



TITLE: Prevention Strategies for Substance Misuse: A Review of the Clinical Evidence

DATE: 06 January 2012

CONTEXT AND POLICY ISSUES

In developed countries, 31% of deaths among people aged 15 to 29 years are attributable to alcohol and illegal drug misuse.¹ Substance misuse is a substantial contributor to injury related death including suicide, homicide, poisoning, and motor vehicle collisions.¹ It has also been associated with the spread of infectious disease, and can harm the development of the body, brain and behavior in youth.¹

Strategies to reduce substance misuse may include limiting supply through disruption of the production and sale of drugs, demand-reduction strategies to prevent initiation of substance use, and harm-reduction strategies to reduce drug-related harms to individuals and communities.¹ The target population for prevention programs may include all, or only some members of community. Universal prevention programs involve the entire population within the school, college, family or community, regardless of their individual risk of substance abuse.^{1,2} This approach is appropriate when risk factors for the problem are not easy to identify, are diffuse within the population, and are not easily targeted by the intervention.² Selective interventions target groups at increased risk, and indicated interventions target those with early signs of substance misuse.¹ The aim of primary prevention is to prevent new cases from developing, (i.e., to deter or delay the onset of a substance misuse),¹ whereas secondary prevention attempts to limit harm in the early stages of a disorder.¹

This report will review the evidence on the primary prevention of alcohol, marijuana or other illegal drug use in order to help inform a policy position on substance misuse prevention.

RESEARCH QUESTION

What is the clinical evidence for evidence-based prevention strategies to reduce harms relating to the misuse of alcohol, marijuana and illegal drugs?

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KEY MESSAGE

Family, parental, and school-based educational programs have shown a positive impact on substance misuse in children and adolescents. Social norms and other computer based interventions may be effective in reducing alcohol misuse in adults.

METHODS

Literature Search Strategy

A limited literature search was conducted on key resources including Ovid Medline, Ovid PsycInfo, The Cochrane Library (2011, Issue 11), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2006 and November 29, 2011.

Selection Criteria and Methods

One reviewer screened the titles and abstracts of the retrieved publications and evaluated the full-text publications for the final article selection, according to the selection criteria presented in Table 1. Due to the volume of relevant literature available, selection was limited to systematic reviews (SRs), meta-analyses and health technology assessments (HTAs) for the populations of interest. Randomized controlled trials (RCTs) evaluating primary prevention programs for First Nations people were also included.

Table 1: Selection Criteria

Populations	Adults (\geq 18 years of age) Children First Nations, Inuit and Metis (of all ages)
Intervention	Primary prevention strategies for substance misuse
Comparator	Any comparator
Outcomes	Decrease substance misuse Decrease in substance abuse/misuse deaths Decrease health resource utilization (e.g. fewer emergency room visits, fewer missed days of work) Reduce Stigma Reduce Discrimination
Study Designs	SR/HTA/MA (for all populations of interest) RCTs (for First Nations people)

HTA=health technology assessment; MA=meta-analysis; RCT=randomized controlled trial; SR= systematic review

The following criteria had to be met for SRs to be included in this report: the authors conducted a comprehensive search of multiple electronic databases, selected studies according to pre-defined inclusion and exclusion criteria, conducted a validity assessment of studies, and included a summary of included studies.

Exclusion Criteria

Studies were excluded if they did not meet the selection criteria, were duplicate publications, or were published prior to 2006. Meta-analyses were excluded if they were not based on a SR of the literature.

If multiple SRs or HTAs were found for a given population and intervention, and all the included studies overlapped between reports, then the most recent and methodologically sound report was included.

Critical Appraisal of Individual Studies

The quality of systematic reviews was assessed using the Assessment of Multiple Systematic Reviews (AMSTAR) tool.³ Randomized controlled trials were assessed to determine if allocation to treatment groups was concealed from participants. Randomization methods, follow-up, intention to treat (ITT) analysis of data, and potential contamination, were also assessed.

SUMMARY OF EVIDENCE

Quantity of Research Available

A total of 471 articles were identified from the database and grey literature search. Of these, 32 articles were selected for full text screening and nine SRs and two RCTs met the inclusion criteria.^{2,4-13} No meta-analyses or HTAs met the inclusion criteria. The study selection process is outlined in the flowchart in Appendix 1.

Additional references of potential interest are provided in Appendix 5.

Summary of Study Characteristics

Details on the included SRs and RCTs are provided in Appendix 2.

Population

The population studied was children in six SRs and adults in three SRs (Table 2). The three SRs in adults included low and high risk drinkers, and therefore may be considered primary and secondary prevention.

No SRs were found that included only First Nations people. Two RCTs included American Indian children in the US.^{12,13} Information on a third RCT in American Indian students was described in a SR (Foxcroft et al. 2011b⁵).

