IHE Report

Means Restriction for Suicide Prevention

Prepared for Alberta Health Services

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HTA Information Paper

Means restriction for suicide prevention

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EXECUTIVE SUMMARY

Background

Suicide is a global public health and social problem. In 2000, approximately one million people in the world died by suicide. Suicide rates have been increasing among young people in some countries. It is one of the three leading causes of death in the world among those aged up to 19 years.

Means/methods used for suicide include hanging/strangulation/suffocation, poisoning, using firearms, jumping from high places (bridge, high building, etc.), and others. In countries such as Australia, Canada, England, Ireland, New Zealand, and Sweden, hanging is the most commonly used method for suicide in the general population, particularly among males. In contrast, firearms are used most commonly in the United States, accounting for more than half of the suicide deaths in the general population.

In Canada, intentional self poisoning, including intentional overdose, is the most common method used by females and the second most common method used by males for suicide. The majority of intentional overdose-related deaths were caused by unspecified drugs, medications, and biological substances, which underscores the difficulty in current data collection systems.

Various strategies to reduce access to lethal means in order to prevent suicide deaths of an impulsive nature, particularly among young people, have been developed and implemented in several countries. Means restriction is considered a key component in a comprehensive suicide prevention strategy and has been shown to be effective in reducing suicide rates.

Objectives and scope

The objectives of this report are to provide a summary of information regarding national means restriction policies/strategies and national/provincial intentional overdose prevention policies/strategies and their effectiveness. Policies/strategies that focus on children, youth, and young adults are of particular interest.

This report consists of two parts: Part I presents an overview of national means restriction strategies/policies, whereas Part II focuses on intentional overdose prevention strategies/policies at the national and provincial levels and examines the evidence on the effectiveness of intentional overdose prevention strategies.

Findings from Part I

Eight national suicide prevention strategy documents were found that addressed means restriction strategies. These varied in scope, comprehensiveness of the means restriction components covered, implementation and evaluation plans, and ongoing monitoring activities.

In general, national suicide prevention strategies targeted restriction of means of suicide from self poisoning (e.g. drug overdose), vehicle exhaust gas, use of firearms, jumping from high places (e.g. bridges), and access to railway lines. However, prevention of hanging in public settings received little attention, although hanging is the most commonly used method worldwide. Some attempts have been made to restrict means for hanging in institutional settings such as prisons and psychiatric institutions.

England's national suicide prevention strategy serves as a good example of a comprehensive and coordinated strategy with goals for feasible actions. This strategy outlines a set of targets to be achieved within a certain time frame for the reduction in the total number of suicides as well as in the number of suicides by each means/method. It covers different aspects for means restriction with detailed plans for implementation and ongoing monitoring.

Canada does not have a government issued national suicide prevention strategy. The Blueprint prepared by the Canadian Association for Suicide Prevention outlined the goals and objectives but did not contain any detailed plans of action, implementation, or evaluation.

Findings from Part II

Among the eight countries with national means restriction strategies, intentional overdose was addressed in the majority of these strategies. Provincial/state/regional suicide prevention policies/strategies that addressed intentional overdose were identified in the policies/strategies from four of the eight countries, including Australia, Canada, United Kingdom, and the United States. These intentional overdose policies/strategies covered a wide range of aspects, such as drug regulation/legislation; awareness/education; safe drug prescription, storage, and disposal; development of tracking and monitoring systems; development of new technologies for safe storage of medications; and establishment of partnerships among different governmental departments. These policies/strategies were usually targeted at the general population, not specifically on children, youth, or young adults.

To address the question about the effectiveness of intentional overdose prevention strategies, a comprehensive literature search was conducted and identified research evidence from three systematic reviews and 10 additional primary studies. Most studies evaluated the impact of drug restriction, including acetaminophen (paracetamol) and co-proxamol legislation, and restriction

of other drugs such as barbiturates on suicide deaths and suicide attempts. In addition, one study examined the effectiveness of parental education, and another study examined the effectiveness of alcohol restriction policies for youth.

Results from the studies assessing the impact of drug restriction legislations are inconsistent. While some studies indicated that drug restriction strategies are associated with decreased suicide deaths and attempted suicides, others did not find any effects. The discrepancy in research findings may be partially due to the differences in the length of the follow-up periods, selection of before-and-after time periods for comparison, data sources, and sizes of geographic areas selected for outcome measurement.

How to evaluate the impacts of national suicide prevention strategies/policies remains a methodological challenge. Suicide rates are influenced by a multitude of variables, many of which cannot be controlled. Future research studies need to control for confounders when evaluating the effect of means restriction strategies in reducing suicide death rates.

The measures used to evaluate suicide prevention programs should also include the prevalence of suicide attempts and suicide-related behaviours, changes in predisposing vulnerability, and protective factors. Currently available research studies did not report these outcomes consistently.

Implications for Alberta's future efforts

Alberta's future efforts on means restriction need to consider a broad range of strategies/activities that address commonly used means/method used for suicide in Alberta, such as hanging, use of firearms, intentional overdose, or carbon monoxide poisoning. However, the potential of means restriction strategies in reducing overall suicide rates from hanging, the most commonly used method for suicide, is limited. Focusing on reducing suicide deaths by intentional overdose may lead to a reduction in female suicide rates but will have limited impact on male suicide death rates.

A provincial intentional overdose prevention policy/strategy/initiative needs to be developed using a framework that includes the following phases: problem identification (baseline data collection), search for evidence (effectiveness of preventive interventions), selection from different options (decisions incorporating research evidence and local context), implementation (specification of the lead agencies or individuals, partners, funding/resources), and evaluation (selection of evaluation model, indicators, outcome measures).

Future efforts for Alberta's intentional overdose prevention activities may include:

- baseline data collection of the causes and trends of suicide deaths and suicide attempts in Alberta;

- identification of drugs commonly used for suicide and suicide attempts, particularly those used by children and youth;
- consideration of provincial regulation of those drugs commonly used for suicide and suicide attempts;
- provision of education for physicians and other health professionals on safe prescriptions for children and youth;
- provision of education for parents, guardians, caregivers, or social workers on safe storage and disposal of the drugs commonly used for suicide and suicide attempts;
- development of assessment tools for identifying individuals, particularly children and youth, who may be at risk of suicide and who have easy access to lethal drugs; and
- collaboration of the provincial mental health services with government departments such as the Department of Education and Alberta Childrens' Services.

Conclusion

Various means restriction/intentional overdose prevention policies/strategies developed in several western developed countries were identified. Means restriction and intentional overdose prevention policies and strategies are usually embedded in broad suicide prevention policy/strategy documents, and are not in stand-alone documents. In general, these policies/strategies do not specifically target children, youths, and young adults. Evaluation of the effects of various means restrictions including intentional overdose prevention in reducing suicidal behaviours is a complex task; hence a systematic approach that takes into account all of the important components of a comprehensive framework for a provincial policy/strategy initiative is essential.

ABBREVIATIONS

AHS	Alberta Health Services
CASP	Canadian Association for Suicide Prevention
DSP	deliberate self poisoning
DUMP	disposal of unwanted medication properly
ED	emergency department
F	female
GP	general practitioner
ICD	International Classification of Diseases
M	male
NA	not available
NAPRA	National Association of Pharmacy Regulatory Authorities

NHS	National Health Services
NICE	National Institute for Health and Clinical Excellence
NIMHE	National Institute for Mental Health in England
NSHPP	Nova Scotia Health Promotion and Protection
OTC	over-the-counter
PCT	primary care trust
SR	systematic review
ss	statistically significant
UK	United Kingdom
WHO	World Health Organization

DEFINITIONS

(Main sources: Suicide and Mental Health Association International,[1] Institute of Medicine 1994,[2] World Health Organization 1999,[3] and Bryant 2009.[4])

Activity – the specific steps that will be undertaken in the implementation of a plan; activities specify manner in which objectives and goals will be met.

Acetylsalicylic acid – also known as Aspirin, is a salicylate drug, often used as an analgesic to relieve minor aches and pains, as an antipyretic to reduce fever, and as an anti-inflammatory medication.

Ecological study – examines trends in disease events over time or across different geographic locations and correlates them with trends in a putative exposure, such as rates of drug utilization. The unit of observation is a subgroup of a population rather than individuals.

Evaluation – the systematic investigation of the value and impact of an intervention or program.

Goal – a broad and high-level statement of general purpose to guide planning around an issue. It is focused on the end result of the work.

Health policy – a set of decisions or commitments to pursue courses of action aimed at achieving defined goals and targets for improving health.

Ibuprofen – is a non-steroidal anti-inflammatory drug, marketed originally as Brufen and since then under various other trade names. It is used for relief of symptoms of arthritis, primary dysmenorrhea, fever, and as an analgesic, especially where there is an inflammatory component.

Indicated prevention – a strategy or approach targeted to high-risk individuals who are identified as having minimal but detectable signs or symptoms foreshadowing mental disorder, or biological markers indicating predisposition for mental disorder, but who do not meet DSM-III-R diagnostic levels at the current time.

Intentional injury – injuries resulting from purposeful human action whether directed at oneself (self directed) or others (assaultive), sometimes referred to as violent injuries.

Intervention – a strategy or approach that is intended to prevent an outcome or to alter the course of an existing condition.

Means – the instrument or object whereby a self destructive act is carried out (e.g. firearms, poison, medication).

Means restriction – techniques, policies, and procedures designed to reduce access or availability to means and methods of deliberate self harm.

Methods – actions or techniques which result in an individual inflicting self harm (e.g. asphyxiation, overdose, jumping).

Objective – a specific and measurable statement that clearly identifies what is to be achieved in a plan. It narrows a goal by specifying who, what, when, and where or clarifies by how much, how many, or how often.

Outcome – a measurable change in the health of an individual or group of people that is attributable to an intervention.

Policy – refers to plans and procedures developed and implemented by governments, agencies, organizations, and associations to achieve desired goals.

Policy analysis – a generic name for a range of techniques and tools to study the characteristics of established policies, how the policies came to be and what their consequences are. The main concerns of policy analysis are the outcomes of health policies or the effects that the policy has on people.

Prevention – a strategy or approach that reduces the likelihood of risk of onset, or delays the onset of adverse health problems or reduces the harm resulting from conditions or behaviours.

Selective prevention – a strategy or approach targeted to individuals or subgroups of the population whose risk of developing mental disorders is significantly higher than average.

Self harm (self injury) – the various methods by which individuals injure themselves such as self laceration, self battering, deliberately overdosing or exhibiting deliberate recklessness.

