Universal primary prevention of alcohol and drug use and related harms: An overview of reviews

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Glossary of terms

Burden of disease
According to the Australian Institute of Welfare, burden of disease is defined as a modelling technique that combines multiple data sources to count and compare the total fatal and non-fatal health loss from diseases and injuries in a population. Burden of disease quantifies the gap between a population's actual health and an ideal level of health in the given year.

Cognitive behavioural therapy (CBT)
Cognitive behaviour therapy (CBT) is a type of psychotherapy that helps the person to change unhelpful or unhealthy habits of thinking, feeling and behaving. CBT involves the use of practical self-help strategies, which are designed to affect positive and immediate changes in the person's quality of life.

Community coalition
A community coalition is a group of community stakeholders that plan and coordinate activities collaboratively.

Controlled trial (CT)
A CT is a study where participants are allocated to receive one of two or more interventions but this is not done randomly (cf. RCT). One of these interventions is the standard of comparison, or control.

Effect size
An effect size is the magnitude, or size, of an effect in standardised units.

Grey literature
Grey literature are materials and research produced by organizations outside of the traditional commercial or academic publishing and distribution channels.

Harmful drinking
Harmful drinking is defined by the Australian National Health and Medical Research Council as alcohol use that is causing damage to one’s health.

Iatrogenic effect
An iatrogenic effect refers to any effect on a person, resulting from the activity of healthcare professionals or those promoting products or services as beneficial to health, that does not support a goal of the intervention or activity.

Interrupted time series (ITS)
In ITS studies, data are collected at multiple time points before and after an intervention in order to detect whether or not the intervention had a significantly greater effect than any underlying secular trend.

Meta-analysis
Meta-analysis, as defined by the Cochrane Collaboration, is typically a two-stage process. In the first stage, a summary statistic is calculated for each study, to describe the observed

intervention effect. In the second stage, a summary (pooled) intervention effect estimate is calculated as a weighted average of the intervention effects estimated in the individual studies.

Meta-regression
In meta-regression, explanatory variables that predict the outcome from a meta-analysis can be explored. Meta-regression can examine whether important potential effect modifiers, or covariates (such as sex or age), have an effect on an outcome from a meta-analysis.

Motivational interviewing (MI)
MI is a counselling method that involves enhancing a patient's motivation to change.

Neurotoxicity
Neurotoxicity is toxicity in the nervous system. It occurs when exposure to natural or artificial toxic substances, which are called neurotoxins, alters the normal activity of the nervous system in such a way as to cause damage to nervous tissue.

Observational studies
An observational study draws inferences from a sample to a population where the independent variable is not under the control of the researcher because of ethical concerns or logistical constraints.

Primary prevention
Primary prevention refers to attempts to reduce the likelihood of developing an illness and disorder in the first place and can target whole populations (i.e., universal prevention) or particular groups who are at increased risk of experiencing problems (i.e., selective prevention).

Randomised controlled trial (RCT)
An RCT is a study where participants are allocated at random to one of two or more groups. One of these groups is the standard of comparison, or control.

Secondary prevention
Secondary prevention aims to halt or interrupt disease progression through intervention in individuals already demonstrating early signs or symptoms of that disease.

Selective prevention
Selective prevention is administered to particular groups who are risk for a given disease.

Social competence model
Social competence models of prevention teach skills based on cognitive behavioural therapy. They tend to include a knowledge component and teach personal, social and cognitive skills, such as: goal-setting, problem-solving and decision-making, and also teach cognitive skills to resist external influences, to enhance self-esteem, to cope with stress and anxiety, to increase assertiveness and to interact with others.

Social influence model
Social influence models of prevention include a knowledge component and emphasise normative education (i.e., correcting overestimates of the prevalence of others' drug use). They also include aspects focusing on media, peer and family influences, and teach and rehearse drug refusal skills.

Statistical significance
In statistical hypothesis testing, statistical significance is attained whenever the observed p-value of a test statistic is less than the significance level defined for the study. Typically the p-value is set at $p < .05$, which means that there is a greater than 95% chance that there is a difference between the two conditions that are being compared.

Tertiary prevention
Tertiary prevention aims to reduce the negative impact of an established disease and can also be referred to as treatment.

Universal prevention
Universal prevention is administered to all members of a population, regardless of risk for a given disease.

Executive summary

Introduction

Given the manifold detrimental health effects associated with alcohol and illicit drug use, considerable resources have been dedicated to preventing their use and related harms. Primary prevention strategies aim to halt or delay the onset of substance use and interrupt the transition to more serious use amongst occasional users (ref UN). Primary prevention can target whole populations (i.e., universal prevention) or particular groups who are at increased risk of experiencing problems (i.e., selective prevention) (Ref UN). The current report will focus on primary prevention strategies that are universal in nature and delivered to whole populations.

Methods

Academic databases, including Medline, EMBASE and PsycInfo were searched using the Medline search terms presented in Table 1 that were then modified for each database according to standard conventions. This search was conducted on the 1st August, 2016 and included all relevant reviews conducted since 2006. In addition, the following grey literature sources were searched:

- Centre for Adolescent Substance Abuse Research;
- EdResearch Online;
- EPPI-Centre database of health promotion research;
- Education Resources Information Centre;
- The European Monitoring Centre for Drugs and Drug Addiction;
- The World Health Organisation Institutional Repository for Information Sharing Library;
- The Campbell Collaboration Library of Systematic Reviews.

Reviews were included in this report if they: were a systematic review or meta-analysis conducted from 2006 up to the end of July 2016; included data on universal primary prevention strategies that were able to be extracted independently data from of other (i.e., selective, secondary or tertiary) prevention strategies; reported outcomes related to either substance use (including initiation of use, proportion of users, quantity or frequency of use) or substance-related harms; published in a peer-reviewed journal; and were reported in English. In total, 54 reviews met the inclusion criteria and were included in this report.

The reviews assessed in this report were grouped according to the different social contexts or settings where prevention strategies have been applied. The settings considered were: family, school, college, workplace, leisure, healthcare, community, media and policy (i.e., availability, legislation and taxation). The findings within each of these settings were then

synthesised and summarised in an overview of findings. Specific conclusions regarding the effectiveness of preventive interventions in each of these settings were formulated. For each of the reviews included in this report, we also provide detailed descriptions of the main findings with respect to substance use and related harms. Each review was then given an objective strength of evidence rating.

Conclusions

There is sufficient positive evidence to support the use of family-based, school-based, multi-component and policy-based universal primary prevention strategies to reduce alcohol use. In terms of reducing drug use, there is sufficient evidence to support the use of school-based universal primary prevention strategies only. For preventive interventions in school settings, it should be noted that only programs including certain elements are effective, and these may differ depending on the age of the students receiving the intervention. There is only limited evidence of the effectiveness of preventive interventions to reduce alcohol use in college settings. There is some evidence to suggest that universal primary prevention strategies implemented in leisure settings can have preventive effects on alcohol and drug use, although the evidence base is small. There is insufficient evidence to determine whether universal primary prevention strategies implemented within workplace, healthcare and community settings have an effect on alcohol and drug use. Current mass media approaches to the prevention of alcohol and drug use to do not appear to be effective.

Introduction

The use of alcohol and illicit drugs is a serious public health concern and entails considerable burden of disease. Data from the 2013 Australian National Household Drug Survey indicates that 78.2% of Australians aged over 14 years have used alcohol recently, with 18.2% of Australians drinking at levels that put them at risk for lifetime harms (Australian Institute of Health and Welfare 2014). The same data indicate that 12.0% of Australians over the age of 14 years had recently used any illicit drug. Cannabis is by far the most commonly used illicit drug, with 10.2% of the Australian population over the age of 14 reporting recent cannabis use. Alcohol and drug use contribute heavily to the burden of disease in the Australian population, with 5.1% and 1.8% of total disease burden attributable to alcohol and drug use respectively (Australian Institute of Health and Welfare 2016). In younger Australians (up to the age of 44 years), alcohol and drug use are the top two risk factors contributing to total disease burden. In all other age groups alcohol use, but not drug use, ranks within the top ten risk factors contributing to disease burden.

Harmful drinking, defined as alcohol use that is causing damage to one's health, is a major avoidable risk factor for many non-communicable diseases, including neuropsychiatric disorders, cardiovascular diseases, liver cirrhosis (World Health Organisation 2010) and cancers of the breast, rectum, stomach, colon, oesophagus, oral cavity and pharynx (Anderson, Chisholm, and Fuhr 2009). Harmful alcohol use is also associated with infectious diseases such as tuberculosis, pneumonia, HIV/AIDS and other sexually transmitted diseases (World Health Organisation 2010). Heavy alcohol use is neurotoxic to brain development (Alfonso-Loeches and Guerri 2011), associated with structural changes in the prefrontal cortex and hippocampus in adolescence (Squeglia, Jacobus, and Tapert 2009) and reduced brain volume in middle age (Taki et al. 2006). Harmful alcohol use is also associated with intentional and unintentional injury, violence, suicide, homicide, crime and road traffic accidents (Anderson, Chisholm, and Fuhr 2009). Ongoing alcohol use has also been associated with family deprivation, absenteeism and poor workplace performance, injuries and fatalities (Anderson, Chisholm, and Fuhr 2009). Meanwhile, illicit drug use has been associated with neuropsychiatric disorders and psychosis, fatal overdose, HIV/AIDS, hepatitis B and C, infection from unsafe injecting behaviour, road traffic accidents, suicide, crime and violence (Degenhardt et al. 2013). Given the manifold detrimental health effects associated with alcohol and illicit drug use, considerable resources have been dedicated to preventing their use and related harms.

Historically, the prevention of illness and disability has been classified into three specific categories: primary, secondary and tertiary prevention. In this classification system, **primary prevention** refers to attempts to reduce the likelihood of developing an illness and disorder in the first place, **secondary prevention** aims to halt or interrupt disease progression through early intervention, and **tertiary prevention** aims to reduce the negative impact of an established disease (i.e. treatment) (Roberts 1954). Specific to alcohol and other drug use, primary prevention strategies aim to halt or delay the onset of substance use and interrupt the transition to more serious use amongst occasional users (United Nations 2010). Primary

prevention can target whole populations (i.e., universal prevention) or particular groups who are at increased risk of experiencing problems (i.e., selective prevention) (United Nations 2010). Due to the inclusion of all members of a given group, regardless of relative risk, the effect sizes for universal prevention strategies are often small. Small effect sizes in the context of delaying the initiation of substances, however, have been associated with significant savings in terms of social costs (Caulkins et al. 2004), and so the real world impact is significant. Australian research, for example, has indicated that universal preventive interventions are consistently more cost-effective than treatment when focusing on harms related to alcohol (Cobiac et al. 2009). Similarly, research based in the US suggests that every dollar spent on universal substance abuse prevention results in savings ranging from $2.00 to $19.64 (Swisher, Scherer, and Yin 2004). Selective prevention strategies, on the other hand, target subsets of a population that have been identified as being at an increased risk of developing substance use problems. Although selective prevention programs have the potential to address risk for substance use problems early on, screening for at-risk individuals can be costly in terms of time and money, and may entail labelling and stigmatisation issues (Offord and Kraemer 2000). Hence, the current report will focus on primary prevention strategies that are universal in nature and delivered to whole populations.

Several recent reviews focusing on the universal primary prevention strategies for alcohol and illicit drugs have recently been published which focus on selected settings (i.e., school, the family). The current review will synthesise the information from these reviews to provide an overview of the evidence for a range of universal primary alcohol and illicit drug prevention strategies that is relevant across different intervention settings. The structure of this report will be adapted from other recent reports focusing on drug and alcohol prevention, and group the findings according to the different social contexts an individual interacts in, ranging from the micro to the macro level (European Monitoring Centre for Drugs and Drug Addiction 2015). The nine social contexts (or intervention settings) considered include the family, school, college, workplace, leisure, healthcare, community, media and policy (i.e., availability, legislation and taxation).

Methods

Search strategy

Academic databases, including Medline, EMBASE and PsycInfo were searched using the Medline search terms presented in Table 1 that were then modified for each database according to standard conventions. These search terms were adapted from a previous overview of reviews focusing on prevention of substance use and harms (Stockings et al. 2016). This search was conducted on the 1st August, 2016 and included all relevant reviews conducted since 2006.

