Adolescent and Young Adult Health in Scotland

Interventions that address multiple risk behaviours or take a generic approach to risk in youth

CHIEF SCIENTIST OFFICE

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A report for the Adolescence and Young Adulthood (AYA) Working Group of the Scottish Collaboration for Public Health Research and Policy (SCPHRP)

Interventions that address multiple risk behaviours or take a generic approach to risk in youth: An environmental scan with special reference to Scotland

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Glossary

Substance use - Substance use refers to all of alcohol, tobacco or illicit drugs (unless otherwise stated).

Sexual risk behaviour - Refers to any or all of: unintended teenage pregnancy; early initiation of sexual intercourse; and inconsistence in or absence of contraception use (condom and/or other contraception), unless otherwise stated.

Early sexual initiation - Refers to sexual intercourse before the age of 16 years.

Abbreviations

AOR	Adjusted odds ratio
CI	Confidence interval
ESPAD	European School Survey Project on Alcohol and Drugs
ESYTC	Edinburgh Study of Youth Transitions and Crime
HBSC	Health Behaviour in School-age Children
HDA	Health Development Agency
LST	Life Skills Training
MRC	Medical Research Council
NICE	National Institute for Clinical Excellence
NNT	Number needed to treat
OR	Odds ratio
RCT	Randomised controlled trial
SALSUS	Scottish Adolescent Lifestyle and Substance Use Survey
UNICEF	United Nations International Children's Emergency Fund

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Executive Summary

Background and objectives

Scotland is widely recognised as the 'sick man of Europe', and the challenge of addressing health inequalities in children is as great as in adults. A recent UNICEF report places the UK as a whole at the bottom of a table of child wellbeing in rich countries. Given the impact that experiences in the formative years have on life trajectories and health and wellbeing in later years, there is an urgent need to improve the health and wellbeing of young people in Scotland.

As a response to this challenge, the Adolescent and Young Adulthood Working Group of the Scottish Collaboration for Public Health Research and Policy (SCPHRP) identified the use of interventions to address multiple, or generic, risk behaviour in young people as a priority area to focus on. The aim of the environmental scan was to explore, through scoping the literature, potential benefits and risks of adopting a generic approach to equitably reducing or preventing risk behaviour in adolescents and young people. The specific objectives were to: (i) identify and summarise the current Scottish government policies relevant to young people; (ii) review and summarise existing surveys and cohort studies relevant to adolescent and young adult risk behaviours; (iii) describe the overlap between risk behaviours in adolescents and young adults; (iv) identify public health interventions applied during adolescence and young adulthood which reported on **multiple** risk behaviour outcomes or took a generic approach to risk (focusing on cigarette smoking, alcohol, illicit drug use and sexual risk behaviours); and (v) identify potential interventions for development by the Adolescent and Young Adulthood Working Group.

Methods

In our review and summary of governmental policy, we searched relevant websites to identify international and Scottish Government policy relating to the health and wellbeing of young people.

We identified data sources for risk behaviour indicators in Scotland through the existing knowledge of these sources within our team. To further investigate the clustering of risk behaviours in young Scottish people, we commissioned secondary data analyses of the West of Scotland Twenty–07 and 16+ studies by colleagues at the Medical Research Council (MRC) Social and Public Health Sciences Unit at the University of Glasgow.

Our literature review consisted of three components. First, we performed a systematic review of reviews of primary studies of interventions to prevent or reduce multiple, or generic, risk behaviour in young people. We used a literature search strategy designed to identify reviews (published since 1999) of intervention studies that reported on alcohol, tobacco or illicit drug use, or sexual risk behaviour outcomes. From these reviews, we aimed to identify reviews of studies that had collected and reported on **multiple** (i.e. more than one) risk behaviour outcomes. Since we did not identify any **reviews** of studies that had collected multiple risk outcomes, we then performed a second primary systematic literature review of randomised controlled trials (RCTs) of interventions to reduce multiple risk behaviour in young people. Our search strategy was designed to identify RCTs in which both any of alcohol, tobacco or illicit drug use **and** sexual risk behaviour outcomes were collected.

Finally, we used the reviews identified in the first review described above to identify reviews of primary studies of interventions addressing **single** risk behaviours, in order to identify common features of effective intervention approaches across multiple risk behaviours.

In each of these reviews we excluded reviews of studies (or primary studies) that were: secondary prevention studies; clinical interventions; or that included highly selected, minority groups (such as young people from drug-using families, abused young people, for example).

Results

Policy review

International policy on young people's health and wellbeing emphasises the need for governments to invest in the early years of life, particularly to ensure equity from the start as a means of closing the gap in health inequalities. This reflects the evidence that early life influences have long-reaching impacts on health in adolescence as well as adulthood. The importance of the school as a health-setting is also endorsed by the World Health Organization (WHO) in their *Global School Health Initiative*.

The Scottish Government recognised the importance of young people's health in its White Paper *Towards a Healthier Scotland* (1999), and 'Early Years' and 'Teenage Transition' are two of four priority areas listed in *Improving Health in Scotland: The Challenge* (2003). Through the *Health Promoting School* and *Curriculum for Excellence,* the government has adopted a holistic approach to young people's health and wellbeing, to support young people to be 'successful learners, confident individuals, effective contributors and responsible citizens'. In terms of addressing specific risk behaviours such as smoking and alcohol, within the government's generic policies surrounding these behaviours there are specific action items relating to preventing or reducing risky behaviours among young people in particular. Some of the measures proposed concern regulation and control, but most of the actions related to the improved provision of education, information, support and treatment.

Patterns of risk behaviours in young people

National surveillance data on alcohol, tobacco and illicit drug use among 13 and 15-year-olds in Scotland is collected, currently biennially, in the Scottish Adolescent Lifestyle and Substance Use Survey (SALSUS). However, this survey collects no data on sexual risk behaviour. In addition, the smaller Health Behaviour in School-aged Children (HBSC) survey, a cross-national survey in 43 countries including Scotland, that is performed every four years, collects data on alcohol and tobacco use among 11, 13 and 15-year-olds, and cannabis use and sexual health among 15-year-olds only.

There is a dearth of surveys collecting risk behaviour data among older adolescents and young adults. The Scottish Health survey does collect data on young people aged between 16 and 24 years, but these data are limited to tobacco and alcohol use only, whilst the Scottish Crime and Victimisation survey collects some data on illicit drug use in those aged 16 and over.

From the SALSUS data, both tobacco and alcohol use increased among 13 and 15-year-olds during the past twenty years. However, in recent years, tobacco and alcohol use, as well as illicit drug use has decreased in both 13 and 15-year-old males and females. From the HBSC data, the rate of sexual intercourse prior to age 16 has remained at around one third, in males and females, since these data were first collected in 1998. However, although there has been a general decrease in the prevalence of many risk behaviours since the year 2000 (or more recently), UK risk behaviour rates in young people remain high, particularly with respect to other similar high-income countries.

Although risk behaviours in young people are widely considered to cluster together, our understanding of the degree and pattern of risk behaviour clustering is limited. Much of the evidence in the published literature derives from US-based studies of high-risk young people from low-income areas. In Scotland, the most informative recent data come from the SALSUS, which indicates that **regular** users of tobacco are highly likely to also regularly use illicit drugs and drink alcohol. A similar picture is observed for regular users of illicit drugs. However, the same strong pattern is not observed for alcohol, the most common substance that is used regularly among teenagers. This undoubtedly relates to the fact that drinking alcohol is a normative behaviour in this age group. Around half of all weekly users of alcohol do not report indulging in regular smoking or illicit drug use. A deeper understanding of risk behaviour clustering is needed, particularly to: identify gender differences; determine whether or not patterning differs for different socioeconomic groups; identify how sexual risk behaviours fit into the patterns of substance use; and determine how clustering differs by age.

Analyses were conducted using data from the West of Scotland Twenty–07 and 16+ cohort samples (recruited from the same geographic area in and around Glasgow city) at ages 18–19 in 1990 (Twenty–07) and 2003 (16+). These found that early sexual initiation (sex prior to age 16 years) was associated with an increased risk of most measures of both **current** and **early** substance (alcohol, tobacco or illicit drug) use in 1990 and 2003. The pattern of associations changed very little between 1990 and 2003, with the exception of the relationship between early sexual initiation and ever having used illicit drugs, which was statistically significantly weaker in 2003. Among females, there was a trend towards associations between most measures of substance use and early sexual initiation and 1990. Most of these associations were stronger, and statistically significant, in the 2003 cohort. In particular, the association between starting smoking prior to age 14 and early sexual initiation was statistically significantly stronger in the 2003 compared with the 1990 cohort. When we analysed relationships according to socioeconomic status, we found that, for both genders, the direction and strengths of associations were broadly similar for young people from a manual working background compared with a non-manual working background.

A brief review of the risk and protective factors for risk behaviours in young people found that these factors generally fall into the four domains of: individual; family; school; and community. Some of these predictors (such as school-connectedness, family connectedness, low income and poor housing) are common to substance use **and** sexual risk behaviours, providing further support for an intervention approach that addresses multiple risk behaviours.

Literature review

Review of reviews of interventions targeting multiple risk behaviours/generic risk behaviour

We found no **reviews** of primary studies of interventions to reduce alcohol, tobacco and illicit drug use **and** sexual risk behaviour.

Systematic review of primary studies of interventions to prevent/reduce multiple risk behaviours

We identified just eight RCTs where outcome data on both substance use (tobacco, alcohol or illicit drugs) **and** sexual risk behaviour were collected and reported in the published literature. Four of these included selected population subgroups (e.g. African-American youth from low-income communities) and four did not include selected population subgroups. Two of the latter interventions were school-based social influence and social skills focused programmes (Project ALERT and Life Skills Training, both USA-based), where data were initially collected on substance use in adolescence, with follow up in young adulthood for sexual risk behaviour outcomes. Both studies had some effects on substance use in the short term, but these did not generally persist in the longer term. Effects on sexual risk behaviour among young adults were less convincing, and limited by methodological shortcomings of the studies.

A third study, the Australian-based Gatehouse Project was designed to influence the school environment and promote a positive school ethos. Although there were trends towards reduced levels of risk behaviour among the original study cohort at three years follow up, these were not statistically significant. However, the study may not have been statistically powered to detect clinically significant differences. Furthermore, a change in school ethos is a gradual process and it may take some time before an impact on risk behaviour is observed. Indeed, among eighth grade students surveyed one year after work with schools had ended (i.e. four years post-implementation), there was a statistically significant reduction in early sexual intercourse, and in a composite variable of marked risky behaviours (defined as one or more of: early sexual behaviour; heavy substance use; and multiple reports of antisocial behaviour). Assuming that any changes made to the school ethos during the intervention period were sustained, the intervention therefore had a significant impact on risk behaviours among subsequent eighth grade students.

The fourth study, the USA-based Healthy for Life Project, included school, community, parent and peer components, but had no impact on any risk behaviour at two-year follow up.

We identified a further intervention, evaluated in a non-randomised controlled trial, which showed much stronger effects on adolescent and young adult risk behaviours than the studies described above. The Seattle Social Development project was implemented in grade 1 of elementary school among children aged about 6, with follow up into adolescence and young adulthood. At age 18, significantly fewer students in the intervention group reported heavy drinking, lifetime sexual activity, multiple sexual partners and pregnancy or causing pregnancy. At age 21, there were also significant effects on condom use, pregnancy, multiple sexual partners, and non-significant trends towards reduced substance use.

Review of reviews of interventions to prevent/reduce single risk behaviours

There are few intervention approaches that have been shown to be consistently effective in preventing or reducing each of tobacco, alcohol and illicit drug use **and** sexual risk behaviour in young people. To date, the most effective approaches have been policy-level interventions to increase the price of tobacco and restrict tobacco marketing, and interventions which use mass-media approaches to prevent smoking. Although access restrictions to alcohol and tobacco are effective in reducing alcohol consumption in the general population and underage sales of cigarettes, their specific effects on **young people's** drinking and smoking behaviour remains unclear. Similarly, the proposed impact of pricing measures on alcohol consumption remains more robust for adults than for adolescents. Media interventions have also been shown to be effective in reducing smoking uptake in young people, but further investigation is needed to determine their impact on other risk behaviours.

While knowledge-giving school-based interventions may be necessary, they are ineffective on their own and insufficient in themselves to prevent uptake of all risk behaviours. The evidence for school-based social influence and life skills training interventions is also very mixed and inconsistent across the different risk behaviours. Interventions that address the school environment and school ethos show some promise, but further research into their effectiveness is needed.

Parenting/family-based programmes have been shown to have some effect on smoking and drinking behaviour, but their effects on illicit drug use and sexual behaviour have not been as well studied. The most promising intervention is the Strengthening Families Program for Parents and Youth 10–14, implemented among families of 11-year-olds (in 7 two-hour-long family sessions), which had significant effects on preventing tobacco, alcohol and cannabis use four years later and hard drug use (i.e. methamphetamine) four to six years later. This programme has been adapted to the UK setting, and is currently being evaluated in a RCT in six areas across Wales.

Although multi-modal interventions (that address all or a combination of individual, family, school and community domains) require further research and evaluation, they do show some promise. This is in keeping with the observed effectiveness of the Seattle Social Development Project in particular, which targeted the individual, school and family domains.

Evaluations of interventions across risk behaviours share some common features that limit the conclusions that can be drawn regards effectiveness. For example, few studies have followed adolescents for more than three years and therefore the long-term impact of most interventions is unclear. Furthermore, methodological short-comings limit the reliability of the results of some studies. It is also difficult to isolate the common features of effective interventions across risk behaviours (such as point of intervention, duration of intervention, inclusion of booster sessions etc), since our review was dependent on and restricted by what was reported and discussed in the review literature, and, in particular, how interventions were generally classified in review-level literature. In addition, the heterogeneity of the design of primary studies made it difficult for reviewing authors themselves to identify elements of successful interventions.

Discussion

Data collection on adolescent risk behaviour in Scotland is reasonably good, with the exception of sexual risk behaviour, which is not collected by SALSUS, the national survey of risk behaviour in school children. There is also a dearth of data collection among older adolescents and young adults. The prevalence of risk behaviour increased among adolescent males and females during the 1990s, especially among females.

Since around 2000, rates of substance use have decreased in both males and females, whilst rate of sexual intercourse prior to age 16 years has remained high at one third since 1998. These risk behaviour rates are still considerably higher than in other similar high-income countries. Furthermore, there is good evidence that substance use and sexual risk behaviour in young people in Scotland do cluster to some extent among both males and females.

There are few evaluations of interventions where outcome data have been collected and reported on both substance use **and** sexual risk behaviour. Interventions that that were delivered in classroom settings and focused on social influence and life skills training had little long-term benefit. The most promising interventions include those which have targeted more than one of the four key domains of risk and protective factors. The Seattle Social Development Project is particularly promising, showing strong effects on both substance use and sexual risk behaviour into adulthood (numbers needed to treat [NNT][1] ranged from 6 to 10 compared with 16 to 36 in classroom-based individual-focused interventions).

A review of reviews of interventions addressing **single** behaviours found few intervention approaches that were **consistently** effective across different risk behaviours. Policy-level interventions affecting pricing and availability of tobacco and alcohol are among the most effective approaches, whereas the evidence from most other approaches is generally very mixed and often inconsistent. Given the limitations in drawing firm conclusions regarding the most effective interventions targeting **single** risk behaviours, it is therefore difficult to identify many commonalities of effective interventions **across** risk behaviours. However, the most promising intervention arising from this literature is the Strengthening Families Program for Parents and Youth 10–14, which shows a similar level of clinical efficiency on substance use in mid-adolescence (NNT 6 to 10), but its impact on sexual risk behaviour has yet to be determined.

Finally, intervention approaches, such as the Gatehouse Project, that aim to improve the school environment and promote a positive school ethos are also worthy of further investigation.

Given the importance of all four of the key domains of risk and protective factors for youth risk behaviour, a cross-domain intervention approach is needed to reduce initiation of risk behaviour in young people. In addition, it is important to note that the contribution and influence of each domain is not static, and will vary across the child-youth life-course. This should be reflected in the design of cross-domain interventions. Furthermore, intervention designs also need to take account of the important transition points (e.g. the transition from pre-adolescence to adolescence) and the critical periods of development (e.g. pre-adolescence and the transition from primary to secondary school) within the child-youth life-course, where there is an opportunity for strengthening protective factors and minimising exposure to risk factors. The introduction and evaluation of a cross-domain intervention approach is complex, and careful consideration must therefore also be given to the larger context within which interventions targeted at single or multiple risk behaviours should be placed. A model in which there are integrated, cross-sectoral collaborations may be the best mode by which to implement such an intervention approach.

Finally, it is important to note that, in considering intervention approaches aimed at preventing or reducing risk behaviour, it is imperative no to lose sight of the wider social context within which the transition from childhood to adolescence and then to adulthood occur, and the changing nature of youth transitions themselves, since these have an impact on the development of risk behaviours. A number of factors influence the success of these transitions, including social mobility, education, personal competence and resilience, as well as gender, neighbourhood deprivation and family support. The increasing complexity and protraction of youth transitions leads to an increase in the window of risk and vulnerability, making

[1] Number needed to treat should be interpreted here as the number of persons to whom the intervention needs to be administered to in order to prevent **one** person from participating in the risk behaviour.

risk-taking behaviour more likely. In addition, key societal factors including cultural norms and attitudes, marketing and media, and access to attractive leisure and social facilities all play an important role in influencing youth risk behaviour. Recognition of this complex societal picture and of the nature of youth transitions must therefore be taken into account when designing programmes aimed at influencing health behaviour in young people.

Recommendations

The findings from this environmental scan have a number of implications for the evaluation of multiple risk interventions in general, and identifying a number of areas of priority for Scotland specifically.

Within Scotland, routine national surveillance data on sexual risk behaviour in adolescents, and sexual risk behaviour and illicit drug use among older adolescents and young adults should be collected. The striking increase in rates of risk behaviour among females between 1990 and 2003 within Glasgow City Region reflects a convergence of risk behaviours between males and females, with the attenuation of gender differences in recent years. Despite this convergence in risk behaviour, interventions should be evaluated for their separate effect on males and females. The interventions, themselves, may also need to be tailored to gender.

Further studies are needed that develop and evaluate interventions aimed at preventing or reducing multiple risk behaviour, with collection of outcomes on substance use **and** sexual risk behaviours. The Seattle Social Development Project and the Strengthening Families Program for Parents and Youth 10–14 have both been shown to be effective in reducing multiple risk behaviours, while the Gatehouse Project shows promise.

Consideration should be given to adapting and evaluating one or more of these interventions within Scotland, or to developing a multi-component programme which combines components from these successful or promising interventions, ideally using an approach that achieves successful community and cross-sectoral participation and collaboration.

Any intervention approach should recognise the key transition points and critical periods of development within the child-youth life-course, to identify the appropriate time periods within which to implement specific interventions. Furthermore, although interventions aimed specifically at preventing or reducing risk behaviour are necessary in improving the health and wellbeing of young people, these must be accompanied by broader social change (to address the impact of pricing and availability of substances, marketing, media, culture and social norms on risk behaviour) and efforts to reduce marginalisation, social exclusion and the vulnerability of young people during periods of transition.

1 Chapter 1 – Introduction and background

Health and wellbeing of young people in the UK

The public health challenges in Scotland are well-recognised, with poor nutrition, smoking, substance misuse, psychiatric and social problems constituting the main issues distributed according to socioeconomic status (1). Although numerous government policies and a range of programmes and services exist to address these issues, progress in improving the health of the Scottish people has been slow. Risk behaviours such as alcohol, tobacco and illicit drug use and sexual risk behaviours are among the major problems affecting the health and wellbeing of adolescents and young adults in Scotland.

In a report on child and adolescent wellbeing, UNICEF compiled data from 21 nations in order to measure and compare child wellbeing across high-income countries, using 40 indicators of youth health and wellbeing under six key dimensions (2). The average ranking position of these 21 countries was tabulated, based on calculated scores for each dimension (table 1).

The UK sits at the bottom of this table (followed closely by the USA), falling into the bottom third of the rankings for five of the six dimensions, and taking bottom place for three of the six dimensions analysed (family and peer relationships, behaviours and risks, and subjective wellbeing).

Within the overall table of risk behaviours (one component of the behaviour and risk dimension) the UK is bottom by a considerable margin, with rates of smoking, cannabis use and percentage who have been drunk two or more times all higher than in most other countries. The proportion of 15-year-olds who report having had sexual intercourse is also markedly higher in the UK, at 38%, than in the other 16 countries with these data available (where the proportion ranges from 15% to 28%). Unsurprisingly, the teenage pregnancy rate (26 per 1,000 women aged 15–19 annually), is also higher in the UK than in almost all other countries included, and is the highest in Western Europe. Furthermore, UK teenage birth rates have remained high – at or above the level of the early 1980s – whereas in the rest of Western Europe rates fell during the ‘70s, ‘80s and ‘90s (3).

There is an urgent need for improvement in young people’s health and wellbeing in the UK, not least because it is well recognised that life trajectories are established by late teenage years, with experiences in formative years impacting heavily on long-term health and wellbeing (4). Although there has been a decline in some risk behaviours, such as smoking, in the past 10–20 years, data from health surveys indicate that the levels of most risk behaviours are still very high. Furthermore, some risk behaviours (such as sexual intercourse prior to age 16) have changed very little in the past 10–20 years, or, as with alcohol use, have increased and then decreased back to levels reported in 1990 (4, 5). Comparisons of the data on youth risk behaviour in the UK with other similarly high-income countries reveals the extent of the problem in the UK compared with these countries (figure 1) and reinforce the need to improve young people’s health behaviour in the UK.

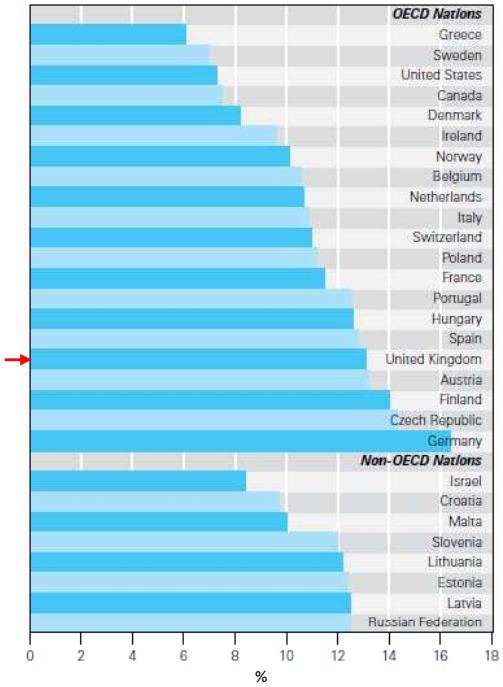
Table 1. Summary table of child wellbeing in 21 high-income countries. Source: Child Poverty in Perspective: An overview of child wellbeing in rich countries, UNICEF (2)

		Dimension 1	Dimension 2	Dimension 3	Dimension 4	Dimension 5	Dimension 6
Dimensions of child well-being	**Average ranking position (for all 6 dimensions)**	**Material well-being**	**Health and safety**	**Educational well-being**	**Family and peer relationships**	**Behaviours and risks**	**Subjective well-being**
Netherlands	4.2	10	2	6	3	3	1
Sweden	5.0	1	1	5	15	1	7
Denmark	7.2	4	4	8	9	6	12
Finland	7.5	3	3	4	17	7	11
Spain	8.0	12	6	15	8	5	2
Switzerland	8.3	5	9	14	4	12	6
Norway	8.7	2	8	11	10	13	8
Italy	10.0	14	5	20	1	10	10
Ireland	10.2	19	19	7	7	4	5
Belgium	10.7	7	16	1	5	19	16
Germany	11.2	13	11	10	13	11	9
Canada	11.8	6	13	2	18	17	15
Greece	11.8	15	18	16	11	8	3
Poland	12.3	21	15	3	14	2	19
Czech Republic	12.5	11	10	9	19	9	17
France	13.0	9	7	18	12	14	18
Portugal	13.7	16	14	21	2	15	14
Austria	13.8	8	20	19	16	16	4
Hungary	14.5	20	17	13	6	18	13
United States	18.0	17	21	12	20	20	-
United Kingdom	18.2	18	12	17	21	21	20

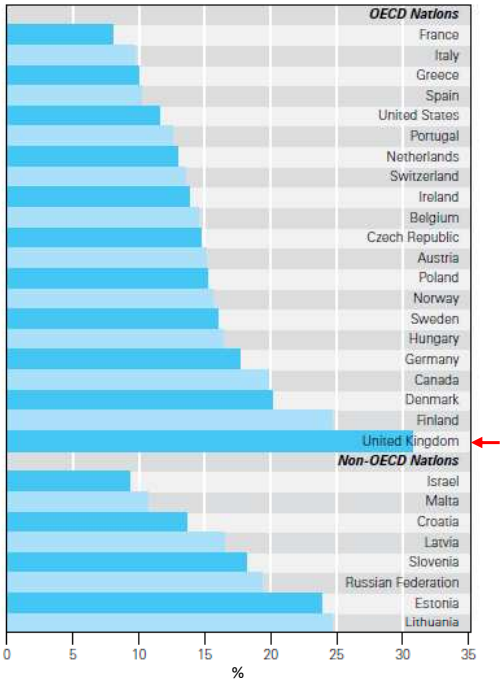
OECD countries with insufficient data to be included in the overview: Australia, Iceland, Japan, Luxembourg, Mexico, New Zealand, the Slovak Republic, South Korea, Turkey

Figure 1. Frequency of risk behaviours among adolescents in the UK (red arrows) in comparison with other high-income countries

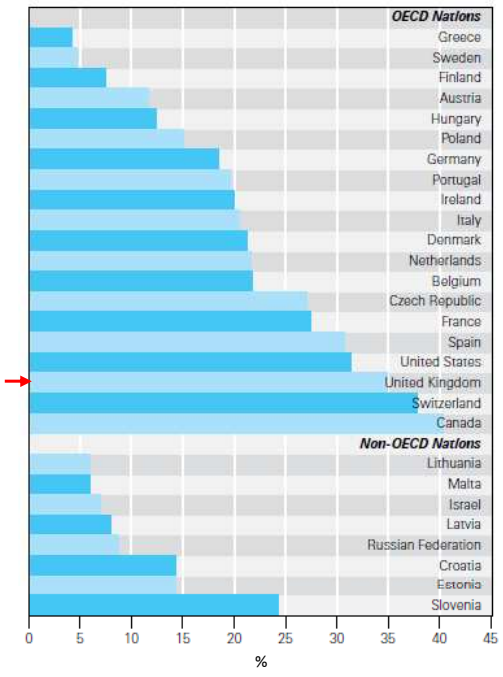
(a) Percentage of students aged 11, 13 and 15 who reported smoking cigarettes at least once a week



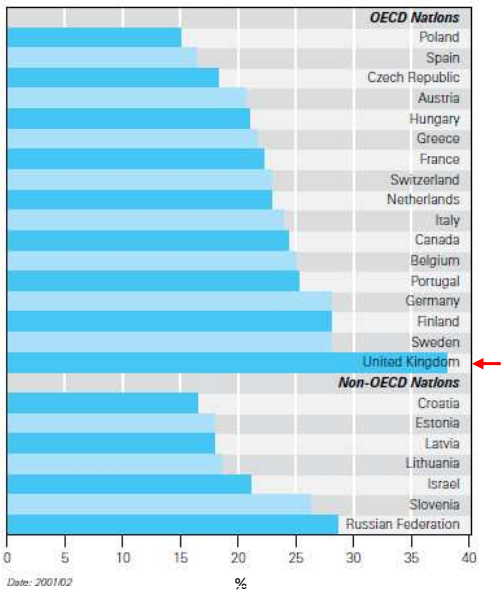
(b) Percentage of students aged 11, 13 and 15 who report having been drunk ≥ two times



(c) Percentage of students aged 11, 13 and 15 who Reported using cannabis in last 12 months



(d) Percentage of 15-year-olds who reported having had sex



Clustering of risk behaviours

There is a growing body of evidence (largely based on studies in the USA) that many risk behaviours in youth tend to cluster together, particularly in young people from the most deprived backgrounds (6, 7). There is also evidence that **early** initiation of a particular behaviour, such as smoking or alcohol use for example, is associated with other risk-taking behaviours in later adolescence and early adulthood, such as sexual risk taking, binge drinking, teenage pregnancy and delinquency (6, 8–10).

However, what is unclear is the magnitude of the correlation between different risk behaviours, which may not be as strong as believed, with possibly two-thirds of the between-individuals variance in problem behaviours due to unique rather common causes (11). What is clear is that this is a complex area, with inter-relationships of risk behaviours often differing by factors such as gender, socioeconomic background, ethnicity, and culture. The inter-relationships of some risk behaviours may be particularly complex, especially the relationships between sexual risk behaviours and nonsexual risk behaviours (9, 12). Furthermore, much of the published literature on multiple risk behaviour patterns includes studies of high-risk young people, such as those living in urban ethnic minority communities, or high-crime neighbourhoods.

Historically, interventions aimed at preventing risk behaviours have targeted single risk behaviours. The apparent clustering of risk behaviours, and the identification of common underlying risk and protective factors (7, 13) have led to the proposal that new interventions should perhaps focus on addressing generic (or multiple), as opposed to single risk behaviours (14). However, further investigation is needed to identify: (i) the patterns of risk behaviour clustering among young Scottish people; and (ii) the extent to which, and the success with which interventions addressing multiple risk behaviour have been applied to adolescents and young adults.