Strategy – a course of action undertaken to accomplish a specific goal or set of goals. Strategies explain how an organization will move from its current state toward its desired vision and goals within a planned time frame. Strategies should be achievable within available human and financial resources and should be focused on higher level, longer term goals.

Suicide – death from injury, poisoning, or suffocation where there is evidence that a self inflicted act led to the person's death.

Universal prevention – a strategy or approach targeted to the general public or a whole population group that has not been identified on the basis of individual risk.

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Introduction

In 2005, the Alberta Mental Health Board[1] developed and released a provincial suicide prevention strategy entitled A CALL TO ACTION: the Alberta Suicide Prevention Strategy.[5] Reducing access to lethal means of suicide was identified as one of the eight goals in this strategy. Among various means used for suicide, intentional overdose was identified as a priority for means restriction efforts in Alberta. Subsequently, a three-year project, the Intentional Overdose Initiative 2007 - 2010, funded by Alberta Health and Wellness, was launched in September 2006.[6,7]

The present report was prepared in response to a request from Alberta Health Services (AHS) for information about currently existing policies/practices in reducing access to lethal means in Canada and other countries. The report consists of two parts: Part I provides an overview of national strategies/policies/practices in restricting access to lethal means in general, and Part II focuses only on national/provincial/state strategies/policies/practices in reducing intentional overdose and research evidence of their effectiveness.

This report is to serve as a background document to assist AHS to direct Alberta's future efforts in means restriction, particularly in intentional overdose in children and youth, as well as to identify research topics and questions and policy gaps.

Part I: An Overview of National Policies/ Strategies on Means Restriction

Objectives

The objectives for Part I of the report are:

- to identify currently existing national suicide prevention policies/strategies/practices for reducing access to lethal means; and
- to identify policy and research gaps in relation to means restriction.

This part of the report attempts to address the following questions proposed by Alberta Health Services:

- What policy/practice has been put in place nationally in Canada and other countries to reduce access to various means used in suicide attempts and suicide deaths?

[1]In April 2009, the Alberta Mental Health Board ceased to be a recognized entity and became part of Alberta Health Services.

- Has any means restriction policy/practice been developed/implemented specific to children (defined as 12 to 15 years of age), youth (16 to 19 years of age), or young adults (20 to 24 years of age)?
- What funding has been allocated to the implementation of means restriction policy/practice?
- What are the gaps in knowledge to inform future means restriction policy/practice efforts in Alberta?

Method

Locating documents on national suicide prevention policies/strategies and practices presents a methodological challenge as such documents are usually not available in peer-reviewed publications. A specific search strategy that consisted of four steps was developed for this report to identify relevant documents (see Search Strategy in Appendix A: Methodology):

- a preliminary literature search for journal articles, Cochrane Reviews, and health technology assessment reports to identify review articles on means restriction;
- identification of national suicide prevention policies/strategies from review documents;
- contact with the Centre for Suicide Prevention in Calgary and search of the Suicide Information and Education Collection catalogues to identify additional policies/strategies; and
- a search of websites of national/federal governments and national associations/societies for suicide prevention to identify relevant national policy/strategy and companion documents.

The Canadian Association for Suicide Prevention, as well as Canadian federal and Alberta provincial drug regulatory authorities were also contacted for information about any specific drug regulations aimed at preventing intentional overdose.

Findings

Through the search strategy described above, 16 national suicide prevention strategy/framework documents were retrieved. Eight of these documents contain some information on means restriction (Table 1) and were selected for further analysis. Documents that were excluded and the reasons for exclusion are listed in Appendix B (Appendix B: Table B.1).

Table 1: National suicide prevention strategies/frameworks

Country	Government document	Title
Australia 2007[8]	Yes	Living Is for Everyone Framework
Canada 2004[9]	No	Blueprint for a Canadian National Suicide Prevention Strategy
England 2002[10]	Yes	National Suicide Prevention Strategy
Ireland 2005[11]	Yes	Reach Out. National Strategy for Action on Suicide Prevention 2005-2014
New Zealand 2006[12]	Yes	New Zealand Suicide Prevention Strategy 2006-2016
Sweden 2007[13]	Yes	National Program for Suicide Prevention
United States 2001[14]	Yes	National Strategy for Suicide Prevention
Wales 2008[15]	Yes	A National Action Plan to Reduce Suicide and Self Harm in Wales 2008-2013

Suicide is not a disease but a behaviour influenced by a variety of social, environmental, and medical factors. It has been well recognized that there is no single approach to suicide prevention. Rather, a broad strategic approach is needed that co-ordinates the contributions of public services and organizations, academic research, voluntary groups, the private sector, and concerned individuals to address multiple risk factors.

Death by suicide is a relatively rare event. Evaluation of the outcomes using suicide rates would require a large sample size. A national suicide prevention strategy allows the collection of data from the whole country to monitor the trend of suicide rates over time.

This report is an attempt to extract and analyze the most important and relevant information from each national suicide prevention policy/strategy document to address the broader scope of questions proposed by AHS. Through a preliminary policy analysis, the policy and research gaps will be identified.

A modified, simple policy analysis framework that includes the following five steps will be utilized in Part I of this report:[16,17,18]

- Problem identification
- Search for evidence
- Delineation of options
- Implementation of the chosen option(s)
- Evaluation of the impact

Information obtained from the included national suicide prevention documents is summarized below within the five-step framework. More details are provided in Appendix C.

Problem identification

Suicide is a global public health and social problem. In 2000, approximately one million people died by suicide, a global suicide rate of 16 per 100,000 persons.[19] Suicides are among the three leading causes of death for adolescents in the world; at least 90,000 adolescents (up to age 19) die by suicide each year.[20] Reported suicide rates vary significantly among countries, ranging from the highest rate of 38.6 per 100,000 persons in Lithuania (in 2005) to the lowest of 0 per 100,000 persons in some Middle Eastern countries such as Egypt (in 1987), Haiti (in 2003), and Jordan (in 1979).[21]

Suicide rates and trends

Most of the included national suicide prevention strategy documents listed in Table 1 started with a description of the status and the trend of suicide in their country.

In 2000, suicide rates among the eight countries ranged from 10.4 (United States), 11.7 (Canada), 11.9 (New Zealand), 12.2 (Ireland), 12.5 (Australia), to 12.7 (Sweden) per 100,000 persons.[21] Data have shown that, while suicide rates in the general population peaked in the late 1990s, they have been decreasing in recent years. Among the eight countries, males accounted for the majority of suicide deaths; for example, 80% in Australia. Male to female ratios of deaths by suicide ranged from 2.7:1 (Sweden) to 5.1:1 (Ireland).[21]

In 2005, approximately 80 (Ireland) to 4500 (United States) children and young people aged 5 to 24 years died by suicide.[21] In this age group, young males account for a more dominant proportion of suicide deaths, with male to female ratios ranging from 3.4:1 to 6.2:1, respectively.[21] Between 2000 and 2004, a decline of suicide rates among males in the age group 15 to 24 was observed in England and Scotland, whereas a significant increase in suicide rates among females aged 15 to 24 was observed in Ireland.[22]

Another common finding is that in some countries (e.g. Australia, Canada, New Zealand), suicide rates in the Aboriginal population, particularly among young males, are much higher (usually two to three times) than that of the general population.

In Alberta, the cause of death of 468 people (332 males and 136 females) was suicide in 2007; of the 468 people, 76 were aged 10 to 24 years.[23] Suicide rates among children and youth (age 15 to 19) have been declining since 2001 from 14.97 per 100,000 in 2001 to 8 per 100,000 in 2007, while suicide rates among young adults (age 20 to 24) have increased since 2002 from 14.9 per 100,000 in 2002 to 22 per 100,000 in 2007.[23]

Means/methods for suicide deaths

Means and methods used for suicide include hanging/strangulation/suffocation, poisoning (e.g. drug, gas), jumping from high places (e.g. bridge, high building), using firearms, and others (e.g. drowning). The frequency of different means/methods used for suicide deaths in each of the eight countries is summarized in Table 2. These data were derived from the eight selected national suicide prevention strategy documents, as well as other sources.

Table 2: Distribution of means/methods used for suicide deaths

Country	Hanging/strangulation/suffocation (M/F)(%)[a]	Poisoning (M/F)(%)	Firearms (M/F)(%)
Australia 2006[24]	**52** (55/44)	24 (21/36)	2 (1.5/5)
Canada 2003[25]	**44** (46/37)	25 (20/42)	16 (20/3)
England 2002[10]	**47**	33	2.4
Ireland 2005[26]	**58** (64/38)	14 (12/23)	6 (7/3)
New Zealand 2003[27]	**47** (48/44)	21	NA
Sweden 2006[28]	**43** (46/36)	25 (18/39)	10 (14/1)
United States 2005[29]	22	18	**52**
Wales	NA	NA	NA

[a]The most commonly used method is bolded. **Abbreviations:** F: female; M: male; NA: not available.

There are some common emerging trends:

- While males use more lethal methods, females tend to use less lethal methods, thus providing them with a greater chance of survival.
- In the majority of these countries, hanging is the most commonly used method of suicide in the general population, accounting for approximately 50% of the total deaths by suicide. In contrast, firearms are the most common means used for suicide in the United States, accounting for more than half of the deaths by suicide.
- While hanging is the most common method used by males, poisoning (including drug overdose) is usually the most common method used by females and the second most common method used by males. Drugs most commonly identified include acetaminophen (also known as paracetamol) (England), antidepressants, antiepileptics, antiparkinsonians, and psychotropic drugs (New Zealand). In the United Kingdom, acetaminophen accounts for 48% of poison admissions to hospital and an estimated 100 to 200 deaths per year.[30]

Canada is similar to the other countries reported here in terms of commonly used means/methods for suicide. For example, as shown in Table 2, in 2003 the most common method used for suicide in the general population was hanging (44%), followed by poisoning (25%), firearms (16%), and other means (15%).[25]

In Alberta, hanging was the leading method of suicide, accounting for over one-third of all suicide deaths in 2007.[23] The top three methods of choice for males were hanging, firearms, and overdose, accounting for 75.3% of all male suicide deaths.[23] The top three methods of choice for females were overdose, hanging, and carbon monoxide poisoning, accounting for 86.9% of all female suicide deaths.[23]

England's suicide prevention strategy set a target for reducing the suicide rate by at least 20% by the year 2010. This translates to about 800 fewer suicide deaths per year (Table 3).