Table 1. Medline search terms used in search strategies and adapted for other databases depending on database convention

1	exp *Substance-Related Disorders/ (185937)
2	("drug use" or "substance use" or "substance abuse").tw. (62291)
3	exp Alcohol Drinking/ (58325)
4	exp Alcoholic Intoxication/ (11693)
5	exp Binge Drinking/ (883)
6	("early alcohol use" or "alcohol consumption").tw. (30396)
7	exp Marijuana Smoking/ (3458)
8	exp Marijuana Abuse/ (5139)
9	exp Cannabis/ (7356)
10	exp Cannabinoids/ (11444)
11	exp Opium/ (1928)
12	exp Heroin/ (5135)
13	exp Opioid-Related Disorder/ or exp Substance Abuse, Intravenous/ (33064)
14	Amphetamine-Related Disorders/ (2500)
15	exp Cocaine-Related Disorders/ or exp Cocaine/ or exp Crack Cocaine/ (27577)
16	exp Street Drugs/ (10435)
17	exp Designer Drugs/ (1234)
18	"multiple drug abuse".tw. (57)
19	"polydrug abuse".tw. (157)
20	"drug dependence".tw. (3207)
21	exp Heroin Dependence/ (8443)
22	exp Morphine Dependence/ (3299)
23	cocaine dependence.tw. (1441)
24	cannabis dependence.tw. (428)
25	or/1-24 (309565)
26	exp Primary Prevention/ (131384)
27	exp Preventive Health Services/ or exp Health Education/ or exp Health Promotion/ (500160)
28	prevention.tw. (379360)
29	exp School Health Services/ (20484)
30	exp Student Health Services/ (2996)
31	exp Public Health Practice/ (569535)
32	adverti*.tw. (11952)
33	campaign*.tw. (28745)
34	exp Family Therapy/ (8169)

35	exp Counseling/ (37600)
36	or/26-35 (1191700)
37	exp Evaluation Studies as Topic/ (872142)
38	evaluation.tw. (838443)
39	exp Program Evaluation/ (62893)
40	exp Evidence-Based Medicine/ (62126)
41	exp follow-up studies/ (555902)
42	exp Patient Outcome Assessment/ or exp "Outcome and Process Assessment (Health Care)"/ (856395)
43	or/37-42 (2740593)
44	exp "Review"/ (2090461)
45	"systematic review".tw. (61126)
46	cochrane.tw. (42136)
47	exp Meta-Analysis/ (71345)
48	exp Meta-Analysis as Topic/ (15199)
49	or/44-48 (2141052)
50	25 and 36 and 43 and 49 (1063)
51	limit 50 to (humans and yr="2006-Current") (570)
52	remove duplicates from 51 (542)

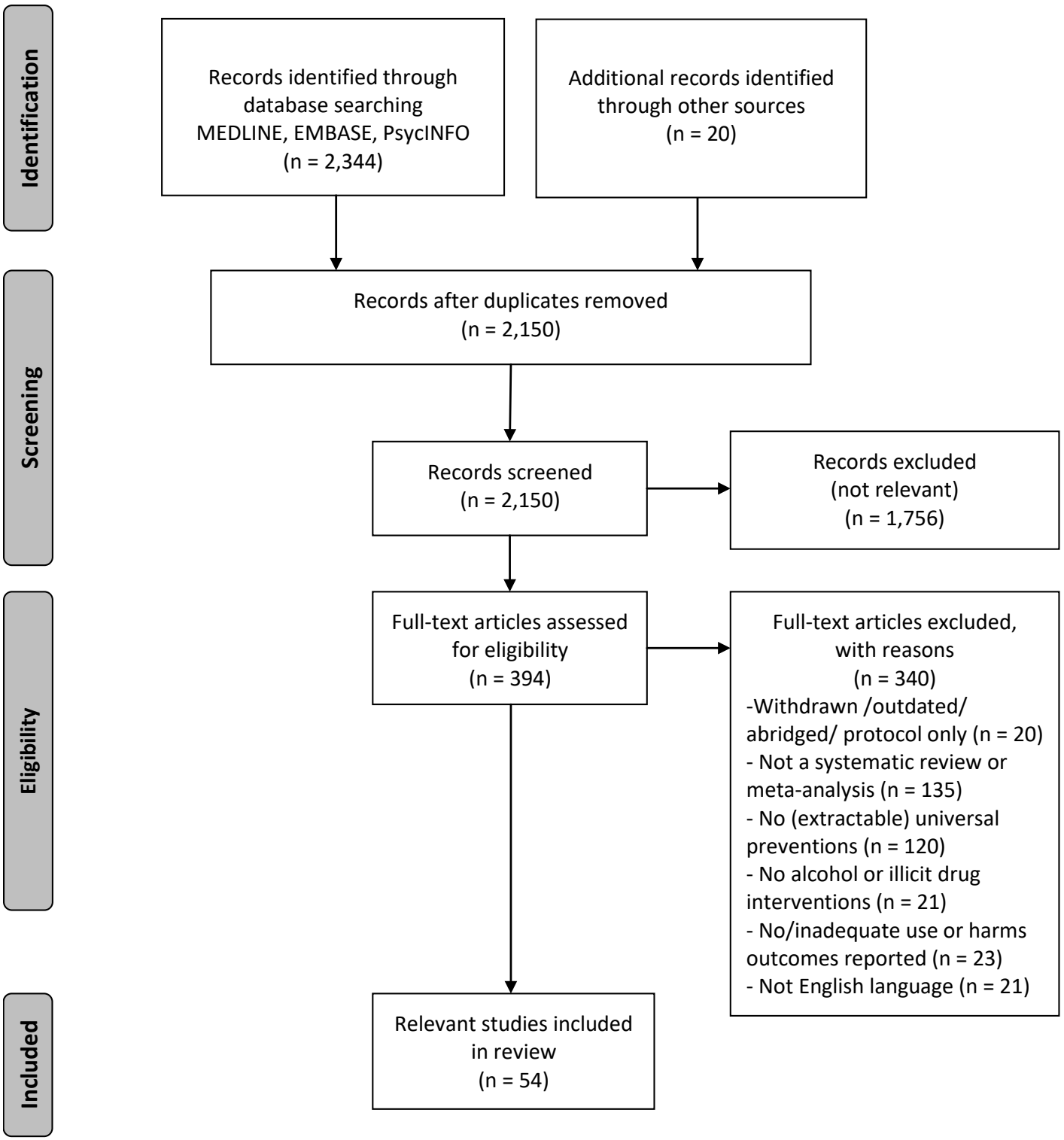
In addition, the following grey literature sources were searched:

- Centre for Adolescent Substance Abuse Research;
- EdResearch Online;
- EPPI-Centre database of health promotion research;
- Education Resources Information Centre;
- The European Monitoring Centre for Drugs and Drug Addiction;
- The World Health Organisation Institutional Repository for Information Sharing Library;
- The Campbell Collaboration Library of Systematic Reviews.

Reviews were included in this report if they: were a systematic review or meta-analysis conducted from 2006 up to the end of July 2016; included data on universal primary prevention strategies that were able to be extracted independently of other (i.e., selective, secondary or tertiary) prevention strategies; reported outcomes related to either substance use (including initiation of use, proportion of users, quantity or frequency of use) or substance-related harms; published in a peer-reviewed journal; and were reported in English. Due to limitations in the data that are able to be extracted from previous peer-reviewed overviews of reviews, these were not included in the detailed findings but guided the content and structure of this report, and provided additional references that were not captured by the database search. Titles and abstracts of all identified reviews were first inspected by one of the study

authors (RV). Full text versions of those reviews identified as being relevant were then retrieved and inspected more closely by two of the study authors (RV and LM). Any disagreements were resolved through discussion. Reference lists of previous overviews of reviews focusing on key prevention areas were also scanned for additional reviews not captured by the comprehensive database search. In total, 54 reviews met the inclusion criteria and were included in this report [see Figure 1 for Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram].

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram



Structure of report

The reviews assessed in this report were grouped according to the different social contexts or settings where prevention strategies have been applied. The settings considered were: family, school, college, workplace, leisure, healthcare, community, media and policy (i.e., availability, legislation and taxation). The findings within each of these settings were then synthesised and summarised in an overview of findings. These summaries include our own conclusions regarding the state of the evidence within each setting and were formulated as per Table 2. We adapted the wording of conclusions used by European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) in a previous overview of the prevention literature (European Monitoring Centre for Drugs and Drug Addiction 2015). No conclusions were drawn in cases where there was an insufficient evidence base.

Three areas of special focus were also identified whilst conducting this review. These areas of focus included issues that were relevant across all prevention settings, identifying two areas in need of further research (prevention in Aboriginal and Torres Strait Islander people and older populations) and one area of emerging research (prevention facilitated by the computer or internet).

For each of the reviews included in this report, we also provide detailed descriptions of the main findings with respect to substance use and related harms. The authors' conclusions specific to these outcomes are also provided. Each review was then given an objective strength of evidence rating. We adapted the strength of evidence rating system used by EMCDDA in a previous overview of the prevention literature (European Monitoring Centre for Drugs and Drug Addiction 2015). This system is described in Table 2.

Given the heterogeneity of the reviews included, and the amount of evidence that needed to be condensed within each of the setting summaries, the summaries and conclusions drawn should only be interpreted with reference to the detailed review descriptions.

Table 2. Strength of evidence rating system adapted from EMCDDA

Type of review	Strength of evidence	Wording of conclusions
A meta-analysis involving high quality studies (RCTs, CTs or ITSs) [a]	A	If evidence in five studies or more: 'has preventive effects' or 'has no preventive effects'. If evidence in fewer than five studies: 'can have preventive effects' or 'appears not to have any preventive effects'
A systematic review involving high quality studies (RCTs, CTs or ITSs) [a]	B	If half or more of studies positive: 'can have preventive effects'. If fewer than half positive: 'occasionally demonstrates preventive effects'. If no studies positive: 'appears not to have any preventive effects'
A meta-analysis or systematic review reporting on all available studies	C	'May have preventive effects' or 'may not have preventive effects'
An unsystematic review, expert opinion or government report	D	

[a] RCTs: randomised controlled trials; CTs: controlled trials; ITSs interrupted time series

Summary of Studies

1. Family-based programs for reducing alcohol and drug use and related harms

There is good evidence to suggest that family-based universal primary prevention programs are effective in delaying and reducing alcohol use, and emerging evidence to suggest that these programs are also effective in reducing illicit drug use. For alcohol, the evidence base for these programs includes one meta-analysis of high quality studies (Rating A) (Smit et al. 2008) and three systematic reviews of high quality studies (Rating B) (Foxcroft and Tsertsvadze 2011a; Kuntsche and Kuntsche 2016; Petrie, Bunn, and Byrne 2007), indicating that there is high quality and consistent evidence supporting the use of these programs. One further systematic review (Rating B) (Cairns, Purves, and McKell 2014) focused on the combination of school- and family-based programs and found that these were effective in the majority of cases. It is worth noting that many of the family-based intervention studies that form this evidence base involve active components across different settings so it is difficult to evaluate the effectiveness of the family-based content in isolation (Petrie, Bunn, and Byrne 2007).

Family-based preventive interventions that include a psychosocial aspect designed to have an impact on a range of behaviours are more effective in reducing alcohol use and harms than those that focus exclusively on substance use behaviours (Foxcroft and Tsertsvadze 2011a; Petrie, Bunn, and Byrne 2007). Active participation of the parents also appears fundamental to the success of the intervention (Petrie, Bunn, and Byrne 2007). There was also an indication that randomisation at the group level rather than individual level increased effectiveness (Smit et al. 2008). This is likely due to a "herd" effect where an effect is amplified by peers and wider changes outside the family unit. There is also evidence to suggest that family-based interventions for alcohol and drug use have the greatest impact when they involve children in early adolescence. Finally, the evidence suggests that gender-specific interventions, for example those targeting mother and daughter dyads, can also be effective in the short and medium term.

There were rare occasions when the interventions studied in these reviews reported adverse effects, in that the intervention seemed to increase the target substance use behaviour. Whilst this may indicate iatrogenic effects, it is also important to consider that occasional unexpected results could arise due to chance or other methodological anomalies (Foxcroft and Tsertsvadze 2011a).

Conclusion: Family-based programs have preventive effects for alcohol use (Rating A) and can have preventive effects for illicit drug use (Rating B).

2. School-based programs for reducing alcohol and drug use and related harms

2.1 Findings regarding specific types of school-based prevention programs

Three meta-analyses (Rating A) and two systematic reviews (Rating B) focused on specific types of school-based prevention programs and their effectiveness in reducing alcohol and drug use.

Alcohol One systematic review of high quality studies (Rating B) reported effects on alcohol use outcomes, and evaluated programs according to whether they had a general health focus or a focus that was specific to alcohol or illicit drug use (Foxcroft and Tsertsvadze 2011c). Thirty-nine studies evaluated interventions with a general health focus and 14 of these had statistically significant effects in favour of the intervention group over the control group. Eleven studies with an alcohol-specific focus were identified, and six showed statistically significant effects in favour of the control group over the intervention group. Three other programs were also identified that focused on two or more substances (including alcohol, cannabis and tobacco) and reported alcohol use outcomes. The findings from these studies were mixed, with two of these three studies demonstrating statistically significant reductions in alcohol use amongst the intervention group when compared with the control group. One other meta-analysis of high quality studies (Rating A) reported effects on alcohol use outcomes for peer-based interventions, which were shown to have small, statistically significant effects (MacArthur et al. 2016).

Illicit drugs One meta-analysis of high quality studies (Rating A) focused on the type of intervention implemented and its effect on illicit drug use (Faggiano et al. 2014). This review indicated that knowledge-only programs appear to have little effect on illicit drug use, although only two knowledge-only universal primary studies were identified. Programs based on social competence and social influence models appear to have some effect on illicit drug use in the short term, with less evidence of longer-term effectiveness (please refer to detailed study description for more information regarding what these types of interventions involve). The most convincing effects on illicit drug use, however, were for those programs that combined knowledge, social competence and social influence approaches, with small effects in both the short and long term.