Interventions and comparators

The interventions studied included school based curriculum, family or parental support programs, mentoring of youth, and preschool programs for children. In adults, it included web or computer based interventions, and social norms interventions that aimed to reduce substance use.

Comparators ranged from no intervention, to minimally active interventions, such as assessment or general drug or alcohol education, and active interventions, such as in-person behavior modification programs.

Outcomes

Drug or alcohol use was reported in all included studies. None of the studies reported on outcomes related to stigma, discrimination or mortality. One study reported on health services utilization.⁸

Table 2: Included Systematic Reviews at a Glance

Study	Foxcroft 2011a ²	Petrie 2007 ⁴	Foxcroft 2011b ⁵	Faggiano 2008 ⁶	Thomas 2011 ⁷	D'Onise 2010 ⁸	Moreira 2009 ⁹	Bewick 2008 ¹⁰	Khadjesari 2010 ¹¹
Population	Primary prevention						Primary & secondary prevention		
Children and adolescents (<18 years)	x	x	x	x	x	x			
Adults							x	x	x
First Nations									
Intervention									
Family- or parent-based	x	x							
School-based curriculum			x	x					
Computer/social media								x	x
Other					x	x	x		
Comparator									
Alternate program	x	x	x	x	x	x	x	x	x
No program	x	x	x	x	x	x	x	x	x
Study designs									
RCT	x	x	x	x	x	x	x	x	x
Controlled non-randomized study		x				x		x	
Other study designs								x	
Primary substance targeted									
Alcohol	x	x	x		x	x	x	x	x
Marijuana		x		x	x	x			
Other drugs or substances		x		x	x	x			
Literature search date limit	2010	2003	2010	2004	2011	2008	2008	2006	2008
Number of included studies	12	20	53	29	4	12	22	10	24

RCT=randomized controlled trial

Summary of Critical Appraisal

The strengths and limitations of included studies are summarized in Appendix 3.

In general, the included SRs were methodologically robust and conducted a comprehensive literature search, screened and extracted studies according to explicit inclusion and exclusion criteria, and assessed the risk of bias of the included studies. The literature search was conducted more than six years ago in two SRs,^{4,6} and the grey literature sources searched were either limited or were incompletely reported in five SRs.^{2,4-6,9} In one SR it was not clear if two researchers independently screened articles.⁸

In both the studies in First Nations children, students were randomized by school, and the authors used appropriate statistical methods for group randomization.^{12,13} One RCT had a low risk of contamination of the control group due to the remote location of the schools.¹³ In both studies, losses to follow-up were 30%.^{12,13}

Summary of Findings

The findings of the included studies are summarized in Appendix 4.

Children and adolescents

Two SRs of family or parental support programs provided evidence that these interventions can reduce substance use.^{2,4} Universal family-based programs with educational and psychosocial components showed statistically significant positive effects across multiple outcomes of alcohol use.² The most effective parenting programs required active parental participation and developed social competence, self-regulation and overall parenting skills.⁴

School-based programs were evaluated in two SRs.^{5,6} Certain psychosocial or life skills programs were reported to reduce the risk of alcohol misuse.⁵ The evidence was strongest for general programs targeting multiple factors including misuse of drugs, tobacco, alcohol and antisocial behavior.⁵ Skills-focused school programs also showed statistically significant reductions in drug use compared to usual curriculum.⁶ Mentoring by peers or adults showed modest impact on the initiation of drug or alcohol use in adolescents primarily from disadvantaged or minority groups in the US.⁷

A systematic review of educationally oriented pre-school programs reported evidence that early childhood interventions improve health behaviors.⁸ Three RCTs showed a lower risk of marijuana use when children reached adulthood, but mixed effects on other drugs or alcohol.⁸ The review authors found no consistent evidence of the impact of pre-school programs on health services utilization.⁸

There was overlap among the studies included in selected SRs. Ten of 29 RCTs included in Faggiano et al.⁶ were included in Foxcroft et al. 2011b⁵ although this may be less of an issue since the two SRs reported on different outcomes. Two studies included in Petrie et al.⁴ were also included in Foxcroft et al. 2011a.²

Adults

Social norms interventions, delivered either face-to-face or via the web or computer reduced the use of alcohol and alcohol related problems among college or university students.⁹ The evidence was strongest for a short term effect (<3 months), with some data to support medium term effects (up to 16 months). There were few studies available on mailed feedback, group in-person sessions, and social marketing campaigns, but the available data showed minimal impact.⁹