Table 3: Means/methods used for suicide in England[10]

Means/method	Number of deaths per year	20% reduction in suicide
Hanging and strangulation	1900	380 fewer
Self poisoning	1330	265 fewer
Vehicle exhaust gas	350	70 fewer
Railway	210	38 fewer
Jumping from high places	140	28 fewer
Using firearms	95	20 fewer
Total	4025	801 fewer

Search for evidence

One of the principles stated in the included national documents is that national suicide prevention strategies should be evidence based. It was recognized that, where possible, all suicide prevention strategies should be based on sound scientific research and supported by the experiences and knowledge of those groups and individuals working in the field of suicide prevention.[12] Where robust scientific evidence is lacking, a plan to build the evidence base that includes evaluations using methods appropriate to the question and context needs to be incorporated into the approach.[12]

After defining the problem, the next step is to search for evidence on the effectiveness of the potential options. Evidence can be obtained from literature review, survey data, or registry data, or by conducting primary research such as field evaluations.

Rationale for means restriction

Means restriction is one of the five major types of interventions that have been regularly undertaken and investigated for suicide prevention.[31] Means restriction, a key activity in a broader public health approach to reducing intentional injuries, is important and necessary to contribute to an overall effort to reduce the rates

of suicide deaths and suicidal behaviours.[14,32] It targets the entire population and provides a way of reaching the many at-risk individuals who are not in contact with health and social care services.

Means restriction is based on the belief that a small but significant number of suicidal acts are impulsive and of the moment.[14] A number of suicidal behaviours result from a combination of psychological pain or despair, coupled with the availability of the means by which to inflict self injury.[14] Measures to limit the availability of means are aimed mainly at reducing those suicidal acts that are impulsive or are the result of an acute or temporary crisis.

Suicidal crises are usually of short duration; for most people who become suicidal the period of the greatest risk is relatively short, lasting a few minutes or hours in some individuals. In others it may last no longer than a few days.[33] If their fatal outcome is prevented, attempts will not be repeated or help will be made available in the meantime.[34]

At the point at which a person feels hopeless and potentially suicidal, access to specific methods for suicidal behaviour can be crucial. Indeed, this may be the key factor that influences translation of suicidal thoughts into a suicidal act.[35] Most important, the nature of the method that is available may have a vital influence on the outcome, particularly where an act is impulsive. The person engaging in suicidal behaviour is likely to use the means most easily available.[33]

Making it difficult to access the means of suicide is a way of 'buying time' and giving the individual a chance to reconsider. If access to a lethal means of suicide is restricted at the time of crisis, then the chance for survival is greater.[33] This might be particularly important in children and youths, given that their emotional and cognitive abilities and coping skills may not be well developed. However, means restriction does not solve the problems that triggered the suicidal impulse in the first place, nor does it relieve the mental suffering of the individual.

Effectiveness of means restriction

Some of the included national suicide prevention documents have companion evidence documents. Information and conclusions about the effectiveness of means restriction policies/activities provided in these documents are briefly summarized below. However, the following section is not a result of a comprehensive search for evidence of effectiveness of means restriction.

Australia's national suicide prevention strategy was accompanied by an evidence document entitled Living Is For Everyone: Research and Evidence in Suicide Prevention.[36] Based on the information from systematic reviews conducted by other authors, the general conclusion is that means restriction is among a few strategies that can effectively reduce suicide death rates.

New Zealand published an evidence document entitled New Zealand Suicide Prevention Action Plan 2008-2012: The Evidence for Action[37] following the development and release of the national suicide prevention strategy. This

document found a large body of evidence addressing the extent to which restricting access to means of suicide may reduce rates of mortality and morbidity from suicidal behaviour. The evidence shows that restricting access to a specific method frequently results in reduced rates of suicide deaths and morbidity by that method; however, these reductions may not translate into significant reductions in overall suicide death rates.[37]

Another earlier evidence paper prepared in New Zealand[38] found that a major population-based component of many national suicide prevention strategies focuses on restricting access to means of suicide. However, the wide availability of the most common methods of suicide in New Zealand (i.e. hanging and vehicle exhaust gas) suggests that there is limited scope for the restriction of access in either youth or adults. Nevertheless, where it is possible to minimize suicide risk by restricting access to methods of suicide, these restrictions should be instituted as a matter of responsible and prudent 'best practice'.

One recent systematic review[31] that was mentioned in the above evidence documents examined evidence of the effectiveness of specific suicide preventive interventions. This comprehensive systematic review, prepared by suicide prevention experts from 15 countries, assessed research studies published between 1966 and 2005. With respect to means restriction, this review found that suicide death rates have decreased after:

- firearm control legislation (six studies),
- restrictions on pesticides (three studies),
- detoxification of domestic gas (six studies),
- restrictions on the prescription and sale of barbiturates (seven studies),
- changing the packaging of analgesics to blister packets (one study),
- mandatory use of catalytic converters in motor vehicles (four studies),
- construction of barriers at jumping sites (one study), and
- the use of new lower toxicity antidepressants (two studies).

The authors found that restriction of the commonly used means/method has led to lower overall suicide death rates, such as firearms in Canada and Washington DC, barbiturate restriction in Australia, domestic gas detoxification in Switzerland and the United Kingdom, and vehicle emissions in England. However, measuring the extent to which decreased overall suicide rates are directly attributable to restriction in access to particular means requires observation of long-term trends and consideration of confounding factors.

Delineation of options

Means restriction can be achieved through measures preventing hanging, self poisoning including intentional drug overdose, using firearms, or jumping from high places.

Details of goals, objectives, and actions for means restriction specified in each of the eight national suicide prevention strategy documents are presented in Appendix C. Components for means restriction, mainly derived from action areas of the strategies, are presented in terms of measures for overall means restriction as well as measures specific to certain types of means/method (Table 4).

Table 4: Means restriction components from national strategies

OVERALLL
Education
• Increase the proportion of primary care clinicians, other health care providers, and health and safety officials who routinely assess the presence of lethal means, including firearms, drugs, poisons and other means in the home, and who will provide education about actions to reduce associated risks
• Educate the public about the specific risk of harm and death by suicide any time there is a firearm in the home or otherwise available
• Educate parents about how to store and secure lethal means of self harm appropriately
• Promote vigilance among families and friends of people who have attempted suicide
Collaboration of different organizations
• Advocate for necessary legislation to support objectives of means restriction
• Improve communications among public safety, suicide prevention, and mental health promotion services
Assessment of presence of lethal means
• Develop an emergency department screening tool to assess the presence of lethal means in the home
• Develop standardized practices for law enforcement response to domestic emergencies and assess the presence of lethal means and advocate their removal or safe storage
Development of new technology and research
• Provide incentives for the discovery of new technologies such as annual awards and recognition
• Support and advocate for the development and use of technology to reduce the lethality of means, e.g. firearm locks, carbon monoxide shut-off controls, bridge barriers, and medication containers
• Continue examination of the evidence base for the effectiveness of restricting access to means of suicide
HANGING
• Redesign cell windows and furniture in prisons to reduce ligature points
• Remove non-collapsible curtain rails or potential ligature point from in-patient psychiatric wards
• Conduct environmental audits of in-patient psychiatric wards
• Support future research into means restriction to hanging in community settings

Table 4: Means restriction components from national strategies (cont'd)

POISONING
• Reduce pack size for over-the-counter sales of acetaminophen and aspirin • Introduce a safety warning and helpline number on over-the-counter packs of acetaminophen and aspirin • Explore the feasibility and potential benefits of promoting the safe disposal of unwanted medicines by the public and the recalling of unused prescribed antidepressants by clinicians • Develop educational materials to make parents aware of safe ways for storing and dispensing common pediatric medications • Support research to assess the risk of suicidal behaviour associated with prescription and over-the-counter medications
FIREARMS
• Facilitate and encourage discussions in relation to developing safer ways of licensing and storing firearms and ammunition • Promote compliance with firearms control regulations • Incorporate discussions of firearm risks and safe storage practices as a standard element for well-child care encounters
MOTOR VEHICLE EXHAUST
• Introduce catalytic converters in motor vehicles • Monitor the rate of suicide by this method • Continue to liaise with the car industry regarding potential future modifications to vehicle design and monitor international research in this area
JUMPING
• Identify suicide 'hotspots' (roads, railways, buildings, bridges, and open water) and work with planning and building authorities to ensure that access to these areas is restricted and, where appropriate, safety barriers are in place • Develop guidance on actions to be taken at high place hotspots • Promote safe building design for residential institutions that are housing people with a high risk of suicide, such as psychiatric in-patient units and corrections facilities • Promote the adoption by local government and other agencies of safe urban design, e.g. safe design of high places that might be used as jump sites • Provide signage and contact numbers to promote access to helplines in suicide hotspots (e.g. on bridges and high places)
RAILWAY
• Work with stakeholders on the potential for developing safety measures on railways (e.g. improved barriers) • Separate data recording of railway suicides to aid monitoring • Develop guidance on actions to be taken at hotspots
OTHER
• Design reliable ignition shut-off sensors that respond to potentially lethal levels of carbon monoxide

The comprehensiveness of the components covered in each national strategy varied considerably (see Appendix C). For example, the Australia suicide prevention framework only briefly mentioned reducing access to means of suicide under 'Universal intervention', one of the eight suicide prevention activity domains, but did not provide further details for this strategy. In contrast, national documents for England and New Zealand provided a great deal of details about actions for each type of means/method.

As shown in Table 4, action options for intentional overdose include:

- drug regulation for acetaminophen (also known as paracetamol) and acetylsalicylic acid (also known as Aspirin),
- parental education for safe storage of drugs,
- safe disposal of unwanted or unused medications, and
- research to determine the risk of medication-related suicidal behaviour.

Except for parental education, no means restriction strategy was specifically designed for children and youth.

Implementation of the chosen options

Five out of eight national strategy documents provided a detailed implementation plan that specified the lead and responsibility for implementing the strategy (Table 5).

Table 5: Implementation of national suicide prevention strategy

Country	Funding specific to means restriction	Implementation plan (action plan)	Lead	Responsibility for implementation
Australia	No	No	Unclear	Unclear
Canada	No	No	No	No
England	No	Yes	Yes	Yes
Ireland	No	Yes	Yes	Yes
New Zealand	No	Yes	Yes	Yes
Sweden[a]	Unclear	Unclear	Unclear	Unclear
United States	No	Yes	Yes	Yes
Wales	No	Yes	Yes	Yes

[a]Based only on English-language summary.

Following the development and release of the national suicide prevention strategy for England in 2002, the National Institute for Mental Health in England developed the Suicide Prevention Local Implementation Framework, a Strategic Multi-Agency Toolkit Aimed at Saving Lives in 2006.[39] This document provided detailed information on the responsible agencies/organizations for implementing and monitoring suicide prevention strategies and resources for each objective.