Alcohol and illicit drugs One final meta-analysis of high quality studies (Rating A) focused on interventions adopting the World Health Organisation's Health Promoting Schools framework, which is a broad systems-level universal approach to prevention (i.e., a multicomponent approach that involved changes to the curriculum, school ethos and engagement with communities or families) (Langford et al. 2015). It was found that this approach did not lead to statistically significant reductions in alcohol and drug use. One other systematic review of high quality studies (Rating B) focused on "whole of school" approaches to the prevention of alcohol and drug use (Fletcher, Bonell, and Hargreaves 2008). Whilst the evidence base was small, there was some evidence to suggest that these approaches lead to reductions in drug use, as well as associated reductions in alcohol use.

Conclusions: For *alcohol*, there is evidence to suggest that general health programs occasionally have preventive effects on alcohol use, whilst alcohol specific programs can have preventive effects on alcohol use (Rating B). Meanwhile, peer-led school-based programs have preventive effects for alcohol use (Rating A).

For *illicit drugs*, school-based programs implementing social competence and social influence models have preventive effects for reducing illicit drug use in the short term and can have preventive effects in the long term (Rating A). School-based programs combining knowledge, social competence and social influence components have preventive effects on illicit drug use in the short and long term (Rating A).

For both *alcohol and illicit drugs*, school-based programs implementing the WHO Health Promoting Schools framework do not have preventive effects on alcohol and drug use (Rating A). "Whole of school" approaches can have preventive effects on alcohol and drug use (Rating B).

2.2 Findings regarding optimal age for implementation

Three other meta-analyses provided information on the optimal age to deliver preventive interventions for alcohol and drugs. In the most recent of these meta-analyses, small, statistically significant effects on alcohol and drug use were found for programs implemented in primary school and younger adolescence (grades 6 and 7). For programs focusing on older adolescents, however, there were no statistically significant effects in favour of the intervention group in terms of alcohol and drug use (Onrust et al. 2016). In another meta-analysis that only reported alcohol use outcomes, there were statistically significant effects of school-based universal primary preventive interventions on frequency and quantity of use but not on the proportion of students drinking alcohol (Strom et al. 2014). Unlike the previous meta-analysis, no effect of age or school level (junior or high school) was found. Another meta-analysis only focused on cannabis use outcomes, and found a moderate positive effect of school-based programs on cannabis use (Porath-Waller, Beasley, and Beirness 2010). Those programs targeting older students were found to be more effective than those targeting students in years 6 and 7. Again, these findings were in contrast to the meta-analysis conducted by Onrust et al. (2016). Thus, whilst these meta-analytic findings consistently found that school-based preventive interventions were effective in reducing alcohol and drug use, there are some inconsistencies as to their effectiveness amongst different age groups.

This means that whilst certain approaches to school-based prevention have been identified as effective, there are contradictory findings as to the optimal age for delivery of these programs. The adoption of a developmental perspective in a more recent review gave a more nuanced picture regarding the effective elements of alcohol and drug prevention at different ages (Onrust et al. 2016). In primary school, programs should target basic skills, including social skills, self-control, problem-solving skills and healthy behaviours in general. The inclusion of information and skills that were substance use specific were not effective for primary school students. The enhancement of basic skills was also beneficial for younger adolescents (grades 6 and 7), as was the inclusion of social influence approaches (i.e., information on social norms) and a parenting component. Middle adolescence (grades 8 and

9) appeared to be a particularly difficult group to target, with little evidence of effectiveness. None of the approaches to prevention (basic skills training, social influence, social competence) resulted in more favourable results in this age group. However, refusal skills training was associated with less favourable results. For older adolescents, a social influence approach increased the effectiveness of alcohol and drug interventions, as did health education, basic skills training and the inclusion of parental support. This information can be used to tailor prevention approaches to different age groups within a development perspective, and also highlights the need to develop new prevention approaches that might increase effectiveness in the difficult years of middle adolescence.

Conclusion: There are discrepancies in the literature as to the optimal age to deliver school-based alcohol and drug prevention (Rating A). Tailoring the content of preventive interventions to different age groups may resolve these discrepancies.

2.3 Specific programs that work in school settings

Based on the recommendations from some of the review authors, specific programs that effectively reduce alcohol and drug use can be identified. One systematic review of high quality studies (Rating B) rated 40 individual school-based programs for alcohol use against strict effectiveness criteria (Lee et al. 2016). Of the 40 programs, the authors identified three programs with sufficient evidence of reductions in alcohol use to recommend their widespread implementation: CLIMATE Schools (Australia), Project ALERT (USA) and All Stars (USA). In two separate Cochrane reviews focusing on alcohol (Foxcroft and Tsertsvadze 2011c) and drugs (Faggiano et al. 2014), the reviewers recommended three programs for wider implementation: Life Skills Training (LST; USA), Unplugged (Europe) and the Good Behaviour Game (Europe and USA). On the basis of the findings from one systematic review (Rating B), however, not all of these programs have been evaluated independently, i.e. evaluated by a research team unaffiliated with its development (Flynn, Falco, and Hocini 2015). Only one of these programs (Project ALERT) had been independently evaluated with promising results. The LST program had also been independently evaluated but did not show any beneficial effects in this evaluation. One additional program, the Skills for Adolescence (SFA; USA) program, also showed beneficial effects when evaluated independently (Flynn, Falco, and Hocini 2015). Independent evaluations of the other programs that have been recommended by individual review authors should be conducted to further strengthen their evidence base.

One systematic review of all available studies (Rating C) focused on school-based alcohol and drug prevention programs in the Australian context (Teesson, Newton, and Barrett 2012). Four Australian programs were identified that had beneficial effects on both alcohol use and binge drinking: the School Health and Alcohol Harm Reduction Project (SHAHRP), CLIMATE Alcohol, CLIMATE Alcohol and Cannabis and the Gatehouse Project. Two programs had beneficial effects on cannabis use outcomes: CLIMATE Alcohol and Cannabis and the Gatehouse Project. Two of the identified programs had no beneficial effects on the substance use outcomes measured: Life Education and the Resilient Families Intervention. The implementation and widespread dissemination of evidence-based school prevention programs that are effective in an Australian context is facilitated by the recent development

of the Positive Choices online portal. Developed by researchers at the National Drug and Alcohol Research Centre, and funded by the Australian Government Department of Health, this online portal is designed to help school communities access accurate, up-to-date drug education resources and prevention programs that are effective in the Australian context.

It should also be noted that there were rare occasions when the school-based interventions studied in these reviews reported adverse effects, in that the intervention seemed to increase the target substance use behaviour. Whilst this may indicate iatrogenic effects, it is also important to consider that occasional unexpected results could arise due to chance or other methodological anomalies (Foxcroft and Tsertsvadze 2011a).

3. College or University-based Programs

Two systematic reviews including high quality studies (Rating B) focused on college samples (Leeman et al. 2015; Larimer and Cronce 2007). Evaluations of universal primary prevention strategies in college students are sparse, with secondary or tertiary prevention strategies more commonly implemented in this setting. One review evaluating college preventive interventions found that seven of the eighteen studies showed positive reductions in alcohol use amongst the intervention group when compared with the control group (Larimer and Cronce 2007). The majority of those that were effective were based on a motivational interviewing approach. The other review focused on very brief internet-delivered interventions amongst college samples, four of which adopted a universal primary prevention approach (Leeman et al. 2015). Two of these four studies showed small effects on alcohol use in favour of the intervention group over the control group. Previous overviews of reviews have lamented the lack of available evidence for universal primary prevention within college settings (Martineau et al. 2013). Whilst the current report suggests some areas of promise, the evidence base is small, and no reviews focusing on the universal primary prevention of illicit drug use in college settings were identified.

Conclusion: College-based prevention programs occasionally have preventive effects on alcohol use (Rating B). There is insufficient evidence to evaluate the effectiveness of college-based universal primary prevention programs in reducing illicit drug use.

4. Workplace-based programs for reducing alcohol and drug use and related harms

One systematic review of high quality studies (Rating B) identified two studies focusing on mandatory alcohol and drug testing and noted some evidence of short term reductions in injury, and some evidence of long term effects after the introduction of mandatory alcohol and drug testing (Cashman et al. 2009). Another systematic review of all available literature (Rating C), however, found no support for the introduction of random alcohol testing in male-dominated industries (Lee et al. 2014). This review also concluded that health promotion activities did not appear to have an effect on alcohol use or harms. Screening for risky drinking, on the other hand, did appear to be effective for reducing alcohol use, whilst workplace injuries appeared to reduce in response to peer-led interventions and changes in workplace policies regarding alcohol use. In another review of all available studies (Rating C), peer-based interventions, health promotion and interventions based on psychosocial skills training were found to be effective in reducing behaviours related to alcohol use (Webb et al. 2009). These results regarding the effectiveness of health promotion activities were not consistent with the more recent review discussed above (Lee et al. 2014). Across all reviews, methodological limitations of the included studies were noted.

Australian national data indicates that those in the paid workforce consume alcohol in riskier patterns than those in the unpaid workforce (Pidd, Shtangey, and Roche 2008). Amongst those in the paid workforce, risky drinking has implications for workplace safety as well as costs associated with lost productivity (i.e., through absenteeism). Australian research indicates that about half of all alcohol-related absenteeism is actually attributable to workers who normally drink at low risk levels but occasionally drink at high risk levels (Pidd et al. 2006). Such findings suggest that "whole of work" or universal primary prevention strategies would be most appropriate. However, as outlined above, there is a lack of literature examining universal primary prevention approaches within the workplace. Because of the amount of time spent within workplaces and the number of people within workplaces drinking at risky levels, the workplace has been identified as a "unique and cost-effective setting" (p. 4) for prevention strategies aimed at reducing alcohol related harms (Pidd and Roche 2009). Three basic components of a primary prevention model for reducing risky drinking within workplaces have been proposed:

1) The development and implementation of formal workplace policies regarding alcohol-related issues;

2) The provision of education and training; and

3) Access to rehabilitation and treatment (Pidd and Roche 2009).

The effectiveness of this model in practice, however, does not appear to have been evaluated.

Conclusion: There is insufficient evidence to determine whether interventions delivered within workplace settings are effective for reducing alcohol and drug use and related harms.

5. Leisure-based programs for reducing alcohol and drug use and related harms

There was a paucity of good-quality evidence in this area. On the basis of one meta-analysis of high quality studies, it is evident that extracurricular programs designed to promote the psychosocial development of children and adolescents have a small effect on substance use outcomes (Rating A) (Durlak, Weissberg, and Pachan 2010). This effect was only statistically significant when extracurricular programs adopted what the authors termed the SAFE approach: meaning they were conducted in sequenced stages, were interactive, provided adequate time and space for the development of skills and specified explicit learning targets and outcome parameters. There is some evidence from two systematic reviews (Ratings B and C) to suggest that preventive interventions mobilised in a sports settings have a positive impact on alcohol use and harms, but the evidence base is small (Kolar and von Treuer 2015; Kingsland et al. 2016). In both of these reviews, the majority of positive findings were based on the Australian Good Sports Program which performed well in a variety of contexts. One systematic review of all available studies (Rating C) focused on preventive interventions conducted in nightlife settings. The included studies had methodological limitations and the evidence base was small. However, the authors concluded that community and education interventions may have an impact on alcohol use and harms in nightlife setting, whilst the effectiveness of alcohol server interventions and alcohol policy interventions in reducing alcohol use and harms is inconclusive. There was no available evidence to suggest that there are any universal primary preventive interventions available that have an impact on drug use and harms in nightlife settings.

There is a clear need to further investigate the effectiveness of leisure-based interventions for reducing alcohol and drug use and related harms. Risky alcohol use is high in both sports and nightlife settings (Tobin et al. 2012; Bolier et al. 2011), but very little research has focused on preventive interventions in these contexts. It should also be noted that within the leisure setting (as opposed to the educational setting), no evidence was found regarding the effectiveness of peer-based preventive interventions, despite their widespread use (European Monitoring Centre for Drugs and Drug Addiction 2015).

Conclusions: Extracurricular programs designed to promote psychosocial development can have preventive effects on substance use if implemented according to guidelines (Rating A). Interventions in sports and nightlife settings may have preventive effects on alcohol use, but further research is needed (Rating C).

6. Healthcare-based programs for reducing alcohol and drug use and related harms

Two systematic reviews of all available literature (Rating C) (Wachtel and Staniford 2010; Boekeloo and Griffin 2007) identified very few studies focusing on universal primary preventive interventions for alcohol use in healthcare settings. Amongst those studies that were identified, there was either no evidence of intervention effect or evidence of an *increase* in alcohol use in the intervention groups. One systematic review of all available literature (Rating C) (Patnode et al. 2014) similarly identified very few studies focusing on preventive interventions for drug use in healthcare settings. There was very limited evidence for the effectiveness of these programs, with one comparison showing a small effect in favour of the intervention group and two comparisons showing no effect of the intervention.