The reviews by Bewick¹⁰ and Khadjesari¹¹ evaluated the impact of web or computer based behavior modification interventions. Bewick¹⁰ concluded that the effectiveness of web-based interventions was inconsistent based on five studies reporting alcohol use outcomes. The review by Khadjesari et al.¹¹ concluded there may be some benefits of computer-based behavior modification interventions over assessment-only interventions. A pooled analysis showed that participants in the intervention group consumed 26 fewer grams of alcohol than controls ($P < 0.05$).¹¹ The apparent inconsistency between the two SRs may be explained by differences in inclusion criteria. Khadjesari¹¹ used broader inclusion criteria for the intervention and therefore reviewed more RCTs than Bewick.¹⁰ It should be noted that there was some overlap between SRs in the studies included. The review by Khadjesari et al.¹¹ included three of five reports from Bewick et al.¹⁰ and seven of 22 included in Moreira et al.⁹

First Nations

The impact of prevention programs among First Nations children was evaluated in three RCTs [Dixon,¹² Johnson¹³ and Schinke (described in Foxcroft 2011b⁵)]. In the two studies with prevention programs that were culturally adapted to include Native American values and beliefs, the intervention showed a positive effect on some drug use outcomes.^{5,13} Johnson et al. reported statistically significant lower use of harmful legal products (inhalants, household products, prescription and over the counter drugs) among students in the intervention group compared with controls.¹³ There was, however, no impact on alcohol, tobacco or marijuana use in these remote Alaskan schools.¹³ Schinke et al. reported that statistically significantly fewer students in the intervention group consumed four or more drinks per week than in the control group (23% versus 30% at 3.5 years follow-up, $P < 0.01$).⁵

The third RCT¹² showed no impact of the Keepin' it R.E.A.L. program on alcohol or marijuana use among urban American Indian youth.¹² This program was culturally adapted to include Latino, African American or European American values, but not American Indian cultural beliefs.¹²

Limitations

All the SRs were limited by the quality of the included studies. The populations, interventions and their comparators were heterogeneous, which made drawing overall conclusions on effectiveness difficult. Many studies were underpowered to detect differences between groups and attrition rates exceeded 20% in a number of studies. Almost all studies used self-reported substance use as an outcome measure which may be influenced by social desirability. Allocation concealment was often unclear. In clinical trials the lack of blinding has been associated with over-estimation of the intervention effects, however blinding is generally not possible with an intervention such as these studied. The statistical analysis did not always take into consideration clusters of participants (i.e., that schools were randomized, not individual

children).⁴⁻⁶ There was overlap among studies included in the SRs, thus the total number of studies available is less than it appears from the review of SRs.

The three SRs targeting an adult population included participants with high- and low risk-drinking behaviors.⁹⁻¹¹ It was not possible to separate the results for the primary prevention population from the secondary prevention population. The length of follow-up was 6 months or less in the majority of studies, thus the durability of the effect of the intervention is unclear.

None of the studies measured death, stigma or discrimination related to substance misuse, and minimal information was available in one study on health services impact.

The generalizability of findings is also a potential limitation. Most of the studies were conducted in the US and thus the differences between Canada and the US in their cultural and racial composition, education and health systems should be considered when applying the findings to the Canadian context. In one SR,⁹ the included RCTs recruited students from university psychology classes, or limited to high-risk drinkers, thus the generalizability to the broader university or college population may be limited. Due to the length of follow-up in the D'Onise⁸ SR, the preschool programs studied were implemented in 1960s to 1980s and may not be generalizable to current pre-school programs.

Overall there were few studies in First Nations people and all were from the US. Johnson et al.¹³ did not report the results of the intervention for Native Alaskan students separately from Caucasian students however in 8 of the 14 communities 90% of residents were of Native American or American Indian ancestry.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING:

There are numerous studies available that evaluate the effectiveness of programs to prevent substance misuse in general adult and youth populations. Three studies included First Nations People, none of which were conducted in Canada.

Family or parental support programs can be effective in reducing or preventing substance misuse in adolescents. School-based programs that develop psychosocial skills have also shown positive effects on drug and alcohol misuse. The evidence to support mentoring and pre-school programs for primary prevention of substance misuse are less clear.

In adults, social norms interventions delivered face-to-face or via computer, or other computer based interventions, have shown some benefits in reducing alcohol use among university and college students or the general adult population.

School-based programs that were culturally adapted to include Native American values and beliefs reported positive effects on some drug use outcomes among US First Nations youth.

None of the studies measured death, stigma or discrimination related to substance misuse, and minimal information was available in one study on health services impact.

The overall quality of the studies, however, may be considered limited. Many of these studies were underpowered and had follow-up times less than six months. Other limitations included lack of blinding, unclear allocation concealment, self-reported outcomes and attrition rates exceeding 20%.

The majority of the studies were conducted in the US. Considering the importance of the population characteristics and setting to the success of psychosocial interventions, the generalizability of these studies to the Canadian context should be carefully evaluated when developing policy options.