Funding

In Australia, the initial focus of the national strategic approach to suicide prevention was primarily on youth suicide. In the 1995 to 1996 federal budget, $13 million was allocated over 4 years to develop and implement a national plan for youth in distress. In the following year, a further $18 million was allocated to

expand the national youth suicide prevention strategy, with a total of $31 million allocated between 1995 and 1999.[8]

In 2000, the Living Is For Everyone (LIFE) Framework was developed in Australia. In 2006, under a Council of Australian Governments agreement, the Australian government doubled funding for the national suicide prevention strategy (from $61 million to $123 million) to enable the expansion of suicide prevention programs, particularly those targeting groups at high risk in the community.[8]

In Canada, Health Canada allocated $65 million dollars to the national Aboriginal youth suicide prevention strategy over 5 years starting in 2004-2005.[40]

In Norway, in the national budget for 1994, the Ministry of Health and Social Affairs proposed annual allocation of NOK 6 million (about CAD 1.2 million) for a national plan for suicide prevention.[41]

The Scottish Executive was allocating GBP 12 million over 3 years to directly support and complement national (GBP 3 million) and local (GBP 9 million) efforts to deliver and implement the first phase of the national strategy and action plan.[42] This was to ensure that Choose Life is implemented effectively through a co-ordinated program of activities involving national and local agencies, local community-based initiatives, voluntary organizations, and self help groups.

However, except for the Australian national suicide prevention strategy,[8] other national strategies mentioned above did not address means restriction. No information is available in terms of funding specifically allocated to activities related to means restriction.

Leadership

It has been well recognized that national suicide prevention strategies should be implemented under national and local leadership, which is the current practice in some countries.

For example, the Ministry of Health in New Zealand has the responsibility to lead and co-ordinate the multi-sectoral implementation. They will co-ordinate the development of an action plan, which will be updated every five years.[12] These action plans will specify the type of activities to be undertaken, identify which government agency will lead which action, and contain specific outcomes and time frames. They will also identify those actions that can be undertaken within existing resources and where additional resources will be needed.

At the local level, the active involvement of communities is essential if implementation of the strategy is to have maximal effect. A community-wide approach to suicide aims to encourage community ownership of suicide prevention activities and to facilitate community members in playing an active role in the planning, development, and implementation of such activities.[12]

According to the New Zealand Suicide Prevention Strategy,[12] to be most effective, the community-wide suicide prevention plans should:

- base their approach on safe suicide prevention interventions,
- have an identified group responsible for leadership and coordination,
- utilize existing community structures and initiatives,
- utilize specialist advice where needed,
- have a shared vision, and
- have a planned approach to build capacity and readiness.

Following the development of the New Zealand Suicide Prevention Strategy 2006-2016,[12] the New Zealand Suicide Prevention Action Plan 2008-2012: The Summary of Action[43] was developed to identify outcomes, actions, milestones, time frames, and the lead agency or agencies responsible for implementing the actions.

In England, the National Institute for Mental Health in England (NIMHE) was designated as the national lead for implementing the suicide prevention strategy. In terms of strategies on means restriction, NIMHE's responsibility is to identify additional steps that can be taken to promote safer prescribing of antidepressants and analgesics and help local services identify their suicide 'hotspots' (e.g. railways, bridges) and take steps to improve safety at these areas.

Current means restriction policies/practices

Although relevant information is limited, the included national suicide prevention documents and their companion documents provided some examples of means restriction policies and practices that are currently in place.

Hanging

- Redesign of cell windows and furniture to reduce ligature points (in prisons) (England).
- Removal of non-collapsible curtain rails from in-patient units (England).
- Removal of ligatures, ligature points and sharp objects, and the design to allow clear lines of sight in institutional settings (New Zealand).
- Institutions with existing policies for preventing suicide include prisons, residential units of Child, Youth, and Family Care and Protection and Youth Justice, police cells, court cells, and psychiatric in-patient units (New Zealand).
- New Zealand police and the Department of Corrections provide some 'suicide safe' cells for detainees, prisons have 'at risk units', and psychiatric in-patient units are built to safety guidelines (New Zealand).

Poisoning

- Reduced pack size for over-the-counter sales of acetaminophen (paracetamol) and acetylsalicylic acid (aspirin).
- A report on the Disposal of Unwanted Medication Properly (DUMP) campaign in the Health Service Executive South Western Area was finalized (Ireland).[44]
- Data collection on the types of medications used in overdose and ongoing evaluation on the correlation of drugs returned and medication used for overdose (Ireland).[45]
- Withdrawal of license for co-proxamol by the end of 2007 (United Kingdom).[46,47]
- The Medicines Act 1981 regulates access to all pharmaceutical drugs in New Zealand, including tricyclic antidepressants, opioid analgesics, and acetaminophen (New Zealand).[37]
- The Medicines Classification Committee, set up under the Medicines Act, makes recommendations to the Minister of Health regarding the classification of medicines and access to medicines by health professionals and the public where concerns arise (New Zealand).[37]

Firearms

- Canada Firearms Act in 1977, amended in 1995 (Canada).[48]
- New Zealand's parliament is considering proposed amendments to the 1983 Arms Act that would strengthen requirements for secure firearm storage (New Zealand).[37]

Vehicle exhaust gas

- Regulation and legislation on catalytic converters in motor vehicles (United States, Europe).
- Requirement of all imported cars to be installed with catalytic converters (New Zealand).[37]

Jumping

- Posted contact number of the Samaritans (a telephone counseling service in the United Kingdom) on bridges and high places (England).[10]

Evaluation of the impact

An ideal, evidence-based prevention intervention is one that has been evaluated and found to be safe, ethical, and feasible as well as effective. Systematic evaluation of all suicide prevention projects, activities, and programs is essential for the continued development of best policy/practice. Evaluation will ensure

that interventions are based on a solid foundation of evidence, that resources and effort are allocated appropriately, and that the required outcomes and impacts can be achieved.8

Evaluation framework/approach

Australia used a program logic approach[49] to evaluate its national suicide prevention strategy. This approach can provide a rigorous alternative to experimental methods of program evaluation. Central to the program logic approach is the exercise of developing program logic models or maps that provide a simplified diagram of the core elements or components of a program that may need to be considered in evaluation. The framework used in this Australian manual involves four basic levels: 1) input/strategies, 2) process and structures, 3) impacts, and 4) outcomes.

Outcome evaluation

Attempts to prevent suicide consist of a number of complex, interrelated activities, which make it very difficult to examine the association between suicide prevention activities and the outcomes. Furthermore, suicide is a rare event, which leads to problems in relying upon reductions in suicide death alone as evidence of effectiveness.[50] Other outcomes, such as reduction of suicide attempts (self poisoning), emergency department visits or hospitalizations, increased rate of liver transplantation due to acute liver toxicity of acetaminophen, or improved knowledge of parents for safe drug and firearm storage, should be considered.

Evaluation of suicide prevention activities may focus on the following indicators:[8]

- effectiveness indicators,
- program quality indicators,
- efficiency indicators, and
- quantity indicators.

How to monitor suicide death rates also requires careful consideration as suicide death rates fluctuate over time as a result of major socio-economic events.[51] In England's annual progress reports, suicide death rates are measured using three-year pooled rates.[52] Three-year rolling averages are generally used for monitoring purposes, in preference to single year rates, to avoid drawing undue attention to year-on-year fluctuations instead of the underlying trend of the data.

Ongoing monitoring of outcomes

England has published annual progress reports since the release of its suicide prevention strategy in 2002. These progress reports are not formal evaluation studies but provide updated information on ongoing monitoring of the outcomes.

The most recent progress report published in 2007[52] offered the following observations:

- There was a 10% reduction in the overall suicide death rate, from 9.2 in 1995/96/97 to 8.3 per 100,000 persons in 2004/05/06.
- There has continued to be an encouraging and sustained reduction in suicide death rates among young people under the age of 35 years; however, the proportion of suicides among this group of people is still high when compared to other age groups.
- The suicide death rate among teenagers continues to fall and is below the rate of the general population.
- While causes of deaths by drug-related and other poisonings has decreased considerably, deaths by hanging and suffocation have increased, particularly in males, accounting for half of all male suicide deaths.
- Among women, drug related poisoning is still the most common method for suicide, accounting for 38% of all female suicide deaths.

Canadian Context

National suicide prevention strategy

In 1993, Canada hosted the first international conference on suicide prevention in Calgary and Banff, Alberta,[9] which resulted in the first United Nations guidelines for a national strategy on suicide prevention.[53]

Health Canada published a report entitled Suicide in Canada in 1987, which was updated in 1994.[54] In 2004, the Canadian Association for Suicide Prevention (CASP) published the CASP Blueprint for a Canadian National Suicide Prevention Strategy.[9] With the change in federal government, a national strategy has yet to be developed. Means restriction was identified as one of the seven goals within the blueprint but measures for means restriction were only stated in the objectives without any detailed action plan. The components for means restriction covered in the blueprint are not as comprehensive as in the documents by some other countries such as England (Table 6). No published implementation (including funding) and evaluation plans were found since the publication of the blueprint.

Table 6: Comparison of the Canadian national strategy with other countries

Country	Hanging	Poisoning	Firearms	Vehicle exhaust gas	Jumping
Canada	×	✓	✓	×	✓
Australia	×	×	×	×	×
England	✓	✓	✓	✓	✓
Ireland	×	✓	✓	×	✓
New Zealand	?	✓	✓	✓	✓
Sweden	?	✓	✓	✓	✓
United States	×	✓	✓	✓	×
Wales	✓	✓	×	×	✓

Symbols: ✓: yes; ×: no; ?: not clear.

A Canadian national Aboriginal youth suicide prevention strategy was developed and released in March 2006.[40] Its ultimate goal is to reduce risk factors and promote protective factors for suicide. In 2005, the federal government committed CAD 65 million over 5 years to support this national strategy. However, this national strategy document did not contain any means restriction strategies.

National suicide prevention policy and practice

Canada's firearm legislation in 1977 (Bill C-51) required acquisition certificates for all firearms, restricted sales of certain types of firearms (such as semi-automatic weapons), and restricted sales to certain types of individuals (such as those under the age of 16 years and those convicted of a violent offence in the previous five years).[55,56] In 1991, Bill C-17 tightened up restrictions and established controls on any firearms that had a military or paramilitary appearance.[56] The Firearms Act of 1995 (Bill C-68)[48] introduced new, stricter gun control legislation.[55,56]

The National Association of Pharmacy Regulatory Authorities (NAPRA) was contacted and confirmed that no federal regulation on medications has been developed to date for the purpose of preventing intentional or accidental drug poisoning. Health Canada, Federal Food and Drug Regulation, was also contacted, but no information was available regarding drug regulation for the purpose of suicide prevention.

