio**: 16.42 **Probability of a positive net present value[5]**: 68%
Multidimensional Foster Care Treatment [in 2014 dollars]	• **Participants**: $1,899 • **Taxpayers**: $4,279 • **Other (1)[1]:** $13,561 • **Other (2)[2]**: -$2,383 • **Total:** $17,356	**Programme costs:** $31,883 **Comparison costs:** $24,536 **Total:** $8,230	**Benefits minus costs:** $9,126 **Benefit to cost ratio**: 2.11 **Probability of a positive net present value[5]**: 65%

[1]Includes the benefits of reductions in crime victimization and the economic benefits of improvement in human capital outcomes;
[2]Includes estimates of the net changes in the value of a statistical life and net changes in the deadweight costs of taxation;
[3]This benefit calculation is reported in the WSIPP output without explanation and it is unclear why it is considered a negative benefit rather than a cost; [4]A benefit to cost ratio of -0.71 is reported in the WSIPP summary for CASASTART. A negative benefit to cost ratio is ambiguous in that it might refer to negative benefits or to negative costs so it is not reproduced here;
[5]WSIPP key measure of risk: *after running the model 10,000 times, what percentage of the time will the net present value of benefits be greater than zero (or the benefit-cost ratio be greater than one)?*

6 Discussion

Although the economic case for prevention seems intuitive, there have been few studies investigating the cost effectiveness of prevention programmes, and modelling studies are rare. Our review confirms this, finding that there is no evidence from high quality English language studies published since 1995 to determine the cost-effectiveness of interventions that aim to prevent or delay drug use, or escalation of drug use. However our review did identify a limited range of evidence from the WSIPP cost-benefit model.

Economic evaluation based on the WSIPP cost-benefit model suggests that cost savings may be achieved for two intervention approaches; those based upon peer mentoring and a comprehensive therapy and skills-based intervention for children and their foster and biological parents (Multidimensional Treatment Foster Care). The economic benefits calculated were largely associated with impact upon labour market earnings and crime,

respectively. The costs of two further interventions – for children and their families identified by their teachers as being at risk, including universal curriculum and targeted components (Family Check Up) and a multicomponent intervention targeting at risk children including regular truants and school drop outs (CASASTART) – costs outweighed benefits. Of the four interventions, only Multidimensional Treatment Foster Care was exclusively an intervention targeted at one of the populations relevant to this review. The other interventions included evidence from these populations, mainly truants, but not exclusively so and therefore evidence beyond the looked after children and truant populations is lacking in this review. Additionally across all evaluations included in the WSIPP modelling work, there was limited evidence of the effectiveness of these four intervention types to prevent drug use. In addition, the reliability of the evidence was low due to key limitations of the model and uncertainty about its applicability to the policy context in the UK.

7 Conclusions

This review has identified that there is a lack of evidence from English language studies published since 1995 to determine the cost-effectiveness of targeted interventions that aim to prevent or delay drug use, or escalation of drug use. Limited evidence was identified from economic modelling undertaken by the WSIPP, which indicates that student mentoring interventions and a comprehensive therapy and skills-based intervention for looked after children (Multidimensional Treatment Foster Care) may be cost saving. While there have been advances in the drug prevention evidence base, the findings of our review highlight a need for more research to be carried out on targeted interventions that aim to prevent or delay drug use. This research needs to include an economic component so that decision makers can, in future, base decisions on the best available evidence of effectiveness and cost effectiveness. Taking into the account the limitations of the WSIPP model, however, the approach taken shows that it is possible to model return on investment from prevention programmes.

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Appendix 1. Example search strategy

Medline

Database: Ovid MEDLINE(R) <1946 to July Week 2 2015>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <July 17, 2015>

1 ((Drug* or substance* or polydrug or "poly-drug" or "legal high*" or psychoactive* or "psycho-active*" or psychotropic* or (ketamine or speed or spice or cocaine or crack or mushroom* or solvent* or inhalant or "nitrous oxide" or "laughing gas" or benzodiazepine* or tranquiliser* or tranquilizer* or opioid* or hallucinogen* or "anabolic steroid*")) adj3 (use* or abus* or misuse* or "mis-use*" or refus* or problem* or taking or take* or experiment*)).ti,ab. (229729)

2 (Cannab* or marijuana or skunk or ecstasy or MDMA or LSD or "lysergic acid diethylamide" or amphetamine* or amfetamin* or mephedrone or mkat or "meow meow" or meth or methamphetamine or methamfetamin* or psychedelic* or pcp or phencyclidine or ped or peds or pied or pieds or "performance enhancing" or "image enhancing" or heroin or poppers or "amyl nitrate" or "butyl nitrate" or "new psychoactive drug*" or "novel psychoactive drug*" or NPS).ti,ab. (107022)