Due to the small amount of literature evaluating preventive interventions in healthcare settings, very few conclusions can be drawn. There is some evidence to suggest that secondary preventive interventions are delivered with success in healthcare settings (European Monitoring Centre for Drugs and Drug Addiction 2015), however healthcare remains an under-utilised primary prevention setting. Given that healthcare professionals have good access to members of the general population and are perceived as reliable sources of health information (European Monitoring Centre for Drugs and Drug Addiction 2015), healthcare settings are also ideal for the implementation of universal preventive interventions. Given the encouraging evidence regarding preventive interventions delivered via the computer or internet (see Panel 3), it may be that the adaptation and evaluation of these interventions within healthcare settings could prove particularly fruitful. If effective within primary care settings, practitioners could endorse or "prescribe" computer- or internet-delivered interventions by providing patients with a link to the program (Patnode et al. 2014). In fact, one of the reviews focusing on computer- and internet-delivered preventive interventions identified a study that was conducted within a primary care setting (Champion, Newton, and Teesson 2016). Compared with the control group, those who completed the intervention had significantly lower rates of cannabis use over 12 months, reduced frequency of cannabis use at three and six months and less other drug use at three months. This study highlights promising new avenues for the prevention of alcohol and drug use in healthcare settings.

Conclusion: There is insufficient evidence to determine whether universal preventive interventions delivered within healthcare settings are effective for reducing alcohol and drug use and related harms.

7. Community-based programs for reducing alcohol and drug use and related harms

There was a lack of high quality evidence examining community-based programs for the prevention of alcohol and drug use and related harms. The two reviews focusing specifically on community based approaches were not systematic (Rating D) (Fagan, David Hawkins, and Catalano 2011; Toomey and Lenk 2011). The first review discussed the elements of nine community-based programs that were effective in reducing underage drinking (Fagan, David Hawkins, and Catalano 2011). Effective elements included the presence of a community coalition guiding the preventive efforts and supplementation with school-based curricular. A further study focusing solely on community interventions that implemented changes to laws, norms and policies, found that these were effective in reducing alcohol consumption amongst young people (Toomey and Lenk 2011). Another review focusing on community interventions in nightlife settings also found that these interventions reduced alcohol-related harms (Bolier et al. 2011). One final review focused on multicomponent approaches to the prevention of alcohol use, of which the community was one of several components studied (Foxcroft and Tsertsvadze 2011b). Whilst these multicomponent interventions were generally effective, it is difficult to draw conclusions on the extent to which the community-based elements contributed to these effects. These multicomponent prevention strategies are covered in more detail in Section 9 below.

The evidence presented here suggests that community approaches that utilise coalitions to enforce policy regulations in combination with effective school-based interventions may have the most success. Despite this, it is difficult to draw conclusions from the available evidence. New research in this area, however, is proving promising. The recent Australian Alcohol Action in Rural Communities project evaluated a community-based intervention aimed at reducing alcohol misuse and alcohol related harm (Shakeshaft et al. 2012). The intervention involved the implementation of school- and family-based programs, media education, and police and healthcare involvement, and was evaluated using a randomised controlled trial design. Five years after the implementation of the intervention, there was a 20% reduction in alcohol consumption and significant reductions in alcohol-related harms in the intervention group when compared with the control group.

Conclusion: There is insufficient evidence to determine whether universal preventive interventions delivered within community settings are effective for reducing alcohol and drug use and related harms.

8. Media-based programs for reducing alcohol and drug use and related harms

Based on two systematic reviews of all relevant studies (Rating C), there is good evidence to suggest that alcohol advertising and promotion *increases* the likelihood that adolescents will start to use alcohol, and to drink more if they are already drinking (Anderson et al. 2009). However, there is not enough evidence to determine whether banning alcohol advertising *reduces* alcohol consumption (two systematic reviews Rating B and C) (Siegfried et al. 2014), although there may be some benefit in terms of delivering drink-driving messages (Wakefield, Loken, and Hornik 2010). In one meta-analysis of all available studies (Rating C), mass media campaigns also had no effect on substance use (including alcohol and illicit substances) (European Monitoring Centre for Drugs and Drug Addiction 2015). There was also little evidence that media campaigns (two systematic reviews, Rating C) (Wakefield, Loken, and Hornik 2010; Ferri et al. 2013) and public service announcements (one systematic review, Rating B) (Werb et al. 2011) reduced drug use, with some evidence of increases in drug use in response to these media-based interventions.

There is moderate to strong evidence for the benefit of mass media campaigns to change health behaviours, such as smoking, physical activity, safe sex practices and road safety behaviours (Wakefield, Loken, and Hornik 2010). However, these have not been replicated in the literature focusing on behaviours related to alcohol and drug use. It may be that different approaches informed by successful campaigns aimed at other health behaviours may be successfully applied to the prevention of alcohol and drug use behaviours in the future.

Conclusion: There is insufficient evidence to indicate whether banning alcohol advertising reduces alcohol use and harms (Rating B and C). Mass media campaigns appear not to have preventive effects on alcohol and drug use and related harms (Rating B and C). With regards to drug use, some iatrogenic effects in response to these campaigns have been noted.

9. Policy approaches to reducing alcohol and drug use and related harms

Three reviews of all the available evidence (Rating C) focused on alcohol taxation and its relationship to alcohol use and harms (Wagenaar, Salois, and Komro 2009; Wagenaar, Tobler, and Komro 2010; Elder et al. 2010). There is strong, convincing and consistent evidence to suggest that there is an inverse relationship between alcohol taxation and alcohol consumption (Elder et al. 2010; Wagenaar, Salois, and Komro 2009) and harms (Wagenaar, Tobler, and Komro 2010). Evidence from two systematic reviews of all the available evidence (Rating C) also consistently indicated that alcohol outlet density is positively associated with alcohol use and alcohol-related harms, with little dissenting evidence (Popova et al. 2009; Bryden et al. 2012). Three studies focused on the relationship between extending trading hours or days and the effect on alcohol consumption or related harms (Rating C) (Hahn et al. 2010; Middleton et al. 2010; Popova et al. 2009). There is reasonably consistent evidence to suggest that *increasing* trading hours or days leads to increases in alcohol consumption and related harms, especially if the increase is greater than two hours (Hahn et al. 2010). Only one of these reviews identified studies focusing on *decreasing* hours or days of sale, and found that there was some evidence that restricting trading days led to reductions in alcohol-related harms, but little evidence to suggest that this had an effect on alcohol consumption (Middleton et al. 2010). However, only three studies focusing on decreases in days or hours of sale were identified, indicating the need for more research in this area. Finally, one systematic review of all available studies (Rating C) focused on alcohol retail privatisation, and found that the privatisation of sales led to considerable increases in alcohol use (Hahn et al. 2012).

One comprehensive review focused on policy approaches to reducing drug use and harms (Rating C) (Strang et al. 2012). Little assessment has been done with regards to drug supply control policies, but the evidence suggests that these can result in higher drug prices which have been independently shown to reduce drug initiation and use. Law enforcement also works to keep drug prices high and may therefore have a similar indirect effect on drug initiation and use. This review found little formal evidence to suggest that decriminalisation or legalisation had an effect on drug use, but the positive effects on current users was noted. The effectiveness of drug policy interventions are difficult to investigate and, as with previous overview of reviews in this area, conclusive evidence of their effectiveness was not identified (Stockings et al. 2016).

Note: The strength of evidence ratings for all of the reviews assessing policy approaches to reducing drug use and related harms was lower than other areas as they were mainly based on observational studies. This is because randomised or controlled designs are often impossible when assessing environmental prevention. The strength of the evidence, however, is bolstered by the quantity of observational studies and the consistency of findings across these studies.

Conclusion: Alcohol taxation, outlet density and changes to trading hours may have preventive effects on alcohol use and harms (Rating C). There is insufficient evidence to support current policy regarding the prevention of illicit drug use except perhaps with respect to interventions that indirectly increase drug prices.

10. Multicomponent approaches to the prevention of alcohol use

Whilst many of the reviews discussed within this report also contained studies of multicomponent programs, only one review focused specifically on multicomponent preventive interventions (Foxcroft and Tsertsvadze 2011b). This review (Rating B), which focused on alcohol use, identified 20 studies involving multicomponent approaches (combining school-, community-, and/or family-based programs), twelve of which were effective. One other review (Rating B) focused on programs to prevent underage drinking, and rated the strength of their evidence according to rigorous criteria. Most of the programs recommended across age groups were multicomponent in nature (Spoth, Greenberg, and Turrisi 2008). It should be noted that other approaches considered within this review may also be described as multicomponent in nature. This is particularly the case for community-based prevention approaches and preventive interventions based on the WHO Health Promoting Schools framework. The conclusions regarding these approaches were not as positive as those reached from the systematic review focusing on multicomponent approaches more generally (Langford et al. 2015).

Conclusion: Multicomponent approaches to the prevention of alcohol use can have preventive effects (Rating B).

Panel 1

Special focus: Alcohol and drug prevention for Aboriginal and Torres Strait Islander People

Aboriginal and Torres Strait Islander People are nearly twice as likely to use illicit drugs and report harmful alcohol use when compared with their non-indigenous counterparts (Calabria et al. 2010). There is evidence to suggest that, as with the general population, supply reduction approaches work to prevent substance use in Aboriginal and Torres Strait Islander People. Such supply reduction strategies include: taxation, restrictions on trading hours and alcohol outlets, dry community declarations, Opal fuel substitution and culturally sensitive law enforcement (Gray and Wilkes 2010). However, there are few evaluations of universal prevention programs targeting substance use in the indigenous population. Only one review of all available studies (Rating C) focusing on universal prevention of substance use in Aboriginal and Torres Strait Islander People was identified (Lee et al. 2013). This review was based on very limited data, but there were some indications of the effectiveness of community-based programs and one school-based program that involved peer support training. The authors noted the methodological limitations of all the included studies. Effective programs within this review tended to include multiple components and actively involve the community. Effective programs also involved both local indigenous and non-indigenous staff and highlighted the need for a strong partnership between these staff members. As with studies focusing on the general population, knowledge-only school-based interventions were not shown to be effective (although only two were included in this review), and it is not yet known whether programs based on social influence or social competence approaches are effective within this population. Recent research focusing on minorities more generally indicates the effectiveness of culturally-grounded approaches (Lauricella et al. 2016). As opposed to culturally-adapted approaches, which adapt existing prevention programs for use in minority populations, culturally-grounded approaches build prevention curricular from the ground up. The current report, however, notes the lack of existing evidence to inform the implementation of either culturally-adapted *or* culturally-grounded preventive interventions amongst Aboriginals and Torres Strait Islanders.

Panel 2

Special focus: Prevention in older populations

Many of the reviews included in this report were specifically limited to younger populations. Younger age groups are natural targets for universal primary prevention strategies because many health risk behaviours associated with the leading causes of morbidity and mortality are initiated in adolescence (Stockings et al. 2016). The highest rates of substance misuse are also reported amongst younger people (Mewton et al. 2011; Teesson et al. 2010; Teesson et al. 2012). However, there is increasing recognition that the initiation of some substances (in particular, psychoactive prescription drugs and pain medications) and harmful use of alcohol are also issues facing older people. Recent Australian data, for example, indicates that the largest group of daily drinkers are those aged over 65 years, with twice the number of alcohol-related hospitalisations than younger people (NSW Health 2016). Meanwhile, a small but significant minority of older people misuse prescription medications (Blow and Barry 2012; Hunter and Lubman 2010). In the US, due to the large population size and high substance use rate of the baby-boom generation, it has been projected that rates of substance use disorders amongst older people will double by 2020 (Han et al. 2009). For older people, primary preventive interventions may focus on the prevention of the initiation of prescription drug misuse, and prevention of risky alcohol use. The current report, however, notes the lack of existing evidence to inform such preventive interventions.

Panel 3

Special focus: Drug and alcohol prevention facilitated by the computer or internet

In recent years, technology-based preventions facilitated by computers or the internet have emerged as promising strategies. This is due to the many advantages technology affords over traditional methods, including increased accessibility, affordability and greater feasibility of use (Champion, Newton, and Teesson 2016). In many previous reviews included in this report, computer- and internet-delivered interventions have been considered alongside mass media approaches. However, several recent reviews and a burgeoning evidence base means that computer- and internet-facilitated interventions for the prevention of alcohol and drug use may now be more appropriately considered separately from mass media approaches (Champion et al. 2013; Champion, Newton, and Teesson 2016; Bewick et al. 2008; Tait, Spijkerman, and Riper 2013; Rodriguez, Teesson, and Newton 2014; Leeman et al. 2015).

Two reviews composed of mainly school-based interventions (Rating B and C) indicated that programs facilitated by computers or the internet can have preventive effects on alcohol use, but the findings with regards to illicit drug use were mixed (Champion et al. 2013; Champion, Newton, and Teesson 2016). This is consistent with another review that focused on drug use outcomes across all settings and found that interventions facilitated by computers or the internet had no immediate effect, but some evidence of effect over longer-term follow up (Wood et al. 2014). It therefore appears that, regardless of the setting, computer- and internet-delivered interventions have inconsistent effects on illicit drug use outcomes. One other review focusing on very brief internet-delivered alcohol interventions in college settings indicated that two of four of these programs were effective in reducing alcohol use (Leeman et al. 2015). Finally, one review included in this report focused on serious educational games delivered via computers or the internet for the prevention of alcohol and drug use (Rating C) (Rodriguez, Teesson, and Newton 2014). Embedding drug and alcohol interventions within serious educational games represents a novel approach to prevention that aims to maximise participant engagement. The authors identified a small evidence base that looked promising in terms of reducing alcohol and drug use. Overall, computer- and internet-facilitated programs for the prevention of alcohol and drug use show increasing promise, and would benefit from further research.