Discussion

Questions from Alberta Health Services

What policy/practice has been put in place nationally in Canada and other countries to reduce access to various means used in suicide attempts and suicide deaths?

Information regarding current national means restriction policy and practice is very limited. Some examples derived from the included national suicide prevention strategy documents and their companion documents are presented in Table 7.

Table 7: Summary of current means restriction policies/practices

HANGING
• Redesign of cell windows and furniture in prisons to reduce ligature points • Removal of non-collapsible curtain rails from in-patient psychiatric wards • Existing policies for preventing suicide in institutions such as prisons, residential units for children and youth, youth justice, police cells, court cells, and psychiatric in-patient units • Provision of 'suicide safe' cells for detainees, 'at risk units' in prisons, and safety guidelines for psychiatric in-patient units
DRUG POISONING
• Regulation on acetaminophen: reduced pack size for over-the-counter sales of acetaminophen and acetylsalicylic acid, and withdrawal of licence for co-proxamol • Regulations on other medications such as tricyclic antidepressants and opioid analgesics • Proper disposal of unwanted medications • Data collection on the types of medications used in overdose and ongoing evaluation on the correlation of drugs returned and those medication used for overdose • Recommendations to the Health Ministry regarding the classification of medications and access to medications by health professionals and the public where concerns arise
FIREARMS
• Firearms legislations
VEHICLE EXHAUST GAS
• Regulation and legislation on catalytic converters in motor vehicles • Requirement of all imported cars to have catalytic converters
JUMPING
• Posted contact number of the telephone counselling centre on bridges and high places

Although hanging is the most commonly used method for suicide among the general population, especially in males, it is very difficult to prevent hanging in a public setting. As can be seen from this table, current efforts for preventing hanging are limited to institutional settings such as psychiatric hospitals or prisons.

The most widely known national policy for restriction of means for drug poisoning is the United Kingdom regulation on acetaminophen and acetylsalicylic

acid. The relevance of this policy to the context of Canada and Alberta needs further exploration as the majority of drug-related suicide deaths are caused by unspecified drugs and biological products in Canada.

Has any means restriction policy/practice been developed or implemented specific to children, youths, or young adults?

In general, the national suicide prevention strategies related to means restriction did not specifically target children and youth, except for parental educational activities.

What funding has been allocated to the implementation of means restriction policy or practice?

No information is available regarding the amount of funding allocated specifically to means restriction strategies.

What are the gaps in policies to inform future means restriction policy/practice efforts in Alberta?

Although a variety of potential measures have been proposed for restricting access to different means used for suicide, currently existing policies and practices cover only a small portion of these measures (Appendix D). Hanging is the most commonly used method for suicide in Alberta, but the possibility of strategies to prevent hanging in public settings is very limited. Intentional overdose is the most common method used by females; thus, strategies to reduce intentional overdose might have a limited impact on males, who account for the majority of suicide deaths. The potentially effective means restriction measures that are not currently in place need to be carefully considered for future means restriction efforts in Alberta.

What is the effectiveness of a means restriction strategy?

This report is not a systematic review of the research evidence on the effectiveness of various means restriction interventions. A recent systematic review prepared by suicide prevention experts from 15 countries found that suicide death rates have decreased after firearm control legislation, restrictions on pesticide, detoxification of domestic gas, restrictions on the prescription and sale of barbiturates, changing the packaging of analgesics to blister packets, mandatory use of catalytic converters in motor vehicles, construction of barriers at jumping sites, and the use of new antidepressants with lower toxicity.[31]

Preliminary results from England's progress reports showed that the overall suicide death rate has declined since the development and implementation of the suicide prevention strategy in 2002.[10] While the number of deaths by drug poisoning has been significantly reduced, the number of deaths by hanging has been increasing. The observed changes need to be interpreted with caution.

As in any society, there are innumerable confounding factors such as socio-economic, demographic, quality of medical care, divorce rate, substance abuse,

and level of education to be taken into account. Therefore, data on the reduction in suicide death rates of one strategy over another must be interpreted cautiously.

Role of means restriction

Means restriction by itself is only one component of an integrated suicide prevention policy that attempts to reduce rates of suicide and attempted suicide.[57] Restriction of access to certain means may lead to an elimination of suicides by that means but not to a reduction in overall suicide rates. It has been argued that efforts in means restriction may lead to temporary decreases, but people who are determinedly suicidal eventually find some other way to die by suicide.[58] Different ways of looking at epidemiological data related to these examples have resulted in continuation of this debate.[58]

Monitoring long-term changes in suicide rates and suicide by a specific means or method following the development of a national suicide prevention strategy may provide help to clarify the issue of means substitution.

Implementing these strategies requires a concerted effort across a number of government departments. One component of a comprehensive policy is to monitor if a decrease in suicide deaths using one means results an increase in suicide deaths using different means.

Socio-demographic differences across countries also impact the effectiveness of different means restriction strategies. There is a need to collect data to inform policy-making in Canada.

Conclusions

Eight national suicide prevention strategy documents were found that addressed means restriction strategies, which varied in scope, comprehensiveness of the means restriction components covered, implementation and evaluation plans, and ongoing monitoring activities.

In general, national suicide prevention strategies focused on restriction of means of suicide from poisoning (e.g. drug overdose), vehicle exhaust gas, use of firearms, jumping from high places (e.g. bridges or high building), and access to railways. However, little is done on prevention of hanging in public settings, although hanging is the most commonly used method worldwide. Some attempts have been made to restrict means for hanging in institutional settings such as prisons and psychiatric institutions.

Strategies specific to reducing intentional drug poisoning include legislation of acetaminophen and co-proxamol, parent education about safe storage of medications, and appropriate disposal of unused, or unwanted medications.

England's national suicide prevention strategy serves as a good example of a comprehensive and co-ordinated strategy with goals for feasible action. This strategy outlines a set target for reduction in total number of suicides as well as in the number of suicides by each means or method to be achieved within a certain time frame. It covers different aspects for means restriction with detailed plans for implementation and ongoing monitoring.

In contrast, Canada does not have a government-issued national suicide prevention strategy. The blueprint prepared by the Canadian Association for Suicide Prevention outlined the goals and objectives but did not contain detailed plans of action, implementation, or evaluation.

In terms of intentional drug poisoning, no national strategy particularly targeted children, youth, and young adults. No information is available regarding the funding allocated to means restriction strategies.

Alberta's future efforts on means restriction need to consider a broad range of strategies and activities that address commonly used means and methods used for suicide in Alberta, such as hanging, use of firearms, overdose, or carbon monoxide poisoning. However, the potential of means restriction strategies in reducing overall suicide rates from hanging, the most commonly used method for suicide, is limited. Focusing on reducing suicide deaths by intentional overdose may lead to a reduction in suicide rates by females but will have limited impact on male suicide death rates.

Part II: Preventing Intentional Overdose – Policies/Strategies and Their Effectiveness

Objectives and Scope

The objectives of Part II of the report are:

1. to identify national and provincial/state/regional intentional overdose prevention policies/strategies from the eight countries with existing national means restriction strategies and
2. to examine the research evidence on the effectiveness of intentional overdose prevention policies/strategies.

Part II of the report attempts to address the following questions:

- What policies or practices have been put in place at the national, provincial, state, and regional levels to reduce intentional overdose?
- Have there been any policies or strategies developed and implemented specifically to restrict access to agents for the purpose of intentional overdose among children, youth, and young adults, particularly those aged 15 to 24 years?
- What is the effectiveness of the identified intentional overdose prevention strategies and policies?
- What are the research gaps to inform future intentional overdose prevention efforts in Alberta?

Part II of the report addresses only intentional overdose of prescribed or over-the-counter (OTC) medications or self poisoning by alcohol. Policies/strategies that address illicit drug abuse or other aspects of suicide means/methods such as use of firearms, hanging, or jumping from high places are beyond its scope.

Background

Definition

The Intentional Overdose Initiative (2007 – 2010) is one of the key initiatives of the Alberta Suicide Prevention Strategy; however, the term *intentional overdose* was not defined in the provincial suicide prevention strategy documents. A comprehensive literature search with the assistance of an information specialist at

the Centre for Suicide Prevention in Calgary, Alberta, Canada, did not uncover an appropriate definition from a reliable source. It appears that several terms, such as intentional drug overdose, self poisoning, or deliberate self poisoning, are used interchangeably in the literature and may refer to the same or similar concepts.

For the purpose of this report, the term *intentional overdose* is defined as the act whereby individuals purposely take higher than safe doses of prescribed or OTC medications or alcohol with the intent to die. This definition is in line with the ICD-10 (International Classification of Diseases, version 10) category Intentional self-harm/Intentional self-poisoning by different drugs and alcohol (X60 to X65).[59]

Suicide by intentional overdose

In most of the eight countries included in the first part of the report, self poisoning was identified as the most common method used by females and the second most common method used by males for suicide. Canada is similar to these countries in terms of commonly used means and methods for suicide. In Canada, the majority of intentional overdose-related deaths were caused by unspecified drugs, medications, and biological substances (Table 8), which underscores the difficulty in our current data collection system. Alcohol was the cause of death in a very small proportion of people who died by suicide. However, the number presented in Table 8 may not be accurate because alcohol is often taken in combination with other medications and it is not clear whether this number only reflects single-agent deaths.

Table 8: Intentional overdose-related suicide deaths (Canada, 2004 data)

Types of drugs	Number of deaths	Number of male deaths	Number of female deaths
Unspecified drugs, medications, and biological substances	389	171	218
Antiepileptics, sedative-hypnotics, antiparkinsonians, and psychotropics	126	57	69
Narcotics and psychodysleptics	87	60	27
Nonopioid analgesics, antipyretics, and antirheumatics	31	12	19
Alcohol	7	5	2
Other drugs acting on the autonomic nervous system	3	2	1

Source: Statistics Canada 2007.[25]

Survivors of intentional overdose are a burden on the health care system, particularly on emergency departments or in-patient hospital beds that are required to treat clinical presentations of intentional overdose. A comprehensive literature review on the epidemiology of intentional overdose in Alberta was

requested of the Alberta Centre for Injury Control and Research; thus, this report made no attempts to provide detailed epidemiology data.