Background to the report

In mid-2006 the Scottish Collaboration for Public Health Research and Policy (SCPHRP) was established to strengthen the fields of public health research and policy in Scotland. The collaboration's mandate is to:

- Identify key areas of opportunity for developing novel public health interventions that **equitably** address major health problems in Scotland, and move those forward.
- Foster collaboration between government, researchers and the public health community in Scotland to develop a national programme of intervention development, large-scale implementation and robust evaluation.
- Build capacity within the public health community for collaborative research of the highest quality, with maximum impact on Scottish policies, programmes and practice.

The initial workshop in January 2009 resulted in the formation of four working groups through which the collaboration will execute its mandate. Each group was charged with developing a portfolio of work focusing on one of the four life-course stages for public health interventions. The Adolescent and Young Adult Working Group subsequently met, with the discussion focusing on three main areas: (i) the use of interventions that address single versus multiple risk behaviours (or generic risk); (ii) the need to address inequalities specific to the adolescent and young adulthood age groups; (iii) the need to engage young people and to explore methods of enhancing youth participation in interventions.

At a post-Working Group meeting between the SCPHRP chairpersons and research fellow, a decision was taken to focus the first environmental scan on exploring the use of a generic approach to risk behaviour in adolescents and young adults. Specifically, the scan focused on the more traditional 'risky' behaviours of substance (tobacco, alcohol and illicit drug) use, sexual risk behaviour and, initially, delinquency although, for reasons detailed below, the latter was subsequently excluded from the risk behaviours of interest. Health behaviours relating to obesity (i.e. nutrition and physical exercise) and mental health among adolescents and young people therefore fell out with the scope of this environmental scan. Obesity among working-age adults is however being addressed by the Early to Mid

Working Life Working Group of the SCPHRP (15). Although the recommendations proposed in this report therefore focus on the 'risky' behaviours described above, it should be noted at the outset that we do not consider other health behaviours (in particular, delinquency and mental health) not covered by this report to be any less of a priority for inclusion as outcomes in the evaluation of interventions addressing multiple risk behaviour.

Aim of the report

The aim of the environmental scan was to explore, through scoping of the literature, potential benefits and risks of adopting a generic approach to equitably reducing or preventing risk behaviour in adolescents and young adults.

Objectives of the report

The objectives of the environmental scan were to:

- identify and summarise the Scottish policies relevant to young people
- review and summarise existing surveys and cohort studies relevant to adolescent and young adult risk behaviours
- describe the overlap between risk behaviours in adolescents and young adults
- identify public health interventions applied during adolescence and young adulthood which reported on multiple risk behaviour outcomes or took a generic approach to risk (focusing on cigarette smoking, alcohol, illicit drug use and sexual risk behaviours[2])
- identify potential interventions for development by the Adolescent and Young Adult Working Group.

[2] Although we initially included delinquency and antisocial behaviour search terms within our literature search strategy, we subsequently chose to exclude delinquency from our risk behaviours of interest, because: (1) studies surrounding delinquency and offending are generally published within a different literature area, the searching of which was beyond the capacity of this environmental scan; and (2) we wished to avoid duplication of ongoing research in this area which is currently being conducted by Peter Donnelly's Public Health Sciences Unit at the University of St Andrews, Scotland

2 Chapter 2 – Methods

Policy overview

In our policy overview, we aimed to describe and summarise the existing Scottish policies and strategies relevant to the health and wellbeing of young people, with the intention of setting the Scottish scene in terms of the current policy picture. These policies and strategies were identified through a search of the Scottish Government; Scottish Public Health Observatory and World Health Organization websites, and through discussions with colleagues. The policies were mapped according to whether they were relevant overarching policies, youth-specific policies or health behaviour-specific policies. The key principles and actions detailed in the policies were extracted and summarised, with a focus on the actions/strategies relevant to young people (particularly within the overarching policies). There was also a focus on highlighting the proposed preventive, as opposed to treatment, strategies, especially with respect to the policies surrounding individual health behaviours.

Clustering of risk behaviours in the West of Scotland cohort studies: secondary analysis

We commissioned colleagues at the Social and Public Health Sciences Unit at the University of Glasgow to carry out a series of secondary analyses of the West of Scotland Twenty–07 and 11–16/16+ studies, which recruited and followed up young people from the same geographical areas (in and around Glasgow city), but some years apart, collecting data on risk behaviours at each time point. The Twenty–07 study recruited 15-year-olds in 1987 and followed them up at age 18 in 1990 (16) (and hereafter is referred to as the 1990 study). The 11–16 study recruited subjects at age 11 in 1995, with follow up at ages 13 and 15, and – in the 16+ Study – at ages 18–20 in 2003 (17) (and hereafter is referred to as the 2003 study).

We aimed to compare risk behaviour frequency and the inter-relationship of alcohol, tobacco and illicit drug use, with sexual risk behaviour (defined as first sexual intercourse before age 16 years, hereafter referred to as 'early sexual initiation'). We used data on substance use obtained at ages 18–19 ('current substance use') and – among the same 18–19-year-old follow up cohort – data on substance use obtained at age 15 ('early substance use'). The objectives were to: (i) determine risk behaviour rates using various measures of substance use during early-mid and late adolescence and early sexual initiation, by gender, and compare changes in these rates over time and; (ii) determine to what extent substance use in early-mid adolescence and in late adolescence is associated with early sexual initiation, by gender, and compare changes in these relationships over time.

Early-mid adolescent substance use measures included: started smoking at age <14 years; monthly (or more frequent) drinking at age 15 years; and ever used illicit drugs at age 15 years. Late adolescent substance use measures included current smoking, heavy smoking, drinking over the recommended safe weekly alcohol limits, binge drinking (for males, more than 21 units per week and for females, more than 14 units per week), ever used illicit drugs in lifetime, and monthly (or more frequent) illicit drug use in past year. We calculate the proportion (and accompanying confidence interval) of participants reporting each risk behaviour, stratifying by each of gender and social class (according to parental occupation of manual or non-manual) for each cohort.

We calculated crude odds ratios (with accompanying confidence intervals) to determine the association between each of: started smoking at age <14 years; monthly (or more frequent) drinking at age 15 years; and ever used illicit drugs at age 15 years (i.e. 'early substance use') and early sexual initiation and each of: current smoking; drinking more than the safe weekly alcohol limits; and ever used illicit drugs (i.e. 'current substance use') and early sexual initiation for males and females separately. In multivariate analyses, we constructed logistic regression models for early and late substance use – separately by gender and by social class – and calculated odds ratios adjusted for potential confounding by the other substance use measures included in the models. We included interaction terms to determine whether there was any interaction by gender and date (i.e. any difference in the pattern of change in the associations over time between males and females) or by social class and date (i.e. any difference in the pattern of change in the associations over time between subjects from manual versus non-manual social class backgrounds).

Literature review

The literature review consisted of three components, and aimed to: (i) identify reviews of review-level literature of interventions that address multiple risk behaviours or take a generic approach to risk among adolescents and young adults; (ii) identify randomised controlled trials (RCTs) of interventions in young people that have collected and reported on substance (alcohol, tobacco **or** illicit drug) use **and** sexual risk behaviour, and to critique and summarise the results of these RCTs; and (iii) to perform a review of reviews of interventions addressing single risk behaviours, to identify intervention approaches that are effective across risk behaviours.

Review of review-level literature of interventions that address multiple risk behaviours or take a generic approach to risk among adolescents and young adults

We constructed a search strategy in collaboration with the National Collaborating Centre for (Public Health) Methods and Tools at McMaster University, Canada. The search strategy included a combination of medical subject heading (MeSH) and text words developed for use in MEDLINE and modified for use in the following databases: EMBASE; PSYCHINFO; Campbell Collaboration; Education Resources Information Centre; and the Cumulative Index to Nursing and Allied Health (see Appendix A for full details of terms included in the MEDLINE search strategy). The search was designed to identify reviews of interventions in which outcomes on single **or** multiple risk behaviours were reported. From these, we aimed to identify any **reviews** of reports of interventions in which outcomes on **multiple** (i.e. more than one) risk behaviours had been collected and reported.

We included reviews:

- of intervention studies that address risk behaviour among adolescents and young adults
- of studies in which the outcomes collected included related to one or more of alcohol, tobacco or illicit drug use, sexual behaviour, or delinquency
- of studies in which the outcomes were collected between age 13 and 25 years
- of human studies written in English
- published between January 1999 and September 2009.

We excluded reviews:

- of secondary prevention studies (e.g. interventions targeting existing drug-users)
- of studies of clinical interventions
- of studies that included a very select population of young people at high-risk (e.g. those from drug-using families etc).

One author (CJ) reviewed the title and/or abstracts of all articles identified in the search, and retrieved full papers for all articles that met the inclusion criteria.

Review of randomised controlled trials of interventions that addressed risk behaviour in adolescents or young adults and that collected outcomes on both sexual behaviour and substance use

We initially adapted the search strategies designed for the 'review of reviews' literature (described above) to identify primary studies of any intervention that collected and reported outcome data on **two or more** of the following: alcohol use, smoking, illicit drug use, sexual risk behaviour, and delinquency. However, the number of hits obtained from this search strategy, when run in MEDLINE, was very high (~9,000 papers), the review of which was beyond the scope of this literature review. We therefore further modified the search to identify only those studies of interventions in which outcome data on (i) **any** substance use (alcohol, tobacco or illicit drug) **and** (ii) sexual risk behaviour were collected. This led to around 5,000 articles being identified by the search strategy. On review of the titles and abstracts of the first 500 articles identified, no relevant study was identified. Given the likely low yield of relevant studies versus the time required to review the search results for the remaining 4,500 studies, we decided to narrow the search further. We therefore limited the search strategy to identify only RCTs of interventions that addressed risk behaviour in adolescents or young adults and that collected outcome data on both sexual behaviour and any substance use (Appendix B).

We included:

- RCTs in which outcome data had been collected on one of alcohol, tobacco or illicit drug use, **and** risky sexual behaviour in young people
- RCTs in which the intervention was applied to parents and/or their children
- studies indexed in MEDLINE (from 1966 to November 2009), EMBASE (from 1947 to November 2009), or PSYCHINFO (from 1806 to November 2009)
- studies of humans written in English.

We excluded:

- studies that included a very selected population of young people at high-risk (e.g. those from drug-using families etc)
- secondary prevention studies (e.g. interventions targeting existing drug-users)
- studies of clinical interventions.

One author (CJ) reviewed the title and/or abstracts of all articles identified in the search, and retrieved full papers for all articles that potentially met the inclusion criteria

Data extraction

One author (CJ) extracted data on the: details of the intervention programme; study population; length of follow up and age of the population at follow up; attrition rate; outcomes collected and key results.

Review of review-level literature of interventions addressing single risk behaviours

One author (CJ) identified potentially relevant reviews of interventions for single risk behaviours from the studies identified in the search strategy described in the previous paragraphs. This was supplemented with a search for systematic reviews or 'review of reviews' published within the past 10 years on relevant websites including the National Institute for Clinical Excellence (NICE), the Health Development Agency (HDA) and the Public Health Consortium, a search of the Cochrane Collaboration Library of reviews, as well as perusal of the reference lists of identified reviews, narrative reviews etc. Although we initially aimed to identify all reviews published since 1999, due to the broad scope of this overview, the breadth of the literature, and time restrictions, we subsequently limited the time period to include only those reviews published between January 2005 and December 2009. However, where a review published prior to 2005 was the only existing review of a particular topic (and hence the only review summarising the evidence in this area) we included it in the overview.

We included only systematic reviews of primary studies, except where current evidence of a particular topic was only summarised in recent reviews papers that drew on a mixture of high quality existing reviews (such as Cochrane reviews) **in addition** to primary studies (e.g. HDA or NICE guidelines). As a guide to deciding which systematic reviews to include, the AMSTAR quality assessment score was applied, to assess the methodological quality of reviews (18). A judgement of quality was made based on the criteria met and a categorical classification of low, moderate or high quality was assigned. The score obtained by each review was used as a guide only, since some criterion could arguably be considered more important than others, which would not be reflected in a total non-weighted score.

3 Chapter 3 – Key policies relating to adolescents and young people

Summary

- International policy focuses on the rights of the child and emphasises the need for governments to invest in the early years of life, particularly with regards to ensuring equity from the start as a means of closing the gap in health inequalities. This reflects the evidence that early life influences have long-reaching impacts on health and wellbeing in adolescence and adulthood. The importance of the school as a health-setting is also endorsed by the WHO in their *Global School Health Initiative*.
- The importance of young people's health and the issue of health equity are prioritised within the government's White Paper *Towards a Healthier Scotland* (1999), and in *Improving Health in Scotland: The Challenge* (2003), 'Early Years' and 'Teenage Transition' are listed as two of four keys areas to be addressed.
- The government has adopted a holistic approach to youth health and wellbeing, through the *Health Promoting School*, and *Curriculum for Excellence*, with a focus on the school as a health-promoting setting, helping to support young people to be 'successful learners, confident individuals, effective contributors and responsible citizens'.
- Within government health policies on specific behaviours, such as smoking and alcohol use, action items are outlined to specifically prevent/reduce risky behaviours among young people. Few of these measures are legislative, with many of the actions detailed related to the improved provision of education, information, support and treatment, with reference to the underpinning principles of their overarching policies, *Getting it Right for Every Child, Equally Well Implementation Plan, More Choices, More Chances and Achieving Our Potential.*

International policy

Two international health documents – the *United Nations Convention on the Rights of the Child* and the World Health Organization's *Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health* – have influenced Scottish health policy.

The *United Nations Convention on the Rights of the Child* was introduced in 1989 following the recognition that children aged less than 18 years need special care and protection that adults do not need. It is the first legally binding international instrument to incorporate the full range of human rights – civil, cultural, economic, political and social rights. The document details in 54 articles the basic rights that every child should have, with the four core principles being: non-discrimination; devotion to the best interests of the child; the right to life, survival and development; and respect for the views of the child. By agreeing to the obligations of the convention, national governments commit themselves to protecting and ensuring children's rights. The Scottish Government supports the provisions of the *United Nations Convention on the Rights of the Child*, and has been working in partnerships with young people and Scotland's Commissioner for Children and Young people to develop resources to help young people know their rights.

In 2005 the World Health Organization set up the Commission on Social Determinants of Health to gather the evidence on how to promote and achieve equitable health. In their final report, *Closing the Gap in a Generation: Health Equity Through Action on the Social*

Determinants of Health (2008), the Commission emphasises the importance of investing in early child development with 'equity from the start' highlighted as being one of the key approaches to reducing health inequalities in a generation. The Commission also recognised the importance of education for health equity, emphasising the need for governments to adopt a comprehensive approach to education that incorporates attention to children's physical, social/emotional, and language/cognitive development.

Overarching Scottish health policies

The key overarching Scottish health policies are listed, along with a brief description (focused on the aspects relevant to youth) in box 1.

In the White Paper, *Towards a Healthier Scotland* (1999) the government pledged to improve the health of the Scottish nation, and recognised in particular the need for a reduction in health inequalities, and the improvement of children's and young people's health. Among a number of targets set within the White Paper, the government included reduction in smoking among 12–15-year-olds and reduction in teenage pregnancies. The Scottish Executive pledged £15 million to support four health demonstration projects in the areas prioritised in the White Paper, one of which was *Healthy Respect* (focusing on fostering responsible sexual behaviour among young people).

Building on *Towards a Healthier Scotland*, the government outlined a framework for action, *Improving Health in Scotland: The Challenge* (2003), in which they focused on four prioritised areas: Early Years; Teenage Transition; Working Life; and Community. Within the teenage transition theme, the government sought to initiate the development of a programme to support young people as they moved from childhood to adulthood. The role of the school was highlighted, with the government proposing that all schools should become 'health-promoting schools' by 2007, with the aim being to ensure that 'each young person develops personal skills, emotional intelligence and a high level of educational attainment.' In addition, the framework highlighted the need to redesign school nursing, with the new Scottish Framework for Nursing in Schools aimed at refocusing attention on identified needs and priorities. It was acknowledged that further approaches outside the school environment would be required and would be identified. The need for integrated community-based information, advice and support services for teenagers was raised, along with the need to involve young people in developing accessible services that meet their needs.

Better Health, Better Care (2007), was launched with the aim of improving the health of the Scottish population by reducing health inequalities and improving the quality of healthcare services. A central theme to this action plan is the improvement of patient experience in the NHS and the involvement of the public in the design and delivery of services. One of the key priorities listed within the health promotion action items is the focus on reducing sexually transmitted diseases and unwanted pregnancies in young people, through information and education.

The issue of health inequality is a dominant feature of the government's health policies. The commitment by the Scottish Government to reducing health inequalities is cemented in the *Equally Well Implementation Plan* (2008) produced in response to the *Equally Well* (2008) report of the ministerial taskforce on health inequalities, which indicated that the government should produce a plan of how to implement the recommendations made by the taskforce, at a local and national level. Many of the principles and recommendations of the Equally Well report are in line with the WHO report on health inequality, *Closing the Gap in a Generation*, published shortly after *Equally Well.*

One of the key principles outlined in the implementation plan is the need to provide children with the best start in life, a principle which is now embedded within the Scottish Government's health policies. With respect to young people, the *Equally Well* report identifies in particular the academic achievement gap that opens up around Primary 5 and continues to widen throughout the first four years of secondary school.

Children from poorer backgrounds are more likely to under-achieve, with the variation in achievement associated with how children and their family backgrounds differ and not how schools differ. Current strategies, such as *Getting it Right for Every Child,* the *Curriculum for Excellence* and *More Choices, More Chances* (which aims to reduce the number of young people not in education, employment or training) should help to address the underlying issues of poverty and deprivation, and thereby health inequalities. *Achieving our Potential: A Framework to Tackle Poverty and Income Inequality in Scotland* (2008) outlines actions to tackle the causes of poverty and inequality, complementary to the government's other policies on inequality and the early years. The framework highlights the important change in the relationship between national and local government, with the recognition that local authorities need the freedom to take action that meets local needs, rather than adopting a national 'one-size-fits-all' approach.

Box 1. Key overarching Scottish policies/papers

Government policy	Description
Towards a Healthier Scotland (1999)	Government pledged to improve Scotland's health, including reduction in health inequalities and improvement of young people's health.
Improving Health in Scotland: The Challenge (2003)	A framework for action, focusing on four prioritised areas, including teenage transition. Target set for all schools to be health-promoting schools by 2007.
More Choices, More Chances (2006)	Action plan to reduce the number of young people not in education, employment or training.
Better Health, Better Care: Action Plan (2007)	Aims to improve Scottish health, decrease health inequalities and improve the quality of healthcare services. Among the priorities is the focus on reducing sexually transmitted diseases and unwanted pregnancies in young people.
Equally Well Implementation Plan (2008)	Sets out cross-cutting actions to address the principles of the Equally Well report to effect change in the culture of organisations and allow progress in achieving equitable health, including amongst young people.
Achieving our Potential (2008)	A framework for action, to reduce poverty and income inequality, with a focus on allowing local authorities the freedom to take action to meet local needs, collective action (e.g. through public agencies working together more effectively), and tackling the long-term drivers of poverty and inequality, including the early life experience.

Policies specific to young people

The health policies specific to young people complement the key overarching health policies described above, and reflect many of the priorities emphasised in these wider health policies, including the focus on: health equity, poverty, social inclusion and early years development; the need for cross-sector and community partnerships; and the involvement of young people in the provision and delivery of services to ensure their needs are appropriately met.

Box 2. Key policies relating specifically to young people

Government policy	Description
Being Well – Doing Well: A Framework for Health Promoting Schools in Scotland (2004)	A framework for the 'health-promoting school' in which the government outlines its implementation plan to ensure all schools are health-promoting by 2007.
Hidden Harm – Next Steps (2006)	Policy to support vulnerable young people from substance-misusing families, to ensure early, timely and appropriate identification of needs and provision of support.
Delivering A Healthy Future: An Action Framework for Children and Young People's Health in Scotland (2007)	An over-arching framework of actions, drawing on existing policies and strategies, focusing on improving the delivery of health services for children and young people.
Curriculum for Excellence (2008)	An education policy integral to the health-promoting school, designed to enable young people to become 'successful learners, confident individuals, responsible citizens and effective contributors'.
Getting it Right for Every Child (2008)	National child-centred approach to working with all children and young people (and adults with children) to give children the best start in life through a coordinated system of support.
Early Years Framework (2008)	Action plan to improving the early life experience (defined as pre-birth to age 8) through a de-centralised approach at the heart of which is a focus on prevention and early intervention.
Valuing Young People (2009)	A practical resource for people involved with decisions related to support or service provision for young people which summarises the delivery pillars designed to aid young people in achieving their potential.

The Government has adopted a cross-cutting approach to improving general health and wellbeing of children and young people, with a focus on:

- ensuring that all young people have the support they need to achieve their potential
- positive opportunities for, and positive engagement with young people
- early intervention to nurture potential and offer support at an earlier stage in a young person's life.

An over-arching action framework for improved delivery of health services for children and young people is detailed within *Delivering a Healthy Future: An Action Framework for Children and Young People's Health in Scotland* (2007). This sets out a structured programme of actions, largely drawing on the existing policies and strategies.

In addition, the recently launched *Valuing Young People: Principles and Connections to Support Young People Achieve Their Potential* (2009) describes the nine 'delivery pillars' in place to support young people to achieve the four capacities (successful learners, confident individuals, effective contributors and responsible citizens) detailed in National Outcome 4 of the National Delivery Plan (figure 2). The policies, strategies, programmes, initiatives and services underlying each 'pillar' are given in more detail in appendix C (19).

Figure 2. Nine delivery pillars to support young people become successful learners, confident individuals, effective contributors and responsible citizens.

Source: Valuing Young People: Principles and Connections to Support Young People Achieve Their Potential. Edinburgh: Scottish Government; 2009

UNCRC=United Nations Convention on the Rights of the Child

In recent years the Scottish Executive has adopted a holistic approach to the education, health and care of children and young people, with the introduction of the health-promoting school. Introduced by the WHO in 1995 and central to its Global School Health Initiative, a 'health-promoting school' is characterised by the constant strengthening of its capacity as a healthy setting for living, learning and working. The framework for health-promoting schools was outlined in *Being Well – Doing Well: A Framework for Health Promoting Schools in Scotland* (2004), the main aims of which are:

- to promote the physical, social, spiritual, mental and emotional health and wellbeing of pupils and staff
- to work with others in identifying and meeting the health needs of the whole school and its wider community.

The Schools (Health Promotion and Nutrition) (Scotland) Act 2007 built on this work, to ensure that health promotion will continue to have a central focus in education, in line with the World Health Organization's Global School Health Initiative.

The key education policy surrounding health-promoting schools is the *Curriculum for Excellence* (2008), targeted at children and young people aged three to 18, within which the health and wellbeing curriculum area takes a holistic approach to the wellbeing of children and young people. Both the *Curriculum for Excellence and the Getting it Right for Every* Child (2008) programme are embedded within the developing *Early Years Framework* (2008) which focuses on improving the early life experience — from pre-birth to age 8, although with relevance beyond age 8 — as a central part of the government's strategy to regenerating communities, reducing crime, substance misuse and unemployment, and to breaking the cycle of poor outcomes associated with teenage pregnancy.

Specific policies are also in place to specifically support and protect vulnerable children in substance misusing families, through the *Hidden Harm – Next Steps* strategy, produced in response to the UK's Advisory Council on the Misuse of Drugs 2003 *Hidden Harm* report. This incorporates the values and principles of the *Getting it Right for Every Child* strategy, through a number of actions, such as ensuring that all agencies identify early and better the needs of children for whom they have responsibility, and that support for vulnerable young people is appropriate and timely.

Under this umbrella of overarching health policy that addresses the general health and wellbeing of children and young people are those policies specific to particular health behaviours, which will be discussed in the next section (figure 3).

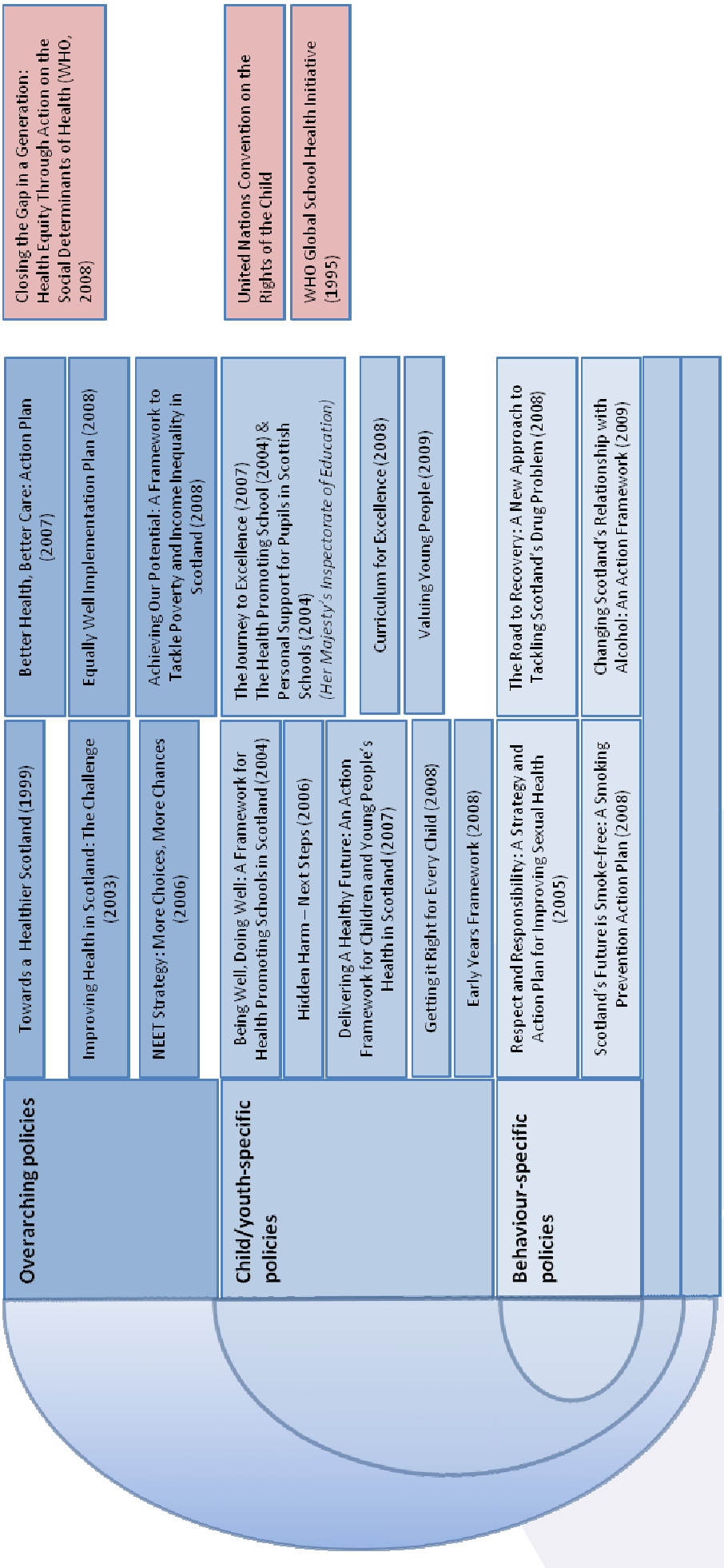


Figure 3. Map of Scottish and international strategies relevant to the health and wellbeing of young people

Key lifestyle-related policies

Alcohol

In March 2009, the Scottish Government published *Changing Scotland's Relationship with Alcohol: A Framework for Action*, in which it sets out a strategic approach to tackling alcohol misuse in Scotland. This framework identified the need for action in four key areas:

- reduction of alcohol consumption
- improved support for families and communities
- promoting 'positive attitudes, positive choices'
- improved treatment and support.

Within this framework there are a number of strategies, particularly those aimed at reducing alcohol consumption and which include targeting pricing of alcohol and drinks promotions in licensed premises, which may impact both younger and older adults. In addition, there are various strategies aimed specifically at younger people, including adolescents, which are listed in box 3.

Box 3. Key alcohol strategies specifically relating to adolescents and young people

1. The set up of a Youth Commission to feed back young people's views on alcohol misuse and proposed actions to the Scottish Government.
2. Review of current advice to parents and carers, to integrate with the *Getting it Right for Every Child* policy.
3. Encourage local Licensing Boards to raise age of off-sales purchases to 21 where considered to be necessary and give the Chief Constables powers to request their local Licensing Board to consider introducing age restrictions.
4. Improve substance misuse education in schools, in line with the *Curriculum for Excellence*.
5. Continue support to third sector organisations to provide youth work and diversionary activities to expand young people's horizons (e.g. through the Cashback for Communities programme).
6. Tighten restrictions on alcohol advertising in relation to young people (e.g. ban of alcohol advertising before the 9pm watershed).

Some of the above measures are ongoing or are in development. Where legislation is needed, proposals have been made within the Scottish Government's recently introduced Alcohol Bill. Each of the proposed strategies is within the powers of the Scottish Government, with the exception of alcohol advertising, the necessary legislation for which is reserved to Westminster.

The link between alcohol and violence is acknowledged, with the government continuing its work with the Violence Reduction Unit, through a project to engage with gang members in the East End of Glasgow and provide them with support services and diversion projects to encourage them to change their lives. A key element of this work is moving gang members away from alcohol misuse.

Smoking

Since Scottish Devolution, the Scottish Government has made significant changes through their action plan on tobacco, *A Breath of Fresh Air for Scotland* (2004). The introduction of legislation to ban smoking in enclosed public spaces in 2006 was quickly followed by the increase in the age of sale for tobacco from 16 to 18 in October 2007. Following this, the Smoking Prevention Working Group was set up as a sub-group of the Scottish Ministerial Working Group on Tobacco Control, and made a series of recommendations, in *Towards a Future Without Tobacco*, for the development of a long-term smoking prevention strategy for Scotland. These recommendations formed the platform for the Government's action plan, *Scotland's Future is Smoke-free: A Smoking Prevention Action Plan* (2008), which set out a programme of measures primarily designed to dissuade children and young people from smoking. This included measures to:

- educate and promote healthy lifestyles
- reduce the attractiveness of cigarettes
- reduce the availability of cigarettes
- reduce the affordability of cigarettes.