A major advantage of computer- or internet-delivered interventions is their scalability and the promise they hold for widespread dissemination and implementation, which is necessary if universal primary prevention interventions are to realise their potential. Australia is leading the way in terms of developing online portals that bring together evidence-based preventive interventions that have been shown to be effective. Funded by the Australian Government Department of Health, and developed by researchers at the National Drug and Alcohol Research Centre, Positive Choices provides a central access point for online evidence-based information and prevention resources about alcohol, cannabis, psychostimulants, crystal methamphetamine and ecstasy. The portal features teacher resources (including access to evidence-based prevention programs for school settings), parent resources (including fact sheets about various drugs and effective parenting strategies to prevent alcohol misuse) and

student resources (including access to prevention programs shown to be effective in preventing and reducing alcohol and drug use). This is just an example of the potential the internet holds for breaking down the barriers associated with access, implementation and dissemination of evidence-based prevention strategies.

Limitations

By focusing on previous reviews, rather than the individual primary studies that compose them, there is a degree of abstraction and loss of contextual detail in this overview that may be important when evaluating the evidence base. The reviews included in this overview were heterogeneous and, in themselves, involve some level of abstraction which is compounded again by collating and synthesising the information at a higher level. On the basis of the reviews included in this overview, for example, we were unable to make any firm conclusions about prevention of harms related to alcohol and drug use. This is possibly because there is more consistency in how consumption of alcohol and drugs is quantified in the primary studies, which is therefore more easily collated and synthesised in the reviews included here. It is likely that the evidence base for prevention of alcohol and drug-related harms exists, but it has been missed in this overview due to multiple layers of abstraction from the primary studies of interest. Secondly, by limiting this overview to the most recent decade, there is a possibility that long established approaches to prevention were not covered, because the evidence base is not in need of updating. For example, it should be noted that we identified no recent reviews of the relationship between minimum legal drinking age and alcohol consumption. The effectiveness of this approach for reducing alcohol use has been previously established (Wagenaar and Toomey 2002), with more recent expert opinions providing evidence to support raising the Australian drinking age to 21 years (Toumbourou et al. 2014). Another limitation of this approach is that more recent innovations in prevention may have been missed because there are, as yet, insufficient primary investigations to warrant a review of the evidence. Across all settings, there is also very little evidence regarding the longer-term impact of preventive interventions due to a lack of primary studies involving more extensive follow-up periods. Delaying the initiation of use is a central purpose of universal primary prevention, but can only be assessed in studies using longer-term follow-up periods, of which there are few. Finally, there were few reviews that included primary studies from low or middle income countries. Whilst this maximises the relevance of these findings to the Australian context, the international applicability of the conclusions from this report is limited.

Conclusions

The following conclusions can be drawn from this report:

Setting	Conclusions
Family	• Family-based programs **have preventive effects** for alcohol use (Rating A) and **can have preventive effects** for illicit drug use (Rating B)
School	• For alcohol, there is evidence to suggest that general health programs occasionally **have preventive effects** on alcohol use, whilst alcohol specific programs **can have preventive effects** on alcohol use (Rating B). Meanwhile, peer-led school-based programs **have preventive effects** for alcohol use (Rating A). • For illicit drugs, school-based programs based on social competence and social influence models **have preventive effects** for reducing illicit drug use in the short term and **can have preventive effects** in the long-term (Rating A). School-based programs combining knowledge, social competence and social influence components **have preventive effects** on illicit drug use in the short- and long-term (Rating A). • For both alcohol and illicit drugs, school-based programs based on the WHO Health Promoting Schools framework **do not have preventive effects** on alcohol and drug use (Rating A). "Whole of school" approaches **can have preventive effects** on alcohol and drug use (Rating B). • There are **discrepancies in the literature** as to the optimal age to deliver school-based alcohol and drug prevention (Rating A). Tailoring the content of preventive interventions to different age groups may resolve these discrepancies.
College	• College-based prevention programs **occasionally have preventive effects** on alcohol use (Rating B). There is **insufficient evidence** to evaluate the effectiveness of college-based universal primary prevention programs in reducing illicit drug use.
Workplace	• There is **insufficient evidence** to determine whether interventions delivered within workplace settings are effective for reducing alcohol and drug use and related harms.
Leisure	• Extracurricular programs designed to promote psychosocial development **can have preventive effects** on substance use if implemented according to guidelines (Rating A). Interventions in sports and nightlife settings **may have preventive effects** on alcohol use, but further research is needed (Rating C).
Healthcare	• There is **insufficient evidence** to determine whether universal preventive interventions delivered within healthcare settings are effective for reducing alcohol and drug use and related harms.

Community	• There is **insufficient evidence** to determine whether universal preventive interventions delivered within community settings are effective for reducing alcohol and drug use and related harms.
Media	• There is **insufficient evidence** to indicate whether banning alcohol advertising reduces alcohol use and harms (Rating B and C). Mass media campaigns appear not to have preventive effects on alcohol and drug use and related harms (Rating B and C). With regards to drug use, some iatrogenic effects in response to these campaigns have been noted.
Policy	• Alcohol taxation, outlet density and changes to trading hours **may have preventive effects** on alcohol use and harms (Rating C). There is **insufficient evidence** to support current policy regarding the prevention of illicit drug use except perhaps with respect to interventions that indirectly increase drug prices.
Multicomponent	• Multicomponent approaches to the prevention of alcohol use **can have preventive effects** (Rating B).

Based on these conclusions, there is sufficient positive evidence to support the use of family-based, school-based, multi-component and policy-based universal primary prevention strategies to reduce alcohol use. In terms of reducing drug use, there is sufficient evidence to support the use of school-based universal primary prevention strategies only. For preventive interventions in school settings, only programs including certain elements are effective, and these may differ depending on the age of the students receiving the intervention. There is only limited evidence of the effectiveness of preventive interventions to reduce alcohol use in college settings. There is some evidence to suggest that universal primary prevention strategies implemented in leisure settings can have preventive effects on alcohol and drug use, although the evidence base is small. There is insufficient evidence to determine whether universal primary prevention strategies implemented within workplace, healthcare and community settings have an effect on alcohol and drug use. Current mass media approaches to the prevention of alcohol and drug use to do not appear to be effective.

Detailed descriptions of included studies

Anderson et al (2009) The impact of alcohol advertising and media exposure on adolescent alcohol use (Rating C)

The authors of this systematic review identified thirteen studies reporting on the effect of alcohol advertising and media exposure on adolescent alcohol use. Twelve of these studies concluded that there was an impact on the amount of advertising and media exposure and alcohol consumption, including the initiation of use and heavier drinking amongst existing drinkers. The authors conclude that alcohol advertising and promotion increases the likelihood that adolescents will start to use alcohol, and to drink more if they are already using alcohol.

Bewick et al. (2008) Web-based interventions for alcohol use (Rating C)

This review included two studies that were universal primary prevention strategies and focused on reduction of either alcohol use or harms. Results were mixed: one study focusing on a binge-drinking newsletter that was either web-based or print found a reduction in both alcohol consumption and binge-drinking that did not differ depending on the medium of the newsletter; one study focusing on a brief web-based intervention for multiple risk behaviours did not have a greater effect on binge-drinking when compared with control group. Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

Boekeloo (2007) Physician intervention approaches to the prevention of alcohol-related problems in adolescent outpatients (Rating C)

This review included three studies that were universal primary prevention focusing on reduction of alcohol use or harms. In two studies, the intervention group showed an increase in alcohol consumption when compared with the control group. In the third study, there were no differences between the intervention and control groups in terms of alcohol consumption. Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

Bolier et al.(2011) Alcohol and drug prevention in nightlife settings (Rating C)

This systematic review examined the effectiveness of alcohol and drug prevention in nightlife settings. The authors identified seventeen studies, fifteen which focused on alcohol and two which focused on drugs. The studies were divided into four groups: community interventions, alcohol server interventions, educational interventions and policy interventions. Community interventions involved a community, staff training and law enforcement component. Alcohol community interventions conducted in nightlife settings were effective in reducing risky drinking, alcohol-related injuries (both road accidents and assaults), underage drinking, violent crime and service to intoxicated patrons. However, these findings were not always replicated across studies. One study failed to find a reduction in road accidents, whilst another failed to find an effect in terms of service to underage youth. Alcohol server

interventions in nightlife settings were those that only involved training of alcohol servers and no other additional components. Some of the studies reported effects on subjective and objective server behaviour as well as road accidents, whilst one study reported no effect on blood alcohol concentration levels of patrons, drink driving and server behaviour. Two educational programs conducted within nightlife setting were identified: one educational program focusing on drugs did not find effects on substance use behaviour, whilst another focusing on alcohol did find reductions in risky drinking and problems related to alcohol use. The five policy interventions conducted in nightlife settings all involved an assessment of responsible service of alcohol interventions. Stricter enforcement of responsible alcohol service, through the introduction of enforcement checks, was shown to have short-term positive effects on service to underage and intoxicated patrons that were not apparent over the longer term. Management training in the absence of enforcement checks was not shown to have an effect on service to underage and intoxicated patrons. Overall, the authors concluded that community interventions have the potential to reduce substance-related harm, whilst educational interventions may have some effect on alcohol use. Regarding alcohol server interventions and policy interventions, the authors concluded that the findings were mixed and inconclusive.

Bryden et al (2012) Impact of community level availability and marketing of alcohol on alcohol use (Rating C)

The authors of this review identified 26 studies focusing on the availability and marketing of alcohol on alcohol use. Thirteen of these studies investigated outlet density, and of the 34 comparisons focusing on alcohol use, 18 found statistically significant relationships between outlet density and measures of alcohol use. Two studies focused on the distance to the nearest alcohol outlet and one found a statistically significant relationship between distance and alcohol use. Four studies focused on willingness to sell alcohol to minors, and of the seven comparisons made only two comparisons (from the same study) found a statistically significant relationship between willingness to sell to minors and alcohol use. Four studies focused on local changes to licensing regulations and only one study found a statistically significant reduction in alcohol use. With regards to advertising, two of three studies found a statistically significant relationship between exterior advertising and alcohol use, whilst all four studies focusing on interior advertising found a statistically significant relationship between alcohol use and interior advertising. Two studies focused on health protection messages and neither showed statistically significant reductions in alcohol use. The authors concluded that there was some indication that higher outlet density and greater exposure to advertising in a local community may be associated with an increase in alcohol use, particularly among adolescents.

Cairns et al (2014) Combined school and family approaches to the prevention of alcohol use (Rating B)

This report identified 35 studies reporting on 25 different interventions that combined school and family approaches to the prevention of alcohol use. Of the 25 included interventions, the authors reported that 60% demonstrated convincing effects in favour of the intervention over

control (although effect sizes were small), 24% had equivocal effects and 16% had no effect on alcohol use behaviours. The authors identified the elements of family-based preventive interventions which were associated with positive effects, and these included information and skills development, family communications, and stricter parental attitudes to alcohol misuse. Effective school-based elements included life skills and social norms approaches. The authors concluded that there was evidence that interventions involving a combination of school and family approaches can result in small positive effects on alcohol consumption.

Cashman et al (2009) Alcohol and drug testing for preventing injury in occupational drivers (Rating B)

Only two studies were included in this review; one focused on the introduction of mandatory alcohol testing and mandatory drug testing into the workplace, whilst the other focused on the introduction of mandatory drug testing alone. Mandatory alcohol testing was associated with a decrease in the level of injuries immediately following its introduction into the workplace. In terms of the long-term effects of the introduction of mandatory alcohol testing, there were no significant changes in the already downward trend noted immediately post-intervention. In terms of immediate effects, contrasting results were reported with regards to the introduction of mandatory drug testing into the workplace. One study found a statistically significant reduction in injuries whilst the other did not. When focusing on longer term outcomes, both studies noted statistically significant downward trends in the numbers of injuries after the introduction of mandatory workplace drug testing. The authors concluded that there is insufficient evidence to advise for or against the use of drug and alcohol testing of occupational drivers to prevent injuries.

Champion et al (2013) School-based alcohol and other drug prevention programs facilitated by computers or the internet (Rating B)

This review included four studies focusing on the universal primary prevention of alcohol, all of which demonstrated some reduction in alcohol use, although the effect was small immediately post-intervention and modest at follow up. Two trials were associated with a reduction in binge-drinking, and one study was associated with a reduction in alcohol-related harms but only among females. One study focused on cannabis use and was associated with a reduction in the frequency of cannabis use at six-month follow up. The authors concluded that existing computer- and internet-based prevention programs in schools have the potential to reduce alcohol and illicit drug use.

Champion et al (2016) Alcohol and other drug prevention programs facilitated by computers or the internet (Rating B)

Whilst not focused specifically on school-based studies, 11 of the 12 studies included in this review were conducted within the school system, two of which did not report outcomes related to use or harms. Three studies (focusing on two intervention programs) reported reductions in alcohol use whilst three studies (focusing on two other intervention programs) showed no preventive effects on alcohol use. One study compared a substance use intervention focusing on alcohol and tobacco with an “energy balance” intervention focusing

on fruit and vegetable consumption, physical activity and television time. When compared with the substance use intervention group, those in the "energy balance" intervention group showed lower alcohol use over time, despite the fact that alcohol use was not targeted in this group. When focusing on cannabis, two studies showed no reduction in cannabis use and one study showed a reduction in cannabis use amongst females only. One study focusing on other illicit drugs was effective in delaying the initiation of ecstasy use, but had no effect on methamphetamine use. The one study conducted outside of a school setting focused on preventing cannabis use in adolescents attending primary care. Compared with the control group, those who completed the intervention had significantly lower rates of cannabis use over 12 months, reduced frequency of cannabis use at three and six months and less other drug use at three months. The authors concluded that online prevention of alcohol and drug use is an area of increasing promise.