Acetaminophen poisoning

Acetaminophen (a generic name used in North America, also known as paracetamol in some European countries) is the most widely used OTC analgesic (pain reliever) and antipyretic (fever reducer) in many countries, including Canada, and is one of the most frequently used drugs in intentional overdose.[60,61] Acetaminophen accounts for most of the drug overdoses in Australia, New Zealand, the United Kingdom, and the United States.[62,63,65] In the United Kingdom, an estimated 70,000 cases of acetaminophen overdose occur each year,60 with approximately 220 to 250 deaths mainly resulting from acetaminophen-induced liver necrosis.[33]

A Canadian population-based study analyzed medication self poisoning of 18,383 Ontario residents who presented to a hospital emergency department in that province between 2001 and 2002.[64] This study found that in youths (aged 12 to 17 years), about 40% of the presentations involved analgesics that were typically not prescribed and most often were from the acetaminophen agent-group. The acetaminophen agent-group was most consistently associated with medical severity; this effect was strongest among female youth.

In a population-based study[65] conducted in a large Alberta health region that provides medical and surgical care to approximately 1.1 million residents, 1543 patients had 1680 hospital admissions for acetaminophen overdose between 1995 and 2004. Of these, the majority of overdoses (85%) were intentional. The highest hospitalization rates were observed in the 10 to 19 year and 20 to 29 year age groups (35.5 and 30.3 per 100,000 persons, respectively).

While acetaminophen is generally safe for human use at recommended dosages, acute overdose is the most common cause of acute liver failure in the western world.[60] Acetaminophen overdose typically has a good prognosis, even if acute liver failure has developed.[66] Less than 5% of patients who take toxic quantities of acetaminophen (150 mg/kg body weight) develop acute liver toxicity, and survival without transplantation for those who develop encephalopathy (about 65%) exceeds that for most other forms of acute liver failure.[65]

Acetaminophen is relatively less toxic in children and there are no reported confirmed deaths from acute poisoning.[67] Whereas acetaminophen poisoning is predominantly seen in adolescents and young adults, the majority of acetaminophen-associated deaths occur in older populations.[68]

Easy access is reported to be the most common reason for patients choosing to overdose on acetaminophen.[67] Excluding preparations that combine acetaminophen with other ingredients (e.g. opioids, codeine), approximately 1.5 billion tablets are sold annually in Canada,[69] and approximately 3.2 billion tablets are sold every year in the United Kingdom.[70]

Co-proxamol poisoning

Co-proxamol is a prescription-only analgesic that combines dextropropoxyphene hydrochloride 32.5 mg and acetaminophen 325 mg.[71] An overdose of as few as 15 to 20 tablets can be fatal, especially if taken in conjunction with alcohol or another central nervous system depressant.[71] Death from co-proxamol overdose, caused by respiratory depression and cardiac effect, sometimes occurs within 1 hour of ingestion.[71] The acetaminophen component rarely contributes directly to death. In most fatal cases, death occurs rapidly from cardiorespiratory effects of dextropropoxyphene overdose before acetaminophen-induced liver damage can take effect.[71]

In England and Wales, between 1997 and 1999, 18% of drug-related suicides involved co-proxamol, which constituted 5% of all suicide deaths.[71]

Policies/Strategies for Preventing Intentional Overdose

A comprehensive search (see Search Strategy in Appendix A: Methodology) was conducted to identify national, provincial, state, and regional intentional overdose prevention policies, strategies, and practices from the eight countries (Australia, Canada, England, Ireland, New Zealand, Sweden, United States, and Wales) with existing national means restriction strategies. As presented in Part I of this report, most of the national strategies included intentional overdose prevention components. Intentional overdose prevention policies and strategies currently exist in some provinces, states, or regions in four countries, including Australia, Canada, the United Kingdom, and the United States. Detailed policies and strategies from each of the provincial, state, and regional documents are extracted and presented in Appendix D (Table D.1). Documents that did not address intentional overdose were excluded and are listed in Appendix B (Table B.2).

The key components of included intentional overdose prevention strategies identified from the included documents are grouped according to types of the strategies and are listed in Table 9. For each component outlined, no information was available regarding the evidence base. Furthermore, the included documents generally did not state whether the strategies specifically target children and youths.

Table 9: Identified intentional overdose prevention policies/strategies

REGULATION/LEGISLATION
• Set legal limits on the pack sizes of nonprescription drugs such as acetaminophen • Use phased withdrawal of prescription-only pain drugs such as co-proxamol • Expand the national policy of prescription of schedule 2 controlled drugsa and diazepam to certain drugs at local communities
AWARENESS AND EDUCATION
General public • Public awareness campaign to promote safe disposal of unused medications • Public education of toxicity of acetaminophen • Education about safe storage of medications • Flyer distribution, public forums, and media coverage to illustrate methods for the storage of medications, particularly prescribed medications and those dispensed in large quantities • Suicide prevention education and support for communities provided by the Department of Emergency Services through programs such as drug overdose visitation **Clinicians, pharmacists, and other health care professionals** • Raise awareness among prescribers of relevant NICE guidelines and prescribed drugs to be dispensed in instalments • Increase awareness about self poisoning among staff working with young people • Conduct public forums for parents, guardians, and media on strategies for securing medications, particularly prescription drugs and those stored in large quantities • Recognition of potential roles of pharmacists in the promotion of mental health through public health campaigns and medicine usage reviews • Encourage discharge nurses, physicians, law enforcement personnel, first responders, and pharmacists to share information verbally and provide education on the safety measures related to the safe storage of the patient's prescribed medications • Support continuing medical education to assist physicians and other health care professionals in making appropriate clinical judgments when prescribing **Children and their parents or guardians** • Develop and disseminate educational materials to make parents aware of safe methods for the storage and dispensing of common pediatric and other medications • Emergency department staff to provide education to parents of children who are assessed to be at risk of suicide • Encourage discussions of lethal means and safe storage practices in educational programs for young people, parents, and gatekeepers
SAFE PRESCRIPTION
• Prescribe antidepressants and analgesics more safely • Address issues regarding the use of venlafaxine and tramadol by the county-wide trust clinical prescribing group • Record details about the prescription of atypical antipsychotic medications substituted for typical medications because of their side effects • Substitute nonlethal medications for lethal ones • Prescribe the right medication in the right amount (no more than 14 days' supply) for patients at risk of suicide • Use of seven-day dispensing and regular reviews of prescribed medication and blister packs • Establish a standard discharge medication protocol • State the appropriate medication and who prescribes in all discharge letters and care plans • Develop all care plans or discharge letters to include explicit advice to every patient's general practitioner about appropriate prescribing quantities • Send a letter to all general practitioners outlining national and local research evidence that recommends reduced prescribing of medications (dothiepin, co-proxamol, and amitriptyline) that are potentially toxic in overdose amounts • Provide pharmacy information leaflets and advice to the public • Develop best practice based guidelines for safer dispensing of medications for individuals at heightened risk of suicide

Table 9: Identified intentional overdose prevention policies/strategies (cont'd)

SAFE STORAGE AND DISPOSAL OF MEDICATIONS
• Increase the number of health care professionals who provide counselling to parents of children and adolescents about the safe storage of lethal means (e.g. drugs) • Use a primary care trust prescribing team to promote appropriate medication disposal and reduce hoarding of medications • Promote safe storage of medications in the home • Promote safe disposal of unwanted medications by the public and encourage clinicians to recall unused prescribed antidepressants • Ensure an understanding and application of the Child Access Protection law and methods for safely storing medications (prescription and OTC) and poisons in households with young children and/or households where children visit
SCHOOL PROGRAMS
• Implement drug interventions in the school by alcohol and drug workers • Adopt and enforce alcohol policies at community colleges, universities, and college campuses
ASSESSMENT OF ACCESS TO LETHAL MEANS
• Increase the proportion of primary care and mental health clinicians, other health care professionals, and public safety officials who routinely assess the presence of lethal means such as drugs and poisons in the home or institutional setting in higher risk situations (person with depression or recently arrested) • Develop an emergency department screening tool that can be used to assess the presence of lethal means within a place of residence, for use in in-patient care, home care, and at discharge planning
DATA COLLECTION AND MONITORING SYSTEM
• Obtain information about types of poisoning and communicate with primary care pharmacies about prescribing issues • Collect and analyze information about the lethal means of suicide in a state-wide data system, including where the agents were obtained and how they were stored • Establish an ongoing county-wide audit to obtain information on the number of deaths by drug poisoning (both prescribed and OTC drugs) • Audit prescribing patterns in primary care, including the number of days on the prescription and whether all prescriptions for antidepressants are clinically indicated • Implement a state-wide prescription drug monitoring system • Develop a fact sheet with statistics on the use of medications and suicide risk and distribute it to care providers, communities, and individuals at suicidal risk
RESEARCH, NEW TECHNOLOGY, AND PARTNERSHIPS
• Work with pharmaceutical companies to encourage research and development of new technologies and appropriate barriers to access • Identify evidence-informed interventions to reduce the use of OTC medication for suicide attempts • Develop safe medication containers • Encourage the education and health departments to work together to support school staff in early identification of risk and facilitating appropriate responses to suicidal and self harming behaviour and mental health problems • Work with state pharmacist associations and other stakeholders to develop and disseminate public information messages about the prevention of intentional overdose with prescription and nonprescription medications

[a]Schedule 2 controlled drugs: a category of drugs considered to have a strong potential for abuse or addiction but which have legitimate medical use. Among the substances so classified by the Drug Enforcement Agency are morphine, cocaine, pentobarbital, oxycodone, alphaprodine, and methadone.[72]

Abbreviations: NICE: National Institute of Health and Clinical Excellence; OTC: over-the-counter.

Of the policies and strategies outlined above, there are a few examples where actions have been taken or are ongoing to prevent intentional overdose. The following provides two examples of intentional overdose prevention practices with supplemental information obtained from other reference sources.

In 1998, the government of the United Kingdom introduced legislation that reduced the maximum pack size from 25 to 16 tablets or capsules of all non-effervescent tablets and capsules containing acetylsalicylic acid or acetaminophen that can be sold or supplied from outlets other than registered pharmacies.[73] The legislation also stated that pharmacies may sell packets of up to 32 tablets or capsules, that no more than 100 tablets or capsules (or a combination of both) may be supplied at any one time,[74] and that specific warnings about the dangers of acetaminophen overdose must be printed on packets and leaflets in packets.[75]

In 2001, Ireland published its Medicinal Products (control of acetaminophen) Regulations, which impose further restrictions on the sale of medicinal products containing acetaminophen.[76] It was stated in the explanatory note that, in general, these regulations:

1. prescribe maximum pack sizes for products when sold in pharmacies and in non-pharmacies,
2. prescribe cautionary and warning statements that must appear on all packs,
3. prohibit the sale of acetaminophen products in automatic vending machines,
4. prohibit the sale of acetaminophen products in non-pharmacy outlets when a second analgesic component is concerned,
5. prohibit the sale of multiple packs of acetaminophen in the course of a single transaction, and
6. prohibit the sale of acetaminophen products unless they are in blister packs or equivalent form of packaging.