3 exp *street drugs/ (7082)

4 exp *designer drugs/ (803)

5 exp *Drug-Seeking Behavior/ (467)

6 exp *Performance-Enhancing Substances/ (313)

7 1 or 2 or 3 or 4 or 5 or 6 (319491)

8 exp *Substance-Related Disorders/pc (10757)

9 exp *Amphetamine-Related Disorders/pc (59)

10 exp *Cocaine-Related Disorders/pc (139)

11 exp *Inhalant Abuse/pc (3)

12 exp *Marijuana Abuse/pc (144)

13 exp *Opioid-Related Disorders/pc (520)

14 exp *Phencyclidine Abuse/pc (0)

15 exp *Substance Abuse, Intravenous/pc (233)

16 exp *Marijuana Smoking/pc (87)

17 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 (10821)

18 exp Preventive Health Services/ (462407)

19 exp Primary Prevention/ (117759)

20 exp Secondary Prevention/ (15903)

21 prevent*.ti,ab. (1035106)

22 (avoid* or refus*).ti,ab. (299062)

23 (abstention or abstinen* or abstain*).ti,ab. (24257)

24 18 or 19 or 20 or 21 or 22 or 23 (1699511)

25 7 and 24 (51637)

26 17 or 25 (59987)

27 26 not (animals/ not (animals/ and humans/)) (52874)

28 (hiv adj prevent*).tw. (9106)

29 27 not 28 (51106)

30 hepatitis.ti. (123429)

31 29 not 30 (49890)

32 (rat or rats or mouse or mice).ti. (1154948)

33 31 not 32 (49443)

34 Economics/ or exp "Costs and Cost Analysis"/ or Economics, Dental/ or exp Economics, Hospital/ or exp Economics, Medical/ or Economics, Nursing/ or Economics, Pharmaceutical/ or Budgets/ or exp Models, Economic/ or Markov Chains/ or Monte Carlo Method/ or Decision Trees/ (286795)

35 (Economic* or cost or costs or costly or costing or costed or price or prices or pricing or pharmacoeconomic* or pharmaco economic* or budget*).ti,ab. (529810)

36 ((monte adj carlo) or markov or (decision adj2 (tree$ or analys$))).ti,ab. (51774)

37 (value adj2 (money or monetary)).ti,ab. (1481)

38 Quality of Life/ or Health Status Indicators/ or Quality-Adjusted Life Years/ or Value of Life/ (155631)

39 (quality of life or quality adjusted life or qaly* or qald* or qale* or qtime* or quality of wellbeing or quality of well-being or willingness to pay or standard gamble* or time trade off* or time tradeoff*).ti,ab. (172759)

40 (disability adjusted life or daly).ti,ab. (1920)

41 health* year* equivalent*.ti,ab. (39)

42 (sf36 or sf 36 or short form 36 or shortform 36 or sf thirtysix or sf thirty six or shortform thirtysix or shortform thirty six or short form thirtysix or short form thirty six).ti,ab. (18011)

43 (sf6 or sf 6 or short form 6 or shortform 6 or sf six or sfsix or shortform six or short form six).ti,ab. (1485)

44 (sf12 or sf 12 or short form 12 or shortform 12 or sf twelve or sftwelve or shortform twelve or short form twelve).ti,ab. (3330)

45 (sf16 or sf 16 or short form 16 or shortform 16 or sf sixteen or sfsixteen or shortform sixteen or short form sixteen).ti,ab. (24)

46 (sf20 or sf 20 or short form 20 or shortform 20 or sf twenty or sftwenty or shortform twenty or short form twenty).ti,ab. (351)

47 (euroqol or euro qol or eq5d or eq 5d).ti,ab. (5050)

48 or/34-47 (917976)

49 (((energy or oxygen) adj cost*) or (metabolic adj cost*) or ((energy or oxygen) adj expenditure*)).ti,ab. (23093)

50 (comment or editorial or letter or news).pt. (1652294)

51 49 or 50 (1675114)

52 48 not 51 (862748)

53 52 not (animals/ not (animals/ and humans/)) (821909)

54 (rat or rats or mouse or mice).ti. (1154948)

55 53 not 54 (820921)

56 55 and 33 (4602)

57 limit 56 to (English language and yr="1995 -Current") (3616)