Box 4. Key tobacco strategies relating to young people

The Tobacco and Primary Medical Services (Scotland) Act 2010

1. Bans the display of tobacco and smoking related products in shops.
2. Bans the sale of tobacco from vending machines.
3. Makes purchase of tobacco by under 18-year-olds an offence.
4. Makes it an offence for adults to buy tobacco for under 18s (proxy purchase).
5. Introduces a registration scheme for tobacco retailers.
6. Introduces fixed penalty notices for retailers who sell cigarettes to under 18s.
7. Introduces banning orders to prevent retailers selling cigarettes if they continually break the law.

Non-legislative measures

1. Promote a holistic approach to health and wellbeing in Scottish schools, through the *Health Promoting School* and a *Curriculum for Excellence*.
2. Explore steps to discourage young people in higher education and those not in education, employment or training from smoking.
3. Ensure an ongoing multimedia campaign is in place to discourage uptake of smoking by young people, with a strand focussing on girls and young women in disadvantaged areas.
4. Develop and assess the feasibility of pilot interventions to discourage uptake/encourage cessation in young people, particularly those in disadvantaged areas, and evaluate the effectiveness of the most promising intervention(s).
5. Introduce picture warnings on tobacco packets.
6. Ensure the UK Government sustains duty on tobacco products to maintain appropriate pricing.

The Tobacco and Primary Medical Services (Scotland) Act 2010 includes legislative measures aimed specifically at reducing the attractiveness and availability of tobacco to under 18s. These are listed in box 4, along with a number of non-legislative measures.

Illicit drug use

Although Scotland has its own system of criminal justice, a few matters, including illicit drugs misuse are reserved to the Westminster Parliament, thereby limiting the legislative strategies that can be adopted by the Scottish Government.

In their action framework, *The Road to Recovery: A New Approach to Tackling Scotland's Drug Problem* (2008), the Scottish Government outline their key priorities, listed in box 5.

Box 5. Scottish government's key priorities in tackling illicit drug use among young people in Scotland

1. Improve the prevention of illicit drug problems, with improved life chances for children and young people.
2. Improve the support for problem drug-users, based on promoting recovery.
3. Make communities safer and stronger.
4. Protect and support children affected by illicit drug abuse.
5. Support families affected by illicit drug use.
6. Improve the effectiveness of delivery at a local and national level.

In recognition of the underlying factors associated with drug use, the government is taking action to tackle poverty, deprivation and inequality (through their *Equally Well Implementation Plan, Achieving our Potential,* and *More Choices, More Chances* strategies) and is working with the police to make communities safer and stronger. Furthermore, the introduction of the *Early Years Framework* recognises the importance of early intervention as the key to supporting the positive development of children, including those who are most vulnerable.

In their action framework they also recognise the need for young people to have access to facilities that promote constructive and positive behaviours and highlight the success of the Government's Cashback for Communities project that uses the funds from the Proceeds of Crime Act to benefit young people in communities worst affected by crime. In recognition of the proximal factors associated with drug use, the Government is also aiming to improve population mental health, reduce and prevent homelessness, and (as described above) tackle alcohol misuse.

Given that substance misuse education is considered to be the first line of prevention against drug use, the health-promoting school plays an important role, with the *Curriculum for Excellence* aiming to develop young people's resilience and adaptability, to encourage them to make informed choices about their own and their families' health and wellbeing. The *Health Promoting Schools* and *Curriculum for Excellence* should also promote inclusion and reduce truancy, both of which are associated with substance misuse.

The Road to Recovery also recognises that schools are not the only setting to play a role in educating young people about substance misuse. The importance of the youth work sector is reflected in the newly introduced post of National Development Officer for Schools and Youth Work, which has been set up to forge closer links between schools and the youth work sector.

Interventions for those people suffering from problem drug use previously focused on harm reduction, principally through substitute prescribing (e.g. methadone). In *The Road to Recovery* the Government proposes a new approach to address problem drug use, based on the concept of 'recovery', following the recommendations by the Scottish Advisory Committee on Drug Misuse within the report, *Reducing Harm, Promoting Recovery*. Under this ethos, in addition to drug treatment services, a wider range of services will be made equitably available, from, for example, community rehabilitation and residential rehabilitation to harm reduction services and crisis services. The action plan also outlines the need for better integration of services, to ensure that barriers to recovery such as mental health, homelessness and unemployment are addressed in conjunction with medical treatment.

Sexual health

In January 2005 the Scottish Government launched *Respect and Responsibility: A Strategy and Action Plan for Improving Sexual Health*, a framework for improving sexual health in Scotland. The strategy endorses the WHO definition of sexual health: 'A state of physical, emotional, mental and social wellbeing related to sexuality; it is not merely the absence of disease, dysfunction or infirmity...For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled'.

The key objectives of *Respect and Responsibility* are listed below.

Box 6. Key objectives of the strategies within Respect and Responsibility

1. To positively influence the cultural and social factors that impact on sexual health by promoting respect and responsibility.
2. To prevent sexually transmitted diseases and unintended pregnancy through education, service provision and support.
3. To improve the quality, range, consistency, accessibility and cohesion of sexual health services.

The action plan recognises the wide influences on sexual health, in particular the strong link between social disadvantage and early initiation into sexual activity, reflected in the far higher rates of teenage pregnancy amongst the most deprived compared with least deprived areas in Scotland. It also highlights the links between drug misuse and the disinhibiting effects of alcohol, in addition to the effect that media, social and school pressures can have on young people. The Scottish Executive's wider policies on lifelong learning, including parenting skills, equity and diversity, social inclusion and drug misuse therefore have a significant bearing on sexual wellbeing. One of the aims of *Respect and Responsibility* is to ensure that sexual health is firmly integrated into the delivery of these policies.

To address the three key objectives listed above, the framework outlines a wide range of action items for NHS Boards, local authorities, NHS Health Scotland, Quality Improvement Scotland, Health Protection Scotland, and various departments within the Scottish Executive.

For example, with regards to the prevention of sexually transmitted diseases and unintended pregnancy, the strategy highlights the need:

- to deliver high-quality sex and relationships education, through partnership between education authorities, partner agencies, parents and other key partners
- for NHS boards to ensure that resources for sexual health promotion are provided to allow good quality specialist services to be available to support local initiatives
- for local authorities and NHS boards, in consultation with Community Planning partners, to ensure that their Community Plans, local health plans and Children's Services Plans complement their local inter-agency sexual health strategies
- for NHS boards to provide programmes for parents and carers to enhance communication skills around relationships and sexual health
- to develop effective sexual health promotion and outreach services for adults.

The strategy emphasises the crucial role of schools in fostering healthy attitudes towards relationships and sexual wellbeing in young people and highlights the key characteristics of the most successful sex and relationships education programmes. One of these characteristics is the emphasis within the current legal framework on 'delaying sexual activity until a young person is mature enough to participate in a mutually respectful relationship' along with the development of communication skills, and transferral of knowledge of sexual health services.

There is also a focus on ensuring that vulnerable and/or excluded pupils who do not have access to school-based programmes do still receive high-quality sex and relationships education.

A new Scottish Government website, Sexual Health Scotland, was also launched in 2008, ahead of a campaign that started in August 2009 to encourage Scots to be more open about their sex lives. This campaign was launched with the overarching aim of reducing the incidence of sexually transmitted diseases and unplanned pregnancies. Also, as alluded to earlier, Healthy Respect was set up as a Scottish Executive-funded national health demonstrations project, coordinated by NHS Lothian. The network, run in Lothian, is a gateway to services and support, including sexual health information, drop-in services, and training and resources for teachers, social workers, youth workers etc.

4 Chapter 4 – Patterns of adolescent risk behaviours and risk/protective factors predictive of risk behaviour

Summary

- Cross-sectional data on adolescent risk behaviour in Scotland is collected in the Scottish Schools Adolescent Lifestyle and Substance Use survey (SALSUS); the Scottish Health Survey; the Health Behaviour in School-aged Children survey (HBSC); and the UK survey of the European School Survey Project on Alcohol and Drugs. Risk behaviour data have also been collected in cohort studies, including the Edinburgh Study of Youth Transitions and Crime and the MRC West of Scotland Twenty–07, 11–16 and 16+ studies.
- Recent data from the SALSUS revealed that:
  - alcohol was consumed in the week prior to the survey by 11% of 13-year-olds and 31% of 15-year-olds, with no differences between gender in 2008
  - among those who reported drinking in the previous week, 15-year-olds boys consumed on average 17 units and girls consumed an average of 12 units
  - 14% of girls and 16% of boys aged 15 are regular smokers, with the rates for both genders having decreased since 1998
  - among 15-year-olds, 21% of boys and 12% of girls reported illicit drug use in the past month.
- Data from the 2006 HBSC survey revealed that 30% of 15-year-old boys and 34% of 15-year-olds girls have had sexual intercourse, with reported condom use higher among boys than girls (73% vs 58%).
- There is some evidence of clustering of substance use among 13 and 15-year-olds in Scotland, with both tobacco use and recent illicit drug use independently related to use of other substances. Children who drink every week are also more likely to smoke regularly or to have used illicit drugs in the past month than non-drinkers, but weekly drinkers were less likely to use other substances than regular smokers and illicit drug-users.
- Data from the West of Scotland Twenty–07 and 16+ studies show that:
  - the prevalence of risk behaviours at age 18–19 and in early adolescence increased dramatically among girls between 1990 and 2003
  - in 2003, among both boys and girls, there were significant associations between sexual intercourse prior to age 16 and most measures of current (age 18–19 years) and early adolescent substance use.
- There is a dearth of survey data on risk behaviours among young people aged 16–25.
- The risk and predictive factors for substance use and sexual risk behaviours fall into four domains – individual, family, school and community, all of which are affected by additional societal factors such as socio-cultural norms and regulative and control measures.

Introduction

This chapter first summarises the surveys and cohorts in which data on adolescent health behaviours are collected in Scotland, and the most recent statistics on alcohol, tobacco and drug use, and sexual risk behaviour among young people in Scotland. Second, results of a secondary analysis examining the extent of clustering of health risk behaviours in young people in Glasgow are presented. Third, a brief overview of the known underlying risk and protective predictors for risk behaviour in young people is summarised.

(a) Surveys and cohort studies relevant to youth risk behaviours

Data on adolescent risk behaviour in Scotland are collected in two surveys of school children – the Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS) (5) and the Health Behaviour of School-aged Children (HBSC) survey (4). The former, which is performed every two years, is the national surveillance tool for adolescent health behaviour in Scotland, collecting data on about 10,000 children during each survey. The SALSUS collects data on alcohol, tobacco and illicit drug use among 13 and 15-year-olds, but does not collect any data on sexual health. The HBSC survey collects data on alcohol and tobacco among 11-year-olds as well as 13 and 15-year-olds, and cannabis use and sexual health among only 15-year-olds (table 2).

Scotland is also included within the UK survey as part of the European School Survey Project on Alcohol and Drugs (ESPAD), which collects data on alcohol, tobacco and illicit drug use among 15–16-year-olds (20).

In contrast to the ongoing surveys among young adolescents, there is a dearth of surveys collecting data on risk behaviours among older adolescents and young adults. The Scottish Health Survey is the only survey which collects data on young people aged between the ages of 16 and 24 years in Scotland, but these data are limited to tobacco and alcohol use only (table 2), and thus data on illicit drug use and sexual risk behaviour are not routinely collected in this age group.

In addition to the survey data, there are a number of cohort studies which have collected data on various risk behaviours. These include the Edinburgh Study of Youth Transitions and Crime (ESYTC), which recruited children from the first year in all secondary schools in Edinburgh in 1998, and followed them up yearly until 2004 (21). They collected data on alcohol, tobacco, illicit drug use, and delinquency, at all ages, with the addition of sexual health at age 17.

In the West of Scotland, the Medical Research Council (MRC) Twenty–07 study recruited 1,009 15-year-olds living in urban areas in and round Glasgow city in 1987, and followed them up in 1990-01, 1995-06, 2000-03 and 2007 (22). Risk behaviour data collected included alcohol, tobacco and illicit drug use, and sexual health. In a similar study, the MRC West of Scotland 11–16 study recruited 2586 primary 7 pupils living in the same geographic area, with follow up in year 2 (age 13) and year 4 (age 15) of secondary school (23). This same cohort was followed up at ages 18–19 in the 16+ study, with data collected on alcohol, tobacco and illicit drug use and sexual health (table 2) (24).

Table 2. Summary of Scottish surveys and cohort studies (or international studies that included Scotland) that collected data on risk behaviours in young people

Study	Design	Population	Sample size*	Survey dates/ follow up	Outcomes (key variables)
Health Behaviour of School-aged Children (HBSC) Study	International cross-sectional school-based survey	11 (P7), 13 (S1) and 15 (S4)-year-olds	≈4,500 (1,500 children in each age group)	Every 4 years, 1990–2006 *(next due 2010)*	Alcohol *(weekly drinking; drunk ≥ 2 times; types of alcohol drunk weekly)* Tobacco *(ever smoked; current smoking; daily smoking)* Cannabis† *(ever used; used in past 12 months)* Sexual health† *(ever had sexual intercourse; contraception use)*
Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS)	National cross-sectional school-based survey	13 (S2) and 15 (S4)-year-olds	10,000 in 2008	2002, 2004, 2008 (and now biennially)	Alcohol *(ever had an alcoholic drink; had a drink in the last week; types of alcohol drunk in last week; usual frequency of drinking; ≥ 5 drinks on the same occasion during the last 30 days)* Tobacco *(ever smoked; regular smoking – at least one cigarette per week; number of cigarettes per week)* Drug use *(used cannabis, stimulants, psychedelics and opiates in the last month, in the last year, more than a year ago or never; types of drugs used; frequency of drug use)*
European School Survey Project on Alcohol and Drugs (ESPAD) [1]	International cross-sectional school-based survey	15–16-year-olds	100,000 across 35 countries	Every 4 years, 1995–2007 *(next due 2011)*	Alcohol *(use in past 12 months; use in last 30 days; ≥5 drinks on the same occasion during the last 30 days)* Tobacco *(smoked in last 30 days; daily smoking)* Drug use *(lifetime use of any illicit drug; lifetime cannabis use; cannabis use in last 30 days)*
Scottish Health Survey	National cross-sectional household survey	16–24 sub-sample of adult population (and small sample of children aged 2–15)	≈ 8,500 (≈2,000 children)	1995,1998, 2003, 2008 and annually until 2011	Tobacco *(ever smoked; current smoking; number of cigarettes smoked per day)* Alcohol *(ever drink alcohol; frequency of drinking; type of alcohol drunk; location of alcohol drinking)*
Edinburgh Study of Youth Transitions and Crime (ESYTC)	School-based cohort study	11–12-year-olds recruited from first year of all secondary schools in Edinburgh in 1998	4,300 at baseline	Annually, 1999 to 2004	Alcohol *(frequency of alcohol smoking – weekly, monthly etc)* Tobacco *(frequency of current smoking – daily, weekly, monthly, never etc)* Drug use *(frequency of illicit drug use, including cannabis)* Sexual health# *(age at first sexual intercourse)* Delinquency *(many variables including theft, violence, criminal damage, weapon carrying etc)*

Table 2. Continued

Study	Design	Population	Sample size*	Survey dates/ follow up	Outcomes (key variables)
MRC Twenty–07 study	Household cohort study	West of Scotland 15-year-olds recruited in 1987	1,009 at baseline in 1987; 90% follow up in 2000	1990, 1995, 2000	Alcohol *(ever used; age first drink; drinking frequency; when last drink; past week drinking grid)* Tobacco *(ever smoked; age started; regular/occasional; cigarettes per day)* Drug use *(ever used cannabis or other illicit drugs; age at first use; past year use)* Sexual health *(age at first intercourse; age first partner; contraception at first intercourse; number of sexual partners ever and past year; contraception ever and past three months; ever been/made pregnant)*
MRC West of Scotland 11–16 Study West of Scotland 16+ Study	Cohort studies	Recruited P7 pupils living in urban areas in and around Glasgow city Followed up the 11–16 sample at age 18–20	2,586 at baseline in 1987 1,258 of the 11–16 study sample; 49% follow up	Follow up in 1990-01, 1995-06, 2000-03 and 2007 16+ study: follow up at age 18–20, and age 22 (brief postal questionnaire)	Alcohol¶ *(ever drinker; age first drink; drinking frequency; ever really drunk; past week drinking)* Tobacco¶ *(ever smoked; regular/occasional; age started; ever quit; cigarettes per week)* Drugs¶ *(ever used cannabis or other illicit drugs; past year frequency)* Sexual health¶ *(age at first sexual intercourse; contraception at first intercourse; regret; number of sexual partners ever and in past year; contraception in current/most recent relationship)*

MRC=Medical Research Council; P7=primary 7; S2=year 2 of secondary high school; S4=year 4 of secondary high school

*Where study is multi-national, refers to Scotland only †Collected among 15-year-olds only ‡Scotland included as part of the UK #Collected at 6th survey (children aged 17) ¶Refers to variables collected in 16+ Study

(b) Risk behaviour among Scottish adolescents and young adults

The SALSUS and HBSC survey both collect data on alcohol, smoking and illicit drug use among children aged 13 and 15, with HBSC also collecting data among 11 year-old children (final year of primary school). Although the most recent SALSUS (carried out in 2008) and HBSC survey (carried out in 2006) were performed two years apart, and used different definitions of risk behaviours, in general, the findings on substance use (alcohol, tobacco and illicit drugs) are similar in both surveys. Given that the SALSUS is the national surveillance tool for Scotland, data from this survey is used to describe trends in risk behaviours below (with the exception of sexual risk behaviour, data on which is only collected in the HBSC).

Alcohol

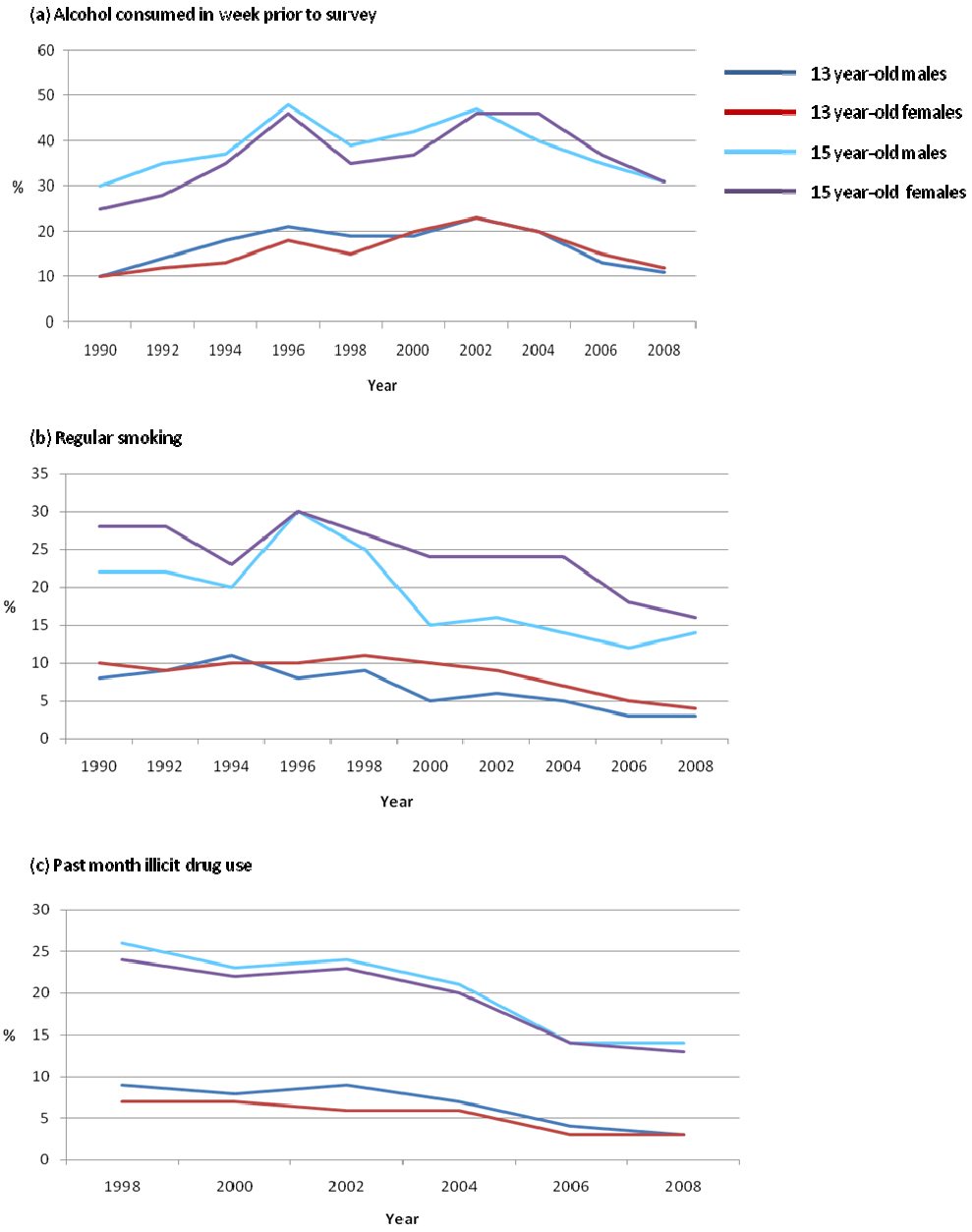
In 2008, 52% of 13-year-olds and 82% of 15-year-olds reported ever having had a drink, with little difference between males and females (figure 4). With respect to long-term trends, the proportion of 13 and 15-year-olds who reported having drunk in the week prior to the survey increased between 1990 and 2002, but has since decreased, with the 2008 rates (11% and 31% for 13 and 15-year-olds respectively) similar to the 1990 rates (5). The proportion of 15-year-old girls drinking in the week before the survey was slightly greater than boys in 2004 and 2006, but there were no gender differences in 2008. Among those who reported drinking in the previous week, 15-year-old boys reported consuming an average of 17 units, while 15-year-old girls consumed an average of 12 units per week. Thirteen-year-olds who had drunk in the past week consumed 12 units on average, with no difference in gender (5). Among pupils who had ever drunk alcohol, the proportion who had ever been really drunk and the number of times they had been really drunk remained fairly constant between 2004 and 2008, and there was little gender difference in the most recent survey (figure 4) (5). A recent review of the evidence on alcohol consumption by young people reported that, amongst those who drink, average units consumed increased markedly between 1990 and 2006 in UK, especially among 11–13-year-olds (25). Thus, whilst the proportion of young people drinking at age under 16 years has decreased in recent years, the report suggests that young people who do drink are drinking in greater amounts, and more frequently than previously. However, as stated by the authors, due to insufficient data it is difficult to draw firm conclusions on trends in mean alcohol consumption in Scotland alone.

Smoking

Smoking prevalence among young people increases with age, with data from 2008 showing that 75% of 13-year-olds have never tried cigarettes, whilst 51% of 15 year-olds have never smoked (figure 4).

Among 13-year-olds, 4% were regular smokers, compared with 15% of 15-year-olds, with rates in both age groups similar for females than males. Rate of regular smoking in both age groups peaked in 1996, and then began to fall substantially. Prevalence of regular smoking among 13-year-olds boys fell from 9% to 3% between 1998 and 2008, and from 11% to 4% among girls. Similarly, among 15-year-olds, rates have fallen from 30% for both boys and girls to 14% among boys and 16% among girls (5).

Figure 4. Trends in alcohol, tobacco and illicit drug use among Scottish 13 and 15-year-old males and females. *Source:* SALSUS 2008 report



Illicit drug use

Cannabis is, by far, the most common drug taken by boys and girls, with very few people reporting use of any other drug (5). The SALSUS 2008 reports that about 25% of boys and girls have ever used illicit drugs, with 20% having used illicit drugs in the past year (figure 4) (5). Use of cannabis is much lower among 13-year-olds, with about 3% ever having used illicit drugs, and 5% having used illicit drugs in the past year (5).

Between 1998 and 2002 there was very little change in reported drug use in the past month, but between 2002 and 2006, rates among 15-year-old boys fell from 24% to 14% and among 15-year-olds girls, from 21% to 12%. There was also a fall in the rates of illicit drug use among 13-year-olds during the same period. The rates for both genders and age-groups remained constant in 2008 (5).

Risky sexual behaviour

The HBSC survey is the only Scottish survey which collects data on sexual behaviour among adolescents. In their 2006 survey, they found that 30% of 15-year-old boys and 34% of 15-year-old girls had had sexual intercourse. The proportion of 15-year-old boys and girls reporting having had sexual intercourse prior to age 16 changed very little between 1998 (when data on sexual health was

first collected) and 2006. Condom use was higher among boys than girls in 2006 (73% vs 58%), and was statistically significantly higher for both genders compared with the previous survey in 2002. The proportion of sexually active children using neither condoms nor the contraceptive pill decreased from 24% in 2002 to 14% in 2006 (4).

Clustering of risk behaviours in youth

Evidence of clustering from existing surveys/datasets

Since the existing surveys of youth risk behaviour have largely been carried out in young adolescents aged 12–15 years, the data on clustering of risk behaviours are similarly derived from this age group.

Among 4,671 children aged about 15 years and surveyed in the 2008 SALSUS, 68% were non-users or non-regular users of any of these three substances. Fifteen percent were regular smokers, 26% were weekly users of alcohol and 13% had used illicit drugs in the last month. Only 6% of all children included were regular smokers **and** weekly drinkers **and** had used illicit drugs in the last month (figure 5) (5).

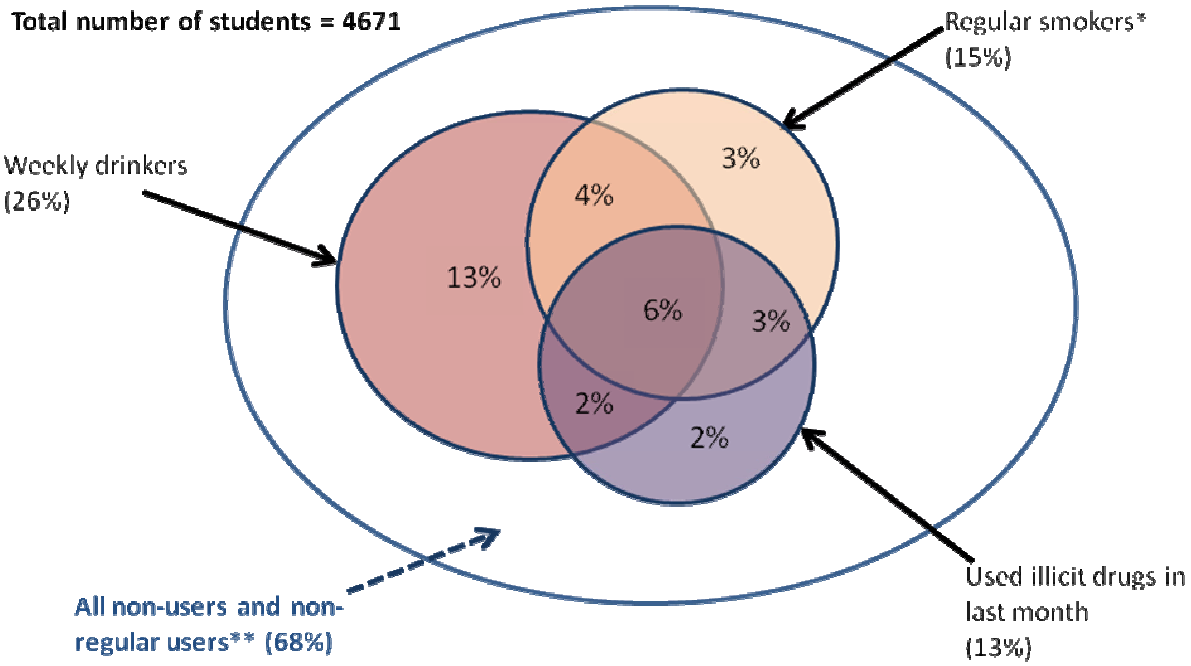
There is a particularly strong relationship between each of tobacco use and recent drug use, and use of other substances. Regular smokers were more likely than non-regular smokers to drink alcohol weekly (63% vs 18%) and to have taken illicit drugs in the past month (54% vs 6%). Fifteen-year-olds who had used drugs in the last month were more likely than non-recent drug users to be regular smokers (63% vs 8%) and to drink alcohol weekly (67% vs 19%) (5). Fifteen-year-olds who usually drank at least weekly were also much more likely to smoke regularly or to have used illicit drugs in the last month than those who did not (38% vs 7%). However, pupils who were weekly drinkers were less likely to use other substances than regular smokers and those who had used illicit drugs in the last month (figure 5) (5).

The pattern of overlap of risk behaviours was very similar for 13-year-olds, although numbers of children within each category were much lower (5).

In summary, just over one quarter of 15-year-olds reported drinking alcohol on a weekly basis, with a smaller proportion reporting regular smoking and slightly fewer reporting regular use of illicit drugs. The overlap in regular use of substances is especially apparent for regular smokers and illicit drug users, but there are a substantial number of regular alcohol drinkers (13%, about half who report regular drinking) who do not report regular use of other substances. This may reflect the more ubiquitous patterning of alcohol drinking among adolescents. The non-static nature of substance use among young people is not captured within figure 6, but the movement in and out of substance use is an important feature of adolescent risk behaviour to bear in mind when measuring risk behaviour and designing interventions.