An Irish report documented progress of the disposal of unwanted medication properly (DUMP) campaign.[44,45] One hundred fifty seven and 254 pharmacies participated in the DUMP project during 2005 and 2006, respectively.[44,45] Each participating pharmacy was provided with waste disposal containers, information leaflets, and promotional posters for display to alert customers. Over 10 tonnes of unused and out-of-date medications were collected in 2006.[45]

Funding

In the included documents, no information was available in terms of funding support for means restriction or intentional overdose prevention policies/strategies.

Effectiveness of Strategies to Reduce Intentional Overdose

Description of the included studies

A comprehensive and systematic literature search (see Search Strategy in Appendix A: Methodology) identified three systematic reviews[30,31,77] and 22 primary studies that met the inclusion criteria (see Study Selection in Appendix A: Methodology). Details extracted from the included systematic reviews are presented in Appendix E (Table E.1). Of the 22 primary studies, 12 studies[63,78-88] were included in the two systematic reviews;[30,77] therefore, no data extraction was performed for these studies (Table E.2). Information extracted from the remaining 10 studies is summarized in Appendix E (Table E.3). Excluded systematic reviews and primary studies and the reasons for their exclusion are listed in Appendix B (Table B.3).

Findings from systematic reviews

Three systematic reviews[30,31,77] published between 2005 and 2007 were identified (Table 10). One review[31] examined the evidence on all kinds of suicide prevention strategies including means restriction, whereas the other two[30,77] focused only on the impact of restricting acetaminophen pack size on acetaminophen poisoning in the United Kingdom. Studies conducted outside the United Kingdom were not included in these two reviews.

Table 10: Conclusions from systematic reviews

Review	Conclusions
Mann et al. 2005[31]	Suicides rates decreased after restrictions on the prescription and sale of barbiturates, changing the packaging of analgesics to blister packets.
Morgan and Majeed 2005[77]	The limitations of the reviewed studies make it difficult to draw firm conclusions. They do, however, suggest that the 1998 regulations may have been associated with reduced admissions to specialized liver units and liver transplants, reduced hospital attendance due to acetaminophen poisoning, and reduced sales of acetaminophen.
Hawkins et al. 2007[30]	The literature to date provides inconclusive evidence as to whether the legislation to reduce acetaminophen pack size in the United Kingdom has been effective in reducing acetaminophen poisoning.

The review by Mann et al.[31] included 10 systematic reviews/meta-analyses and 83 primary studies that covered a wide range of suicide prevention strategies. Ten of the 83 primary studies are relevant to intentional overdose prevention: seven studies (published between 1972 and 1996) focused on barbiturate restriction, one (published in 2002) on analgesic packaging changes, and two on alcohol restriction (published in 1998 and 1999, respectively).

This review found that restriction of commonly used means has led to lower overall suicide rates. Suicides have decreased after restrictions on the prescription and sale of barbiturates (in Australia) and changing the packaging of analgesics to blister packets (in the United Kingdom). Restrictions on access to alcohol have coincided with decreases in overall suicide rates in the former Union of Soviet Socialist Republics and Iceland. It appears that this review did not include many effectiveness studies on drug poisoning, and the inclusion criteria for means restriction studies were not clearly specified.

Of the two systematic reviews that focused on acetaminophen legislation, the review by Morgan and Majeed[77] that was published in 2005 included 12 primary studies, and the review by Hawkins et al.[30] that was published in 2007 included 17 primary studies (Appendix E, Table E.1). Ten of the included studies overlap between the two reviews.

Outcome measures included acetaminophen-related deaths, hospital admission for acetaminophen poisoning, admission to specialized liver units or liver transplantation, severity of acetaminophen poisoning, and acetaminophen sales. In the two reviews, however, outcomes were not reported separately for intentional versus accidental acetaminophen poisoning.

The findings of both reviews are similar. The review by Hawkins et al.[30] included more recent studies and offered thorough discussions on the study results and methodological issues; thus, this review is used as the primary source for the information presented below.

Deaths by acetaminophen poisoning

The data reported for deaths caused by acetaminophen poisoning are not consistent but appear to suggest that death rates by acetaminophen poisoning may at least be decreasing in England and Wales. A 2004 study[82] found a 34% reduction in suicide deaths due to acetaminophen (used as a single agent) overdose over the 2 years following the introduction of the legislation compared with the 2 years before its introduction. In Scotland, death rates by acetaminophen poisoning appear to be relatively constant. Four large studies conducted in Scotland have shown no significant decrease in mortality rates since the introduction of the legislation in 1998.

One study published in 2005[80] showed the reductions in acetaminophen-related deaths and hospital admission for acetaminophen poisoning in England and Wales began in 1997 (1 year before the legislation). Notably, a different study, published in 2001,[63] used the same mortality data but failed to demonstrate this trend.

Acetaminophen poisoning related mortality statistics need to be interpreted with some caution, as recording deaths from acute poisoning is not straightforward. Where more than one substance (other than alcohol) is implicated in a poisoning death, there is usually no indication on the death certificate as to which

substance was principally responsible for the death. Therefore, death rates due to acetaminophen poisoning, particularly those where death has occurred with acetaminophen preparations covered by this legislation, may not be accurate.

Hospital admissions for acetaminophen poisoning

Hospital admissions due to acetaminophen poisoning appear to be decreasing. However, the reduction seems to be confined to England and Wales; hospital admissions in Scotland appear to have increased beyond pre-legislation levels. Only one small study assessed whether a switching effect had occurred following acetaminophen restriction legislation and showed an increase in overdoses with other agents such as antidepressants, antipsychotics, and sedatives.

Admission to specialized liver units and liver transplants

While five of the seven included studies showed reductions in the number of admissions to specialized liver units and liver transplants, two studies did not find any change. A 2001 study[63] found a 30% reduction in admission to specialized liver units, with 66% fewer patients undergoing liver transplantation. Accurate interpretation of the data requires that both the criteria for admissions to specialized liver units and the criteria for liver transplantations have remained constant both across the review period and across the liver units in question.

Severity of acetaminophen poisoning

Severity of acetaminophen poisoning can be measured by the number of tablets taken, frequency of the use of antidotes, or plasma acetaminophen concentration. One study showed a reduction of the mean number of tablets taken from 21.1 to 19 (2.1 reduction), which may be statistically significant but not of clinical significance. The most sensitive marker of risk from acute acetaminophen poisoning is plasma acetaminophen concentration measured between 4 and 15 hours after ingestion; this is also a good guide to determine the amount ingested, as patient-reported histories are often unreliable. However, the currently available data regarding the plasma acetaminophen concentrations are also inconclusive.

Acetaminophen sales

Data in this regard are conflicting; increase in the number of packs sold offset the reduction in the number of acetaminophen tablets sold.

Methodological issues

The authors of the above-mentioned systematic reviews identified several methodological issues in the included primary studies. Most studies were based on short-term follow-up; thus, it was difficult to draw any conclusions regarding long-term trends. Many of the studies were also restricted to relatively small areas in the United Kingdom. This, combined with the variety of outcome measures

used, makes it difficult to distinguish any conclusive trends. The studies also suffer from a lack of control groups.

Short duration of follow-up

The systematic review by Hawkins and colleagues[30] found that the follow-up periods in 11 of the 17 included studies were 2 years or less. The average duration of follow-up across the included studies was approximately 2.3 years, which did not allow for observation of any long-term effects of the legislation or accounting for potential short-term changes in epidemiology that could be affected by other factors.

As pointed out by Morgan and Majeed,[77] it is unlikely that the 1998 regulations on acetaminophen would have led to rapid changes in the first few months after the introduction. One of the intentions of the regulations was to reduce acetaminophen stocks in households; thus, sufficient time would be needed to allow existing stocks to be depleted.

The conflicting conclusions about suicide death rates reported by the different studies reflect the problems of short durations of follow-up. The regulations may have caused a reduction in suicide death rates initially, but such gains may be lost over time. Similarly, trends are lost with before-and-after analyses used by several studies; results may differ depending on which before-and-after time periods are selected for comparison. Furthermore, differences may occur when analyzing data from only one or two hospitals, as these differences are more likely to be affected by local or random variation.

Lack of control

Many studies did not have control groups or used inappropriate comparators. An appropriate control would be any drugs or groups of drugs that are available only on prescription and that are not commonly used as drugs of abuse (e.g. antibacterials or antidepressants). These drugs are not freely available and hence would possibly be exempt from the switching effect that may occur with over-the-counter drugs. Most of the included studies do not consider overall trends in self poisoning over the period since the legislation was introduced. This is important as any observed changes in acetaminophen overdose may just be following overall trends in self poisoning.

Legislation

Several methodological issues were associated with the studies that evaluated the effectiveness of legislation on acetaminophen in reducing suicide rates.

First, in many of the studies reviewed, there was a lack of differentiation between acetaminophen preparations that were affected by the 1998 legislation and those that were not (e.g. those available on prescription only). Morgan and colleagues[80] found that deaths involving compound acetaminophen (i.e. preparations not covered by the legislation) remained relatively constant over their study period.

About two-thirds of all acetaminophen-related deaths and about 10% of hospital presentations involve acetaminophen compounds, many of which are not sold over the counter.[77] Therefore, including all acetaminophen preparations would inflate the number of poisonings and possibly reduce any observed effect due to the legislation. However, it may be difficult to exclude 'non-legislated' acetaminophen from any given data set because of the way that hospital data, particularly mortality data, are recorded. Data from poison centres, on the other hand, may help distinguish between acetaminophen preparations that are covered by the legislation and those that are not.

Second, before any changes in the presentation of acetaminophen overdose can be attributed to the legislation rather than to other factors, it is important to consider whether the legislation is achieving one of its primary goals, to reduce the availability of acetaminophen stores in the community and hence the amount of acetaminophen immediately available for ingestion in overdose quantities. There is currently no published evidence demonstrating that a reduction in the immediate availability of acetaminophen has been achieved. Overall, the sales data showed no dramatic decline in sales of acetaminophen.

Finally, some data demonstrated that it is still very easy to obtain large amounts of acetaminophen from various outlets after legislation. Therefore, although the total number of tablets being supplied may have been reduced, it is still very easy to obtain a potentially toxic dose despite the legislative change.

Medical considerations

When the 1998 regulations were introduced, there were considerable concerns that reduced availability may cause shifting from acetaminophen to ibuprofen or acetylsalicylic acid (Aspirin). The latter two drugs are associated with significant adverse gastrointestinal events (e.g. gastrointestinal hemorrhage) in therapeutic use. People can also switch to other medications such as antidepressants, antipsychotics, and sedatives. The legislation may have taken pressure off the specialized liver units, but at the same time have displaced the burden to acute medical and high-dependency units and the cause of morbidity from liver injury to cardiovascular or central nervous system toxicities.