Notes

1. For consistency, search terms are based on NICE effectiveness search.
2. MeSH terms without subheading /pc are ‘AND’ed with prevention terms. MeSH terms with subheading /pc are not ‘AND’ed with prevention terms, since by definition, /pc applies a prevention search to the MeSH heading.
3. All MeSH terms exploded but focus is kept for drugs terms. Focus not kept for prevention MeSH terms since this may not necessarily be the focus of the paper, but a reported outcome.
4. All freetext terms searched in title or abstract fields.
5. Economics filter (supplied by NICE) applied.
6. Limited to 1995- as per economic review protocol

Appendix 2. Review Protocol

	Details
Main review question	The following 10 at risk population groups will be searched / sifted for: 1. people who have mental health problems 2. people involved in commercial sex work or are being sexually exploited 3. people who are lesbian, gay, bisexual or transgender 4. people not in employment, education or training (including children and young people who are excluded from school or are regular truants) 5. children and young people whose parents use drugs 6. looked after children and young people 7. children and young people who are in contact with young offender team but not in secure environments (prisons and young offender institutions) 8. people who are considered homeless 9. people who attend nightclubs and festivals 10. people who are known to use drugs occasionally / recreationally[8].
Sub question 1	How does cost-effectiveness vary according to the content and framing of any message?
Sub question 2	How does cost-effectiveness vary according to mode of delivery?
Sub question 3	How does cost-effectiveness vary according to who delivers it?
Sub question 4	How does cost-effectiveness vary according to where it is delivered?
Sub question 5	How does cost-effectiveness vary according to intensity/duration of the intervention?

[8] Treatments or interventions for people described in the literature as having a drug problem / dependency / drug abusers will be excluded in line with the scope.

	Details
Sub question 6	How does cost-effectiveness vary according to intended recipient?
Sub question 7	What is the most cost-effective way for prevention interventions to be delivered using existing resources?
Sub question 8	What is the threshold for the cost of interventions for them to be cost effective?
Objective	The review will support the PHAC in developing recommendations for local authorities, service providers and commissioners about how best to commission and provide cost-effective targeted interventions that prevent or delay drug use, or that prevent escalation of drug use in terms of frequency, volume and diversification of drugs used.
Language	Only English language papers will be considered
Study design	Economic evaluations conducted alongside trials, modelling studies and analyses of administrative databases will be considered. Only full economic evaluations that compare two or more options (including comparison with a 'do nothing' alternative or controlled before and after studies) and consider both costs and consequences (including cost-benefit, cost-effectiveness, cost-utility, cost-minimisation, cost-benefit analyses and before and after studies with an economic element) will be eligible for inclusion. Non comparative costing studies, burden of disease studies and cost of illness studies will be excluded. Studies that do not meet the minimum criteria for applicability and methodological quality will be excluded. *Effectiveness studies* Relevant effectiveness studies will be tagged by the review team at the title & abstract sifting stage. A

	Details
	bibliography of tagged references will be passed to the NICE effectiveness review team for consideration. Effectiveness studies will be eligible for tagging if it is suspected that they meet the inclusion criteria for the effectiveness review
Setting	• Social environments where drugs may be available such as nightclubs, pubs, festivals and music venues. • Fitness environments such as gyms and sporting events. • Environments where drugs may be used in a sexual context (for example, ‘chemsex’ parties). • Online and ‘virtual’ environments, including social media. • Youth clubs and youth organisations. • Schools, colleges and universities. • Health, social care and other environments where interventions may be delivered, for example, primary health care services, sexual health services and custody suites. Interventions in prisons and young offender institutions will be excluded. Universal school based interventions (i.e. those not targeted at any of the population groups described) will be excluded. Interventions set in the workplace will be excluded (other NICE guidance covers workplace

	Details
	interventions). Included countries are: Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Turkey, UK, USA.
Population	Children, young people and adults who are most likely to start using drugs or who are already experimenting or who use drugs occasionally or who are risk of moving onto other drugs. Only the following population groups will be included: 11. people who have mental health problems 12. people involved in commercial sex work or are being sexually exploited 13. people who are lesbian, gay, bisexual or transgender 14. people not in employment, education or training (including children and young people who are excluded from school or are regular truants) 15. children and young people whose parents use drugs 16. looked after children and young people 17. children and young people who are in contact with young offending team but not in secure environments (prisons and young offender institutions) 18. people who are considered homeless 19. people who attend nightclubs and festivals. 20. people who are known to use drugs occasionally / recreationally[9].

[9] Treatments or interventions for people described in the literature as having a drug problem / dependency / drug abusers will be excluded in line with the scope.