Figure 5. Overlap between weekly alcohol use, regular smoking and use of illicit drugs in the last month among 15-year-olds included in the 2008 Scottish Schools Adolescent Lifestyle and Substance use Survey.

*Defined as ≥ 1 cigarette per week. **Non-regular users drank alcohol less than weekly, smoked ≤ 1 cigarette per week and used illicit drugs but not in last month



The Edinburgh Study of Youth Transitions and Crime (ESYTC) investigated the inter-relationships between use of tobacco, alcohol and illicit drugs. They found that single substance users predominantly consisted of regular alcohol users, with regular smokers and illicit drug users far less likely to fall into this group (26). Similar to the pattern observed in SALSUS, regular smokers were more likely to report drinking – occasional or regular – than regular drinkers were to report smoking. There was also a dose-dependent relationship between smoking and drinking, and smoking and illicit drug use, which became stronger with age.

There was also a relationship between any substance use and self-reported delinquency within the Edinburgh cohort, with multiple substance users statistically significantly more likely to report a greater volume and variety of delinquent behaviour than single substance or non-substance users (26).

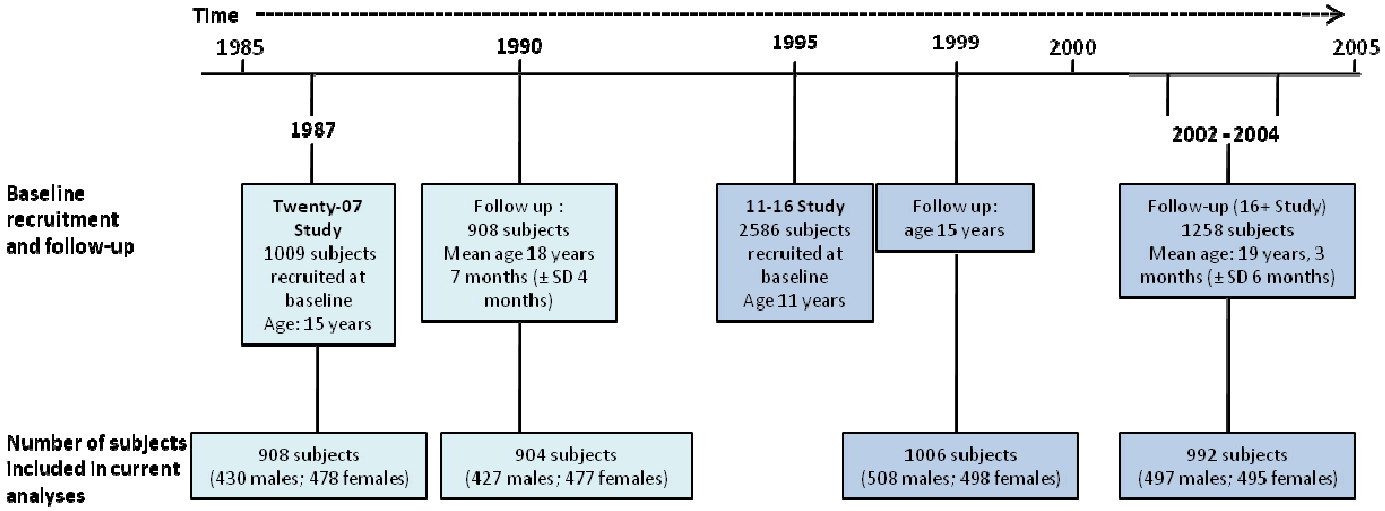
The only Scottish survey to routinely collect data on sexual health as well as other health behaviours is the HBSC survey, which has not yet published data on clustering of health behaviours including risk sexual behaviours. The ESYTC collected data on age at first sexual intercourse from 17-year-olds during the sixth year of follow up, but again, patterns of overlap between this and other health behaviours have yet to be examined.

However, in the SHARE study (a randomised controlled trial of enhanced school-based sex education carried out in Tayside and Lothian) analysis of risk behaviours at age 16 years revealed that, compared with the entire cohort, those who were sexually active by this time were more likely to smoke regularly (24.4% vs 13.7%), drink ≥ once a week (47.1% vs 28.8%), and regularly use cannabis (11.3% vs 5.9%) (27). Regular use of two or three substances was also greater among those who were sexually experienced (27.8% vs 14.2%). After controlling for social background and gender, regular use of each of tobacco and alcohol at age 14 years, and each of tobacco, alcohol and cannabis at age 16 years were statistically significantly associated with lower condom use at most recent intercourse among 16-year-olds. Condom use was also shown to vary by gender and socioeconomic status, with girls and those from a more deprived background more likely to report not using condoms (27).

Clustering of risk behaviours in the West of Scotland cohort study: secondary analyses

The methods of the secondary analyses of the West of Scotland cohort studies are given in detail in Chapter 2. To briefly recap, we performed analyses of the West of Scotland Twenty–07 and 11–16/16+ studies, which

Figure 6. Time period of recruitment and follow up in the Twenty–07 and 11–16/16+ studies



recruited and followed up young people from the same geographical areas (Glasgow City Region), but some years apart (figure 6), collecting data on risk behaviours at each time point. We included 904 subjects (427 males and 477 females) followed up at ages 18–19 in the Twenty–07 study, and 992 subjects (497 males and 495 females) followed up at ages 18–20 in the 16+ Study (figure 6).

For males and females, rates of current smoking changed very little between 1990 and 2003 whereas rates of heavy smoking (defined as 70+ cigarettes per week) dropped by over a third. Among males, rates of drinking more than the government recommended maximum units of alcohol in the previous week increased only slightly between 1990 and 2003, while the rates of ever having used illicit drugs increased by about 50% between 1990 and 2003. The most striking increase in risk behaviours were among females, where, at age 18–19: drinking more than the weekly recommended maximum units of alcohol more than doubled between 1990 and 2003; binge drinking doubled between 1990 and 2003; experience of illicit drugs more than doubled between 1990 and 2003; and sex at age <16 years more than trebled between 1990 and 2003. In terms of earlier adolescent risk behaviour, rate of smoking initiation at age <14 years was similar in both cohorts for both genders, whilst rate of monthly drinking at age 15 more than doubled in males between 1990 and 2003, and increased by more than four times among girls between 1990 and 2003 (Appendix F).

The results of our analyses of the relationship between early sexual initiation and **current** substance use are shown in table 3. Among males, early initiation of sexual intercourse was related to an increased risk of current smoking and excess alcohol use in both cohorts, with the pattern changing very little between 1990 and 2003. Although early sexual initiation was statistically significantly associated with ever having used illicit drugs by age 18–19 in 1990, this association was weaker, and no longer statistically significant, in 2003 (with the change in strength of association statistically significant). Early sexual initiation was also associated with an increased risk of early adolescent use of all three substances in 1990, and 2003, although the association between illicit drug use at age 15 and early sexual initiation was slightly weaker in 2003 (but still statistically significant).

Among females there was a non-significant trend towards associations between current substance use and early sexual initiation in 1990 (with the exception of excess alcohol, which was not associated with early sexual initiation). Each of these associations were stronger and – for smoking and illicit drug use – statistically significant in the 2003 cohort (table 3). However, given the wide confidence intervals surrounding the 1990 odds ratios, we must be cautious in our interpretation of these estimates and our conclusions regards changes in associations among females between 1990 and 2003. In contrast to males, the association between early sexual initiation and ever having used illicit drugs became stronger among females in 2003, with the change in pattern by gender being statistically significant ($p<0.001$). There was a non-significant trend towards associations between early substance use and early sexual initiation in 1990, with all three associations becoming stronger, and statistically significant, in 2003. The change in strength of association between starting smoking before age 14 and early sexual initiation between 1990 and 2003 was statistically significant, with the change in association significantly different from that in males. When we analysed relationships according to socioeconomic status, we found that, for both genders, the direction and strengths of associations were broadly similar for young people from a manual working background compared with a non-manual working background.

Table 3. Associations between early sexual initiation and each of current and early substance use, by gender and cohort

	MALES (OR* with 95% CIs)		FEMALES (OR* with 95% CIs)		Interaction between date and sex
Risk behaviour	**1990‡**	**2003#**	**1990‡**	**2003#**	
Current substance use	**N=427**	**N=497**	**N=477**	**N=495**	**(p-value)†**
Current smoker	**2.00 (1.20 to 3.34)**	**2.26 (1.45 to 3.51)**	1.72 (0.81 to 3.65)	**2.19 (1.38 to 3.47)**	0.869
Excess alcohol in past week¶	**1.88 (1.13 to 3.13)**	**1.63 (1.09 to 2.44)**	0.81 (0.25 to 2.58)	1.23 (0.77 to 1.96)	0.441
Ever used illicit drugs**	**3.95 (2.31 to 6.73)**	1.09 (0.68 to 1.75)††	1.94 (0.89 to 4.25)	**3.02 (1.86 to 4.91)**	**0.001**
Early substance use	**N=430**	**N=508**	***N=478***	**N=498**	
Started smoking <14 years	**2.49 (1.45 to 4.27)**	**2.69 (1.63 to 4.45)**	1.15 (0.49 to 2.69)	**3.60 (2.22 to 5.85)††**	0.044
Monthly (or more frequent) drinker at age 15 years	**1.84 (1.08 to 3.13)**	**1.92 (1.18 to 3.11)**	1.83 (0.78 to 4.31)	**1.88 (1.05 to 3.35)**	0.595
Ever used illicit drugs at age 15	**2.30 (1.19 to 4.44)**	1.28 (0.81 to 2.03)	2.27 (0.76 to 6.78)	**2.73 (1.67 to 4.46)**	0.248

CI=confidence interval; ORs in bold are statistically significant at the $p < 0.05$ level; N=total number of males or females included in each logistic regression model for each cohort

*For each of 'current substance use' and 'early substance use' odds ratios are adjusted for each of the other two substance use variables and are based on weighted data which adjusts for loss to follow up

†Test of whether the pattern of change between 1990 and 2003 differed significantly between males and females

‡Twenty–07 Study

#11–16/16+ Study

¶>22 units and >14 units in the previous week, for males and females respectively

**Ever used illicit drugs in lifetime

††change in strength of association between 1990 and 2003 statistically significant at $p < 0.01$

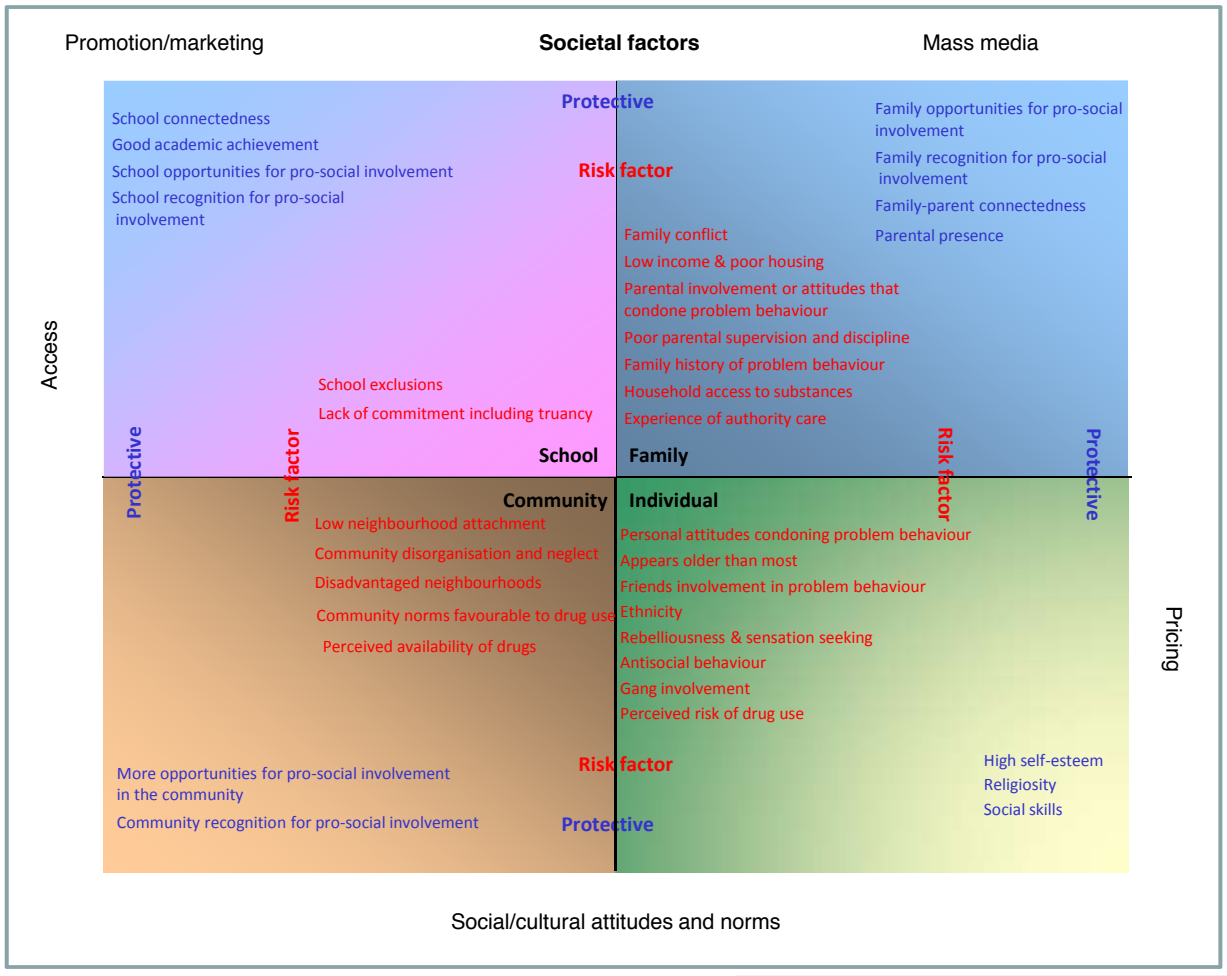
Risk and protective factors predictive of risk behaviour in young people

There is a substantial body of literature on the risk and protective factors for substance use and risky sexual behaviour, a systematic review of which was beyond the scope of this environmental scan. However, a brief non-systematic review of the recent literature revealed two key points. First, the risk and protective factors (identified largely in cross-sectional studies), of young people fall into four main categories of 'Individual', 'Family', 'School', and 'Community',(28–31) all of which are affected by additional 'Societal' factors, as portrayed in figure 7. Although family and individual factors (the latter of which also includes peer factors) are important, the contribution of school and community influences is also striking (figure 7).

The factors that influence development of sexual risk behaviours and substance use therefore span multiple domains, highlighting the complexity of the underlying causes of risky behaviour in young people, and the challenge of deciding where best to focus interventions. Furthermore, these risk factors are not always static, having different predictive values throughout childhood and adolescence (32).

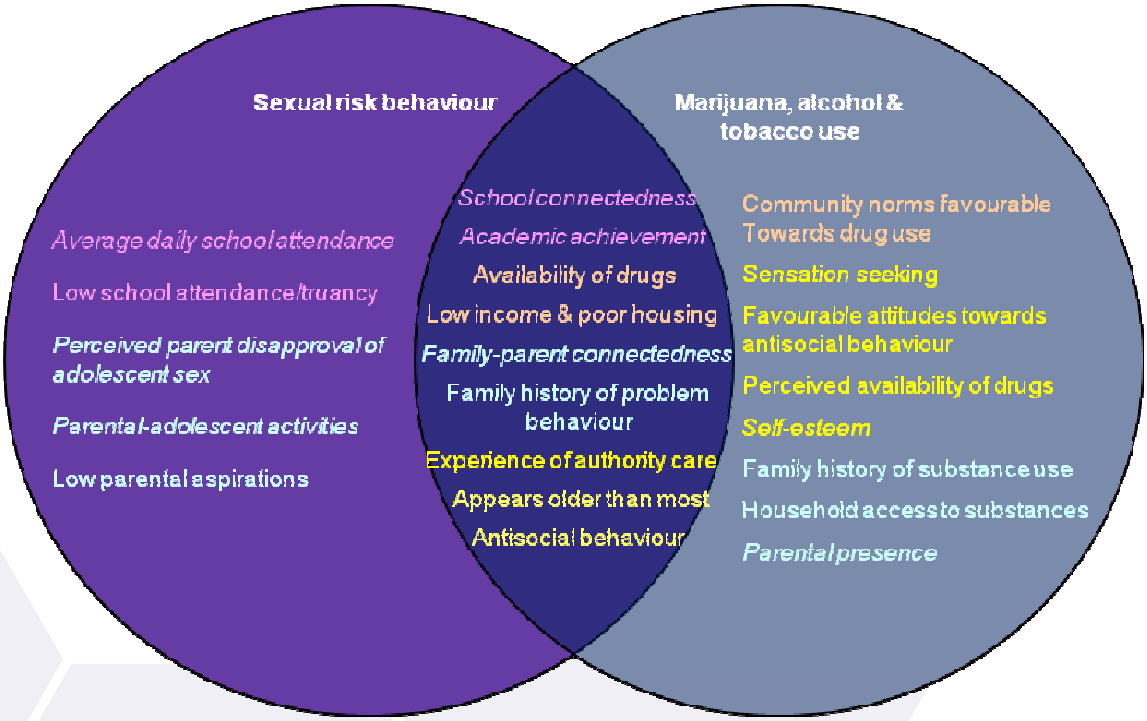
Figure 7. Risk factors (red) and protective factors (blue) associated with any of tobacco, alcohol or illicit drug use, or risky sexual behaviour, according to domain

NB Implicit in this diagram is that the converse of a risk factor is protective, and vice versa



The second point to highlight is the relationship between risk behaviours, in terms of the overlap in underlying risk and protective factors. There are some factors which appear to be unique in their association with particular risk behaviours, and others that are common to multiple risk behaviours (28–30). Those consistently reported as being associated with sexual risk behaviour and/or substance use are shown in figure 8. Academic achievement, school connectedness and family connectedness are protective factors found to be associated with prevention of all four risk behaviours (28–30). Similarly, community risk factors such as availability of drugs and low income and poor housing are common to all four risk behaviours, as are individual factors including antisocial behaviour and experience of authority care (28–30). This overlap in underlying factors is reflected in the observed clustering of risk behaviours, as discussed previously, and provides further support for the use of interventions that address multiple risk behaviours. However, the uniqueness of some associations between risk/protective factors and single risk behaviours also reflects the complexity of youth risk behaviour, and might partly explain why risk behaviours only cluster to a certain extent. Furthermore, the strength of the observed common associations between risk/protective factors and risk behaviours varies. Finally, much of the data on predictors of risk behaviour in young people is derived from USA-based studies. However, a relatively recent comparison of findings from surveys in USA and Australia found notable similarity between the two countries in terms of the key risk and protective factors relevant to substance use (30), providing some support for the application of these findings to other high-income settings.

Figure 8. Risk factors and protective factors (in italics) for sexual risk behaviour and substance use, with variables listed in both circles depicting areas of overlap between risk behaviours.
Text colour reflects risk/protective factor domain – school: pink; family: blue; individual: yellow; community: brown – as per figure 5.



5 Chapter 5 - Review of interventions that aim to reduce/prevent multiple risk behaviours or take a generic approach to risk among adolescents and young adults

(a) Review of review level literature of interventions that address multiple risk behaviours or take a generic approach to risk among adolescents and young adults

Summary

- In a systematic search of the published review literature, we found no reviews of interventions that reduce or prevent generic or multiple risk behaviours among adolescents and young adults.

The literature search yielded a total of 1,545 reviews. After reviewing the titles and abstracts, there were nine studies which were potentially relevant (in that they appeared to focus on the topic in question), but it was unclear whether they were reviews of primary studies or simply discussion papers, and 12 studies that were possibly relevant but it was difficult to determine their relevance from the abstract alone. Following retrieval and review of the full papers, none of these 21 articles were actually found to be reviews of the topic we were addressing. Therefore there appears to be no review level literature on interventions that address multiple risk behaviours or take a generic approach to risk among adolescents and young adults.

(b) A review of randomised controlled trials of interventions that addressed risk behaviour in adolescents or young adults with outcomes on substance use *and* sexual risk behaviour

Summary

- There is a dearth of studies that have evaluated interventions where outcome data on both substance use (tobacco, alcohol or illicit drugs) **and** sexual behaviour have been collected and reported in the published literature.
- We identified eight RCTs, of which four were targeted at selected populations (e.g. African-American youth from low-income communities) and four were non-targeted.
- The effects of the non-targeted interventions (Project ALERT, Life Skills Training, Gatehouse Project and the Healthy for Life Project) were mixed, with interventions having some or no effects on one more risk behaviours. In some cases there were inconsistent effects across different measures of single risk behaviours and/or different follow up time points:
  - Project ALERT and Life Skills Training had some effect on substance use in the short term, which, for the Life Skills Training programme, persisted in the longer term. In Project ALERT, sex with multiple partners in the past year was lower in the intervention group, but there was no difference in condom use. In the Life Skills Training programme there was a reduction in a composite outcome of 'high risk behaviour for HIV' in the intervention group.
  - In the Gatehouse Project, there was a statistically non-significant trend towards reduced risk behaviour among the original cohort at three years-follow up.
  - The Healthy for Life Project had no impact on any risk behaviour at two-year follow up.
- Interventions targeted at specific subgroups in the population have had some positive effects on risk behaviours, but the relevance and transferability of their findings to the Scottish population is unclear.
- The Seattle Social Development Project, a non-randomised controlled trial implemented in primary school-aged children had a significant positive impact on alcohol use and sexual risk behaviour at age 18 years and sexual risk at age 21 years.

Characteristics of identified studies

Our literature search for randomised controlled studies yielded a total of 481 studies. Upon review of titles and abstracts, 22 articles were potentially relevant and the full articles were retrieved. Of these, 11 articles met the inclusion criteria, which, after accounting for multiple papers arising from the same study, resulted in the identification of 6 randomised controlled trials. An additional two trials were not identified by this search strategy, but had been identified through our literature search of reviews of single risk behaviour interventions, reported in part (d) of this chapter. This gave a total of 8 relevant trials. Four of these were interventions carried out within specific population subgroups (e.g. African-American youth from low-income communities) (33–37), and four were not targeted at a particular sub-group in the population (38–41). In addition, we identified a study which was a non-randomised controlled trial of an intervention delivered to high-crime areas of Seattle, USA, which will be discussed separately.

Non-targeted interventions

Of the four evaluations of non-targeted interventions, three were from the USA. In two studies (Project ALERT and Life Skills Training) the authors evaluated the effects of adolescent substance-use-oriented life skills training programmes on early adulthood sexual risk behaviours (39, 40). In a third study (the Gatehouse Project, investigators evaluated the effect of a school environment intervention on substance use and sexual behaviour (38). The fourth study (the Healthy for Life Project) involved a multi-component intervention that was delivered to 11-year-old school children, with evaluation of the effect on risk behaviours at age 14–16 (41).

Project ALERT

Project ALERT is a school-based programme comprised of a social skills curriculum (including 11 sessions) and delivered to children aged about 11 (table 4) (39). Previous analyses of this study revealed a significant positive short-term impact on alcohol use (at three months), which did not persist at 12 and 15 month follow up, significant reductions in initiation of cannabis use at 12 and 15 months follow up, and significant reductions in smoking levels among existing cigarette smokers (but no reduction in smoking initiation) (42). However, these effects on tobacco and cannabis use did not persist at 6–year follow up (table 5) (43).

The effects on sexual behaviour were subsequently assessed (in a second cohort recruited from a different USA state) during a longer term follow up study of adults who were unmarried and sexually active, and who responded to a survey 8.5 years post-intervention implementation (39). Those included in the intervention group (either Project ALERT or ALERT Plus – which included additional booster sessions) were statistically significantly less likely to report having sex with multiple partners in the past year (table 5), an effect which was partially mediated by reduced alcohol abuse at age 21. The intervention group was also less likely to report drug-linked unprotected sex, but this was of borderline statistical significance, and there was no significant difference in inconsistent condom use and no difference in effect for any outcome by gender. There were also no differences between ALERT and ALERT Plus for any outcome, suggesting that inclusion of booster sessions did not have any additional benefit in terms of an effect on the analysed behaviours.

There are a number of limitations to this study. The authors were unable to control for partner relationships other than marriage, which may have impacted their analysis of inconsistent condom use.

The attrition at follow up was also high, with 43% of the original cohort not responding to the survey at age 21. However, attrition did not differ across experimental groups, and although there were differences in baseline characteristics between the responders in the control and intervention groups, these were controlled for in the analyses. However, the high attrition rate may mean that the study population is not representative of the general target population, thereby limiting the generalisability of the results. Finally, the allocation of the intervention was at group level, yet the long-term effects were analysed at the individual level, without clustering being taken into account, which may lead to over-estimation of any programme effects.

Life Skills Training

Similar to Project ALERT, the Life Skills Training programme consists of a school-based curriculum focused on improving personal and social skills to reduce motivations to use substances (table 4) (40). It has been evaluated in a number of studies, with results showing mixed effects on substance use. Although alcohol, tobacco and illicit drug use were shown to be reduced in the short term, these effects only persisted for smoking and monthly drunkenness (and not other measures of alcohol use or cannabis use) at 6-years follow up (table 5) (44–47).

Given that the skills taught within life skills training programmes have a broad application, the authors proposed that this programme may also have an effect on sexual behaviours for HIV risk. They therefore followed up their original cohort 10 years post-intervention implementation, when the individuals were about 25 years old (40). The authors constructed a composite dichotomous outcome of 'high risk behaviour for HIV' i.e. a HIV risk index (defined in table 4), and report a statistically significant effect of the intervention on this outcome, with a statistically significant reduction in odds of HIV risk index of about 30% (table 5). This effect was partially mediated by reduced increase over time in alcohol and cannabis intoxication. It is interesting that for this outcome to be considered present, individuals had to report all three of the component sexual risk behaviours. Justification for the definition of the HIV risk index was not given, raising questions about the extent to which this index is data-derived post-hoc. Although all three behaviours that made up this HIV risk index were reported as being less common in the intervention group, it is unclear which differences were statistically significant. There was no difference in frequency of condom use between the intervention and control groups, but the authors did not perform a sub-group analysis to include only single sexually active individuals.

Although the attrition rate was high, it was reported to be similar across comparison groups. And although substance users and males were more likely to not respond at follow up, the attrition rates among these subgroups did not apparently differ across comparison groups. However, exclusion of baseline high-risk individuals lost to follow up may have underestimated the impact of the intervention.

Table 4. Characteristics of non-targeted randomised controlled trials that collected outcome data on both substance* use **and** sexual behaviour

Intervention group	Control group	Study population	Follow up (post-intervention)†	Age at follow up (years)	Attrition	Outcomes
Project ALERT‡ Primary year of intervention in 7th– 8th grades (age 11; 11 classes delivered over 2 years). In the expanded program (ALERT Plus) additional 5 lessons in each of grades 9 and 10. Classes focused on: • knowledge and consequences of drug use • reducing barriers to drug resistance through confidence building • building social norms against use and the skills for resisting pro-drug pressures • linkage of the lessons to other risky behaviour, including linking risky sexual behaviour with drug use.	Existing school prevention curricula already in place.	Study 1 & 2: 30 schools in urban, suburban and rural areas of California and Oregon; ~7500 children at baseline. At follow up: Study 1: N=3,852 Study 2: N=3,640 Study 3: 55 schools in rural, small town and urban areas of South Dakota; 4,689 children at baseline. At follow up: N=1,901 (41%) who were unmarried and sexually active at follow up (71% of those eligible were included in the follow up study).	Study 1: 3, 12 and 15 months post-implementation. Study 2: 6 years Study 3: ~9 years	Study 1:~12–13 Study 2: ~17 Study 3: Mean 21	43%	• Inconsistent condom use during sexual intercourse in the last year. • Sex with multiple partners (≥ 2 in last year) . • Drug-linked unprotected sex (unprotected sex because of alcohol or drug use one or more times in the last year). Collected drug and alcohol misuse at ages 19 and 21, but only used this data to determine if intervention effects on sexual behaviour were mediated through effect on alcohol and drugs.
Life Skills Training‡ Primary year of intervention in 7th grade (age 11; 15 classes) with booster interventions during 8th grade (10 classes) and 9th grade (5 classes). Classes focused on: • teaching of information and skills for resisting social influences to use drugs • developing personal and social skills for increasing overall competence (e.g. skills for building self esteem, communicating effectively, developing personal relationships and asserting rights).	Existing school prevention curricula already in place.	Study 1: 3,597 of the original cohort (which included 5569 participants from 56 schools from mainly middle-class suburban and rural areas of New York State). Study 2: 2,042 of the original cohort.	Study 1: 6 years Study 2: 10 years	Study 1: ~17 Study 2: median 24.6	63%	• Number of sexual partners. • Frequency of being drunk or high when having sex. • Frequency of condom use. • Alcohol and cannabis intoxication. • Other illicit substance use in past month. • 'High risk behaviour for HIV' outcome .constructed (defined as present if individuals reported all three of (1) having multiple sex partners, (2) having sex when drunk or high, (3) past month high risk substance use).