Durlak et al (2010) Extracurricular programs for health promotion and prevention (Rating A)

These authors identified 68 studies of extracurricular, non-school based programs designed to promote the psychosocial development of children and adolescents. Overall, 28 of these studies reported substance use outcomes, with a meta-analysis indicating a small effect that was not statistically significant. The authors identified 12 studies that they considered to meet recommended practices for skills training. These programs were conducted in sequenced stages, were interactive, provided adequate time and space for the development of skills and specified explicit learning targets and outcomes parameters. When only these 12 studies were considered, the effect on substance use was small but statistically significant in the intervention groups when compared with the control groups. The authors concluded that only programs including these elements were effective in reducing substance use.

Elder et al (2010) The effects of alcohol taxation on alcohol use and harms (Rating C)

This systematic review included 78 studies focusing on the effectiveness of alcohol taxation policy on the prevention of alcohol use and misuse. Fifty of these studies reported alcohol use at the population level, almost all of which reported that increases in tax resulted in decreases in alcohol consumption, with consistent result amongst beverage types (beer, wine and spirits). Sixteen studies focused on the impact of alcohol taxation at the individual level, and again an inverse relationship between taxation and consumption was found in almost all of these studies. Twenty-two studies also investigated the effects of alcohol taxation on alcohol-related harms. Of the 11 studies focusing on traffic accidents, consistent inverse relationships were found between taxation and 1) fatal traffic accidents, 2) non-fatal traffic accidents and 3) self-reported drinking under the impairment of alcohol. A further six studies investigated non-traffic related mortality (liver cirrhosis and all-cause mortality), all of which found inverse relationships between taxation and relevant mortality rates. In terms of violence outcomes, statistically significant inverse relationships were also identified between taxation and homicide, assault, rape, robbery, and violence towards children. The authors conclude that there is strong evidence across different countries, time periods, study designs and

outcomes to indicate that alcohol taxes are an effective strategy for reducing alcohol use and related harms.

European Monitoring Centre for Drugs and Drug Addiction (2015) Mass media campaigns to prevent alcohol and drug use in young people (Rating D)

This is a government report and, therefore, not peer-reviewed, but it has been included in this report because of a lack of quality evidence regarding mass media campaigns as a preventive strategy. Four studies were identified that reported on alcohol and drug use and a meta-analysis of these studies indicated no differences between intervention and control for alcohol and drug use outcomes. The authors concluded that there is no evidence to indicate that mass media campaigns have an impact on alcohol and drug use, although the lack of available evidence was noted.

Fagan et al (2011) Community based efforts to prevent underage drinking (Rating D)

This is not a systematic review, but due to the lack of quality evidence regarding the effectiveness of preventive efforts with a community focus, it was included in the current report. This review examined the effectiveness of community mobilisation to prevent alcohol use by underage drinkers. Community-based alcohol prevention was defined as reducing alcohol misuse by changing the larger environment, using approaches that are owned and operated by the local community. The authors identified nine community based programs that were effective in reducing underage drinking and discussed their effective elements. Most effective programs were found to rely on community coalitions – a group of community stakeholders that plan and coordinate prevention activities collaboratively. The inclusion of school-based drug prevention curriculum was also found to enhance the effectiveness of community-based programs to prevent alcohol use. Meanwhile, those community-based programs that focused on changing local laws, norms and policies in isolation were not found to be effective in reducing alcohol use. However, they have been identified as parts of successful multicomponent community-based interventions. The authors concluded that community-based efforts can reduce alcohol use and misuse amongst youth.

Faggiano et al (2014) School based prevention for illicit drug use (Rating A)

This Cochrane review and meta-analysis reported on 51 studies including 127,146 participants. Findings were grouped based on the approach of the intervention, as well as their effectiveness in terms of reducing either cannabis or other illicit drug use over both the short and long term. **Knowledge interventions** include information about drugs, such as their health risks and the prevalence and incidence of drug use. It is assumed that this knowledge alone will prevent the use of drugs. Only two studies used a knowledge-only approach, and there was little evidence to suggest they had any effect on the use of cannabis or other illicit drugs over the short or long term. **Social competence interventions** teach skills based on cognitive behavioural therapy. They tend to include a knowledge component and teach personal, social and cognitive skills, such as: “goal-setting, problem-solving and decision-making, and also teach cognitive skills to resist external influences, to enhance self-esteem, to cope with stress and anxiety, to increase assertiveness and to interact with others” (p. 9).

Studies adopting this approach tend to show positive short-term effects in terms of cannabis use. Less than half of the studies examining the longer-term effects of these interventions showed a positive effect on cannabis use over and above drug education as usual. In terms of other illicit drug use, there may be small effects of these interventions in the short term, but there is little evidence to suggest any longer-term effects on other illicit drug use. **Social influence interventions** also tend to include a knowledge component and emphasise normative education (i.e., correcting overestimates of the prevalence of others' drug use). They also include aspects focusing on media, peer and family influences, and teach and rehearse drug refusal skills. Of those studies using this approach and assessing cannabis use, there were small effects in favour of the intervention in the short term but little evidence to suggest these were effective in the longer term. Only one study using a social influence approach assessed other illicit drug use, with no effects in the short term but a small effect in the longer term. **Combined interventions** involve a combination of these approaches. Interventions adopting a combined approach show small effects on cannabis use over short- and long-term follow-up. In terms of other illicit drug use, there was little evidence these programs were effective in the short term, but some evidence that they were effective over the longer term. The authors concluded that interventions based on combined approaches had the highest support, followed by social competence interventions, then social influence interventions, and finally knowledge-only interventions, which have little support although the evidence base is small. They also concluded that the overall quality of the included studies was less than satisfactory.

Ferri et al (2013) Media campaigns for preventing illicit drug use in young people (Rating C)

The studies included in this review tested an array of different interventions including internet-based interventions, national campaigns and school-based campaigns. Fifteen of the included studies included drug use as an outcome measure and these were analysed together. Those based on internet interventions showed mixed results with some showing these interventions reduced the use of drugs and one study showing that an internet-based intervention increased drug use. Similar findings were noted with national campaigns, with results showing both decreases and increases in use in response to these campaigns. The one study evaluating a school-based campaign found a non-significant reduction in drug use amongst the intervention group. The authors concluded that mass media campaigns were not clearly supported by the available evidence. The evidence of iatrogenic effects (i.e., increased use by the intervention group) was also noted by the study authors.

Fletcher et al (2008) "Whole of school" drug prevention approaches (Rating B)

The authors identified four randomised controlled trials which focused on whole of school approaches to preventing drug use. Whole of school approaches make changes to the school's "overall organisation, and its policies, working practices, culture, and environment (generic and/or drug-focused) to promote young people's health, including in relation to substance use" (p.210). One study found that fewer students in the intervention group than in the control group reported cannabis use in the previous six months, whilst two other studies found slower growth in drug use amongst the intervention group but only amongst males.

These studies all focused on the long-term effects of their programs, with these effects being reported two to four years after the intervention. One study found no difference in the number of students who used cannabis at the end of the intervention, and amongst those who were already using cannabis there appeared to be an increase in cannabis use amongst the intervention group when compared with the control group. Three of the four studies also reported small reductions in alcohol use amongst those in the intervention group when compared with the control group. The authors concluded that there is evidence for the use of whole of school approaches in the prevention of drug and alcohol use.

Flynn et al (2016) Middle school-based drug prevention curricula that have been independently evaluated (Rating B)

This review focused on school-based drug interventions that had been independently evaluated (i.e., had been evaluated by a research teams unaffiliated with the program developers). The authors identified six randomised controlled trials focusing on four school-based drug use prevention programs. Across these studies, 42 various drug use comparisons were made, of which only three demonstrated statistically significant improvements in the intervention group when compared with the control group. The three statistically significant results all related to reductions in cannabis use amongst the intervention group when compared with the control group. Two of these positive results came from the Skills for Adolescence intervention (reducing both current and lifetime cannabis use) and one came from the Project ALERT program (reducing past-year cannabis use). The authors concluded that there was a dearth of independent research that appropriately evaluates school-based drug use prevention programs, with little evidence of effectiveness for those programs that had been evaluated independently.

Foxcroft (2011) Family-based prevention programs for alcohol misuse in young people (Rating B)

This review identified 12 trials evaluating family-based alcohol misuse universal primary prevention programs in young people. Overall, nine of these 12 studies showed evidence of statistically significant reductions in alcohol use; one study suggested a positive effect in favour of the intervention, which did not reach statistical significance perhaps due to small sample size; and one study demonstrated no intervention effects. However, this study found that the family-based intervention was effective when combined with a school-based intervention. One final study showed small increases in alcohol use in the intervention group. The authors conclude that certain family-based prevention programs are effective and should be considered in practice and policy decisions.

Foxcroft et al. (2011) Multi-component prevention programs for alcohol misuse in young people (Rating B)

This review identified 20 trials of multi-component universal primary prevention programs, or programs that deliver prevention across a variety of settings. These interventions consisted of combinations of school-, community- and/or family-based programs. Overall, 12 out of the 20 trials reported statistically significant reductions in alcohol use, but these reductions were

not always greater when directly compared with a prevention program focusing on only one of these multiple components. The authors conclude that multi-component prevention programs appear to be effective, but not necessarily more effective than those interventions based on their single components.

Foxcroft et al (2011) School-based alcohol preventions (Rating B)

The authors identified 53 studies of school-based universal primary prevention programs designed to prevent alcohol misuse in adolescents. Findings were grouped in terms of the focus of the prevention. In 39 of the identified studies, the focus of the intervention was general health, in that they focused on a range of factors such as alcohol use, drug use, smoking and anti-social behaviours. In 25 of the studies with a general health focus, there were no statistically significant differences between intervention and control. Fourteen of the general health studies reported statistically significant reductions in alcohol use in favour of the intervention group. One large trial (n=17,320 participants) showed a statistically significant difference in alcohol use that favoured the control group (45.7% in the intervention group vs. 41.9% in the control group). In 11 trials, the focus of the intervention was alcohol-specific. Five of the alcohol-specific prevention programs demonstrated no statistically significant differences between the intervention and control groups in terms of alcohol use. The remaining six interventions were shown to have statistically significant positive effects when compared with respective control groups. One further study was based on an alcohol and cannabis intervention, whilst another study focused on tobacco only. Both trials showed statistically significant reductions in alcohol use when compared with the control groups. One final study focused on an alcohol and drug intervention and found no difference between the intervention and control groups in terms of alcohol use. The authors noted that across all studies included in the review, the most commonly observed positive effects were for binge drinking and drunkenness. Overall, the authors concluded that the review supports the use of general health programs over alcohol-specific programs, although certain interventions based on either focus appear to be effective.

Hahn et al (2010) The effect of changing hours of alcohol sale on alcohol use and harms (Rating C)

The authors identified 16 studies that reported on the effects of increasing hours of alcohol sale on alcohol use and harms. No studies were found that reported the effects of decreasing the hours of sale. The authors present the results in terms of changes in excess of two hours (10 studies) and changes that were less than two hours (six studies). Increases greater than two hours were associated with an increase in alcohol-related harms in six studies, a decrease in alcohol-related harms in two studies and no effect in two studies. Increases less than two hours were associated with greater alcohol sales and alcohol-related harms in only one study. The authors concluded that increasing the hours when alcohol may be sold by two or more hours increased alcohol-related harms.

Hahn et al (2012) The effect of alcohol retail privatisation on alcohol consumption and related harms (Rating C)

The authors identified a total of 17 studies assessing the impact of privatizing retail alcohol sales on per capita alcohol consumption. Across the 17 studies, there was a 44.4% median increase in the per capita sales of beverages in locations that privatised retail alcohol sales. During the same time period, sales of non-privatised alcoholic beverages decreased by a median of 2.2%. The authors concluded that there is strong evidence to suggest that privatising alcohol retails sales leads to an increase in alcohol use.

Kingsland (2016) Interventions in sports settings to reduce alcohol consumption and alcohol-related harm (Rating B)

The authors identified three studies of alcohol use preventive interventions conducted in a sports setting. Two of three trials found a statistically significant reduction in alcohol use in favour of the intervention group over the control group. Additionally, one of these studies identified a statistically significant reduction in alcohol-related harms amongst the intervention group when compared with the control group. The final study found no statistically significant differences between the intervention and control groups in terms of alcohol use and harms. The authors concluded that the evidence base was too small to draw any firm conclusions regarding the effectiveness of alcohol use preventive interventions in sports settings.

Kolar et al (2015) Interventions for alcohol misuse in sporting clubs (Rating C)

This review identified five studies of interventions for alcohol misuse in sporting clubs, all of which were conducted in Australia and evaluated the Good Sports intervention. Three studies reported outcomes related to alcohol use, all of which demonstrated statistically significant reductions after the introduction of the Good Sports program. One study also reported reductions in drink-driving following the introduction of the program. The fifth study did not report use or harms outcomes. The authors conclude that the Good Sports program yields significant improvements in alcohol consumption and drink-driving, however the lack of longer-term evidence for this program was noted.