	Details
Intervention	Interventions will be included that have a stated & measured aim of enhancing personal and social skills, improving self-confidence, increasing knowledge and awareness about the risks of drug use and/or increasing knowledge and awareness about how to reduce the risks and harms of drug use:
	• group-based skills training or information provision using lessons, talks and activities
	• one-to-one skills training, information provision and advice given as part of planned outreach activities
	• one-to-one skills training, advice and information provided using peer education initiatives
	• opportunistic skills training, advice and information provision
	• using targeted print and new media for different groups at risk of drug misuse to influence social norms or enhance skills and provide information and advice
	• family-based programmes providing structured support for children and young people at risk of drug misuse • group-based behaviour therapy for children and young people who are at risk of drug misuse
	• parental skills training for parents or carers of children who are at risk of drug misuse

	Details
Comparator	Other intervention No intervention or ‘normal care’ Before and after
Outcomes	Any objective outcomes related to drug misuse prevention For example: • Quality of life measures. • Drug-related morbidity and mortality (using, for example, hospital admissions). • Objective measures of drug use (for example, blood or urine tests). Behavioural outcomes (many will be self-reported outcomes). For example: • person never uses drugs • onset of drug use is delayed • person uses drugs less frequently • person stops using drugs. • Co-morbid measures (for example, alcohol use). In addition to these outcomes, to be eligible for inclusion studies will have to provide economic outcomes. The types of outcomes measure will vary according to the types of economic analyses identified but may relate to, for example, quality of life, intervention costs and incremental cost-effectiveness ratios. In order to provide data that will be useful for the economic modelling, data including effect size (for example relative risk reduction, odds ratio, hazard ratio) and distributions (for example confidence

	Details
	intervals, standard error) will be provided.
Searches	The team will liaise with the team at NICE to access their search strategies used in the effectiveness reviews. These search strategies will be adapted for the economic review, including the application of economic filters. The core search strategy devised for searching Medline will be adapted for searching the following databases since 1995: • Medline & Medline in-process • PsychInfo • Embase • Econlit • NHS Economic Evaluation Database (NHS EED) • HTA database • NIHR HTA Programme • Social Care Online • Social Policy & Practice Reference lists of all included articles, key publications and systematic reviews in the field will be searched for further studies to include. In addition, the following websites will be searched for relevant articles: • NIHR Public Health Research Programme • Advisory Council on the Misuse of Drugs • European Monitoring Centre for Drugs and Drug Addiction • UN Office on Drugs & Crime • Organization of American States • OECD iLibrary

	Details
	• Washington State Policy Bureau Details of all searches undertaken will be recorded to include the dates that searches were undertaken, names of databases, platforms and database coverage dates, names of other sources searched, details of supplemental searches and limits or search filters applied.
Data screening	All references from the database searches in each step will be downloaded, de-duplicated and screened on title and abstract against the criteria above. Where no abstract is available, a web search will be used to locate one; if none is found, references will be screened on title alone. All references will be screened by two reviewers independently, with any disagreements resolved through discussion between reviewers and consultation with a third reviewer if necessary. Where abstracts meet all the inclusion criteria, or if it is unclear from the study abstract whether it does, the full text will be retrieved and re-screened. Full-text screening will be carried out by two reviewers independently and any differences resolved by discussion between reviewers and consultation with a third reviewer if necessary. Studies that are excluded at the full paper stage will be recorded along with the reason for their exclusion.
Data extraction and QA	Quality assessment and data extraction for all included studies will be conducted using the tools in Developing NICE guidelines: the manual. All studies will be quality assessed and data extracted by one reviewer, with all data checked in detail by a second reviewer. Details of all extracted data will be entered into comprehensive evidence tables. Data to be extracted will include bibliographic details, population details, setting details, intervention details and outcomes. Substantial economic data, such as costs, effect sizes and distributions for each

	Details
	study will be provided in the summary tables. Where available, the method of eliciting any quality of life or utility data will be recorded (e.g. EQ-5D, HUI etc).
Data synthesis	A narrative description of economic data will be provided along with summary tables of economic evidence, as described in the NICE methods guidance.
Perspective	For most purposes, a public sector perspective will be used. The main components of this will be the NHS, local government and the criminal justice system, the relevant costs (and cost savings) of which may also be reported separately. It is not clear to which part of the public sector QALYs and other health outcomes should be attributed, so cost per QALY will apply only to the public sector as a whole, and not to its component parts.
Time horizon	Various time horizons will be used, from 1 year up to a lifetime.
Other information/criteria	The review will report on any unintended consequences or adverse outcomes.