Table 4. Continued

Intervention group	Control group	Study population	Follow up (post-intervention)†	Age at follow up (years)	Attrition	Outcomes
Gatehouse Project Implemented in grade 8 (2nd year of high school) through grade 9 (i.e. 3 years;1997–1999) and included the following: 1.Survey of students' views on security, communication with teachers and broader participation in school life. 2.Feedback to a school-based action team. 3.Consultation with school team regards intervention strategies. 4.Training of teachers in the selected strategies. All schools implemented a curriculum component (life skills teaching in interpersonal communication and emotional management) and were encouraged to teach concepts through study of texts – literature, poetry, song, film and visual materials.	Assume school prevention curricula already in place.	12 intervention schools (1,335 participants – 81% of eligible students) and 14 control schools (1,342 participants – 68% of eligible students) included.	1.End of 10th grade (coinciding with the end of the intervention (with interim follow up at end of grades 8 and 9). 2.Carried out surveys in new 8th grade students 2 and 4 years after intervention was introduced.	15–16 13–14	Grade 8:3% Grade 9:8% Grade 10:10% N/A	For follow up of original cohort: • Alcohol use (any alcohol, regular drinker, binge drinking). • Tobacco (any smoking and regular smoking). • Cannabis use (in past 6 months). • Early sexual initiation. • Antisocial behaviour.
The Healthy for Life Project **School component:** 54 lesson social influence curriculum delivered in sequential 12-week block (intensive) to 7th graders or 3 four-week segments (age appropriate) in 6th, 7th and 8th grades. **Family component:** a Parent Orientation Session prior to beginning of the program; home mailings 3 times during the program; Parent/adult interviews (homework assignments). **Community component:** sponsoring at least one health event and focusing on one policy issue during the course of the program, with adults and children working together. **Peer component:** peer-leaders elected in each class and taught their classmates through 'words and action'.	Usual programme (no further details given).	2,483 students at baseline from 21 middle schools in Wisconsin (1,981 of these provided data at grade 9).	1–2 years (9th and 10th grades).	14–16 years	Grade 9:20% Grade 10:32%	• Alcohol use in past month. • Smoking in past month. • Cannabis use in past month. • Sexual intercourse in past month.

*Alcohol, smoking and/or illicit drug use. †Unless otherwise stated, 'post-intervention' refers to number of years after the intervention was implemented (i.e. from baseline). ‡Results are presented for the original evaluations of these programmes. Results of independent replication studies are referred to in the text.

The Gatehouse Project

The Gatehouse Project, carried out in Australia, was a whole-school intervention implemented in grade 8 (second year of high school) and evaluated through a cluster-randomised controlled trial (38,48,49).

Designed to promote a sense of social inclusion and connection in secondary schools, the strategies varied between schools, according to students' perceptions of need. The conceptual framework focused on three areas of action: building a sense of security and trust; enhancing communication and social connectedness; and building a sense of positive regard through valued participation in aspects of school life (50). The curriculum component of the program was consistent across schools (although the manner in which it was integrated did vary e.g. whether it was incorporated into English classes or health/physical education classes etc) and included skills teaching in interpersonal communication and emotional management.

Box 7. Gatehouse Project

Actions taken by schools in response to student surveys typically fell into four areas:

Bullying

- Changes to school policy.
- Rules developed in consultation with students.
- Supervision of risky areas during break times.
- Involving parents in development of anti-bullying policy.
- Providing parents with information on anti-bullying activities.
- Introduction of peer support program.

Student-teacher communication

- Training teachers to encourage voicing of and listening to range of views in classroom.
- Negotiation and display of rules governing teacher and student conduct in classes.
- Introducing teacher as mentor programmes for students experiencing difficulties.
- Forming teachers into peer teams to support such changes.

Students' self esteem

- Greater emphasis on positive feedback on student work, sport and social skills.
- Extra-curricular activities, including lunchtime activities program.
- Displays of student work around school.
- Activities that celebrate student achievements (e.g. performances).

Student participation

- Promotion of student leadership in the school.
- Increasing number of school committees.

Table 5. Results of studies of non-targeted randomised controlled trials that collected outcome data on both substance* use **and** sexual behaviour

Intervention	Result	Limitations
Project ALERT	• Significant reduction in cannabis use initiation at 12 months (4.9% vs 7.7%; p=0.03: [NNT ≈ 36]) and 15 months (8.3% vs 12.1%; p=0.03: [NNT ≈ 26]), but no difference at 6 years. • No reduction in smoking initiation at 12 or 15 months or 6 years. • Significant reduction in alcohol use initiation at 3 months, but no difference at 12 or 15 months or 6 years. • At 9 years post-intervention, the intervention group were statistically significantly less likely to report having sex with multiple partners (43.5 vs 49.7%; p < 0.05: [NNT ≈ 16]) and less likely to engage in drug-linked unprotected sex (27.2 vs 31.6%; p=0.05: [NNT ≈ 23]), but there was no significant difference in inconsistent condom use. • No significant difference between ALERT and ALERT Plus for any outcome and no difference in effect for gender. • The only significant mediator for multiple partners was alcohol abuse at age 21, and for unprotected sex, alcohol abuse at age 21 and drug consequences at age 19; none of the mediators completely explained the program results.	• Unable to control for partner relationships other than marriage. • External validity may be reduced through responders not being representative of the general target population. • Intervention implemented at the group level, but analysis performed at individual level and clustering not taken into account.
Life Skills Training	• At 6 years follow up, significant reductions in monthly smoking (27% vs 33%; p<0.05: NNT ≈17]), weekly smoking (23% vs 27%; p<0.05: [NNT ≈ 25]), and in monthly drunkenness (34% vs 40%; p<0.05: [NNT ≈ 17]), but no difference in other alcohol use measures or cannabis use. • At 10 years follow up the intervention had a protective effect on the HIV risk index (OR 0.70, 95% CI 0.51 to 0.96). All three behaviours that made up the index were less common in the intervention group (but unclear whether statistically significant). • This effect was partially mediated by reduced growth in alcohol and cannabis intoxication over the course of adolescence. • No difference in condom use between the groups (but no subgroup analyses to compare single, sexually active individuals).	• High attrition at 6 years (40%) and 10 (43%) years follow up, although no differential attrition across comparison groups. • Since justification for the HIV risk index was not given, could question whether this index is data-derived post-hoc. • Unable to control for marriage and other partner relationships.
Gatehouse Project	• Slight trend for reduced prevalence of some behaviours but no statistically significant differences other than significant reduction of regular smoking at end of grade 8 (OR 0.66, 95% CI 0.46 to 0.95) which was not sustained at subsequent follow ups. • Unpublished data reveals no difference in early sexual initiation. • No statistically significant difference in past 6-month substance use at any of the new 8th grade student survey time points. • But, statistically significant reduction in early sexual intercourse (OR 0.55, 95% CI 0.37 to 0.83) and marked risky behaviours† (OR 0.71, 95% CI 0.52 to 0.97) among new 8th graders surveyed one year after the intervention had ended (2001 survey).	• Low precision of effect estimates (i.e. wide confidence intervals) perhaps reflecting inadequate power. • Difficult to identify the mechanisms that explain reductions in risk behaviour, where found. Since the intervention consisted of a life skills curriculum component as well as a broader 'school environment' element, any changes might have been the result of either (or both) these elements.
The Healthy for Life Project	• At 2-years follow up, no significant effect on past-month alcohol, tobacco or cannabis use, or on past-month sex. • Intensive school component version had some marginal positive effects for past-month smoking (0.01 > p <0.05) and cannabis use (adjusted OR for cannabis: 0.56†, p < 0.05).	• Study population was a relatively stable, white, middle-class population residing in small Midwestern towns and cities, so results may not be generalisable to urban centres.

OR=adjusted odds ratio (NB: variables adjusted for in multivariate analyses vary between studies); CI=confidence interval; NNT=number needed to treat (number of people who would need to receive the intervention to prevent one person from initiating or reporting the behaviour). *Alcohol, smoking and/or illicit drug use; †Defined as one or more of: early sexual behaviour; heavy substance use; and multiple reports of antisocial behaviour; ‡Confidence interval not reported for this odds ratio

The program was implemented in 25 schools (2,677 students) over a three-year period, with yearly follow up of the original cohort up to grade 10 (table 4). Typical changes made by the schools are listed in box 7 (51).

Although there was a slight trend towards a reduced prevalence of some behaviours, none were statistically significant at the third year of follow up (38) (including early sexual initiation, results for which have not been published, but analyses of which showed no significant difference between comparison groups; *L Bond, personal communication*).

There were generally no differences in risk behaviours in yearly cross-sectional studies carried out among subsequent new eighth grade students. However, among eighth grade students surveyed one year after work with schools had ended (i.e. four years post-implementation), there was a statistically significant 45% reduction in early sexual intercourse, and a significant 29% reduction in a composite variable of 'marked risky behaviours' (table 5) (49). Assuming that any changes made to the school ethos during the intervention period were sustained, the intervention therefore had some impact on risk behaviours among subsequent eighth grade students. However, marked risky behaviour consisted of one or more of: early sexual behaviour; heavy substance use; and multiple reports of antisocial behaviour. Although there were trends towards reduced heavy substance use and multiple reports of antisocial behaviour when these outcomes were analysed separately, the reductions were not statistically significant. The significantly reduced marked risky behaviour may therefore be largely accounted for by the significant reduction in early sexual behaviour.

Interestingly, the investigators found no change in student's reporting of increased connectedness to school (50), which raises the question – 'by which mechanism were significant reductions, and non-significant trends towards reductions, in risk behaviours achieved?'. The explanation may partly lie in the observed differential effect of the intervention according to baseline level of school connectedness. The investigators found reductions in regular smoking in children among the intervention group, who reported good school connectedness at baseline, compared with the control group, but found no such difference in effect among those with low baseline school connectedness (52).

The low precision of effect estimates, particularly for the estimates obtained in the analyses of the original cohort, suggests that the study may not have been adequately powered, particularly given the nonparticipation of six schools after randomisation. In addition, it is difficult to identify the precise mechanisms by which some risk behaviours were reduced. Because the intervention consisted of a life skills component as well as a broader 'school environment' element, any observed changes may have been the results of either (or both) these elements. The study investigators indicated that the assessment of implementation was focused on the curriculum component and could not capture the complexity of the whole-school changes (38). They do, however, argue that it is not appropriate to isolate the effect of separate elements of the intervention, indicating that 'it was a combination of what the schools did... which contributed to the success of the Gatehouse Project' (50).

Another important point to bear in mind is that changing whole school structures, policies, culture and curriculum is also challenging and a gradual process. Thus it is possible that the degree of change that occurred during the intervention period of the Gatehouse Project was insufficient to impact on students who were already disengaged or disengaging with school (50). This may explain the significant risk behaviour changes observed among new students who entered grade 8 four years after intervention implementation, by which point greater changes might have been implemented and become established in the schools. It may also indicate that specific strategies are needed to engage these disengaged and disengaging students (50).

The Healthy for Life Project

The Healthy for Life Project consisted of a school-based social influence component, a peer component, a family component and a community component (table 4). The programme was implemented in grade 8 (among 2,483 students), with follow up for recent substance use and sexual behaviour at one and two years later (41). The authors found no statistically significant difference in past-month alcohol, cannabis or tobacco use, or sexual intercourse. The curriculum component was delivered in either an intensive 12-week block or three four-week segments. The program that included the intensive curriculum version had a marginal statistically significant positive effect in reducing smoking and cannabis use in the past month at two-year follow up (table 5). Attrition was low compared with the two previously discussed studies, reflecting the more short-term follow up evaluation in this study.

Targeted interventions

Of the four identified interventions that included selected population subgroups, three were USA-based. The study populations in these intervention programs included participants from poor Africa-American Chicago schools (the Aban Aya Youth Project) (33), adolescents with one parent born in a Spanish-speaking country in the Americas (Familias Unidas) (35), youths and their parents living a low-income setting in Baltimore (Focus on Kids [FOK] plus Informed parents and Children Together [ImPACT]) (37), and children from a low-income urban setting near Cape Town (HealthWise) (36). Full details of study characteristics are given in the table in table 6. Given the highly selected nature of the study populations included in these intervention studies, the transferability and relevance of the findings to the Scottish population is unclear. The results of these studies are therefore only briefly discussed below.

Aban Aya Youth Project

The addition of a community component to the school-based social development curriculum in the Aban Aya Youth Project resulted in statistically significant reductions in substance use, recent sexual intercourse, and condom use among boys at the end of the intervention period, but had no significant effect on any of the outcomes for girls (table 7) (33).

Table 6. Characteristics of identified randomised controlled trials that target particular sub-groups in the population and report on both sexual behaviour and substance use outcomes

Intervention group	Control group	Study population	Follow up (post-intervention)†	Age at follow up (years)	Attrition	Outcomes
Aban Aya Youth Project Compared a classroom-based curriculum (social development curriculum [SDC]) with a school/community intervention (SCI), consisting of SDC plus parental support to reinforce skills and promote child-parent communication, school climate and community components.	Health-enhancing behaviour program.	1,153 participants from 12 poor African-American Chicago schools.	Follow up at end of intervention delivery (4 years)	14-15	49%	• Substance use (combined outcome from multiple measures). • Having had sex. • Use of condoms. • Violence. • School delinquency. • Provoking behaviour.
Familias Unidas (focuses on improving family functioning) + Parent-Adolescent Training for HIV Prevention (PATH). Familias Unidas aims to increase parental involvement in the adolescent's life, increase family support for the adolescent, promote positive parenting and improve parent-adolescent communication. PATH aims to promote responsible sexual behaviour by training parents to become effective HIV educators for their children.	Two controls: (1) PATH + English for Speakers of other Languages (ESOL) (2) ESOL + HEART (HeartPower for Hispanics). ESOL and HEART used as attention controls.	266 adolescents (mean age 13) [and one of their main care-givers] about to enter grade 8, and with at least one parent born in a Spanish-speaking country in the Americas.	6, 12, 24 and 36 months.	16	21%	• Substance use (smoked, drunk alcohol, or used an illicit drug in lifetime and in the last 90 days). • Having had sex in lifetime and past 90 days. • Condom use during past 90 days. • Unprotected sex at last intercourse. • Consumed alcohol or drugs before last sexual intercourse. • Ever contracted an STD.

Table 6. Continued

Intervention group	Control group	Study population	Follow up (post-intervention)†	Age at follow up (years)	Attrition	Outcomes
HealthWise Consists of Life Skills Training, TimeWise (Taking Charge of Leisure Time Curriculum) and lessons drawn from effective sexual prevention curricula. Of 19 schools, 4 randomly selected to participate in the pilot of the intervention. During the efficacy trial these same schools used as the intervention arm, and four additional schools 'subjectively matched' to the four treatment schools. Program consisted of 12 lessons in grade 8 (age 12), followed by 6 booster lessons in grade 9.	Life orientation curricula.	2,176 children (mean age 14 years) from a low-income urban setting near Cape Town.	Every 6 months, up to 2 years.	14-15	About 10% of the target population lost between each wave of data collection. At wave 5, N=1350 (62% of baseline).	• Sexual intercourse in lifetime. • Knowledge of condom availability. • Sexual intercourse in past month. • Condom use. • Alcohol, cigarette and drug use in lifetime, past month and heavy use.
Focus on Kids (FOK) + Informed Parents and Children Together (ImPACT), +/- booster sessions FOK (all youths): HIV risk reduction intervention (8 small group sessions), focusing on life skills and information giving. ImPACT: 20 minute video emphasising several concepts of parental monitoring and communication, followed by role play. Delivered in the participants' home to both the youth and the parent. Boosters for the FOK conducted among youths only after 6 months follow up and at 10 months	Focus On Kids only.	817 youths aged 12–16 living in and around 35 housing developments, community centres and recreation centres in Baltimore, Maryland (low-income setting), USA.	6, 12 and 24 months.	16	26% at 6 months. 29% at 12 months. 13% at both 6 and 12 months.	• Sex in last six months. • Unprotected sex in last 6 months. • Sexual risk (score of 0–2 based on previous two items). • Alcohol consumed or cigarettes smoked in past 6 months. • Cannabis used. • Drugs sold. • Knife carrying. • Fighting and 'beating someone up' (last 4 all in past 6 months).

Familias Unidas

The family-based parenting intervention, Familias Unidas, had no effect on recent alcohol use, but the growth trajectory for smoking and illicit drug use over three years of follow up decreased in the intervention group, and increased in the control group. This effect on smoking and illicit drug use was partially mediated by improved family functioning. There was no difference in engagement in sexual intercourse, but the number of sexually active subjects was very small (table 7) (35).

Focus on Kids and ImPACT

In the study of FOK (youth group-based sessions) versus FOK plus ImPACT (parent and child component), mean scores for unprotected sex, smoking and alcohol use were statistically significantly lower in the FOK + ImPACT group at 6 months post-intervention. At 12 months, cannabis use was significantly lower in the in FOK + ImPACT group, and the effect on alcohol persisted, but the effects on smoking and sexual behaviour did not. However, at 24 months there was significantly less smoking in the FOK + ImPACT group, but no significant difference in alcohol or cannabis use. There was also no impact on sexual intercourse or condom use, but there was a significant reduction in becoming pregnant or causing pregnancy (table 7) (37).

HealthWise

HealthWise consisted of Life Skills Training, TimeWise (a 'Taking Charge of Leisure Time' curriculum) and lessons drawn from effective sexual prevention curricula (table 6).

At two-years follow up, heavy alcohol and past-month cigarette use was significantly lower among all participants, including baseline non-users, in the intervention group, with effects particularly strong among girls (36). There were no differences in initiation of sexual intercourse, prevalence of sex in past month or condom use for boys and girls (table 7). However, in comparison to the control group, the intervention group had a higher proportion of sexually active children at baseline, which may partly explain the apparent lack of effect of the intervention on initiation of sexual behaviour (36).

Table 7. Results of studies of randomised controlled trials targeting particular sub-groups in the population and that collected outcome data on both substance* use **and** sexual behaviour

Intervention	Key results*	Limitations
Aban Aya Youth Project	• No significant effects on risk behaviour growth among girls. • Program effects for boys were statistically significant for substance use, recent sexual intercourse and condom use in the school/community intervention group.	• Control group may have been too similar in content to the SDC which may have limited ability to detect an intervention effect. • Follow up was immediately after the end of the intervention period, so lack of long-term evaluation of intervention. • Only 51% of students still present at the end of grade 8.
Familias Unidas	• No differences in past-90 day's alcohol use between the intervention and control groups. • For past-90 days smoking the mean growth trajectory decreased in the intervention group, but increased for the control groups (difference, $p<0.02$) and there were significant differences in past-90 day cannabis use ($p<0.05$). • Small numbers prevented growth curve analysis of unprotected sex in past 90 days, but tests conducted at each time point revealed no significant differences. • Changes in family functioning partially mediated the effect of intervention condition on smoking and illicit drug use.	• Culturally-specific intervention which limits generalisability. • No inert control group, and so attention control modules might have had an effect and reduced power to detect intervention effects. • Possible self-selection bias (11% families refused inclusion); authors unable to compare characteristics of refusers vs participants.
Focus on Kids and ImPACT	• 6 month mean scores for unprotected sex ($p<0.01$), smoking ($p=0.03$) and alcohol use (0.04) significantly lower in the FOK + ImPACT group versus FOK only. • Sexual risk† ($p=0.06$) and sexual intercourse ($p=0.05$) borderline significantly lower in the FOK + ImPACT group. • At 12 months, no statistically significant difference in sexual behaviours, but difference in alcohol use ($p<0.01$), borderline difference in smoking ($p=0.07$), and significantly lower cannabis use ($p=0.04$) in the FOK + ImPACT group. • At 24 months, no significant difference in alcohol or cannabis use, but reduction in smoking ($p<0.01$). • At 24 months no effect on sexual intercourse, condom use or use of birth control, but 'being pregnant or getting a girl pregnant' was reduced in the FOK + ImPACT group ($p=0.01$).	• Study population consisted entirely of black youths from low-income communities, which may limit generalisability to other populations. • FOK +ImPACT was compared to FOK only and not to a further control group, and so the authors presumed that FOK is better than a control based on past, rather than concurrent, data. • Substantial attrition at 24 months (39% lost to follow up); baseline characteristics indicated that those lost to follow up were at greater baseline risk than those followed up (but there was no difference across comparison groups).
HealthWise	• At 2 years follow up, control group had significantly greater heavy alcohol use (OR 1.6, 95% CI 1.2 to 2.2) and past-month cigarette use (OR 1.4, 95% CI 1.04 to 1.8), which were particularly strong among girls. • Significant reduction in cannabis initiation among girls, but no effect among boys. • No difference in initiation of sexual intercourse for boys and girls (but improved knowledge of access to condoms). • No difference in prevalence of sex in past month or condom use between 18 and 24 months.	• Intervention group had a higher proportion of sexually active children at baseline than the control group which may partly explain a lack of effect of intervention on sexual intercourse initiation. • Did not account for school-level clustering. • Treatment assignment not entirely random.

CI=confidence interval; OR=odds ratio; SDC=Social Development Curriculum

*A p-value of less than 0.05 denotes statistically significance †Sexual risk=composite variable of sexual intercourse and condom use (no sex; sex with condom; sex without condom)

Seattle Social Development Project

The Seattle Social Development Project (now known as Raising Healthy Children), a **non**-randomised controlled trial, is unique among all studies identified in this review in that it has collected long-term outcome data on health behaviours, at six and nine years post-end of intervention (12 and 15 years post-implementation). This intervention sought to promote bonding to school and family and strengthening of children's social competencies. It consisted of three components: teacher training, child social and emotional skill development, and parent training, with the intervention commencing in grade 1 (age six years) (53).

At age 18, fewer students in the intervention group reported heavy drinking, sexual intercourse and multiple sex partners, and had borderline significantly lower rates of pregnancy or causing pregnancy compared with the control group (14). However, there were no significant differences in cannabis or tobacco use in the intervention versus control group (table 8).

At age 21, the intervention group reported significantly fewer lifetime sexual partners than the control group. Single people in the intervention group were also significantly more likely to have reported condom use at last intercourse, but there was no significant difference in delay in sexual intercourse. Females reported significantly fewer pregnancies and lifetime births in the intervention group than the control group, but there was no difference among males between the two groups. Condom use during first intercourse and lifetime diagnosis of sexually transmitted disease (STD) did not differ between the two groups in the entire cohort. However, significant increases in condom use, and reductions in STDs were found among African-Americans. Although there was a trend towards reduced substance use at age 21 in the intervention group, the difference was not significant. However, there were significant effects on positive functioning in university or work, and on emotional and mental health (54).

The effects on outcomes among those receiving the late intervention – in grades 5 and 6 – were consistently weaker than those observed among young people who had received the full intervention (from grade 1), but were stronger than the effects in the control group, indicating a dose-response effect (14,54).

Interestingly, the intervention group were significantly more bonded to school group at ages 13 and 18. Furthermore, changes in level of school-bonding between ages 13 and 18 and level of bonding at age 18 were both significantly correlated with risk behaviour at age 18 (55). Indeed, the success of the Seattle Social Development Project, in terms of its positive effects on multiple risk behaviours, could be attributed to the programme being focused on strengthening three of the key factors protective against substance use and sexual risk behaviour – namely, school-connectedness, family-connectedness and academic achievement.

Table 8. Seattle Social Development Project: study characteristics and key results

Intervention group	Control group	Study population	Follow up (post-intervention)	Age at follow up (years)	Key results	Limitations
Seattle Social Development Project Quasi-experimental evaluation of a social development intervention implemented in primary school that included 3 components: teacher training; social competence training for children; and parental education* (voluntary). Full intervention group: children receiving the intervention from grades 1–6 (ages 6–12). Late intervention group: children receiving the intervention in grades 5–6 (ages 10–12) only.	No intervention in grades 1–6 (further details not given).	643 children from public schools serving high-crime areas of Seattle, Washington, USA.	6 and 9 years.	18 and 21 years (7%).	**At age 18** • Fewer students in the full intervention group reported: o heavy drinking (15.4% vs 25.6%; p=0.04): NNT ≈ 10 o lifetime sexual activity (72.1% vs 83%; p=0.02): NNT ≈ 9 o having multiple sex partners (49.7% vs 61.5%; p=0.04): NNT ≈ 8 o pregnancy or causing pregnancy (17.1 vs 26.4%, p=0.06): NNT ≈ 11. • There was no significant effects on lifetime smoking, lifetime alcohol use or lifetime cannabis use. • Late intervention in grades 5 and 6 did not significantly affect health-risk behaviours. **At age 21** • More students in the full intervention group reported condom use during last intercourse (60% vs 44%; p<0.05): NNT ≈ 6. • Fewer female students in the intervention group reported: o pregnancy (38% vs 56%; p<0.05): NNT ≈ 6 o giving birth (23% vs 40%; p<0.05): NNT ≈ 6 o multiple sex partners (p<0.05). • Fewer students in the full intervention group reported: o recent substance use (use of alcohol or tobacco in past month or any other illicit drug in past year; p=0.09) o But there were significant effects on functioning at university and work and on emotional and mental health.	• Non-randomised controlled trial (but comparisons of baseline characteristics revealed no differences in key variables that may impact on outcomes). • Parental component of intervention voluntary, hence only 43% of parents took part in the parental education sessions. • Relative impact of individual components of the intervention not assessed. • Intervention was allocated at the class level, not the school level, so there is the possibility of contamination between the experimental and control groups. However, this would probably have resulted in a dilution of any intervention effect, and thus the observed effects are, if anything, likely to have been underestimated

**7-session curriculum called 'Catch 'Em Being Good when children are in grades 1 and 2; 4-session curriculum called 'How to Help Your Child Succeed in School' in grades 2 and 3; and 5-session, 'Preparing for the Drug-Free Years' curriculum in grades 5 and 6;
STD=sexually transmitted disease; NNT=number needed to treat (number of people who would need to receive the intervention to prevent one person from initiating or reporting the behaviour)

Although the intervention was delivered to high-crime areas of Seattle, the use of 'bussing' during this time – whereby children from higher socioeconomic backgrounds were bussed into lower socioeconomic areas *(JD Hawkins, personal communication)* – meant that the study population was actually very mixed (as indicated by the fact that 50% of the children in the study received free school meals). There are few limitations to this study, as listed in the final column of table 8. However, one of the main limitations is the non-randomised design of this controlled trial. Although there were no measurable baseline characteristic differences between the intervention and control groups, there could be unmeasured differences and thus residual confounding, which could partially account for the large effect sizes observed.

Early childhood interventions with adolescent or young adulthood health behaviour outcomes

For completeness, we have included details of the four preschool interventions in which data were collected on health-risk behaviours once the children reached adolescence, or young adulthood, as identified in the SCPHRP's Early Life Working Group environmental scan Interventions for promoting early child development for health: an environmental scan with special reference to Scotland (56). These interventions included early childhood education, home visitation or a combination of both programmes, and included high-risk families from low socioeconomic areas.

Carolina Abecedarian Project

In the Carolina Abecedarian Project children were randomised to either receive year-round, full-day intervention in a child-care setting from early infancy until kindergarten entry at age 5, followed by 3-years of a more family- and school-mediated phase, or to serve as untreated controls. At follow up of these children at age 21, the proportions of young adults who had used cannabis in the past month and who were teenage parents was statistically significantly lower in the intervention group. Regular smoking and binge drinking were non-significantly lower in the intervention group (table 9) (57).

Chicago Child–Parent Center Programme

The Child–Parent Center program, which provides educational and family-support services between the ages of 3 and 9 years, has been administered to low-income areas of Chicago through the state school system since 1967. In the Chicago Longitudinal Study, long-term follow up data have been collected on children who attended the program between 1985 and 1986 with matching to a comparison group that included children who had received alternative kindergarten programs (but no preschool experience) (58).

By age 24 years, there was no difference between the two groups in the proportion of females who had a child when aged <18 years, and no difference in the proportion who used substances at age ≥ 16 years, or who used cannabis or a harder drug at least a few times per week, or who used tobacco daily (table 9) (58).

Nurse–Family Partnership

In the Elmira Study of the Nurse–Family Partnership programme, offspring were followed up at age 15 years. Although adolescents born to pre- and post-birth nurse-visited women had statistically significantly fewer arrests, convictions and violations of probation than the control group, there were no significant differences in other behaviours such as smoking or alcohol use (59). Among the subgroup of low socioeconomic, unmarried mothers, offspring reported significantly fewer sexual partners in the past six months, and consumed alcohol for fewer days than adolescents in the control group, but there were no significant differences in number of cigarettes smoked per day or initiation of sexual intercourse (table 9) (59).

The High/Scope Perry Preschool Project

The High/Scope Perry Preschool Project is an educational programme that is based on an active learning model that emphasises participants' intellectual and social development. In addition to children attending the preschool Monday to Friday, parents participated in monthly small group meetings with other parents, facilitated by programme staff. The study population included 123 black children from families of low socioeconomic status who were at risk of failing school. In terms of adolescent risk behaviour outcomes, data on substance use were not collected, but data on teenage pregnancy were collected. At age 19, there were fewer pregnancies among females in the intervention group than in the control group (64 per 100 vs 117 per 100; p=0.08), although this difference was not quite statistically significant (60).

Conclusions from early life programmes

The evidence from early life programmes that followed children into teenage years and/or adulthood is rather mixed. Both the Carolina Abecedarian Project and the Nurse–Family Partnership programme had a mixed effect on youth risk behaviour, whereas the Chicago Child–Parent Center Programme had no effects on young adulthood risk behaviour. The Abecedarian Project led to a reduction in teenage parenthood and past-month cannabis use, but had no effect on smoking, past-month alcohol use or binge drinking, whilst the High/Scope Perry Preschool Project reported fewer teenage pregnancies in the intervention group (although this was not statistically significant). In the Nurse–Family Partnership programme the intervention had no effect in the total cohort on smoking, alcohol use, initiation of sexual intercourse or number of sexual partners, but did lead to a reduction in number of days of alcohol consumption and to fewer sexual partners among the low socioeconomic subgroup. The inconsistent findings from these studies perhaps reflect differences between the interventions and the different follow up periods. These results do however suggest that early childhood intervention, in itself, is not sufficient to prevent all risk behaviour in young people.