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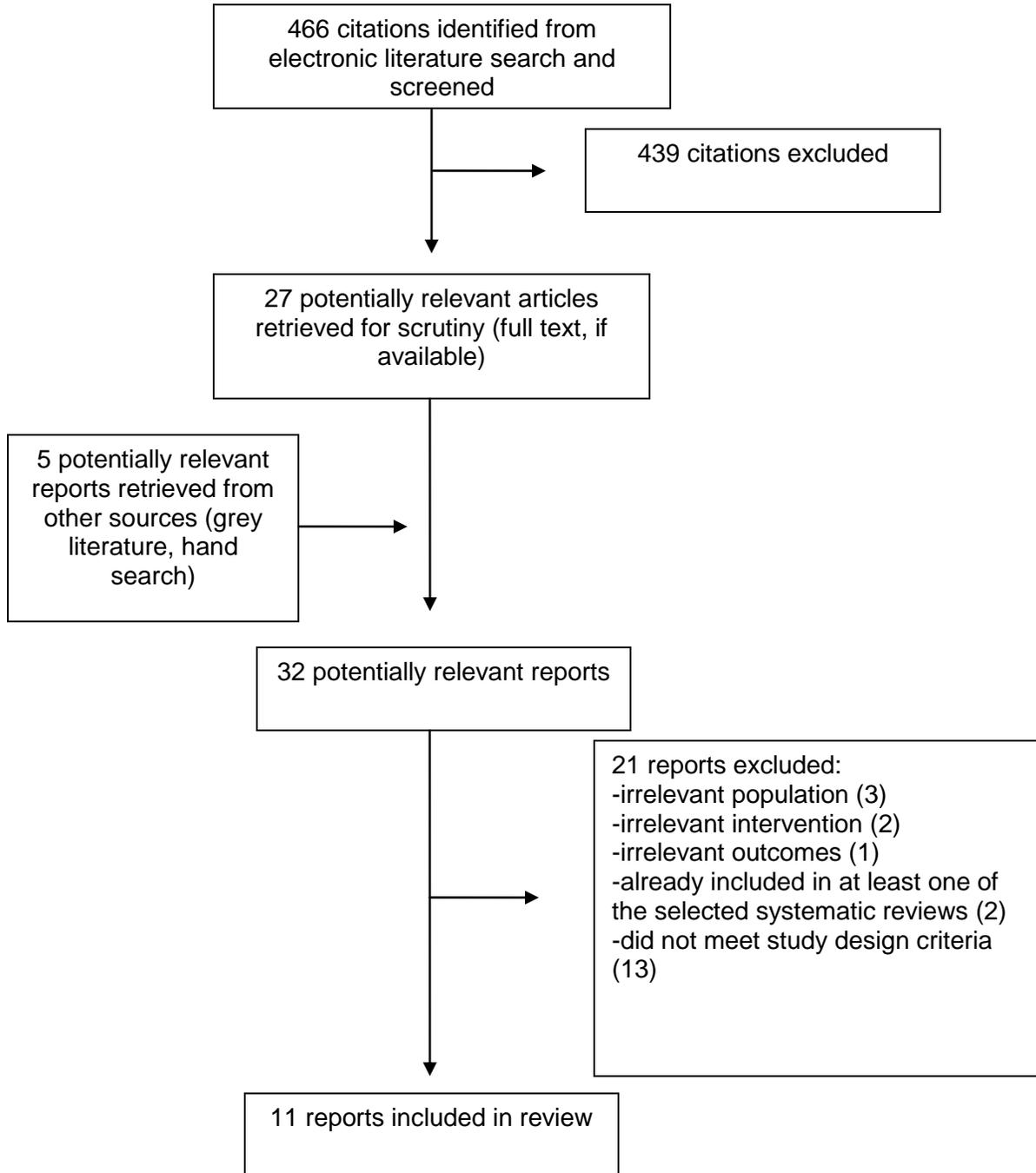
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APPENDIX 1: Selection of Included Studies



APPENDIX 2: Study Characteristics

First Author, Publication Year, Country	Study Design	Population Characteristics, Number of studies/ participants	Intervention	Comparator	Key Outcomes
Children and Adolescents					
<i>Family-based Programs</i>					
Foxcroft 2011a ² UK	SR	Young people <18 years of age attending school N=12 studies	Universal family-based prevention program	No program, any alternate program	Alcohol use
Petrie 2007 ⁴ UK	SR	Parents with children < 18 years of age N=20 studies	Parenting programs	No program, any alternate program	Alcohol, drug or tobacco use
<i>School-based Programs</i>					
Foxcroft 2011b ⁵ UK	SR	Young people <18 years of age attending school N=53 studies	Universal school-based prevention programs	No program, any alternate program	Alcohol use
Faggiano 2008 ⁶ Italy	SR	Primary or secondary school students N=29 studies	Universal school-based prevention programs	No program, any alternate program	Drug use
<i>Other Programs</i>					
Thomas 2011 ⁷ Canada	SR	Adolescents aged 13 to 18 years (mainly disadvantaged youth experiencing difficulties at school or home) N=4 studies	Mentoring programs with a goal to deter alcohol and drug use	No intervention, drug prevention and life skills education, community service activities	Alcohol or drug use
D'Onise 2010 ⁸ Australia	SR	Preschool children (mainly from disadvantaged families) N=12 studies	Centre-based preschool interventions	No program, other health and social services	Alcohol or drug use in adulthood
Adults					
Khadjesari 2010 ¹¹ UK	SR	Adults (≥18 years) with any level of alcohol consumption N=24 studies	Computer-based behavioral intervention	Minimally active (assessment only, usual care, educational material), or active comparator (brief intervention)	Alcohol consumption
Moreira 2009 ⁹ UK	SR	University or college students N=22 studies	Social-norms interventions or marketing	Assessment only, or educational or psychosocial	Alcohol consumption