Kuntsche (2016) Parent-based interventions for preventing or reducing adolescent substance use (Rating B)

This review focused on both primary and secondary prevention studies. Twenty-six studies of parent-based universal primary preventive interventions that reported alcohol or drug use outcomes were identified. With regards to alcohol use outcomes, 14 reported a positive effect in favour of the intervention over control, whilst 12 reported no statistically significant differences between intervention and control groups. Illicit drug use outcomes were investigated in five studies. Four of these studies reported positive effects in favour of the intervention over control, two of which focused on cannabis and two of which focused on illicit drugs generically. One study found no statistically significant differences between intervention and control when cannabis use was the outcome. One final study reported

outcomes in terms of a single measure of substance use that combined alcohol and illicit drug use. This study found significant reductions in this measure amongst the intervention group when compared with the control group. Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

Langford et al (2014) Prevention studies focusing on the World Health Organisation's Health Promoting Schools framework (Rating A)

The World Health Organisation's Health Promoting Schools framework consists of a multicomponent approach to promoting health and educational attainment in schools. Preventions adopting the Health Promoting Schools framework needed to include the following three elements: input into the curriculum, changes to whole of school ethos and/or environment, and engagement with families and/or communities. Only those preventions that included all three elements were included in this review and meta-analysis. This review included both primary and secondary prevention studies, as well as studies that focused on outcomes other than alcohol and/or drug use. Seven studies included alcohol use as an outcome measure, two of which focused on alcohol, four of which focused on multiple factors, and one which focused on emotional well-being. One study focusing on alcohol found a positive effect in favour of the intervention over the control, whereas the other study found no significant differences between intervention and control in terms of alcohol use. Amongst those interventions focusing on multiple factors, two found positive effects in favour of the intervention over control, whereas the other two found no statistically significant differences between the intervention and control groups. The study with an emotional well-being focus found no statistically significant differences between the intervention and control groups in terms of alcohol use. All of these studies also assessed drug use outcomes except one of the studies focusing on multiple factors. Only one study focusing on multiple risk behaviours showed statistically significant positive effects of the intervention when compared with control. The other two studies focusing on multiple risk factors found no statistically significant differences between the intervention and control groups in terms of drug use. There was no evidence of any differences between the intervention and control groups in the two studies focusing on alcohol and the one study focusing on emotional well-being. The authors conducted separate meta-analyses focusing on alcohol use and drug use outcomes separately. These indicated that none of these prevention approaches (alcohol-focused, multifactorial or emotional well-being) were effective in reducing alcohol or drug use. The authors concluded that there was no evidence of effect for either alcohol or drug use, but more evidence is required due to the small number of studies reporting on these outcomes.

Larimer (2007) Individual-focused college drinking prevention strategies (Rating B)

The authors reviewed individual-focused interventions for college students that had either a motivational interviewing active component, a cognitive behavioural active component, or involved knowledge only (including the provision of normative information). This review focused on both primary and secondary prevention studies, and included 18 studies that could

be classified as universal primary prevention. Seven of these studies showed positive results in favour of the intervention over the control, whilst 11 showed no statistically significant differences between the intervention and control groups. Of those that showed positive effects in favour of the intervention, five had a motivational interviewing active component, two had a cognitive behavioural active component and one involved a knowledge-only component. Of those that did not show any statistically significant differences, one involved motivational interviewing, four involved cognitive behavioural therapy and five involved a knowledge-only component. Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

Lee et al (2013) Prevention of substance use in indigenous Australians (Rating C)

The authors of this review identified five studies reporting on the universal primary prevention of substance use in indigenous Australians. Three of these were school-based, whilst two were community-based. Two school-based programs provided drug education only and no change in substance use was found. The third school-based prevention program involved peer support training and education and resulted in decreases in analgesic use. One community-based study found cessation of petrol sniffing amongst those who had identified petrol sniffing as a problem at baseline, whilst the other reported reductions in cannabis use. The authors conclude that the limited data support multicomponent interventions, designed with community input, to protect young indigenous people against substance misuse, rather than simple facts-based education. The methodological limitations of the existing research were also emphasised.

Lee et al (2014) Alcohol intervention among workers in male-dominated industries (Rating C)

This systematic review focused on eight studies of alcohol interventions in male-dominated industries. Whilst many of the studies included aspects of both primary and secondary prevention, conclusions were drawn on workplace prevention strategies that would be considered universal in focus (i.e., they were delivered regardless of risk for alcohol use problems). Based on the available evidence, the authors concluded that the introduction of screening for harmful drinking appears to be effective in reducing alcohol amongst the general workforce, as well as amongst those identified as risky drinkers. Peer-based workplace interventions appeared to reduce both alcohol use and workplace injuries, whilst workplace policies on alcohol and drug use have also been shown to be effective in reducing workplace injuries. The authors concluded from the available evidence that health promotion activities and random alcohol testing do not appear to be viable interventions in the workplace.

Lee et al. (2016) Effective school-based prevention programs for alcohol outcomes (Rating B)

This systematic review rated school-based alcohol prevention programs according to rigorous effectiveness criteria. This review therefore supplements other comprehensive reviews focusing on school-based interventions because it groups the evidence according to

individual programs, many of which have been evaluated in multiple trials. The authors identified 70 studies focusing on 40 individual programs. Three of these programs had good evidence of a positive effect on alcohol outcomes: CLIMATE Schools (Australia), Project ALERT (USA) and All Stars (USA). Four of these programs had some evidence of effect on alcohol outcomes: Life Skills Program (Germany), Life Skills Training (USA), School Health and Alcohol Harm Reduction Project (Australia) and Unplugged-EU (Europe). One program was identified as having no evidence of effect on alcohol outcomes: Drug Abuse Resistance Education (DARE; USA). Two programs were identified as having a negative impact on alcohol outcomes: Peer Acceleration Social Network (USA) and Take Charge of Your Life (USA). The remaining 29 programs were inconclusive due to poor methodology, inconsistent outcomes or too few studies. The authors conclude that there were only three programs with sufficient evidence to endorse their widespread implementation within school systems: CLIMATE Schools, Project ALERT and All Stars.

Leeman et al (2015) Very brief, web-based interventions for reducing alcohol use and related problems in college students (Rating B)

This review focused on interventions that were delivered entirely over the internet (i.e., no contact between researcher and participant except in recruitment), and that take less than fifteen minutes to complete. This review reported results from both primary and secondary prevention approaches. Four of the included studies could be classified as universal primary in focus. In terms of alcohol use, two of these four studies demonstrated small effect sizes in favour of the intervention group over the control group. The other two studies demonstrated negligible effect sizes when comparing intervention and control groups on alcohol use measures. Only effect sizes were reported in this review, and it should be noted that it is possible that negligible effect sizes do not mean that there was no statistically significant differences between the intervention and control groups. Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

MacArthur et al (2016) Peer-based interventions to prevent alcohol and drug use in young people (Rating A)

Whilst not focusing specifically on school-based programs, all peer-led programs focusing on alcohol and drug use in this meta-analysis were based in schools. Six studies focused on alcohol use outcomes and meta-analysis indicated that there was a small, statistically significant effect in favour of the interventions groups over the control groups in terms of alcohol use. Three studies focused on cannabis use outcomes and a meta-analysis indicated that there was also a small, statistically significant effect in favour of the interventions groups over the control groups in terms of cannabis use. The authors concluded that peer interventions may be effective in preventing alcohol use and possibly cannabis use among adolescents, although they noted that the evidence base is small and methodological limitations are common.

Middleton et al. (2010) Effectiveness of policies maintaining or restricting days of alcohol sales on alcohol use and harms (Rating C)

This systematic review included 14 studies, 11 of which assessed the effect of adding days of alcohol sale and three of which focused on restricting days of alcohol sale. The authors concluded that there is strong evidence to suggest that adding days of alcohol sale increased both alcohol use and harms, including motor vehicle crashes. Whilst the evidence base was small, there was some evidence to suggest that restricting days of alcohol sale generally reduced alcohol-related harms, but insufficient evidence to suggest that these restrictions reduced alcohol consumption. The authors concluded that increasing days of sale leads to increases in excessive alcohol consumption and alcohol-related harms, and that reducing the number of days that alcoholic beverages are sold generally decreases alcohol-related harms.

Onrust et al (2016) Effective elements of school-based programs to prevent substance use in different age groups (Rating A)

This review and meta-analysis identified 288 studies evaluating 241 school-based programs designed to prevent substance use. Meta-analysis was used to summarise effectiveness in terms of substance use, whilst meta-regression was used to identify components of the interventions that predicted effectiveness. Two hundred and six of these were focused on universal primary prevention. Amongst universal primary prevention programs focusing on elementary school students, there was a small and statistically significant effect in terms of reductions in alcohol use. Effectiveness was predicted by self-control training, problem-solving or decision-making skills training, the application of cognitive behavioural therapy techniques and behavioural management by a parent or teacher. Amongst elementary school students, there was also a small and statistically significant effect in terms of reductions in drug use, and this effectiveness was predicted by self-control training.

Amongst universal primary prevention programs focusing on students in grades 6 and 7, there was a small and statistically significant effect on alcohol use, which was predicted by self-control training, problem-solving or decision-making skills training, refusal skills training, focusing on healthy alternatives, the application of cognitive behavioural therapy techniques, behavioural management by a parent or teacher and parental involvement. Programs focusing on grades 6 and 7 students also demonstrated small and statistically significant reductions in drug use. Effectiveness was predicted by social skills training, self-control training, problem-solving or decision-making skills training, making a public commitment not to use substances, applying techniques from cognitive behavioural therapy and mentoring.

For programs focusing on students in grades 8 and 9, there were no statistically significant effects for alcohol use or drug use. For alcohol use, effectiveness was negatively influenced by refusal skills training and making a public commitment not to use substance (i.e., these components reduced effectiveness). There were no statistically significant predictors of drug use in this age group.

There were also no statistically significant effects for alcohol and drug use for programs focusing on students in grades 10 through 12, but the authors concluded that this was likely

due to the low number of studies conducted with this age group. For alcohol use, program effectiveness was predicted by self-control training, problem-solving or decision-making skills training, health education on the interference of substance use with personal goals, refusal skills training, the adoption of a social influence approach, applying techniques from cognitive behavioural therapy, and the involvement of parents in the program. For drug use, program effectiveness was predicted by self-control training and adjustment of social norms.

The authors concluded that programs involving self-control training, problem-solving skills training, and techniques from cognitive behavioural therapy appeared beneficial for the majority of students, regardless of age.

Patnode et al (2014) Primary care interventions for drug use in adolescents (Rating C)

The authors identified three studies focusing on primary care patients receiving preventive interventions for drug use, only two of which would be classified as universal primary preventions. One of these studies recruited samples from two different countries and identified statistically significant reductions in cannabis use in one sample but not the other. The other study found no statistically significant reductions in illicit drug use more generally. The authors concluded that the evidence on the effectiveness of primary care behavioural interventions in reducing drug use amongst adolescents is limited in quantity, quality, and generalisability.

Petrie et al (2007) Parenting programs for preventing alcohol and drug use (Rating B)

This systematic review focused on primary and secondary parenting prevention programs for tobacco, alcohol and drugs. Of the 20 studies included in this review, 14 were studies of universal primary preventions focusing on either alcohol or drug use outcomes. The authors discussed the findings of these in terms of age group (primary school, transitioning from primary to secondary school and older adolescents). Two studies focused on primary school children. One of these studies reported on alcohol, drugs and tobacco and found no statistically significant reduction in general substance use. The other study focused on alcohol use and found less use and misuse in those children who had never used, but a significant increase in use amongst those who had already begun drinking before the intervention commenced. Amongst children transitioning from primary to secondary school, six universal primary prevention studies were identified, three focusing on alcohol, drugs and tobacco and three focusing on alcohol alone. Of the studies focusing on a range of drugs, there were statistically significant reductions in alcohol, cannabis and drug use in favour of the intervention over the control group. Of the studies focusing on alcohol use alone, one found statistically significant delays in initiation of use as well as alcohol consumption, one found a positive effect on alcohol use but only in certain types of schools, and the third found no statistically significant differences between intervention and control groups. There were six studies of parenting prevention programs identified in older adolescents. Three studies focused on alcohol, drug and tobacco use. One reported higher rates of use when a parenting component was added to a classroom intervention, one study found reductions in substance use but only amongst males, and the third found positive effects in terms of alcohol and

cannabis use for the parenting intervention over the control group. One further study with older adolescents focused on drugs and chewing tobacco, whilst another study focused on tobacco and alcohol use. Neither study found statistically significant differences between the intervention and control groups. One last parenting intervention looked at alcohol only in older adolescents and found slower growth in alcohol use in the intervention group when compared with the control group. The authors concluded that parenting programs can be effective in preventing substance use, with the most effective programs focusing on active parental involvement, developing skills and social competence.