Table 9. Summary of long-term outcomes of early childhood intervention programmes

Program	Design	Study population	Age at Follow up (years) [Attrition]	Effects of intervention on health behaviour outcomes
Carolina Abecedarian Project Full-day child care until age 5. School-age: parent programme including home visits. (Control group: no intervention)	RCT	104 children of 109 families who had met the criteria for having children at risk for school failure (98% were African American) and were included in the study.	21 [6%]	• Compared with the control group, the intervention group reported statistically significantly lower rates of: o teenage parenthood (26% vs 45%; $p<0.05$): NNT ≈ 5 o cannabis use in past month (18% vs 39%; $p<0.05$): NNT ≈ 5. • No significant difference in smoking, past-month alcohol use or binge drinking.
Chicago Child–Parent Center Programme Intensive preschool education and family support between ages 3 and 9. (Control group: full-day kindergarten)	Quasi-experimental	1,389 children of an original cohort of 1,539 low-income minority children (93% Black, 7% Hispanic) who attended the Chicago Child–Parent Center programme or alternative full-day kindergarten programs available to low-income families.	~24 [20–23%]	• No difference in: proportion of females who were teenage mothers; substance use*; frequent misuse of cannabis or harder drugs or daily tobacco use.
Nurse–Family Partnership Home visits by nurses from pre-birth (pregnancy) to age 2 to improve antenatal health and improve development and school readiness.	RCT	Children of 400 women recruited to the study Investigators actively recruited women who were aged <19 years, unmarried or of low socioeconomic status and with no previous live births (85% of total cohort). 315 children were included in follow up study.	15 [12%]	• In total cohort, no differences in smoking or alcohol use, but in low SES subgroup, adolescents in intervention group had fewer sexual partners in previous months ($p=0.003$) and consumed alcohol for fewer days than the control group ($p=0.03$). • No difference for total cohort or subgroup, in number of cigarettes smoked per day or initiation of sexual intercourse.
High/Scope Perry Preschool project Preschool education aimed at the intellectual and social development. Also included sessions on parenting skills. (Control group: no intervention)	RCT	123 black children of low IQ and of low-income families.	15 [1.6%]	• At age 19, there were fewer teenage pregnancies in the intervention group than the control group, although this difference was not quite statistically significant (64 per 100 females vs 117 per 100 females†; $p=0.08$).

* Defined as current use of cannabis or harder drugs, drinking alcohol more than once a day, having a substance use problem, or having received substance use treatment since age 16

† Data reported by study investigators as pregnancy rate (i.e. total number of pregnancies per 100 women, with multiple pregnancies per female counted)

RCT=randomised controlled trial; SES=socioeconomic status; NNT=number needed to treat (number of people who would need to receive the intervention to prevent one person from initiating or reporting the behaviour)

(c) An overview of review literature and a summary of the common features of effective interventions across single risk behaviours

Summary

- Few interventions have been shown to be consistently effective across all of tobacco, alcohol and illicit drug use and sexual risk behaviours in young people.
- The most effect approaches to date have been pricing interventions that influence price of alcohol and tobacco.
- Although access restrictions to tobacco and alcohol products are effective in reducing underage sales of tobacco and alcohol consumption in the general population, their effects on smoking and drinking behaviour among young people is unclear.
- Media interventions have been shown to be effective in preventing smoking initiation, but their effects on other substance use and sexual risk behaviour is unknown.
- Knowledge-giving school-based interventions may be necessary, but insufficient in themselves to prevent uptake of all risk behaviours. The evidence for school-based social influence and life skills training interventions is very mixed and inconsistent for all risk behaviours. There is some evidence from a recent UK-based trial that peer-led interventions might be effective in preventing and reducing smoking.
- Interventions that address the school environment show some promise of effectiveness, but need to be further researched.
- Parenting/family-based programmes have been shown to have some effect on smoking and drinking behaviour, but their effects on illicit drug use and sexual risk behaviour is unknown. The Strengthening Families Program for Parents and Youth 10–14 appears most promising in preventing tobacco, alcohol and cannabis use.
- Although multi-modal interventions (consisting of any combination of school, family and community components) require further research and evaluation, they do show considerable promise.
- Evaluations of interventions across risk behaviours share some common features that limit the conclusions that can drawn regards effectiveness (e.g. few studies have followed adolescents for more than 3 years, and so the long-term impact of many approaches is unclear, and methodological shortcomings, including high loss to follow up, use of inappropriate control groups and failure to account for clustering in the analyses, limit the reliability of the results of some studies).

We identified a total of 22 recent reviews of primary studies that addressed smoking, alcohol, illicit drug use or sexual risk behaviour. Reviews of smoking interventions were the most common (10 reviews), followed by reviews of sexual risk behaviour (five reviews), alcohol use (four reviews), and illicit drug use (two studies). One further review addressed substance use in general. Of these 22 reviews, 16 were assessed to be of high methodological quality and three were moderate or moderate/high quality (table (a), Appendix E). Three reviews were judged to be of low or low/moderate quality and were excluded from the overview (table (b), Appendix E) (61–63). We also identified and included 10 reports which reviewed the review-level literature (or reviewed a mixture of primary studies, review studies and – sometimes – narrative papers); these papers largely dealt with investigating the effects of pricing, access or media interventions on alcohol use and/or smoking (64–73).

Pricing/taxing interventions

A recent UK systematic review concluded that, overall, pricing measures are effective in reducing smoking initiation and cessation in young people (although the effect is more moderate for sustained cessation) (66). What is less clear is the magnitude of this effect. Most of the evidence base is from the USA, where the cost of cigarettes is cheaper than in the UK. Furthermore, there is a distinct lack of data on the impact of price interventions on smoking in different socioeconomic groups (66).

Alcohol pricing interventions are the most effective means of reducing alcohol-related harm, and may be particularly effective in young people.

The relationship between alcohol consumption and pricing is well researched and described. In the UK, alcohol consumption has risen in the past 40 years in parallel with the decreasing price of alcohol which, in 2005, was 62% lower than in 1980 (71). Along with access restrictions and drink-driving laws, pricing is the most effective means of reducing alcohol-related harm (64,71,72). It has been estimated that a change in taxes that raised the prices of alcoholic beverages (across the board) by 10% would decrease on-premise beer consumption by 4.8% and spirits consumption by 10% (71).

Pricing interventions for tobacco are effective in reducing smoking initiation and cessation.

Although access restrictions reduce illegal sales of tobacco to youth, its impact on smoking **behaviour** has rarely been investigated.

The introduction of minimum retail pricing for a UK unit of alcohol of 40p or 60p is projected to lead to reductions in consumption of 2.7% or 12.9% respectively (69). Findings from some, but not all, reviews indicate that young people may be particularly sensitive to price increases. However, recent modelling of the potential impact of pricing increases is less robust for adolescents than adults, with the estimated impact of pricing measures on these young people remaining equivocal (74). The evidence on the influence of pricing measures on binge drinking also remains unclear (64,74).

Access restrictions

Access restrictions have been shown to be effective at reducing the rate of illegal sales of tobacco to youth, but very few studies have looked at whether access restrictions actually impact on smoking behaviour in terms of smoking prevalence or uptake (70). A review of youth access interventions identified just nine studies (eight of which were cross-sectional in design) that had collected data on merchant compliance and smoking prevalence, and none of these showed a statistically significant correlation between the two (70,75). There is some evidence that merchant compliance had the largest impact on students who were further along their smoking uptake progression, and less of an impact on youths who are in the early stages of their smoking uptake progression, when cigarettes may more often be obtained from social sources (70,76).

Apart from price, other controls on the availability of alcohol have been shown to impact drinking levels and alcohol-related problems (68,71). For example, alcohol consumption rose considerably from the 1950s onwards, when the strict controls on alcohol availability, introduced as an alternative to prohibition were gradually weakened (71). Systematic reviews of controlled before and after studies, largely in the USA, concluded that raising minimum purchase age for alcohol reduces consumption (68). Also, alcohol consumption can be reduced by restriction of the hours and days of alcohol purchasing, as well as the numbers and types of alcohol outlets (71). The effect of availability restrictions on young people is unclear however, and enforcement of merchant compliance for alcohol (and indeed cigarette) sales may simply alter the purchase patterns, with young people obtaining these substances through other avenues.

Mass-media interventions

A recent review of experimental studies and population-based campaigns indicates that, overall, there is good evidence for mass-media interventions having an impact on smoking prevention, cessation, knowledge and attitudes among youths, despite methodological limitations of studies making evaluation of their results challenging (65). It is unclear whether mass-media campaigns are more effective as part of a multi-modal intervention since the relative contributions of individual components have generally not been investigated. Factors that affect the effectiveness of media interventions include message content, target audience, demographics (gender, age etc), number of sources of anti-tobacco messages, duration and intensity of exposure (67).

A lack of studies of the impact of media interventions on alcohol and illicit drug use makes the role of media in reducing use of these substances much less clear.

Although mass-media interventions, which played a huge educational role after the onset of the HIV epidemic, have been shown to have some, albeit small, positive effects on sexual behaviour in low-income countries (77), we did not identify any recent systematic reviews of mass-media interventions promoting responsible sexual behaviour in middle or high-income countries. A relatively recent narrative, non-systematic review of primary studies concluded (largely from studies in low-income countries) that mass-media interventions can be part of a broad strategy to promote responsible sexual behaviour, and, as with mass-media campaigns targeting smoking, are most effective when multiple avenues are used simultaneously and sustained over a long period of time (78). However, the impact and cost-effectiveness of these approaches in high-income countries remains to be established.

Mass media has been used successfully to positively impact on smoking prevention and cessation among youths, but investigation of its role in reducing other risk behaviours has been limited.

School-based interventions

The overall evidence picture for school-based interventions (focused on modifying individual characteristics) targeting smoking, alcohol and/or drugs is remarkably similar across these risk behaviours. Rigorous systematic reviews of school-based interventions to address tobacco, alcohol and/or illicit drug use, which have taken account of the methodological quality of studies, found mixed evidence for their effectiveness in preventing uptake or lowering prevalence of use of these substances (45–47,62,79). There is little evidence that information-giving alone is an effective strategy, and mixed, inconsistent evidence for an effect through social influence or social competence interventions. One of the most widely implemented programmes in the USA is Botvin's Life Skills Training programme. However, as discussed in section (b) of this chapter, there are mixed effects on smoking, alcohol and illicit drug use in the short-term, inconsistent medium- to long-term effects on cannabis use (79) and a small, but significant, effect on only 'monthly drunkenness' and smoking in the long-term (45–47).

School-based interventions focused on modifying individual characteristics show some limited effects on risk behaviour in the short-term.

Programs that address school-ethos show considerable promise for reducing multiple risk behaviour and are worthy of further investigation.

There is some evidence that peer-led interventions among students aged 12–13 years might be effective in preventing smoking uptake, with the UK-based A Stop Smoking in Schools Trial (ASSIST) programme reporting a sustained reduction in smoking uptake 2 years post-intervention (80). In contrast to previous, ineffective peer-led programmes, the peer-supporters in the ASSIST trial did not deliver classroom-based sessions, but rather, discouraged smoking amongst their peers in informal interactions outside the classroom. Such an approach shows some promise in terms of achieving changes in cultural norms surrounding smoking behaviour in the whole school (80). However, a modified version of this intervention programme, has not, in preliminary studies, been shown to be effective in

preventing alcohol misuse *(D Foxcroft, personal communication)*. Therefore we must be careful not to assume that this intervention approach is effective in preventing all risk behaviour.

There are a handful of high quality experimental/quasi-experimental studies which have assessed the impact of a combined curriculum-based strategy and a whole-school strategy to improve school ethos, one of which is the Gatehouse Project, discussed in the previous section. These studies show some significant effects on substance use behaviour, with particular effects on alcohol and smoking at follow up, especially among boys (81). Although the evidence to date is limited, this approach shows considerable promise and is worthy of further development.

The findings from two rigorous systematic reviews of randomised controlled trials indicate that sex education programmes do not appear to be effective in delaying sexual intercourse initiation, increasing contraception use or reducing pregnancy rates, when compared with control groups (82,83). A more recent Cochrane systematic review of randomised controlled trials reported mixed evidence for the effectiveness of school-based education-only programmes, with some support for effectiveness from two relatively recent education-focused programs, in which condom use at last sexual intercourse was reported to be greater in the intervention group (84). This could, however, be due to social desirability response bias, since condom use is of course self-reported. The authors concluded that there was insufficient evidence to determine the effectiveness of education-only interventions on unintended pregnancy, contraception use or initiation of sexual intercourse. However, these school-based interventions have generally been compared with control groups in which the regular sex/health education programme is delivered, and since the control itself may be having an effect on behaviour, any impact of the intervention itself may be diminished. Scher *et al* note that these findings do not necessarily mean that school-based sex education programs are not effective. They may be necessary, but not sufficient on their own for reducing sexual risk behaviour (83).

A more recent systematic review specifically examined the effect of peer-led approaches in adolescent sexual health education (85). These studies found no impact on condom use at last sexual intercourse, pregnancy rate, or number of partners. Just one study reported a lower rate of initiation of sexual intercourse among girls in the intervention group. However, the authors exerted caution when interpreting the findings of the included studies, given the heterogeneity between study results and the overall poor quality of the studies, and proposed that such an approach might be found to be effective if intervention and evaluation design were improved (85).

Parenting/family programmes

There is some evidence that parenting/family programmes positively impact on smoking and alcohol, but limited evidence for their effectiveness in illicit drug use or sexual risk behaviour prevention.

As with school-based interventions, the evidence for parenting/family programmes positively impacting on youth smoking is mixed, with results from studies varying considerably (86). They may, however, be particularly effective in preteen and early adolescent children, and it has been proposed that the most effective interventions include: strategies to involve adolescents in family activities, maintain familial bonds and manage conflict; the development of skills in social competence, self-regulation and personal responsibility among the young people; and an emphasis on **active** parental involvement (87).

The evidence for parent/family interventions is perhaps stronger for reducing alcohol use outcomes in children, with a meta-analysis of good quality RCTs indicating that family interventions for school-aged children reduced alcohol initiation by about 30%, compared with the control group (88). A second recent review similarly found that family-based interventions showed considerable promise when implemented among children aged <10 and 10–15 years (46), and the most recent Cochrane review highlighted the Strengthening Families Program for Parents and Youth 10–14 as the most promising intervention for preventing/reducing alcohol misuse in young people (45). It also shows the most promise in reducing cannabis use in the short and long-term (89). It has also been shown to significantly reduce hard drug use (i.e. methamphetamine) in the long-term (90). Beyond this, the evidence for family programs (delivered

to adolescent children's families) having an impact on illicit drug use is limited, and further research is needed (89).

To our knowledge, there is a clear lack of synthesis of the existing data on family/parent-only interventions for sexual risk behaviour, particularly when children reach teenage years, with no systematic reviews having been carried out. A HDA review of teenage pregnancy and parenthood indicates that some interventions have included a 'family outreach' component, and the authors suggest that there is some good evidence for the effectiveness of such an approach (91). However, the lack of specific discussion in the report regards the evidence for this makes it difficult to assess the accuracy of this conclusion. Another report by the HDA in the previous year does not include any discussion of the role of parenting/family interventions for young people (92). This may reflect a distinct lack of parenting/family interventions being implemented among older children, with sexual behaviour outcomes collected. There are however, a small number of school-based education programmes that have included some parental involvement, and are largely aimed at reducing sexual risk behaviour through improved parent-child communication (73). As with many other interventions, these programmes often included only short-term follow up (with one study following young people up after just six weeks for example), which is perhaps insufficient in detecting any changes in sexual risk behaviour. One study (Growing Together), did follow young people up for two years, and reported a lower sexual activity initiation rate among those in the intervention group, but the conclusions that could be drawn were limited by the small study population (73).

Parenting/family interventions with **active** parental involvement may be particularly effective at reducing adolescent alcohol and tobacco use when implemented in preteen and early adolescent years.

Their role in preventing illicit drug use or risky sexual behaviour is unclear.

As described in section (c) of this chapter, there is some evidence that parenting/family interventions in **early** childhood (i.e. preschool) have an impact on risk behaviours, including alcohol misuse, illicit drug use and pregnancy in teenage years (57,58). In addition, there are a number of combined family and school interventions which have been shown to be effective in reducing aggressive behaviour (which has been shown to be associated with alcohol misuse in later childhood), and a marked number of school, family or multi-component interventions with mixed or emerging evidence on reductions in aggressive behaviour by children (46).

Community interventions

There is some support for the effectiveness of community interventions in preventing youth smoking, but less for alcohol and illicit drug use. Most studies of community-interventions with smoking outcomes have included a school-based component (and can thus be considered multi-modal in nature), and have compared the intervention to no intervention or usual care (93). These studies are therefore discussed in the following paragraph, under 'multi-modal interventions'.

Two large community-based studies were highlighted by Foxcroft *et al* in his review of interventions to reduce alcohol misuse in young people, with one reporting significant reductions in underage alcohol sales, and one reporting significantly fewer drink-driving arrests amongst 18–20-year-olds, but neither reporting on actual alcohol use outcomes (45).

There is a dearth of studies of community-based-only interventions with illicit drug use outcomes. All 4 preventive interventions identified in a relatively recent Cochrane review combined a community component with a school-based programme (89). Community-based sexual behaviour interventions consist primarily of youth development schemes, all of which are essentially multi-component, and are discussed in the following discussion of multi-modal interventions.

Multi-modal interventions

There is no single systematic review of multi-modal interventions for any of the risk behaviours of interest. However, evidence summarised in reviews of specific settings and of multiple settings does suggest that multi-modal interventions may be effective in preventing risk behaviour.

There is some good evidence from both a Cochrane review (93) and a systematic review of recently published studies (94) for the effectiveness of multi-modal interventions in preventing smoking by young people. Two methodologically robust intervention studies (the Minnesota Heart Health Programme and the Finnish North Karelia Project) evaluated the impact of large-scale cardiovascular disease prevention programmes aimed at entire populations, and found significant reductions in smoking prevalence in young people in the community intervention group compared with the control group (93). In another study – a combined intervention consisting of a media campaign, school programme, and homework sessions for parents – monthly smoking rates increased at a significantly lower rate compared with the control group given a media campaign only (93). Furthermore, among six recent multi-component interventions identified in one review, four (all of which contained a parenting/family component) showed significant effects on smoking outcomes compared with no intervention, and two showed significant effects for some subgroups only (94).

In Thomas *et al's* review of school-based programmes for preventing smoking, three of seven studies, in which multi-modal programmes (community plus school +/- parent programmes) were compared to school-based interventions only, reported positive significant effects on smoking uptake (47).

There is some evidence for multi-modal interventions being effective at reducing tobacco and alcohol use and risky sexual behaviour. Further studies are needed which isolate the separate effects of the components of these interventions.

Two multi-modal studies with alcohol outcomes have been shown to have an impact on youth drinking. Project Northland, comprised of community, family and school components, shows considerable promise, with significantly less past-month and past-week alcohol use in the intervention group at 2.5 years follow up, and significantly less binge drinking at 6.5 years follow up (46). Project STAR, which involves the school and the community found significantly reduced past-week and past-month alcohol use at one year follow up, but found no secondary prevention effects on baseline users at 2.5 and 3.5 years follow up (46).

Scher *et al* report that the most successful interventions in reducing sexual risk behaviour are multi-modal youth development programmes. He included 13 assessments of six programs in his meta-analysis and found that these programs had a significant effect on increasing contraception use and reducing pregnancy rates (83). On closer examination, these effects were significant among girls, but not among boys. Similar findings were reported in a recent review of the effectiveness of early childhood interventions and youth development programmes for reducing teenage pregnancies (95). These conclusions differed from those of DiCenso *et al*, but the former identified fewer multi-component studies, and were unable to include data from all studies in their meta-analysis (82). These multi-modal interventions generally consisted of 50–100 hours of program-related work, including paid work or community service, mentorship programs, life skills classes, volunteer experiences etc. However, they were primarily carried out in 'high-risk' young people living in primarily low-income, urban settings in the USA (83). Therefore, the applicability of these results to non-US non-high-risk populations is unclear. This type of youth work may be more appropriate as an intensive targeted approach to reduce sexual risk behaviour in 'high-risk' young people. Multi-modal interventions were also reported to be the most effective approach in a recent Cochrane review which found that interventions that include education, skill-building **and** contraception promotion components appear to have a significant effect on reducing unintended teenage pregnancies (84).

An important, common feature across risk behaviours is that the effects of specific components of these multi-modal interventions were rarely investigated, and so it is difficult to isolate the impact and importance of each component.

Advertising and marketing

One important limitation of our literature search strategy was that it did not identify studies relevant to the effect of advertising and marketing on tobacco and alcohol use, which, given the susceptibility of young people to advertising and marketing, is an important area not to overlook. Although it is impossible to study the effect of advertising bans – on tobacco consumption, for example – via RCTS, it is possible to investigate the effect of advertising bans through, for instance, pre- and post-ban studies, and through examining trends in tobacco consumption and anti-tobacco measures. Evidence from such studies does show that comprehensive tobacco advertising bans can reduce consumption (although a limited set of advertising bans has little or no effect) (96). In terms of tobacco, restriction or banning of two further marketing measures – point of sale, and branding – are also likely to have effects on tobacco consumption, especially among young people. Evidence from the UK, New Zealand, Australia and the USA indicates that presence and awareness of point of sale tobacco marketing is associated with future smoking, including encouraging experimental smoking and influencing experimental smokers to become regular smokers (97).

Future evaluation of the recent banning of point of sale tobacco marketing in Scotland will reveal the impact of this measure, particularly on young people's smoking behaviour. Although tobacco advertising and promotion in the UK has been banned, branding continues to drive smoking. Research with young people indicates that the branding on cigarette packets greatly affected perceptions of the attractiveness and relative safety of the cigarettes (97). Australia is currently leading the way with addressing tobacco branding, with the introduction of plain, generic cigarette packaging (98).

Similar to tobacco (and indeed, food) advertising, research evidence clearly demonstrates the association between alcohol advertising and alcohol use among young people. The evidence base is robust, with numerous longitudinal studies consistently demonstrating an association between exposure to media and commercial communications on alcohol and initiation of alcohol use among non-drinking young people and increased consumption amongst current drinkers (99,100). There is little data on the effects of alcohol marketing restrictions on alcohol use, including among young people, however, given that alcohol marketing restrictions are much less stricter than tobacco marketing restrictions in high-income countries. The issue of marketing is recognised by young people as being incredibly important, with the Scottish Youth Commission on Alcohol including stricter regulation of alcohol marketing, and (101) the reduction of exposure of young people to this marketing, among its recent recommendations to the Scottish Government.

Conclusions from overview of reviews of single risk behaviour interventions

There are three key points that can be made from this brief overview of the effectiveness of interventions addressing single risk behaviours. First, as demonstrated in table 10, there are few intervention approaches that have been shown to be consistently effective across risk behaviours. The most effective interventions appear to be policy interventions that influence pricing of tobacco and alcohol, and, with respect to tobacco use, interventions to restrict or ban advertising. Although access restriction measures decrease illegal sales of tobacco and lead in general to decreased alcohol consumption, the specific effects on smoking and alcohol use in **young** people remains unclear. Second, there are numerous areas where mixed, inconsistent evidence has emerged with respect to the effectiveness of particular intervention approaches, which limits firm conclusions being drawn about the effectiveness of such approaches. This is partly due to heterogeneity in the design of intervention programs, and in the methodological shortcomings of some studies. Third, there are also numerous areas where there is insufficient evidence, largely due to a lack of studies, to determine whether or not certain intervention approaches are effective.

Table 10. Summary of evidence for effectiveness of interventions addressing single risk behaviours

Intervention type	Risk behaviour: Smoking	Alcohol	Illicit drugs	Sexual behaviour
Pricing	Fairly good evidence of positive effect on youth smoking, although magnitude of effect is less clear. But, based on mainly survey studies in the USA, and little data on impact by socioeconomic group.	Robust evidence that alcohol consumption is related to alcohol price, and that pricing is one of the most effective means of reducing alcohol-related harm. It may be particularly effective in young people, but the evidence is less robust and remains equivocal.	—	—
Access restrictions	Effective in reducing illegal sales, but few studies assessed effect on smoking outcomes so impact on smoking behaviour unknown. Evidence of possible greater impact on youths in higher stages of smoking uptake.	Good evidence that alcohol availability restrictions impacts on alcohol consumption, but impact among young people uncertain.	—	—
Marketing restrictions	Good evidence that measures such as banning advertising can reduce tobacco consumption, if sufficiently comprehensive.	Lack of studies investigating the effect of marketing restrictions on alcohol use (largely due to less well developed restriction policies).	—	—
Mass media intervention	Good evidence from controlled experimental and population interventions that media campaigns can be effective. They may be more effective in combination with other approaches than alone.	Lack of studies looking at the impact of mass-media interventions. Their role in combination with other intervention types is unclear.	Lack of studies looking at the impact of mass-media interventions. Their role in combination with other intervention types is unclear.	Lack of studies looking at the impact of mass-media interventions in middle and high-income countries. Their role in combination with other intervention types is unclear.
School-based intervention	Lack of evidence for information-giving alone being effective. Mixed evidence for effectiveness of social influence and social competence interventions. Some evidence to support whole-school approaches to improve school ethos and to support peer-led intervention to reduce smoking uptake.	Mixed evidence, with some studies reporting effectiveness for some outcomes but not others, and other studies reporting no effectiveness or negative effects.	Knowledge-focused and affective-focused (building self esteem and self-awareness) programs impacted on mediating variables, but had no effect on drug use. Life skills training programs impacted on cannabis use in some studies compared with usual curricula, but there is a lack of comparison with other program types.	No consistent evidence for an impact on sexual intercourse initiation, contraception use or pregnancy rates **compared with regular sex/health education**. Summary of evidence for effectiveness of interventions addressing single risk behaviours.
Parenting/family programme	Mixed evidence. Some high quality studies suggest smoking uptake may be reduced.	Some evidence from high quality studies that family-based interventions, or those with a family component are effective when children are aged <10 and 10–16 years.	Limited evidence; results from most existing studies were negative, but some evidence of effectiveness in a few studies, including those in early childhood. Further studies needed.	Some evidence of effectiveness for early childhood interventions, but role of parenting/family programmes when children are teenagers is unclear.
Community-based intervention	Mixed evidence. Most community interventions include a school-based component and have been compared with a no intervention/usual care group.	Evidence of effectiveness in terms of reduced underage sales of alcohol and reduced drink-driving arrests among young people, but lack of robust studies with drinking behaviour outcomes.	Lack of clear evidence of effectiveness; few robust studies performed, and most have added a community component to a school programme. Some evidence that this is more effective than school programs alone. In most cases, studies not designed to identify effects of individual components.	Some evidence for multi-component youth development programmes impacting on contraception use and pregnancy rates among females, but evidence base largely 'high-risk' youth in mainly low-income areas. May be more appropriate as an intensive targeted approach for vulnerable youth.
Multi-modal intervention	May be effective, but mixed evidence and studies not designed to identify effective components.	Some evidence for effectiveness; effect of individual components not investigated.		

Good evidence for effectiveness | Mixed evidence for effectiveness | Limited evidence, largely due to lack of studies

Common limitations of primary studies and of review synthesis

It is important to bear in mind some of the common limitations of both the primary studies identified (but not always then included) in the systematic reviews used to inform this overview, and the limitations of the reviews themselves (in terms of identifying commonalities across risk behaviours). Furthermore, consideration must be given to the relevance and the transferability of interventions identified and highlighted in this overview, to the Scottish population. These considerations are listed in box 8 below, and will be discussed in greater detail in the following chapter.

Box 8. Limitations of primary studies, systematic reviews and review synthesis

Limitations of primary studies

- Many studies identified in reviews are methodologically weak (e.g. inappropriate control group, high attrition rates, self-reported behavioural outcomes, contamination of groups, units of allocation and units of analysis frequently different).
- Evaluation of interventions usually in the short-term; few studies with long-term follow up.
- Evaluations of multi-modal interventions usually not designed to identify effects on outcome of individual intervention components.
- Process evaluations are rarely reported (or even carried out), and so data on adherence to the intervention is not always reported/collected.
- There is a lack of replication of most interventions in other populations (urban, rural, mixed socioeconomic areas etc) and in other countries.
- Few studies have reported on the effect of interventions by gender or socioeconomic characteristics.

Limitations of systematic reviews and review synthesis

- Variation in nature of interventions, outcomes collected (and time-points) and effect estimates reported.
- Heterogeneity between studies frequently precludes meta-analysis, limits comparisons across studies and prevents identification of common effective features of interventions.
- Uncertainty about public health relevance of outcomes collected (e.g. which alcohol measures are the best indicators of alcohol misuse, morbidity and mortality in later life?).

Transferability/relevance

- Studies predominantly USA-based (where goal of substance misuse programmes tends to be abstinence from any use, and where there is a strong focus on promoting abstinence from premarital sex).
- Effect sizes in studies showing a positive impact of intervention often small, with no indication of the broader public health benefits of these effects.

6 Chapter 6 – Discussion

Risk behaviours in young people in Scotland

Data collection of risk behaviour in adolescents is reasonably well developed in Scotland, through the large biennial national adolescent risk behaviour surveillance tool, SALSUS. There are, however, two major gaps in the collection of risk behaviour indicators among young people. First, the SALSUS does not collect data on sexual health. Some data on sexual health are collected in the HBSC, but this survey is smaller than the SALSUS and is carried out every four years as opposed to every two years. Second, there are notable gaps in the collection of data on risk behaviours among 16–24-year-olds. The Scottish Health survey collects some data on alcohol and tobacco, but does not collect data on illicit drug use or sexual health.