First Author, Publication Year, Country	Study Design	Population Characteristics, Number of studies/ participants	Intervention	Comparator	Key Outcomes
Bewick 2008 ¹⁰ UK	SR	Adults (mean age 20 to 41 years) N=10 studies	campaigns Web-based behavior intervention	intervention Any comparator	Alcohol consumption
First Nations					
Johnson 2009 ¹³ US	RCT	Frontier Alaskan 5 th and 6 th grade students N=606	School-based drug prevention curriculum (Think Smart)	No program	Harmful legal products (inhalants, household products prescription or OTC drugs,), alcohol, marijuana, tobacco
Dixon 2007 ¹² US	RCT	Mixed racial urban youth in 35 middle schools in the US N=4,222	School-based drug prevention curriculum (Keepin' it R.E.A.L.)	No program	Alcohol, marijuana or cigarette use

OTC=over the counter; RCT=randomized controlled trial; SR=systematic review

APPENDIX 3: Critical Appraisal

First Author, Publication Year, Country	Strengths	Limitations
Children and Adolescents		
<i>Family-based Programs</i>		
Foxcroft 2011a ² UK	-comprehensive literature search -robust screening, extraction and quality assessment methods -findings take into consideration methodological limitations of included studies	-not clear which grey literature sources were searched.
Petrie 2007 ⁴ UK	-robust screening, extraction and quality assessment methods -findings take into consideration methodological limitations of included studies	-literature searched up to 2003 -limited grey literature search
<i>School-based Programs</i>		
Foxcroft 2011b ⁵ UK	-comprehensive literature search -robust screening, extraction and quality assessment methods -findings take into consideration methodological limitations of included studies	-not clear which grey literature sources were searched.
Faggiano 2008 ⁶ Italy	-robust screening, extraction and quality assessment methods	-literature searched up to 2004 -limited grey literature search -outcomes for all studies were not reported in detail
<i>Other Programs</i>		
Thomas 2011 ⁷ Canada	-comprehensive electronic database and grey literature search -robust screening, extraction and quality assessment methods -findings take into consideration methodological limitations of included studies	-none of the included RCTs had a low risk of bias.
D'Onise 2010 ⁸ Australia	-comprehensive literature search -findings take into consideration methodological limitations of included studies	-unclear if two researchers independently screened and extracted studies. -5 of 12 studies reported the outcomes of interest for this report
Adults		
Khadjesari 2010 ¹¹ UK	-comprehensive literature search -robust screening methods -findings take into consideration methodological limitations of included studies	-included adults with and without pre-existing alcohol misuse. Review did report results separately for these populations.
Moreira 2009 ⁹ UK	-comprehensive electronic literature search -robust screening, extraction and quality assessment methods -findings take into consideration	-not clear which grey literature sources were searched. -included adults with and without pre-existing alcohol misuse.

First Author, Publication Year, Country	Strengths	Limitations
	methodological limitations of included studies	
Bewick 2008 ¹⁰ UK	-comprehensive literature search -robust screening and extraction methods -findings take into consideration methodological limitations of included studies	-literature searched up to 2006 -included adults with and without pre-existing alcohol misuse. -5 of 10 studies reported the outcomes of interest for this report
First Nations		
Johnson 2009 ¹³ US	-randomized schools to intervention and control -low risk of contamination* due remote location of communities -statistical analysis was appropriate for group randomized study	-30% of students did not participate in the surveys (missing data imputed)
Dixon 2007 ¹² US	-randomized schools to intervention and control -statistical analysis was appropriate for group randomized study	-results based on a subgroup analysis -31% missing data (imputed using multiple imputation methods) -no comments on potential for contamination*

*contamination refers to inadvertent exposure of control population to the intervention. Risk of contamination would be high if both intervention and control students were taken from the same school.