Popova (2009) Alcohol outlet density and hours and days of sale: Impacts on alcohol use and harms (Rating C)

These authors identified 44 studies focusing on alcohol outlet density and 15 focusing on hours and days of sale, many of which were cross-sectional in design. Thirteen of the studies focusing on alcohol outlet density reported effects on alcohol use and most reported that higher density was associated with higher consumption. Thirty-six of the studies focusing on alcohol outlet density focused on alcohol-related harms, and most indicated that higher density was associated with greater alcohol-related harms. Of those focusing on hours and days of sale, the two studies reporting alcohol consumption directly reported an increase in use associated with extended trading hours. With regards to alcohol-related harms, the results were mixed, but most studies reported an association between alcohol-related harms and the extension of trading hours. The authors conclude that the evidence supports limiting trading hours/days and regulations on vendor and alcohol outlet density.

Porath-Waller et al (2010) School-based prevention for cannabis use (Rating A)

These authors identified 15 studies that investigated the effectiveness of school-based prevention programs for cannabis use. Meta-analysis of these 15 studies indicated that these programs had a moderate positive effect on cannabis use in favour of the intervention over control. Greater effectiveness was found for those studies based on a mixed approach (including a social influence approach) versus those that were based on a social influence approach alone. Those that were longer (i.e., greater than fifteen sessions), facilitated by individuals other than teachers and interactive (versus didactic) were also found to be more effective. Finally those targeting high school students (grades 8 and above) were more effective than those targeting middle school students (grades 6 and 7). The authors concluded that school-based programs are effective in preventing cannabis use.

Rodriguez et al (2013) Computerised serious education games for alcohol and/or other drugs in adolescents (Rating C)

The authors identified eight computerised serious educational games for alcohol and/or other drugs in adolescents. Six of these adopted an education approach (information alone), whilst the remaining two adopted a social influence approach (information including norms and drug resistance skills). Only one of these studies demonstrated statistically significant reductions in both alcohol and cannabis use and this was based on a social influence

approach. The authors concluded that computerised serious educational games for the prevention of alcohol and/or drugs had potential but identified a need for further research.

Siegfried et al (2014) Banning alcohol advertising to reduce alcohol consumption (Rating B)

The authors identified three studies of sufficient quality that focused on restricting or banning alcohol advertising to reduce alcohol consumption. The authors concluded that the data arising from the included studies did not show a clear effect either for or against the restriction or banning of alcohol advertising. The lack of available evidence was noted.

Smit et al. (2008) Family interventions and their effect on adolescent alcohol use (Rating A)

The authors identified nine randomised controlled trials focusing on family interventions and their effects on adolescent alcohol use. Meta-analysis of these studies indicated a statistically significant effect on the initiation of alcohol use and the frequency of alcohol use, but no statistically significant effect on overall alcohol consumption. Meta-regression was used to identify the effective elements of these prevention programs. Studies that targeted all families within a group (i.e., all families within a school) were more effective than studies that targeted individual families. The authors concluded that family interventions appear effective in delaying the initiation of alcohol use, as well as the frequency of alcohol use. The authors noted the need for more evidence.

Spoth et al. (2008) Effective programs to prevent underage drinking (Rating B)

These authors identified and screened over 400 interventions that reported alcohol use outcomes in young people and assessed 127 of these interventions in terms of the strength of their evidence according to a rigorous set of criteria. These 127 interventions were then classified as "most promising", "mixed or emerging" and "insufficient". Both primary and secondary preventive interventions for alcohol were considered. For those aged under 10 years, three universal primary prevention programs were classified as most promising for alcohol use, all of which included both family and school components: Linking the Interests of Family and Teachers, Raising Healthy Children and the Seattle Social Development Project. For those aged 10 through 15 years, four universal primary prevention programs were identified as most promising: Keepin' It REAL (school-based), Midwestern Prevention Project/Project STAR (multicomponent), Project Northland (multicomponent) and the Strengthening Families Program: For Parent and Youth 10-14 (family-based). For those aged 16 through 19 years, one universal primary prevention program was identified as most promising: Project Towards No Drug Abuse, which is implemented within the workplace. The authors concluded that their review identified several universal primary prevention programs that are capable of significantly reducing alcohol use.

Strang et al (2012) Effective drug policy interventions (Rating C)

This systematic review examines the effectiveness of drug policy in three key areas relevant to the universal primary prevention of drug use: supply control, criminal justice interventions and prevention programs.

Supply control: One method of supply control involves an alternative development approach which encourages the cultivation of sustainable alternatives in drug-producing countries. Alternative development programs have been assessed qualitatively in most major source countries with indications that there are no documented correlations with reduced drug use in the final market country. Alternative development programs are very high cost and take time to reduce production which allows other regions to increase production to fill supply gaps. Another method of supply reduction involves crop eradication which has been shown to sometimes create temporary disruptions. However, production often shifts to other growing regions which leads to no real effect on final markets. The final method of supply control considered in this review involves controls on precursor chemicals, which has good evidence for temporary disruption of drug markets. These can be circumvented, however, by the use of new production materials or by moving production to other regions or countries.

Criminal justice interventions: Law enforcement strategies are perhaps most effective in keeping the retail price of drugs high which has shown to have positive effects on both drug initiation and use. Drug interdictions, or a focus on the interruption of drugs smuggled by land, sea or air (cf. the American "War on Drugs"), have been shown to disrupt drug market and supply chains and keep the retail price of drugs high. Similarly, criminal investigations and the incarceration of high level drug dealers can lead to significant increases in the retail price of drugs. Street-level enforcement has been shown to reduce flagrant use of drugs, but the evidence for its effectiveness in reducing overall use is sparse. Imprisonment, which involves huge expense in terms of the management of the prison system and community re-engagement services, has some effectiveness in reducing drug use, but only a few studies have been conducted outside of the USA. De-criminalisation of cannabis, or the imposition of non-criminal penalties for cannabis use and possession, has been shown to have small or no effects on cannabis use, although its positive effects for established cannabis users have been noted. Reducing the level of criminal penalties for cannabis use offences similarly has small or no effect on overall use, but reduces adverse consequences for users. Circumstantial evidence indicates that legalisation, such as in the Dutch system, has some positive effects on cannabis consumption.

Finally the authors consider drug prevention programs which are covered in more detail in other reviews summarised within this report. Briefly, the authors found some support for family or parenting programs, and in particular the Strengthening Families Programs for people aged 10-14 years and their parents. They also found some evidence for environmental or classroom management programs, specifically with regards to the Good Behaviour Game. Social or life skills training was shown to have medium- to long-term effect, with little evidence of effect in the short term. Multicomponent community programs, knowledge only-prevention programs, mass media and Drug Abuse Resistance Education (DARE) all had no evidence of effectiveness.

Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

Strom (2014) School-based preventive interventions for adolescent alcohol use (Rating A)

The authors identified 28 randomised controlled trials focusing on school-based prevention interventions for adolescent alcohol use. Only studies containing sufficient data to be entered in a meta-analysis were included. Twelve of these studies reported continuous alcohol use outcomes and were included in one meta-analysis, whilst 16 reported categorical outcomes which were reported in a separate meta-analysis. The overall effect size for studies reporting continuous outcomes (frequency and quantity of use) was small but statistically significant, and did not depend on age or gender. The overall effect size for studies reporting categorical outcomes (proportion of students who drank alcohol) was not statistically significant. Moderator analyses showed no statistically significant differences between school level (junior or high school) or program intensity (low, medium or high intensity programs). The authors concluded that, overall, the effects of school-based preventive alcohol interventions on adolescent alcohol use were small but positive for some alcohol use outcomes.

Tait et al. (2013) Internet and computer based interventions for cannabis use (Rating B)

This review included 10 studies of internet- and computer-based interventions for cannabis use, of which five would be classified as universal primary prevention. All of these universal primary prevention studies showed small, positive effects in favour of the intervention group over the control group, however, only one of these was statistically significant. Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

Teesson et al. (2012) Australian school-based prevention programs for alcohol and drugs (Rating C)

This review supplements the other school-based reviews in this area by providing an Australian perspective. The authors identified eight Australian school-based prevention programs for alcohol and drugs. Seven of these investigated alcohol use outcomes, five of which demonstrated a statistically significant positive effect in favour of the intervention over the control. Two of the studies investigated cannabis use outcomes, both of which showed statistically significant effects in favour of the intervention group over the control group. The authors conclude that existing school-based prevention programs are efficacious in the Australian context. However, they noted that there are only a few programs available, which require further evaluative research.

Toomey and Lenk (2011) Community interventions for alcohol use (Rating D)

This is not a systematic review, but due to the lack of quality evidence regarding the effectiveness of preventive efforts with a community focus, it was included in the current report. The authors present the evidence for six community-based preventive interventions that implemented various policy and practice changes to reduce alcohol use. Such policy and practice changes include things like media and awareness campaigns, public education efforts, responsible service of alcohol training, alcohol zoning and regulations regarding access to and availability of alcohol. All six studies reported positive effects on at least one

negative consequence of alcohol, including two studies which found an impact of the consumption behaviour of young people. The authors concluded that changing the community environment can reduce alcohol use and related problems among youth and adults.

Wachtel et al (2010) Brief intervention for alcohol prevention (Rating C)

This study included five studies of alcohol preventive brief interventions in healthcare settings, only two of which would be described as universal primary prevention approaches. Both studies aimed to motivate participants to examine and question alcohol use behaviour and neither found a reduction in alcohol use amongst the intervention group when compared with the control group. Some adverse effects on alcohol use were noted. Authors' conclusions are not presented because they pertained to all studies in the review rather than those focusing on universal primary prevention alone.

Wagenaar et al. (2009) Effects of alcohol taxation on alcohol use (Rating C)

The authors identified 112 studies containing 1003 separate empirical estimates of the relationship between alcohol taxes or prices and drinking. Results from the meta-analysis indicate that the evidence for the effectiveness of increasing prices or taxes on reducing alcohol consumption is very strong, whether investigated at the aggregate (i.e., at the state or province level) or individual (i.e., person) level. Based on this very large literature, the authors concluded that alcohol prices and taxes have a very strong inverse relationship with alcohol use and that raising the price of alcohol is an effective means to reduce drinking at the population and individual level.

Wagenaar et al. (2010) Effects of alcohol taxation on alcohol-related harms (Rating C)

The authors identified 50 studies containing 340 separate empirical estimates of the relationship between alcohol taxation and alcohol-related harms. Results from the meta-analysis indicate that increased alcohol taxation leads to statistically significant reductions in alcohol-related disease, alcohol-related injury outcomes, violence, traffic crash outcomes, sexually transmitted diseases, other drug use and crime. The only other outcome assessed was suicide, where the relationship was not statistically significant. Their analyses further suggest that doubling the alcohol tax would reduce alcohol-related mortality by an average of 35%, traffic crash deaths by 11%, sexually transmitted disease by 6%, violence by 2%, and crime by 1.4%. The authors concluded that public policies affecting the price of alcoholic beverages have significant effects on alcohol-related disease and injury rates.

Wakefield et al. (2010) Mass media campaigns to change health behaviours (Rating C)

This is a comprehensive review of mass media campaigns to change health behaviours, of which alcohol and illicit drug use campaigns are only a small subset. The authors note the strong successes of campaigns focusing on tobacco use, as well as other health behaviours. The authors identified 17 alcohol misuse campaigns that had been evaluated and concluded that there was very little evidence for benefit, except with respect to drink-driving campaigns. Three drug use campaigns were identified, only one of which showed positive effects in

terms of cannabis and cocaine use. One campaign focusing on drug use may have increased intentions to use cannabis amongst those exposed to the campaign. The authors concluded that the evidence for campaigns focusing on drug use was inconsistent.

Webb et al. (2009) Workplace interventions for alcohol use (Rating C)

These authors identified 10 studies evaluating workplace interventions, six of which would be described as primary in focus and reported effects on either alcohol use or harms. There were methodological limitations for many of the included studies, and only three of the six studies were described as randomised controlled trials. This review is included in this report, however, due to a lack of other research focusing on prevention strategies within the workplace. Positive effects were noted for the following studied interventions: a mail out offering access to a health and wellness program, personalised feedback and education, psychosocial skills training, peer referral and mailed feedback alone. One study which only involved an educational component saw no effects of the intervention. The authors comment on the lack of rigorous research in this area, but conclude that interventions contained within health and lifestyle checks, psychosocial skills training and peer referral have potential to produce beneficial results.

Werb et al (2011) Public service announcements for reducing illicit drug use (Rating B)

The authors identified seven randomised controlled trials evaluating the effectiveness of public service announcements for reducing intentions to use illicit drugs. Whilst the effects on use were not reported by the authors, intentions to use drugs are often used as a proxy for delaying the initiation of drug use. Only one of these randomised controlled trials identified statistically significant effects in favour of the intervention over the control group, whilst two studies found that public service announcements increased intentions to use drugs in the intervention groups when compared with the control groups. A meta-analysis including data from four of these seven trials showed no statistically significant differences between intervention and control groups in terms of intentions to use drugs. The authors concluded that there is insufficient data to support the use of public service announcements to reduce intentions to use drugs.

Wood et al (2014) Computer-based programs for the prevention of drug use (Rating B)

The authors identified 10 computer-based programs for the prevention of illicit drug use, five of which were primary in focus. None of these studies showed immediate improvements in the rates of drug use post-intervention when comparing intervention and control groups. Two studies, however, identified small but statistically significant effects in the medium term (six months post-intervention). The authors concluded that universal primary prevention programs aiming to prevent illicit drug use were effective in the midterm but not immediately post-intervention.

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