Although risk behaviours in young people are widely considered to cluster together, our understanding of the degree and pattern of risk behaviour clustering, especially in the Scottish setting, is actually somewhat limited, and much of the evidence in the published literature derives from US-based studies of 'high-risk' young people from low-income areas, and ethnic minorities. The most informative recent routinely collected data in Scotland comes from the SALSUS. From their analyses of regular substance use, it is estimated that a relatively small proportion (6%) of 15-year-olds regularly use tobacco, alcohol and illicit drugs. But it is clear that 15-year-olds who smoke regularly are highly likely to also regularly use illicit drugs **and** drink alcohol, with the picture similar for regular users of illicit drugs. Alcohol is the most common substance that is used regularly among a large proportion of teenagers, but, around half of all regular users of alcohol (i.e. weekly users) do not report indulging in regular smoking or illicit drug use.

A deeper understanding of risk behaviour clustering is needed, particularly to: identify gender differences; determine whether or not patterning differs for different socioeconomic groups; identify how sexual risk behaviours fit into the patterns of substance use; and determine how clustering differs by age. Our secondary analysis of data from two West of Scotland cohort studies (that included study populations from the same geographical area of Glasgow) makes an important contribution to understanding risk behaviour patterns. Among 18–19 year old males in 1990 and 2003 there were significant associations between most measures of **current** and **early** substance use and early sexual initiation. The pattern of associations changed very little between 1990 and 2003, with the exception of the relationship between early sexual initiation and ever having used illicit drugs, which was statistically significantly weaker in 2003. Among females, there was a trend towards associations between most measures of substance use and early sexual initiation and 1990. Most of these associations were stronger, and statistically significant, in the 2003 cohort. In particular, the association between starting smoking prior to age 14 and early sexual initiation was statistically significantly stronger in the 2003 compared with the 1990 cohort.

A systematic review of all risk and protective factors for risk behaviours in young people was out with the scope of this environmental scan, but a brief overview of this area raised two important points: (i) risk and protective factors for substance use and sexual risk behaviour span multiple domains (individual, family, school and community); and (ii) many of these risk and protective factors are common to different risk behaviours. The implications of these conclusions are that: (i) there is evidence to support a 'multiple risk behaviour intervention' approach with young people; (ii) a successful approach requires either a single intervention that includes components within each domain, or multiple interventions targeting individual domains; and (iii) a single intervention within one domain is unlikely to be effective, on its own, in either preventing or reducing risk behaviours in young people.

Literature review

Effectiveness of interventions to reduce multiple risk behaviours

The focus of the review element of this environmental scan was on identifying interventions to reduce or prevent multiple risk behaviour in adolescents and young people. The lack of intervention studies, where outcome data on both substance use (alcohol, tobacco or illicit drug use) **and** sexual risk behaviour has been collected and reported on, highlights a large evidence gap in this field. Although numerous studies have collected multiple substance use outcomes at follow up, only a few studies have collected and reported outcome data on both substance use **and** sexual risk behaviours, and none of these were carried out in the UK. Some evaluation studies have no doubt collected data on both substance use and sexual risk behaviour, but not published the results of the impact of the intervention on all these risk behaviours, especially where variables were covariates (and not pre-specified primary outcome variables) not found to be affected by the intervention. The results of some of the identified intervention studies are promising, but their translation in a UK context clearly needs to be investigated. Therefore, despite the growing interest in the notion of addressing generic, or multiple, risk behaviour in young people, the evidence for the effectiveness of such multi-risk interventions is very limited.

Modifying individual characteristics

Of the four identified evaluation studies of randomised controlled trials with outcome data on both any substance use **and** sexual risk behaviour, and which were not targeted at specific subgroups in the population, two were focused on modifying individual characteristics (39,40). The school-based Life Skills Training program, implemented at around age 11, had some statistically significant positive (albeit small) effects on substance use at six years follow up, but the effects on sexual risk behaviour at 10 years follow up were less convincing and limited by a number of methodological shortcomings. A similar program, Project ALERT, had only short-term effects on substance use, which were not sustained in the longer term, and rather small long-term effects on some measures of sexual risk behaviour (sex with multiple partners and drug-linked unprotected sex), but not others (condom use).

Addressing the broader social and institutional contexts

In general, interventions in young people that have focused on modifying individual characteristics (e.g. knowledge, attitudes, and social and life skills) have had limited long-term benefits. The importance of the broader social and institutional contexts is becoming increasingly evident, and it has been proposed that strengthening protective factors within these wider contexts may have a greater effect on risk behaviour than simply targeting individual characteristics (51,52,81). The enhancement of school-connectedness in particular, through promotion of a positive school ethos, has recently attracted interest as a promising intervention approach (51,81). However, with very few studies to date having robustly evaluated this intervention strategy, it is an area which requires further research.

The importance of promoting young people's social and emotional wellbeing in school is clearly recognised in the UK (102). In Scotland, although the Health Promoting Schools concept is firmly embedded within the government's policy surrounding the health and wellbeing of young people, evaluation of the Health Promoting Schools approach is limited, largely due to the complexities of such an evaluation (103). To date, reviews of evaluation studies investigating the effectiveness of Health Promoting Schools have found little evidence of an impact on substance use or sexual risk behaviour (104). However, the Health Promoting Schools approach is not always implemented in its entirety, in that often only single elements, most often programs to develop personal health skills, are delivered. Most interventions to prevent substance use, for example, have involved classroom-based programmes only, and have not incorporated the broader components of the Health Promoting School approach, such as improving the social and physical environment of the school and school/community relationships. Indeed, the Health Promoting Schools approach has been shown to be far more effective in addressing mental health, healthy eating, and physical activity, where the most successful interventions involved the whole

school, changed the school psychosocial environment, and involved parents and the community, in addition to promoting personal skill development (104).

Data from high-quality observational studies, one of which is the West of Scotland 11–16 Study, indicate that positive ethos and strong school relationships with strong engagement are associated with lower rates of substance use (81). The West of Scotland Study, which followed children from age 11 to age 15, found that there was considerable variation in the rates of health behaviours across 43 secondary schools included in the study. After adjusting for individual characteristics (including family and sociodemographic variables), school-level variation (i.e. school effects) remained, indicating that pupil characteristics did not account for the between-school variation in risk behaviours (105). Furthermore, school-level use of substances was found to be largely associated with the level of engagement and involvement of pupils in education and with pupil-teacher relations (105). These findings support the inclusion of the positive school-ethos element in the Health Promoting Schools approach. However, the existing evidence for the effectiveness of school-ethos interventions, from studies such as the Australian Gatehouse Project (discussed in this report), is limited and requires further investigation, especially within the UK. The nature of such an intervention does raise a number of challenges. It should be noted that achieving changes to the school environment and ethos takes time, through a sustained long-term implementation process. Thus, short-term programs are unlikely to yield evidence of changes in student behaviour. Furthermore, the appropriate method with which to evaluate such whole-school interventions needs careful consideration, given the complexity of such a holistic intervention, and the inherent flexibility of the approach which should allow schools a degree of autonomy over the development of their programs. It may be that randomised controlled trials of such complex interventions should evaluate the integrity – defined functionally rather than compositionally – of the intervention. In this way, the process and function of an intervention can be determined, whilst allowing flexibility and context-adaptation of the intervention components (106).

This approach is, however, particularly attractive since it addresses a number of risk and protective factors known to be common to many risk behaviours. Furthermore, the adoption of a universal approach does not rely on identifying and targeting 'high-risk' individuals, a process which is not always accurate, and which can result in stigmatisation of individuals, putting them at increased risk of initiating risk behaviours (107). The whole-school interventions should also lead to greater population-level reductions in risk behaviour prevalence because it has the potential to influence the large number of children at low to moderate risk, as well as the small number of people who are at high risk. It may also have a greater impact on altering overall peer social norms (107). However, school-based strategies rely on students attending school, and perhaps a certain level of school-connectedness at baseline (i.e. at the start of secondary school), as was observed in the evaluation of the Gatehouse Project (50). Thus there is the potential for children from low-income areas to benefit least (or not at all) from these strategies, thereby leading to increased health inequalities. In addition, although the Health Promoting Schools ethos highlights the importance of the school as a setting within which to influence young people's health and wellbeing, we must not focus on this approach at the expense of the family/parental- and community-based strategies, which have no less an important role in influencing risk behaviour.

In comparison to the interventions identified in our systematic reviews that address individual characteristics, the Seattle Social Development Project had stronger, more consistent effects on risk behaviours. This non-randomised controlled trial, implemented in year 1 of elementary (primary) school (14), was designed to promote bonding to school and family and strengthening of children's social competencies via teacher training, child social development and parental education. It stands alone as being, to our knowledge, the only intervention implemented during **primary** education with collection of **adolescent** risk behaviour outcomes. It is also the only intervention that aimed to promote school-connectedness in the **primary** school setting. Evaluations of interventions implemented in children of a similar age have generally followed participants for a few years at the most, and, by and large, only examined behavioural outcomes such as aggression, problem behaviour and fighting, rather than specific health risk behaviours (46). By contrast, the Seattle Social Development Project had the longest follow up (and one of the lowest attrition rates) of all studies identified (excluding the preschool interventions),

with young people followed up at ages 18 and 21, an impressive 12 and 14 years after the intervention was implemented. The significant effects on substance use at age 18, and sexual risk behaviour at 21, are large in comparison with other studies (with number-needed-to-treat[3] ranging from 6–10 compared with 16–36 in Project ALERT and 17–25 in Life Skills Training). These effect sizes are impressive, but given that a substantial proportion of the children who received the intervention were from low-income, high-crime, urban areas of Seattle, the direct relevance of the findings from this study to the young people of Scotland could be debated. However, unlike the other **highly** targeted interventions identified in our review, this intervention used a social development program which was not specifically designed for, or targeted, at selected minority groups. Furthermore, it attempted to address risk and protective factors for risk behaviour which appear to be broadly similar across countries (within the school, individual and family domains).

Applicability and transferability of interventions evaluation findings to the UK setting

As with many other areas of public health, most of the intervention studies identified in this review were conducted in the USA, with few studies carried out in the UK. This may limit the applicability of findings from highly targeted intervention studies, such as those that included particular ethnoracial subgroups of the population, for example, African-Americans or Hispanics. The evidence from other, more universal, intervention programs may, however, be applicable to the UK. In a recent review of trials to reduce teenage pregnancy, the authors also reviewed qualitative research studies, and assessed intervention need and appropriateness on the basis of the views and experiences of young people. They found that the content of the largely USA-based interventions identified in their review did fit appropriately with the factors found to be associated with pregnancy risk in young women in the UK (95). Furthermore, a comparison of studies in the USA and Australia of the underlying risk and protective factors for risk behaviours found marked similarities between these factors. This suggests that, certainly in high-income countries, risk and protective factors are probably very similar, and interventions that address some of these factors effectively in one country could be considered for implementation in other countries. Of course this does not remove the need for thorough evaluation of potentially effective interventions within other countries. Promising interventions from out with the UK would therefore need to be appropriately adapted to the Scottish setting.

Evidence from reviews of interventions with outcome data on single risk behaviours

Given the paucity of studies that have collected outcome data on substance use **and** sexual risk behaviour, it was useful to briefly review reviews of interventions with outcome data on single risk behaviours (or combinations of substance use behaviours – for example smoking and alcohol).

In table 10, presented in chapter 5, we give a broad overview of what is known with respect to the effectiveness of interventions targeting single risk behaviours. What is striking is that, with the exception of policy interventions that target tobacco pricing and marketing and mass-media interventions to prevent smoking, the evidence for the effectiveness of intervention approaches is – overall – either mixed or lacking for the prevention or reduction of use of substances or sexual risk behaviour in young people.

[3] Number needed to treat here can be thought of as the number of persons to whom the intervention needs to be administered to in order to prevent **one** person from participating in the risk behaviour

Table 11. Summary of intervention approaches demonstrated to be effective for one or more risk behaviours, and areas where there are gaps in the evidence which need to be addressed

GOOD EVIDENCE	GAPS IN EVIDENCE/FURTHER RESEARCH NEEDED
School-based interventions that focus on knowledge-giving impact on knowledge and understanding of risk behaviours, but have little impact on actual risk behaviour.	–
Policies that increase the price of tobacco and alcohol reduce smoking initiation and cessation, and may decrease alcohol consumption among young people.	The impact of alcohol pricing on consumption of alcohol among adolescents remains under debate and requires further research.
Policies that restricts access to tobacco and alcohol decreases illegal sales of tobacco and in general decreases alcohol consumption.	The impact on actual smoking behaviour, especially on alcohol consumption among **young** people is unclear.
There is good evidence that mass-media programs are effective in preventing/reducing smoking.	Impact of mass-media interventions on alcohol, illicit drug use and sexual risk behaviour is unknown.
PROMISING EVIDENCE	**GAPS IN EVIDENCE/FURTHER RESEARCH NEEDED**
There is some evidence from a UK-based trial that peer-led interventions can be effective in preventing and reducing smoking.	This promising approach could be tested in other communities/populations within the UK to determine the consistency of its effect on smoking. The effect of peer-led approaches on other risk behaviour needs more investigation.
Whole-school interventions show some promise of effectiveness.	The impact, especially in the long-term, of whole-school interventions on substance use and sexual risk behaviour needs further investigation.
There is some support for community-only interventions (such as the Minnesota Heart health Program (a cardiovascular disease prevention programme) being effective in impacting on smoking behaviour.	Impact of community-only interventions on alcohol and illicit drug use is unknown.
There is some evidence that multi-modal interventions (generally consisting of any combination of school, community and family programs) may be effective in preventing/reducing use of substances and risky sexual behaviour.	Further methodologically rigorous multi-modal intervention studies need to be performed.
Youth development programs are effective in reducing sexual risk behaviour among young girls, but the evidence is largely based on studies of high-risk young people living in low-income, urban settings.	The impact of youth development programs on substance use in high-risk populations, and impact on all risk behaviours in **non**-high-risk populations needs to be determined.
MIXED OR LIMITED EVIDENCE*	**GAPS IN EVIDENCE/FURTHER RESEARCH NEEDED**
School-based interventions that focus on developing social competence and life skills etc have had mixed, inconsistent results, with small to moderate – mostly short term – effect sizes.	Long-term impact of school-based social influences and life skills learning remains unclear for all risk behaviours.
There is some evidence that parenting/family programmes positively impact on smoking, alcohol and illicit drug use, but limited evidence for their effectiveness in sexual risk behaviour prevention†.	Impact of parenting/family interventions for adolescents is mixed for most risk behaviours, and data are scarce for the impact of family interventions on illicit drug use or sexual risk behaviour prevention.

*Where there is limited evidence, this is largely due to a lack of studies i.e. absence of evidence as opposed to evidence of no effect

†Parenting/family programmes have been included under 'mixed or limited evidence' due to the mixed nature of results from different family intervention studies. The Strengthening Families Programme for Parents and Youth 10–14 does fall under this group of interventions, and is the most promising intervention among the family/parenting interventions. However, given the **overall** literature base for parenting/family interventions, this intervention approach as a whole is considered to be mixed.

Given the limitations in drawing firm conclusions regarding the most effective interventions targeting **single** risk behaviours, it is difficult to identify many commonalities of effective interventions **across** risk behaviours. However, we have been able to: (i) identify which particular intervention approaches have had some success in preventing/reducing one or more risk behaviours, since this might highlight approaches which could be potentially effective in preventing other risk behaviours, especially where the approach has been rarely used; and (ii) highlight intervention approaches which are under-researched and/or show promising effects, and require further investigation (table 11).

In terms of specific interventions, the Strengthening Families Program for Parents and Youth 10–14 is particularly promising. This family-based intervention included families of 11-year-olds in the USA and was shown to have a statistically significant impact on alcohol, tobacco **and** cannabis use at four years follow up. The effects were strong and consistent across single risk behaviour indicators, with numbers-needed-to-treat over four years, to prevent one child from ever using each substance, ranging from around 6 for alcohol and smoking to 10 for cannabis (108). These are comparable to the favourable numbers-needed-to-treat for risk behaviours obtained in the Seattle Social Development Project, as discussed earlier. The effect of this family-based intervention on sexual risk behaviour has not been evaluated. A UK-adapted version of the Strengthening Families Program for Parents and Youth 10–14 is, however, currently being investigated in the UK (although, again, the effects on sexual risk behaviour are not currently being examined) (109).

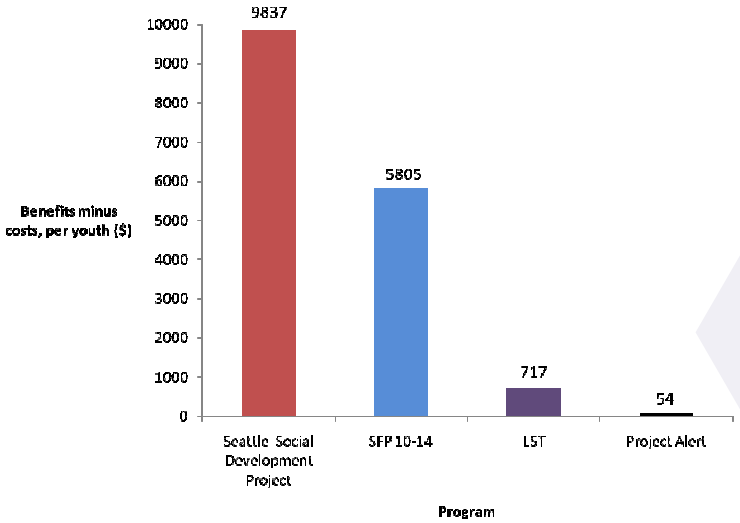
Benefits and costs of prevention programs for youths

As illustrated in figure 9, the economic benefits of the interventions shown to be effective, in the short- and/or long-term, in reducing multiple risk behaviour, are quite varied (110). Classroom-based substance use prevention programmes, such as Life Skills Training and Project ALERT have relatively low net benefits, but are still cost-effective due to the inexpensive nature of the programmes. Although the cost-benefit ratio is lower in the Seattle Social Development Programme than in the Strengthening Families Program for Parents and Youth 10–14 ($3.14 vs $7.82 per dollar of cost, per youth), the economic benefits are greater in the former, leading to an overall greater net benefit ($9,837 vs $5,805 per youth).

Some youth development programmes, such as the Seattle Social Development Project and the Strengthening Families Program for Parents and Youth 10–14 are therefore attractive preventive programs providing good economic returns on investment. As with all such economic analyses, these cost-benefit analyses are based on a number of assumptions and are very context-specific, which should be borne in mind when interpreting these models or using them for policymaking.

Figure 9. Economic benefits of four USA-based programmes demonstrated to be effective in reducing multiple risk behaviour in the short and/or long-term

SFP=Strengthening Families Program for Parents and Youth 10-14; LST=Life Skills Training



The broader picture: context matters

In considering specific intervention approaches aimed at preventing or reducing risk behaviour, it is important not to lose sight of the wider social context within which the transition from childhood to adolescence and then to adulthood occur, and the changing nature of youth transitions themselves, since these have an impact on the development of risk behaviours.

The successful transition from childhood to adolescence and from adolescence to adulthood is dependent on a number of factors. The transition from childhood to adolescence is accompanied by the transition from primary to secondary school, which has been shown to have effects on health and well being in later adolescence. Studies of primary-secondary school transitions found that individual characteristics were the most important predictors of successful transition. Among these characteristics, personal attributes appeared to be more important than sociodemographic, family, or other factors (111).

Recent studies of young people in transition to adulthood highlight the importance of social mobility, education, personal competence and resilience, as well as gender, neighbourhood deprivation and family support (112). Although adolescent risk behaviour is associated to a far lesser extent with socioeconomic status compared with other stages of the life-cycle, continuation of many health-risk behaviours beyond the adolescent years is associated with socioeconomic status. Children and young people who come from a more deprived background are at an increased risk of lower educational attainment, which is a strong predictor of adverse transitional experiences and patterns of social inclusion. Young people who attain reasonable qualifications follow more advantaged pathways into the labour markets, whereas those with poor or no qualifications follow more chaotic pathways and are those most likely to experience unemployment and social exclusion in young adulthood (113). Improved educational opportunities for the less well qualified, and a reduction in family poverty and community deprivation, should lead to reduced vulnerability and social exclusion.

Youth transitions have become more protracted and complex, with routes from education to work, and housing and domestic transitions, for example, becoming more fragmented. This means that young people now spend more time in the company of their peers, who have taken on a greater importance in shaping attitudes and behaviours (113). Furthermore, the longer period of transition from adolescence to adulthood (and the accompanying uncertainty – for example, through protracted periods of further education, periods of unemployment, homelessness etc) leads to an increase in the window of risk and vulnerability, and makes risk-raking behaviour more likely, irrespective of socioeconomic status and educational attainment (113).

In addition to pricing and availability (which are largely relevant to alcohol and tobacco and have been discussed earlier in this report), key societal factors include cultural norms, marketing and media, access to attractive leisure and social facilities, and opportunities for engaging in health-enhancing activities.

The cultural picture is particularly relevant to alcohol, which has a high profile within Scottish culture. Increased alcohol consumption and changing drinking patterns have given rise to a culture of excessive drinking, which has become normative behaviour among both adult males and, latterly, females. The 2004 Scottish Social Attitudes Survey found that two-thirds of the sampled population agreed that 'drinking is a major part of the Scottish way of life'. As discussed in this report, the regular and often heavy consumption of alcohol has also become commonplace among adolescents (114). Among young people the perceived benefits associated with drinking include reducing inhibition and facilitating fun. Drinking is also considered to be central to socialising and meeting people, and is often reported as being the only leisure option available (114).

The influence of marketing is also highly relevant to both alcohol and tobacco use. There has been a global diversification in drink products over the past twenty years, with the introduction of high-strength beers, ciders, lagers and wine, followed by alcopops, and more recently, ready-to-drink spirit mixers and shots (115). Studies have also demonstrated that drinks have been created to meet the needs of various subgroups of the youth market (e.g. designer drinks and alcopops) (116). This change has

been accompanied by a more intensive, aggressive marketing of alcohol drinks to young people (114). Marketing techniques have focused on the packaging and labelling of products, drink promotions in pubs and clubs, and promotions via the internet and mobile phones. Young people are also more susceptible to advertising influences than adults (100,114).

Cultural beliefs and attitudes regards alcohol use may be reinforced by mass media which portrays drinking as normative and expected, and which emphasises the positive aspects of drinking (114). The impact of mass media advertising and marketing on young people smoking has been firmly established, and following on from the ban on tobacco advertising, further action in Scotland has been taken, with the removal of tobacco point of sales, as discussed in the previous chapter.

In addition, access to attractive leisure and social facilities for young people will influence whether or not they make health-enhancing lifestyle choices. In areas where communities have high access to health damaging products, along with low access to leisure and social facilities, making positive lifestyle choices will be far more difficult (117).

The social attitudes, norms and behaviours of adults within a community have a huge influence on youth health behaviours. The heavy drinking culture among adults undoubtedly compounds the risk of these young people engaging in alcohol use. There is evidence that changing adults' smoking behaviours and attitudes towards smoking can impact on young people smoking (97), whilst young women have an increased risk of having a teenage pregnancy if their own mother was a teenage mother (29).

This complex societal picture must be taken into account when designing programmes aimed at influencing health behaviour in young people. Furthermore, although interventions aimed specifically at preventing or reducing risk behaviour are necessary in improving the health and wellbeing of young people, these must be accompanied by broader social change and efforts to reduce marginalisation, social exclusion and the vulnerability of young people during periods of transition.

Limitations of the environmental scan

The literature review component of this environmental scan consisted of two reviews of review-level literature, and one review of primary studies to identify randomised controlled trials in which outcome data on any substance use **and** sexual risk behaviour had been collected. In the latter we included specific terms in the literature search strategy to limit the search to RCTs. Depending on how papers were indexed within literature databases, it is therefore possible that we did not identify **all** relevant studies. In addition, although we did identify some non-RCT evaluations of programs, we did not aim to systematically identify non-RCT studies, and so may not have identified all such studies. However, after carrying out the systematic review we did consult the members of the SCPHRP Adolescent and Young Adult Working Group and asked them to alert us to any other relevant primary studies that we had not identified in the literature search. A third limitation of our primary systematic review is the possibility of publication bias. This may have arisen in the context of authors collecting multiple outcome data in a study of an intervention that addressed a single risk behaviour (e.g. sexual risk behaviour), but only reporting the effect on the primary outcome, especially where other secondary outcomes were not significantly and/or positively affected by the intervention. Finally, our review did not incorporate a search of the grey literature, and we will therefore not have included any study where the authors had reported effects of an intervention (especially on secondary or tertiary outcomes) at conferences and other meetings.

In our 'review of reviews' of interventions targeting single risk behaviours, we relied on recent good-quality systematic reviews of primary studies, and, where there were no recent reviews, the 'reviews of reviews' literature. Review of the many hundreds of **primary** studies within this topic was beyond the scope of this environmental scan. For this same reason, we largely relied on **recent** reviews (or reviews of reviews), all of which were published from 2002 onwards. Reviews published prior to this were therefore excluded. Our review was also dependent on and restricted by what was reported and discussed in the review literature, and, in particular, by how interventions are generally classified in review-level literature. As a

result, we were limited in terms of identifying common effective features of successful interventions across single risk behaviours. For example, we were unable to determine whether particular features, such as point of intervention, duration of intervention, or inclusion of booster sessions were associated with effectiveness of interventions. However, the heterogeneity of the design of primary studies made it difficult for reviewing authors themselves to identify elements of successful interventions. Effects of interventions by gender or socioeconomic status were rarely reported in reviews (or even investigated in most primary studies), limiting the conclusions that could be drawn regarding the differential impact of interventions.

Although equitable improvement of health is a key component of the mandate of the SCPHRP, the literature reviewed in this environmental scan was limited in terms of its discussion of equitably addressing young people's risk behaviours. Reports of intervention studies with outcomes on multiple risk behaviours did not include details of differential effects according to socioeconomic status, and so it is unclear whether interventions had any harmful effects (such as increased uptake of a particular behaviour by specific at-risk subgroups) leading to widening of health inequalities. It may be that most studies were not statistically powered to perform such subgroup analyses. However, in contrast to childhood and adulthood, socioeconomic gradients in health during adolescent years are much less evident. Indeed, there appears to be a change from socioeconomic inequality to socioeconomic equalisation during child-youth transition, at around ages 11–12 (118). This may be because the influence of school environments and peers begins to outweigh the family influences during adolescent years. A recent systematic review of the relationship between socioeconomic status and risk behaviours in adolescents and young people aged 10–21 found that alcohol and cannabis use do not appear to be associated with socioeconomic status, whereas there was some evidence that smoking is associated with lower socioeconomic status, especially in the early adolescent (ages 10–14) years (119).

In addition, we did not perform a systematic review of the primary or review-level literature on the underlying risk and protective factors for risk behaviour in young people. This was beyond the scope of the environmental scan, and thus our brief discussion of this area is a non-systematic overview of relevant background literature identified in the course of carrying out the scan.

Finally, as with all reviews of this nature, **very** recent relevant intervention studies may not have been identified and included in the review-level literature upon which much of this report is based. Following the initial completion of this report, one such study – the Good Behaviour Game – came to light, which is worth mentioning here, largely due to the programme having been evaluated in a RCT, with 15 years of follow up.

The programme (implemented in grades 1 and 2 of elementary [primary] school, and aimed at addressing aggressive, disruptive behaviour), had significant effects on young adult alcohol and illicit drug abuse or dependency and regular smoking during late adolescence/early adulthood (120), and, reportedly, on sexual risk behaviour *(D Foxcroft, personal communication of unpublished data presented at a conference in June 2010).* However, significant effects on substance use at ages 19–21 were largely seen in males only, (and were generally stronger in those who displayed highly aggressive, disruptive behaviour in grade 1), and thus was largely ineffective in preventing substance use in females. Furthermore, evaluation of this intervention in a subsequent first grade cohort, within the same schools, found little impact on substance use, and failed to replicate the results observed in the first cohort (120). It is also important to note that the definitions of alcohol and illicit drug 'abuse or dependency' in this study are unspecified, with the authors appearing to use measures of substance 'abuse' and 'dependency', rather than 'use', as used in other similar studies identified in our report.

However, despite the limitations of our systematic review, it is reassuring that our findings concur with many of the themes and conclusions that emerged in a recent US report on the prevention of a range of adverse behaviours in young people (31).

Scottish Government youth policy and Scottish programme mapping

Our summary of the current Scottish Government policies surrounding risk behaviours in young people does not set the present policies in the context of previous policy or current, ongoing programmes happening on the ground. However, this was not the purpose of our policy overview. The lack of clearly defined, detailed descriptions of the strategies that the Government intends to use in order to actually implement the policies is, however, notable. We also did not map the current youth risk behaviour programmes currently being carried out in Scotland, which was beyond the scope of this report.