APPENDIX 4: Study Findings

First Author, Publication Year, Country	Intervention, description	Outcomes	Author's conclusions
Children and Adolescents			
<i>Family-based Programs</i>			
Foxcroft 2011a ² UK	<p>Universal family-based prevention programs</p> <p>Programs have an educational or psychosocial developmental orientation designed to impact a range of health and lifestyle behaviors (e.g. improve parenting skills, parental rules, communication skills, conflict resolution, youth's resilient behavior, self-esteem, social networking, problem solving)</p>	<p>-9 RCTs showed SS positive effects with family-based programs across multiple outcomes (e.g., alcohol use or initiation, being drunk) for alcohol misuse in youth in the short- and long-term.</p> <p>-positive effects with the intervention were often small but were potentially important.</p> <p>-2 RCTs (with large sample sizes) found no positive effect with family programs.</p> <p>-1 RCT found positive effects with family programs that failed to achieve statistical significance.</p>	<p>Family based programs are effective and could be considered as policy and practice options. Further evaluation studies, conducted alongside implementation will help reduce uncertainty in effect size and persistence of effects in different settings.</p>
Petrie 2007 ⁴ UK	<p>Parenting programs</p> <p>Any program designed to develop parenting skills, improve parent/child communication or enhance the effects of other prevention programs. Many of the programs involved multiple components, of which parenting skills were just one part.</p>	<p>-5 of 8 RCTs reported a SS reduction in alcohol use in pre-teen students in the intervention group compared to controls.</p> <p>-2 of 5 RCTs reported SS reductions in alcohol use among teenagers in the intervention groups.</p> <p>-4 of 4 studies in pre-teens and 1 of 4 studies in teenagers reported a SS reduction in drug use in the intervention versus control groups.</p> <p>-evidence was strongest for the pre-teen and early adolescent population.</p> <p>-successful programs had active parental participation and involved children in family activities, maintained good family bonds, and managed conflict. In teenagers, those programs that focused on developing social skills and personal responsibility showed reductions in substance use.</p>	<p>Parenting programs can be effective in reducing or preventing substance use. The most effective approaches included active parental involvement and developed social competence skills, self-regulation and parenting skills. Overall quality of evidence was fair.</p>

First Author, Publication Year, Country	Intervention, description	Outcomes	Author's conclusions
<i>School-based Programs</i>			
Foxcroft 2011b ⁵ UK	<p>School-based prevention program</p> <p>Programs could be psychosocial, educational or other types. Psychosocial programs aimed to develop psychological or social skills such as peer resistance. Educational programs aimed to raise awareness of dangers of alcohol misuse. Other types included screening for alcohol use, or healthy school and community initiatives. Programs were either focused on reducing alcohol use or targeted prevention of multiple factors including alcohol, drugs, tobacco and antisocial behavior.</p>	<p>-6 of 11 alcohol specific programs showed a SS reduction in alcohol misuse compared with controls.</p> <p>-in 15 of 39 RCTs, generic prevention programs reported SS reductions in alcohol misuse compared to controls.</p> <p>-1 RCT (Schinke 2000**) included Native American students and compared culturally tailored life skills training to standard curriculum. Weekly drinking was SS lower in intervention than control group at 2.5 and 3.5 years follow-up.</p> <p>-2 of 3 RCTs of other types of interventions showed SS reductions in some alcohol use outcomes (average weekly alcohol use or every having a drink) compared to standard curriculum.</p> <p>-In some studies, the results varied depending on the student's prior drinking habits and gender.</p>	<p>Current evidence suggests that certain generic school-based psychosocial and developmental prevention programs can be effective in reducing or preventing alcohol misuse. The successful programs included the Life Skills Training Program in the US, the Unplugged program in Europe, and the Good Behavior Game in the US and Europe. Considering the variability of effects between studies and subgroups within studies, the authors recommend that attention is paid to program content and delivery context. Further evaluation should be conducted with implementation in different settings.</p>
Faggiano 2008 ⁶ Italy	<p>School-based prevention program</p> <p>Main components of programs included: (i) skills focused - improve general life skills, refusal and safety skills; (ii) affective focused – modify self-esteem, self-efficacy and motivations to use drugs; (iii) knowledge focused – information on effects and risks of drug use. Programs were interactive or didactic, and were delivered by teachers, external educators or peers.</p>	<p><i>Skills-based</i></p> <p>-4 RCTs showed skills-based programs reduced risk of marijuana use compared to usual curricula [RR 0.82 (95% CI 0.73 to 0.92)]†</p> <p>-another 4 RCTs not suitable for meta-analysis showed mixed effects on marijuana use.</p> <p>-skills based programs SS reduced drug use in 6 RCTs (no effect reported in 3 RCTs).</p> <p><i>Affective programs</i></p> <p>-mixed effects reported on drug use outcomes (2 RCTs)</p> <p><i>Knowledge-based</i></p>	<p>Skills-focused programs appear to have a positive effect on drug use compared to usual curricula. No clear benefit on drug use outcomes were shown for affective- or knowledge-focused programs. There is limited data on long-term effectiveness of school-based interventions and corroboration in well-designed long-term RCTs is warranted.</p>

First Author, Publication Year, Country	Intervention, description	Outcomes	Author's conclusions
		-drug related knowledge improved. Drug use outcomes not reported.	
<i>Other Programs</i>			
Thomas 2011 ⁷ Canada	Mentoring programs Included mentoring by older peers or adults other than parents. Mentoring could also include community service activities (visiting frail elderly, planting trees), monthly parent activities, and life skills curriculum. Peer mentors acted as friends and met weekly under adult supervision.	-2 RCTs reported that fewer mentees initiated alcohol use compared to no intervention controls [RR 0.71 (95% CI 0.57 to 0.90)]†. -1 RCT found no difference in alcohol use. -1 RCT found a lower risk of initiating drug use in mentees [RR 0.54 (95% CI 0.35 to 0.83)]†. Two RCTs found no impact of mentoring on drug use. -A fourth RCT found no SS difference between mentees and other controls on combined drug and alcohol use. -No adverse effects were reported.	Four RCTs evaluated the impact of formal mentoring programs for adolescents from the US described as disadvantaged or from minority groups. Two RCTs found mentoring reduced the rate of initiating alcohol and one RCT showed a reduced initiation of drugs. The age of the participants and the low baseline use of substances in three studies limited the ability of the studies to detect an effect of mentoring.
D'Onise 2010 ⁸ Australia	Educationally oriented pre-school programs based in a center. May have included other services such as nutrition, health and social services, parenting programs, home visits or kindergarten.	-3 studies showed reduction in the absolute risk of marijuana consumption in the intervention versus control populations (ARR ranged from 7% to 23% across studies)‡. -a positive but non-statistically significant effect was found for use of other illicit drugs for the intervention groups. -intervention groups reported an increased use of alcohol in 2 of 4 studies -no consistent evidence of enhanced preventative health service use, or increased requirement for hospitalization.	There is some evidence that early childhood interventions improve health behaviors. The evidence for health services use was inconsistent.
Adults			
Khadjesari 2010 ¹¹ UK	Computer-based behavior modification intervention Interventions included personalized feedback	-participants who received computer-based intervention reduced alcohol consumption statistically significantly more than minimally active controls	Computer-based behavior modification interventions may reduce alcohol consumption compared with assessment-only interventions however any

First Author, Publication Year, Country	Intervention, description	Outcomes	Author's conclusions
	<p>on drinking and comparison with safe levels, campus focused interventions (e.g., interactive games, motivational feedback, information on risk taking and refusal skills), video on alcohol expectancy-disconfirming experience, behavior modification intervention tailored to adult problem drinkers, and peer-to-peer discussion forum.</p>	<p>[MD -26g per week (95% CI -41 to -11g) pooled results of 16 studies]* -subgroup analysis showed more consistent but less pronounced reduction in alcohol consumed in students [MD -19g (95% CI -30 to -9) 12 studies], than in non-students [MD -115g (95% CI -199 to -31) 4 studies]* -no significant difference between computer-based and other active interventions on alcohol consumption.</p>	<p>conclusions remain tentative due to methodological weakness of the included studies.</p>
<p>Moreira 2009⁹ UK</p>	<p>Social norms intervention</p> <p>Interventions included mailed, web or individual feedback, group face-to-face feedback or social marketing campaigns (e.g., media campaign). The intensity varied from no session (paper feedback) to two in-person sessions. Some had a booster session. Most interventions were targeted to high-risk drinkers.</p>	<p><i>Short term (<3 months)</i> -12 RCTs reported at least 1 short-term outcome. -computer feedback SS reduced alcohol related problems, peak BAC, drinking quantity, frequency and binge drinking. -individual and group face-to-face feedback SS reduced drinking frequency and drinking quantity respectively. Both interventions SS reduced binge drinking. -mailed feedback had no SS impact on any outcome.</p> <p><i>Medium term (3-16 months)</i> -9 RCTs reported at least 1 medium-term outcome. -computer-based and individual face-to-face feedback SS reduced alcohol related problems, and drinking frequency</p> <p><i>Long term (>16 months)</i> -no consistent effect was found among 3 RCTs reporting long term outcomes for mailed feedback and social marketing interventions.</p>	<p>The review suggests that individual face-to-face and web- or computer- based personalized normative feedback appear to reduce alcohol use, misuse and related problems among university and college students. Findings are strongest for short-term, with some data supporting medium term effects.</p> <p>There were few studies available on the effectiveness of mailed feedback, group in-person interventions and social marketing campaigns, but those available showed minimal impact.</p>