The importance of critical periods in development and transition points in the child-youth life-course, and the promise of the 'cross-domain' intervention approach

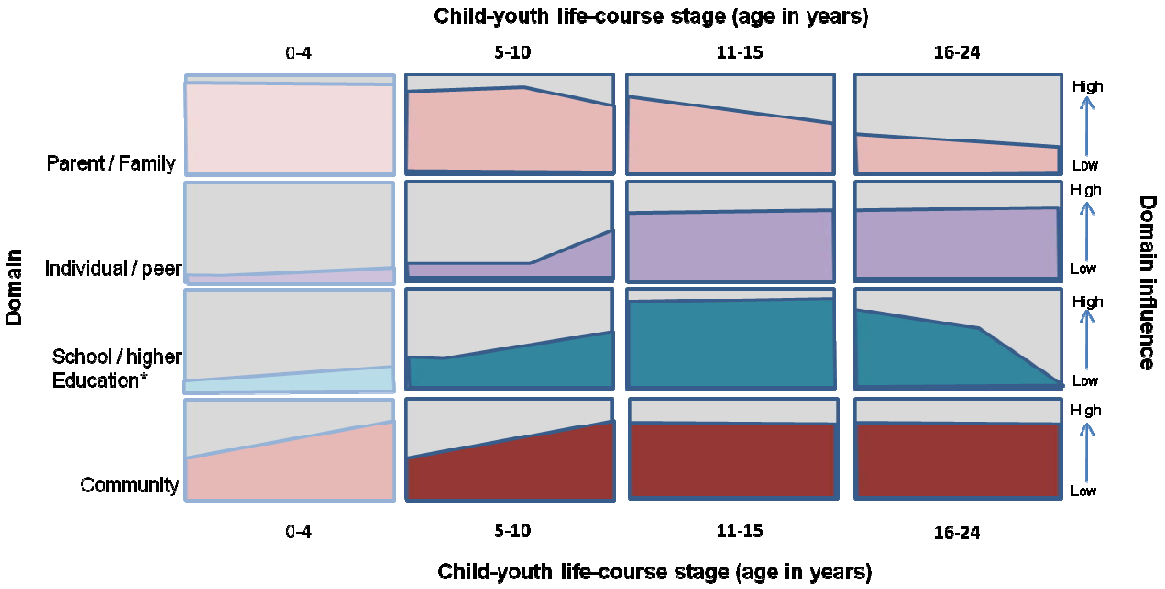
Although regular indulgence in a particular risk behaviour during adolescence does increase the risk of adopting other risk behaviours, the proportion of adolescents who are regularly indulging in multiple risk behaviours, certainly with respect to substance use, is relatively small (with the SALSUS finding that 6% of those surveyed reported use of alcohol, tobacco **and** illicit drugs). Many of those who do indulge in multiple risk behaviours also have conduct problems and exhibit antisocial behaviour. A proportion of this group will have diagnosable – i.e. disabling – mental health disorders, with antisocial behaviour problems having started much earlier in childhood. Although perhaps a little simplistic, one could say that this creates a dichotomy, with a distinction between the very 'high-risk' adolescents, who are at risk of persistently indulging in multiple risk behaviours, and the moderate/low-risk adolescents who may indulge in fewer risk behaviours (or exhibit mild to moderate behavioural problems) non-persistently, during adolescence (121). The implications of such a distinction is that although a broad, universal intervention approach is needed, additional intervention measures are needed to provide further support to, and treatment of, those adolescents at the very high-risk end of the spectrum.

Transition points (that mark a change in social, psychological, or physiological states) and critical periods (a limited time-window in which an exposure can have a profound adverse or protective effect on development and disease, or behaviour, outcome) are important concepts within life-course epidemiology (122). They are particularly relevant to the child-youth life-course, during which the transition into adolescence, which coincides with the huge social transition from primary to secondary school (111), can have an enormous effect on risk behaviour development. The pre-adolescent period and the transition from primary to secondary school can be considered critical periods during which there is the opportunity to minimise exposure to risks and strengthen protective factors, to reduce the risk of initiation of risky behaviour in early adolescence in particular (since this is predictive of greater risk of dependency and poor health-related outcomes in later years). In short, truly primary preventive interventions for risk behaviours in adolescence should ideally be applied at much earlier ages.

As described in this report, the risk and protective factors for adolescent risk behaviour largely fall into four key domains – individual, family, school and community. Furthermore, these influences on adolescent risk behaviour development are not static over time, but exert differing degrees of impact at different points of the child-youth stage of the life-course, as depicted in figure 10. For completeness, we have included a 0–4 years of age category, to acknowledge the critical importance of this early life period in terms of the potential for preventing later risk behaviour in older childhood and adolescence. This diagram should not be interpreted in any way as depicting the **quantitative** contribution of each domain to development of risk behaviour the child-youth life-course. Rather, this is a purely conceptual diagram to illustrate the differing **relative** contributions of each domain (indicated by the block-coloured graphs) and how this varies over the child-youth life-course in influencing risk behaviour development, varying from low through to high importance. For example, the parental/family influence is much stronger and, relative to later stages, perhaps most important during the pre-adolescent stage. For some, the influence of family decreases during adolescence, and is at its lowest during late adolescence and early adulthood. Within the individual/peer domain, the role of protective factors such as resilience, self esteem, and good social skills come into play during the transition phase between primary and high school, becoming increasingly

important throughout adolescence and young adulthood. The school environment, whilst important during the primary school years, also becomes increasingly important during adolescence, and indeed, along with individual/peer influences, outweighs the impact of parental/family influences. However, it is important to note that although in reality the influence of the family is outweighed during adolescence by the influence of peers and the school environment, maintaining family connectedness into the adolescent years may be desirable because it actually reinforces and strengthens the protective factors needed to prevent risk behaviour development in adolescence.

Figure 10. Schematic representation of the contribution of each domain to the development of youth risk behaviour, with the block-colour graphs representing the variation in importance, from low to high.
NB Each domain represents an area of protective/risk factors for the development of risk behaviours.
*The 0–4 age category is included in this diagram for completeness. Within this age category the school/higher education domain refers to the preschool environment



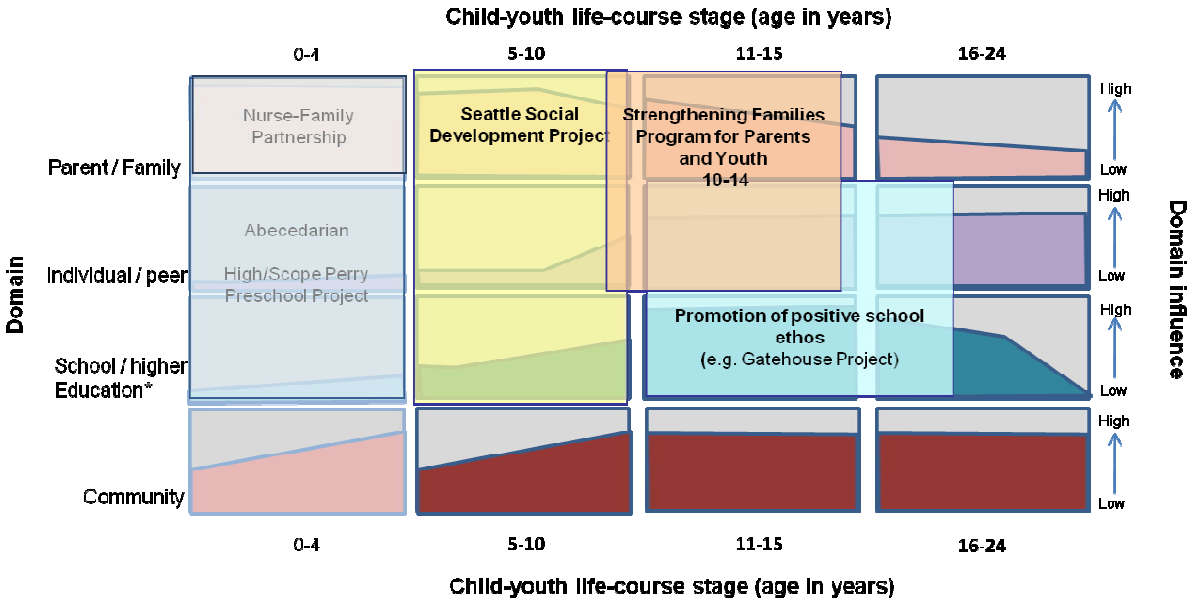
In terms of impacting **directly** on risk behaviour development, the community domain perhaps becomes more important as the child approaches the later years of primary school, when he/she is maybe more vulnerable to external influences out with the home environment. However, it could be argued that the community domain is consistently highly important across the entire child-youth life course stage, since the community often strongly impacts the parent/family environment, which, as discussed, has an important role to play in preventing development of risk behaviour, especially in pre-adolescent years.

This diagram highlights the need for intervention approaches to be appropriate to specific periods of the child/youth stage of the life-course, which must take into account the combination of approaches required, and the relative importance, or potential for impact, of each approach. Whilst we are concerned primarily with universal intervention approaches for the whole population, we do recognise that the importance of each domain will follow a different pattern for particular 'high-risk' sub-groups or sub-populations. For example, some children living in particularly deprived communities may require continued parent/family intervention throughout the adolescent years, and the role of single-focused interventions may come into force earlier in the child-youth life-course than for other children.

In figure 11 we have presented the interventions identified from the literature review within this environmental scan as being effective – or showing promise of effectiveness – in preventing/reducing multiple risk behaviour among young people, in the context of these four key domains. This illustrates the multi-domain characteristic of these successful, or promising, approaches. It also highlights the domains, and stages of the child/youth life-course, in which we have as yet no robust evidence for effective

universal 'multi-risk' interventions. These include the community domain, and the 16–24 years stage of the child-youth life-course, where there are no interventions shown to be markedly effective in prevention of substance use and sexual risk behaviours (with the exception of the whole-school approach, which may impact on older adolescents still enrolled in school).

Figure 11. Known effective, or promising, interventions to reduce multiple risk behaviour in young people, within the schematic representation of domain influence on risk behaviour.
*The 0–4 age category is included in this diagram for completeness. Within this age category the school/higher education domain refers to the preschool environment



Taken together, figures 10 and 11 serve to demonstrate: (i) the changing state of importance of each domain at different time points; (ii) the importance of the transition phase between pre-adolescence and adolescence, which coincides with the transition from primary to secondary school; (iii) the importance of focusing interventions on the critical periods of pre-adolescence (i.e. in the early and later years of primary school period) as well as early and late adolescence; and (iv) the need for a 'cross-domain' intervention approach at all stages of the child-youth life-course.

Thus, an integrated, coordinated intervention approach is suggested as optimal by the evidence reviewed above, to simultaneously strengthen the protective factors within each domain and maximise the impact on prevention of risk behaviours. Ideally, this would involve the use of intervention programmes as components of the whole approach, which are known to be effective in reducing multiple risk behaviours.

Given the paucity of such studies, further research in this area is clearly needed. However, it is useful to briefly consider in this report the larger context within which interventions targeted at single or multiple risk behaviours should be placed. One USA model that uses such an integrated, cross-domain approach, and which has been shown to be successful in reducing initiation of alcohol and tobacco use and delinquent behaviours, is the Communities That Care prevention programme (123).

Although its impact on sexual risk behaviours has not been investigated, this approach may also have an impact on these behaviours. Communities That Care coalitions of community stakeholders first identify the risks and protective factors present in the community, before implementing locally appropriate school-based, family-based and youth-focused community-based programmes to target these risks and strengthen protective factors. Although this approach has been piloted in some UK communities, including communities in Scotland, and the process of implementation in pilot programmes

has been evaluated, it has not, as far as we can tell, been evaluated for its long-tem impact on risk and protective factors in communities, or on actual risk behaviour in communities. The Communities That Care programme and its potential for use in Scotland could be re-visited as a model on which to base an integrated, community-focused approach to addressing risk behaviour in young people. Scottish government policy, in theory, fits well with such a strategy, with the recognition that cross-sectoral and community partnership approaches are needed to improve the health and wellbeing of young people. However, these policies would need to be translated into firm and explicit actions, so that a solid, cross-sector community partnership would be both feasible and sustainable in order to facilitate and support a community-led approach.

7 Chapter 7 - Recommendations

Recommendations for evaluation of interventions to prevent or reduce multiple risk behaviour in young people in Scotland

- Data on sexual risk behaviour in adolescents are currently only collected in the Health Behaviour of School-aged Children survey, which collects data every four years. Routine national surveillance data on sexual risk behaviour in adolescents could be collected, and could perhaps be incorporated into the Scottish Adolescent Lifestyle and Substance Use Survey.
- There is a dearth of survey data on risk behaviours among young people aged 16–25, with data on alcohol and smoking only being collected in the Scottish Health Survey. National surveillance data on illicit drug use and sexual risk behaviour among older adolescents and adults could also be collected in the Scottish Health Survey.
- The striking increase in rates of risk behaviour among females between 1990 and 2003 within Glasgow city and surrounding urban areas reflects the convergence of risk behaviour rates between males and females in just over a decade, with the attenuation of gender differences. However, health behaviour interventions should still be evaluated for their separate effect on males and females. Also, the interventions themselves may need to be tailored to males and females.
- Further studies are needed that develop and evaluate interventions aimed at preventing or reducing multiple risk behaviour, with collection of outcomes on substance (alcohol, tobacco and illicit drugs) use **and** sexual risk behaviours.
- Unless they are highly risk-behaviour-specific, new interventions that are being evaluated among young people should be encouraged to collect outcomes for multiple risk behaviours, where appropriate.
- The Seattle Social Development Project and the Strengthening Families Program for Parents and Youth 10–14 have both been shown to be effective in reducing multiple risk behaviours, while the Gatehouse Project shows promise. Consideration should be given to adapting and evaluating one or more of these interventions within Scotland, or to developing a multi-component programme which combines components from these successful/promising interventions, ideally using an approach that achieves successful community and cross-sectoral participation and collaboration.
- Recognition of the key transition points, and critical periods of development within the child-youth life-course is needed to identify the appropriate time periods within which to introduce particular interventions.
- Although interventions aimed specifically at preventing or reducing risk behaviour are necessary in improving the health and wellbeing of young people, these must be accompanied by broader social change (to address the impact of pricing and availability of substances, marketing, media, culture and social norms on risk behaviour) and efforts to reduce marginalisation, social exclusion and the vulnerability of young people during periods of transition.

- In studies of risk behaviours among young people in general, limitations of existing studies and lack of research in some areas have created a number of evidence gaps which need to be addressed. In particular, future studies should:
  - include a sufficiently long enough follow up period to allow detection of intervention effects that may take some time to become established and/or conversely, wash out
  - be appropriately designed (e.g. use appropriate control group) and analysed (e.g. take into account clustering effects), and should minimise loss to follow up.

  Although it is not always feasible to power studies adequately to perform sub-group analyses, **where it is possible** analyses of effectiveness of interventions according to socioeconononomic status, gender, and ethnicity should be performed and the results made available.

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Appendix A - Search strategy to identify review level studies of interventions to address generic or multiple risk behaviour in young people

MEDLINE search strategy*

1. (Teen$ or Adolescent$ youth$ or young adult$ or early adult$ or college student$).tw. or adolescent/ or adolescent behaviour/ or (university student$ or (student$ and (high school$ or secondary school$))).tw.
2. (Risk-taking$ or Risk taker$ or Risky behav$).tw.
3. (Risky sex$ or Unsafe sex or Safe sex or Contraceptive$ or Condom$).tw. or (Pregnanc$ and (teen$ or adolescen$ or youth$ or school-age$ or college student$ or university student$)).tw. or (Sexually transmitted disease$ or STD$ or HIV or AIDS).tw. or safe sex/ or unsafe sex/ or sexual behaviour/ or sexual abstinence/ or (exp contraceptive devices/ or contraceptive agents/ or birth control/) or Pregnancy in adolescence/ or Pregnancy, unwanted/ or Pregnancy, unplanned/ or exp sexually transmitted diseases/
4. (Alcohol misuse or Misus$ alcohol or Alcohol abuse or Abus$ alcohol or Risky drinking).tw. or drinking behaviour/
5. (Marijuana abuse or Abus$ marijuana or Cannabis or Recreational drug$ or Street drug$).tw. or cannabis/
6. (Juvenile delinquency or Delinquent youth$).tw. or juvenile delinquency/
7. exp 'tobacco use cessation'/ or exp smoking/ or smoking.tw.
8. or/2–7
9. (program$ or strateg$ or Initiative$ or Project$ or Prevent$ or Mass media campaign$ or school-based intervention$ or policy).tw. or primary prevention/ or School health services/ or health education/ or Health Promotion/
10. (effect* or efficacy evaluat* or evidence or impact or outcome*).tw.
11. 1 and 8 and 9 and 10
12. limit 12 to (english language and 'review articles' and yr='1999 –Current')
13. animals/
14. 12 not 13

*A similar, appropriately modified search strategy was used to search EMBASE, PSYCHINFO, Campbell Collaboration; Education Resources Information Centre; and the Cumulative Index to Nursing and Allied Health
NB 'tw' represents text words (i.e. free-text terms) included in search strategy and all terms followed by '/' are medical subject heading terms (i.e. MeSH terms).

Appendix B - Search strategy to identify randomised controlled trials of interventions in young people with outcome data on substance use and sexual behaviour

MEDLINE search strategy*

1. (Teen$ or Adolescent$ youth$ or adolescen$ or young adult$ or early adult$ or college student$ or university student$ or (student$ and (high school$ or secondary school$))).tw. or adolescent/
2. (Unsafe sex or safe sex or contraceptive or condom or sexually transmitted disease or STD or risky sex$ or (pregnan$ and (teen$ or adolescen$ or youth$ or school-age$))).tw. or Safe sex/ or unsafe sex/ or sexual behavior/ or sexual abstinence/ or exp contraceptive devices/ or contraceptive agents/ or birth control/ or pregnancy in adolescence/ or pregnancy, unwanted/ or pregnancy, unplanned/ or exp sexually transmitted diseases/
3. (Alcohol or Alcohol misuse or alcohol use or misus$ alcohol or alcohol abuse or abus$ alcohol or drink or binge drink$ or risky drink$).tw. or exp drinking behavior/ or alcoholism/
4. (marijuana abus$ or abus$ marijuana or marijuana or marijuana use or cannabis or recreational drug$ or street drug$ or drug$).tw. or cannabis/ or exp street drugs/
5. (Smok$ or tobacco or cigarette$).tw. or exp tobacco use cessation/ or exp smoking/ or tobacco use disorder/
6. (rct or “randomi$ed controlled trial”).tw.
7. randomized controlled trial/
8. 6 or 7
9. 3 or 4 or 5
10. 2 and 9
11. 1 and 8 and 10

*A similar, appropriately modified search strategy was used to search EMBASE and PSYCHINFO
NB ‘tw’ represents text words (i.e. free-text terms) included in search strategy and all terms followed by ‘/’ are medical subject heading terms (i.e. MeSH terms).

Appendix C - Policies/strategies/programmes/initiatives underlying the 9 'pillars of delivery' to help young people achieve their potential

Source: Valuing Young People, Scottish Government, 2009

CURRICULUM FOR EXCELLENCE

CfE – personalised learning experiences for all involving a range of partners

Raising achievement & attainment

Skills

Qualifications that support the Principles of Curriculum for Excellence

Recognition of achievement

SUPPORTING TRANSITIONS

More Choices, More Chances

16+ Learning Choices

Determined to Succeed

Information, advice & guidance (Skills Development Scotland)

YOUTH-FRIENDLY HEALTH SERVICES

General health services

Mental health services

Support with ongoing physical health problems

Health improvement incl, physical activity, eating, drugs, alcohol, smoking, sexual health

Social marketing approaches

Young people's influence on health services

Health Inequalities/Equally Well

SERVICES FOR YOUNG PEOPLE

Young people with Additional Support Needs

Looked after Young People – We Can and Must Do Better

Children affected by parental substance-misuse

Young asylum seekers

Young runaways

Young carers

PREVENTING OFFENDING BY YOUNG PEOPLE

Youth Justice Framework

Anti-Social Behaviour Review

Violence Reduction Measures

Campus Police and Firefighters

Offender Learning Strategy

INFORMATION AND ACCESSIBLE YOUTH-FRIENDLY SERVICES

Information – Young Scot + WOW (What's on Where)

Entitlement card/rewards

Young Scot Active

Safe accessible transport

Housing

Regeneration

YOUTH WORK OPPORTUNITIES AND APPROACHES

Youth Work – universal and targeted

- Outdoor
- International
- Sports
- Arts

Cashback

Youth space/places to go

Youth Work Strategy sector capacity-building

Peer-led approaches/ volunteering

Role models for young people

YOUNG PEOPLE'S VOICE AND COMMUNICATIONS

National engagement – Govt. consultations

Scottish Youth Parliament (SYP)

Local engagement – Dialogue Youth/Community Planning Partnerships

Media perceptions

Young Scot Active

Anti-ageism campaign

WORKFORCE DEVELOPMENT

Social Services – Continuous Learning Framework

Social Services Leadership Framework

Infrastructure Support – Centres for Excellence

Teacher training and CPD

CLD Standards Council

NHS workforce training

Skills Strategy

Appendix D Assessment of methodological quality of reviews relevant to the overview of single risk behaviour interventions
Table (a) Studies rated as moderate/high and included in the overview

Review	Year*	AMSTAR criteria											
		'a priori' design provided	Duplicate study selection and data extraction	Comprehensive literature search	Status of publication used as an inclusion criterion	List of included and excluded studies provided	Characteristics of included studies given	Scientific quality of included studies assessed and documented	Scientific quality used appropriately in formulating conclusions	Appropriate methods used to combined study findings	Likelihood of publication bias assessed	Conflict of interest statement†	Overall quality
Smoking reviews													
Interventions for preventing tobacco sales to minors *Stead & Lancaster*	2008	Y	?	Y	N	Y	Y	Y	Y	N/A	N	Y	High
Mass media and point-of-sales measures to prevent the uptake of smoking by children and young people	2008	?	Unclear	Y	N	Y	Y	Y	Y	N/A	N	N	High/ Moderate
Long-term effectiveness of behavioural interventions to prevent smoking among children and youth *Muller-Riemenschneider et al*	2008	?	Partially	Y	N	Partially	Y	Y	Y (but author's **interpretation** of results not always appropriate)	Y	Y	Y	Moderate
Family-based programmes for preventing smoking by children and adolescents *Thomas et al*	2007	Y	Y	Y	N	Y	Y	Y	Y	N/A	N	Y	High
Parenting programmes for preventing tobacco, alcohol or drugs misuse in children <18: a systematic review *Petrie et al*	2007	Y	Y	Y	N	N	Y	Y	Y	N/A	N	Y	High
School-based programmes for preventing smoking *Thomas & Perera*	2006	Y	Partially	Y	N	Y	Y	Y	Y	Y	N	Y	High
Community Interventions for preventing smoking in young people *Sowden & Stead*	2002	Y	Y	Y	N	Y	Y	Y	Y	N/A	N	Y	High

Table (a) Continued

Review	Year*	AMSTAR criteria: 'a priori' design provided	Duplicate study selection and data extraction	Comprehensive literature search	Status of publication used as an inclusion criterion	List of included and excluded studies provided	Characteristics of included studies given	Scientific quality of included studies assessed and documented	Scientific quality used appropriately in formulating conclusions	Appropriate methods used to combined study findings	Likelihood of publication bias assessed	Conflict of interest statement†	Overall quality
Youth access interventions do not affect youth smoking *Fichtenberg & Glantz*	2002	?	Unclear	N (searched only one literature database)	Unclear	Partially	Y	N	Y	Y	N	N	Moderate
Alcohol reviews													
Family interventions and their effect on adolescent alcohol use in general populations: a meta-analysis of randomised controlled trials *Smit et al*	2008	?	Partially	Y	N	Partially	Y	N	Y	Y	Y	Y	High
Preventive interventions addressing underage drinking: state of the evidence and steps toward public health impact *Spoth et al*	2008	?	Not specified	Y	N	Partially	Y	Y	Y	N/A	N	N	High
Primary prevention for alcohol misuse in young people *Foxcroft et al*	2002	Y	Partially	Y	N	Y	Y	Y	Y	Y	N	Y	High
Illicit drugs reviews													
Interventions for prevention of drug use by young people delivered in non-school settings *Gates et al*	2006	Y	Y	Y	N	Y	Y	Y	Y	N/A	N	Y	High
School-based prevention for illicit drugs' use *Faggiano et al*	2005	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	High

Table (a) Continued

Review	Year*	AMSTAR criteria: 'a priori' design provided	Duplicate study selection and data extraction	Comprehensive literature search	Status of publication used as an inclusion criterion	List of included and excluded studies provided	Characteristics of included studies given	Scientific quality of included studies assessed and documented	Scientific quality used appropriately in formulating conclusions	Appropriate methods used to combined study findings	Likelihood of publication bias assessed	Conflict of interest statement†	Overall quality
Smoking, Alcohol and illicit drugs reviews													
School effects on young people's drug use: a systematic review of intervention and observational studies *Fletcher et al*	2008	?	Partially	Y	N	Partially	Y	Y	Y	N/A	N	N	High
Sexual behaviour reviews													
Interventions for preventing unintended pregnancies among adolescents *Oringanje et al*	2009	Y	Y	Y	N	Y	Y	Y	Y	Y	Partially	Y	High
Teenage pregnancy and social disadvantage: systematic review integrating controlled trials and qualitative studies *Harden et al*	2009	?	Unclear	Y	N	Partially	Y	Y	Y	Y	Partially	Y	High
Recent evaluations of the peer-led approach in adolescent sexual health education: a systematic review *Kim & Free*	2008	?	N	Y	Y	Partially	Y	Y	Y	Y	Y	N	High
Interventions intended to reduce pregnancy-related outcomes among adolescents *Scher et al*	2006	Y	Partially	Y	N	Y	Y	Partially	Y	Y	N	Y	High
Interventions to reduce unintended pregnancies among adolescents : systematic review of randomised controlled trials *DiCensco et al*	2002	?	Y	Y	N	Partially	Y	Y	Y	Y	N	Y	High

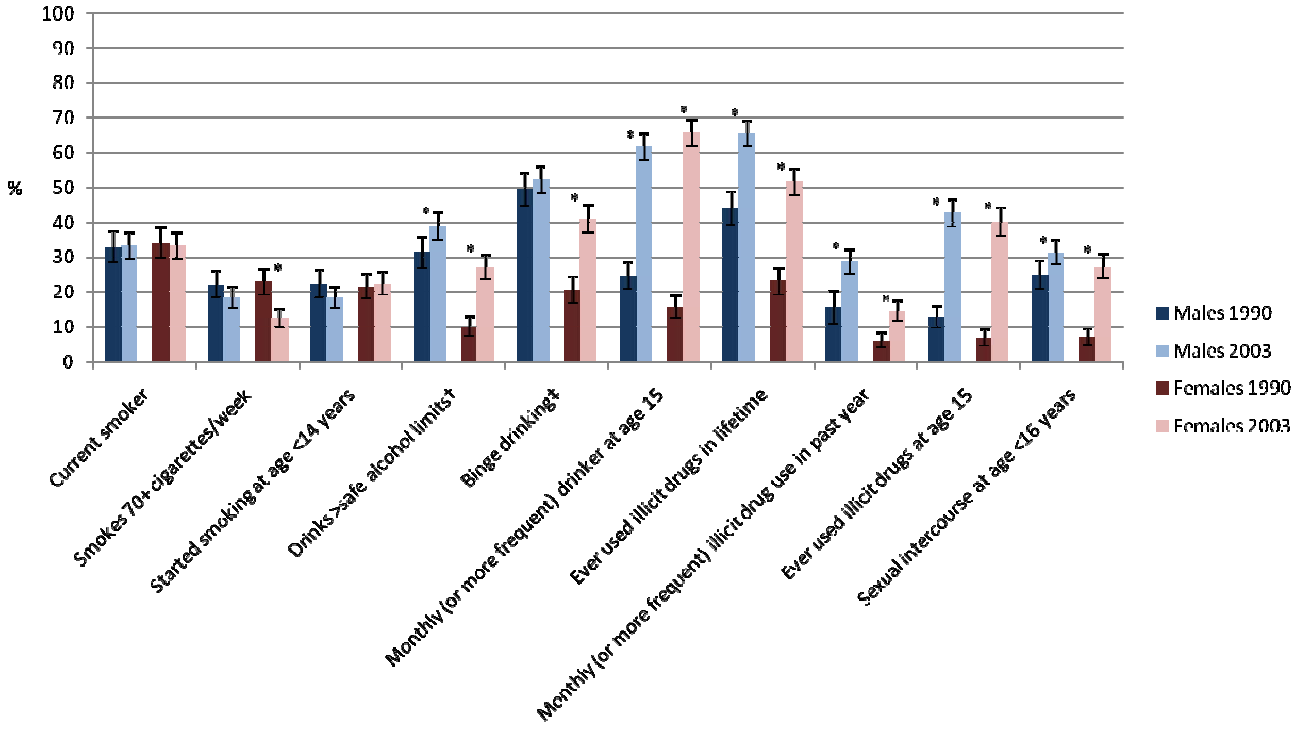
*of publication; †Conflict of interest statement reported by reviewers (and not for the primary studies included in the review, as defined in the AMSTAR criteria); ? = unclear / not reported

Table (b) Studies that were rated as low quality and excluded from overview

Review	Year*	AMSTAR criteria											
		'a priori' design provided	Duplicate study selection and data extraction	Comprehensive literature search	Status of publication used as an inclusion criterion	List of included and excluded studies provided	Characteristics of included studies given	Scientific quality of included studies assessed and documented	Scientific quality used appropriately in formulating conclusions	Appropriate methods used to combined study findings	Likelihood of publication bias assessed	Conflict of interest statement†	Overall quality
Smoking reviews													
School-based smoking prevention programs with the promise of long-term effects *Flay*	2009	?	N	Partially	N	N	N	N†	N	?	N	N	Low
A systematic review of school-based smoking prevention trials with long-term follow up *Wiehe et al*	2005	?	Partially	N (limited search terms used)	Y	Partially	Y	N	N	N/A	N	N	Low/ Moderate
Alcohol reviews													
A systematic review of school-based studies involving alcohol and the community *Woods et al*	2006	?	Partially	N	N	Partially	Y	Y	N	N	N	N	Low

*of publication †No formal assessment – method used based on authors perception of which intervention components work ? = unclear / not reported

Appendix E - Adolescent risk behaviour in the West of Scotland cohort studies



Rates of risk behaviours in males and females in 1990 compared with 2003
*Indicates where the change in proportion of males or females reporting the behaviour differed significantly in 2003 compared with 1990
†Defined as drinking >21 units per week for males and >14 units per week for females
‡Defined as ≥ 9 units on any day in the previous week for males and ≥7 units on any day in the previous week for females


CHIEF
SCIENTIST
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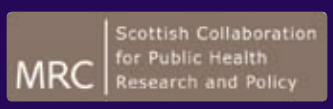
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