First Author, Publication Year, Country	Intervention, description	Outcomes	Author's conclusions
Bewick 2008 ¹⁰ UK	Web-based behavior modification intervention Intervention included assessment, personalized feedback and advice, and web-based prevention newsletters.	-no consistent differences in alcohol use were found between web-based interventions and education only website, print based newsletters, or web-based intervention plus self-help booklet.	The effectiveness of web-based interventions on alcohol use is inconsistent. The studies available lacked methodological rigor.
First Nations			
Johnson 2009 ¹³ US	Think Smart Program adapted to frontier Alaska based on Schinke's life skills training curriculum for Native Americans. It consisted of 12 core and 3 booster sessions that taught drug refusal skills, anti-drug norms, self-management and social skills. Also included education on drug adverse effects and bicultural competence (Native and Caucasian Alaskans).	The intervention SS reduced self-reported use of harmful legal substances within the last 30 days, 6 months after completing the program [OR 0.13 (95% CI 0.08 to 0.19)].† There was no SS impact on alcohol, tobacco or marijuana use for the intervention compared to control students.	Think Smart curriculum decreased the proportion of students who used harmful legal products 6 months after completing the program, but had no effect on other drugs among Native and non-Native grade 5 & 6 students in remote Alaskan communities.
Dixon 2007 ¹² US	Keepin' it R.E.A.L. A validated, culturally grounded video-enhanced prevention program. Consisted of 10 lessons that taught drug resistance skills, designed for 6 th to 8 th grade students. Three different culturally based versions: Latino, Non-Latino (European or African American values), and Multi-cultural (mix of Latino and non-Latino values)	Self-reported alcohol, marijuana, and cigarette use increased in all groups over the 1 year follow-up period. In non-American Indian students, the intervention reduced the rate of increase of alcohol or marijuana use relative to control students. In American Indian students, the program was SS less effective than no intervention in preventing alcohol or marijuana use.	The Keepin' it R.E.A.L program may have limited effectiveness in curbing drug use in urban American Indian youth. The findings suggest that American Indian youth may require drug prevention curricula that are specific to their developmental and cultural realities.

ARR=absolute risk reduction; BAC=blood alcohol content; CI=confidence interval; MD=mean difference; OR=odds ratio; RCT=randomized controlled trial; RR=relative risk; SS=statistically significant

*A mean difference with 95% confidence intervals that does not include 0 is statistically significant.

†A relative risk or odds ratio with a 95% confidence interval that does not include 1 is statistically significant. A relative risk or odds ratio less than 1 indicates that individuals in the intervention group were less likely to use a substance than those in the control group.

‡7% to 23% fewer students in the intervention group used marijuana compared to the control group.

** Shinke SP, Tepavac L, Cole KC. Preventing substance use among Native American youth: three-year results. Addictive Behaviours 2000; 25(3):387-97.

APPENDIX 5: Additional Articles of Potential Interest

Other Reports

Community-based interventions to reduce substance misuse among vulnerable and disadvantaged children and young people [Internet]. London: National Institute for Health and Clinical Excellence (NICE); 2007. [cited 2012 Jan 5]. (NICE public health intervention guidance 4). Available from: <http://www.nice.org.uk/nicemedia/live/11379/31939/31939.pdf>

Prevention of substance misuse: guidance document [Internet]. Toronto: Ontario Ministry of Health Promotion; 2010 May. [cited 2012 Jan 5]. Available from: <http://www.mhp.gov.on.ca/en/healthy-communities/public-health/guidance-docs/PreventionOfSubstanceMisuse.PDF>

A drug prevention strategy for Canada's youth [Internet]. Ottawa: Canadian Centre on Substance Abuse (CCSA); 2007. [cited 2012 Jan 5]. Available from: <http://www.ccsa.ca/2007%20CCSA%20Documents/ccsa-011522-2007-e.pdf>

First Nations

Moran JR, Bussey M. Results of an alcohol prevention program with urban American Indian youth. *Child & Adolescent Social Work Journal*. 2007;24(1):1-21.

In comparing alcohol use among American Indian and non-Indian youth, the age at first involvement with alcohol is younger for Indians, the frequency and amount of drinking are greater, and the negative consequences are more common. This article presents the results of an innovative alcohol prevention program for urban Indian youth, blending mainstream prevention approaches with culturally appropriate intervention. A quasi-experimental treatment/non-equivalent control group research design was used to evaluate the Seventh Generation Program, comparing scores over time on measures assessing alcohol beliefs as well as decision-making, social support, locus of control, self-concept, depression, and ethnic identity. Results of repeated measures analysis revealed significant effects for treatment in the areas of alcohol beliefs, social support, locus of control and depression.

Dell CA, Lyons T. Harm reduction policies and programs for persons of Aboriginal descent [Internet]. Ottawa: Canadian Centre on Substance Abuse (CCSA); 2007 Jun. [cited 2012 Jan 5]. Available from: <http://www.ccsa.ca/2007%20CCSA%20Documents/ccsa-011515-2007.pdf>