Furthermore, an extremely effective antidote (acetylcysteine) exists for acetaminophen poisoning but not for other drugs. Toxicity following acetaminophen takes many hours to develop, during which time an effective antidote can be administered.[77] According to clinical experts, however, this is not the case with other OTC medications (e.g. ibuprofen).

Evidence from primary studies

Intentional overdose prevention policies/strategies evaluated in the 10 primary studies include drug restriction (eight studies), alcohol policies for youth (one study), and parent education programs (one study). Details about intentional

overdose prevention policies and strategies, study period, target population, and results were extracted from each study and are presented in Appendix E (Table E.3).

Drug restriction

Of the eight studies on drug restriction, four[67,89-91] focused on acetaminophen, one study[92] on co-proxamol, two[93,94] examined several drugs including barbiturates, and one study[95] focused on barbiturates.

Acetaminophen

Four studies examined the effects of restricting acetaminophen on suicidal behaviours. Two studies[67,89] conducted in Australia looked at the trend of suicide before and after the two acetaminophen recall periods, whereas the other two[90,91] evaluated the impact of the 1998 UK legislation on acetaminophen use.

Two Australian studies examined the effect of the 2000 acetaminophen recall on acetaminophen poisoning. One study[89] found a reduction in hospital admissions for acetaminophen poisoning. The authors commented that it is important to assess the effect on poisonings from other agents and to assess random as well as seasonal variations in rates. The authors were only able to measure the effect of the recall on acetaminophen poisonings requiring hospital admission and to establish a possible association rather than a causal relationship.

The other Australian study[67] found no significant change in acetaminophen or acetylsalicylic acid intentional self poisoning but did report an increase in ibuprofen-related intentional self harm. The data support previous suggestions that reducing acetaminophen availability increases the use of other medications for deliberate and accidental poisonings. Unless availability of other medications is controlled, the removal of one readily available medication, such as acetaminophen, could lead to intentional or accidental poisoning with other potentially more toxic medications.

An interrupted time-series analysis published in 2007[90] found that the 1998 legislation coincided with a decrease in acetaminophen poisoning mortality. However, fatal poisoning involving acetylsalicylic acid (Aspirin), antidepressants, and, to a lesser degree, acetaminophen compounds also showed similar trends. This raises the question whether the decline in acetaminophen deaths was due to the legislations or was part of a wider trend in decreasing drug poisoning mortality.

Another study[91] found that following the 1998 legislation, all social groups had similar reductions in acetaminophen-related poisoning. However, this effect was short-lived because rates have returned to pre-legislation levels. The authors concluded that legislation has not permanently affected the overall use of acetaminophen in overdose in Scotland or reduced the proportion of patients taking acetaminophen in overdose quantities in the long term.

Co-proxamol

A retrospective, observational study[92] examined the impact of the 2004 legislation for phased withdrawal of co-proxamol from the UK market on co-proxamol related deaths in Scotland. The proportion of all co-proxamol poisoning deaths for the 5 years before legislation (2000 to 2004) was compared with the 2 years after legislation (2005 to 2006). Data on deaths related to other commonly used analgesics were also examined. The data showed a significant reduction in proportion of co-proxamol related deaths, from a mean of 37 deaths (21.8% of total poisoning deaths) before legislation (2000 to 2004) to 10 deaths (7.8% of total poisoning deaths) afterwards (in 2006); this reduction was most significant in males. This was associated with a 60% decline in prescriptions within 6 months of legislation. No compensatory increase in deaths from poisonings from other common analgesics was observed.

Barbiturates and other medications

One study[95] compared suicide death rates and methods for suicide over two time periods (1961 to 1965 versus 1985 to 1994) in a city in England. The study found that a significant decline in suicide rates in females and a modest decline in suicide rates for males coincided with marked changes in patterns of exposure and method used for suicide, including replacement of barbiturates by antidepressant drugs such as selective serotonin reuptake inhibitors.

Two Danish studies[93,94] reported time trends in method-specific suicide rates compared with the availability of specific methods over a 30-year period (from 1970 to 2000). The analysis indicated that restrictions on the availability of barbiturates and dextropropoxyphene in 1986 and 1987, respectively, were associated with a decline in the number of suicide deaths by self poisoning with these medications.

Alcohol policy for youth

A US study[96] looked at the role of alcohol-related policies in reducing suicide deaths by American youths and young adults. The study found that policies designed to reduce alcohol consumption may have the unintended benefit of reducing suicides, particularly among young males; however, these policies have little impact on female suicides.

Parental education

A prospective study[97] conducted in the United States followed 103 parents whose children visited emergency departments for mental health assessment or treatment. Forty-one parents received a means restriction education program during their child's visit to the emergency department, and 62 parents did not. This study, with an average follow-up of 2 months (ranged from 0.03 to 5.6 months), found that the education program was associated with new action taken by parents to limit their child's access to alcohol, prescribed, or over-the-counter medications.

Canadian Context

In contrast to the United Kingdom, several Canadian provinces and territories had place-of-sale restrictions on acetaminophen lifted in September 1999.[69] Control over location of sale for nonprescription medications in Canada generally falls under provincial jurisdiction. Acetaminophen restrictions had limited the sale of all acetaminophen strengths greater than 325 mg per tablet and all packages of more than 24 tablets of any strength to pharmacies only. These restrictions were not originally implemented in a specific attempt to control access to this particular class of drugs.[69] Provinces with no pre-existing restrictions in place-of-sale included Alberta, Nova Scotia, and Prince Edward Island. However, six provinces and territories had restrictions that were lifted in September 1999 - these included Ontario, New Brunswick, Manitoba, Yukon, Nunavut, and the Northwest Territories.

Analysis of hospital discharge data from the Canadian Institute for Health Information provided a unique opportunity to assess the effect of lifting acetaminophen place-of-sale restrictions in several Canadian provinces and territories in September 1999.[69] These data indicate that the incidence of reported hospitalizations related to acetaminophen overdose toxicity had not increased in 1.5 years after restrictions were lifted. Total acetaminophen sales remained stable during the time period 1996 through 2001.[69] Thus, lifting acetaminophen place-of-sale restrictions does not appear to have led to an increase in total acetaminophen sales.

The National Association of Pharmacy Regulatory Authorities was contacted, and it was confirmed that no federal regulation on medications for the purpose of preventing intentional or accidental drug poisoning has been developed to date. Health Canada, Federal Food and Drug Regulation, was also contacted, but no information was available regarding drug regulation for the purpose of suicide prevention.

The Alberta College of Pharmacists was contacted, and they confirmed that no provincial regulation on medications for the purpose of preventing intentional or accidental overdose has been developed to date (representative of Alberta College of Pharmacists, personal communication, February 2009).

Discussion

Summary of findings

National intentional overdose prevention policies/strategies currently exist in several countries, with policies and strategies available from provincial/state/regional levels in four countries, including Australia, Canada, the United Kingdom, and the United States. A wide range of policies/strategies identified from the national/provincial/state/regional documents can be categorized into groups such as regulation/legislation, awareness/education, safe prescription/storage/disposal of medications, development of tracking and monitoring systems, new technology, and partnership (see Table 9). However, except for parents' education, most identified policies/strategies did not specifically target children and youth. Furthermore, Canadian national suicide prevention strategies developed for Aboriginal youth did not contain any means restriction/intentional overdose prevention components.

Three systematic reviews and an additional 10 primary studies examined the effects of intentional overdose prevention strategies in reducing suicide and suicide attempts. Most of the studies focused on acetaminophen restriction. Since the introduction of package size restrictions in the United Kingdom in 1998, there have been a number of studies that reported on the benefit or lack of benefit of these restrictions and the limitations of studies conducted to evaluate this issue, most of which are based on ecological data. Some of the ecological studies evaluate the method-specific suicide rates and suicide rates before and after a change in legislation; others evaluated regional differences in the method-specific pattern in one country or between countries. Results from these studies are inconsistent.

Most studies were conducted in the United Kingdom; generalizability of research findings to the Canadian context is of question. The means/method used for suicide varies greatly across countries and even within countries; consequently, a means restriction approach that might work under one set of cultural and environmental conditions might not work under another.[34]

Methodological issues

Availability of the means for suicide is definitely not the only factor leading to suicide. The majority of the studies employed an ecological study design, which does not allow control for confounders. The association between means restriction and the reduction of suicide death rates may therefore be due to coincidence. Using only on crude ecological data, one cannot infer a causal relationship between means restriction and suicide death because other social factors may play important roles in suicide rate reductions.[94,98]

Inconsistency in findings of the included studies on acetaminophen may be partially due to the differences in terms of length of follow-up, selection of before-and-after time periods for comparison, data sources used, outcome measured, and sizes of geographic areas covered in the studies. Use of inappropriate control groups and lack of differentiation of acetaminophen that is regulated from acetaminophen compounds that are not regulated may also contribute to conflicting results.

In ecological studies, data should be analyzed in age- and gender-specific subgroups wherever possible to avoid, for instance, inferences that a positive effect among middle-aged women of restrictions in availability of some specific drugs is outweighed by an increase in hanging among young men. In this case, there might not be an overall change in suicide rate, but it would be wrong to conclude that method substitution was responsible for this lack of effect on the overall suicide rate.[98] However, subgroup analysis was not done in the majority of the included studies.

Another problem is the validity of the coding used. For example, when using the International Classification of Diseases (ICD), it is important to consider whether the events evaluated in the study could be well defined by ICD codes. This is of particular concern in the coding of *intentionality* in relation to acetaminophen overdose (e.g. intentionally overdosing but without intentionally trying to harm him- or herself). Frequency of suicide as a reason for overdose might be higher than reported since suicidal intent is difficult to confirm.

Case fatality

Case fatality is defined as A/B, where

A = Number of persons who die by suicide by method X and

B = Number of persons who engage in suicidal behaviours using method X (fatal and nonfatal cases).[98]

In general, case fatality was 80% to 91% for firearms; 1% to 3% for poisoning, cutting, or piercing; and 60% to 80% for suffocation or hanging.[93] A comprehensive list of case fatality percentages for various substances was not prepared for this report due to time constraints.

Methods substitution must be considered when restricting certain means or methods for suicide. When restrictions are limited to methods with high case fatality, the problem of method substitution seems to be negligible. If the case fatality of the method is low, it is necessary to consider the possibility that the suicidal person will choose a method with a higher case fatality.[98] Only the study of restrictions in pack size of acetaminophen and salicylate in the United Kingdom considered a method with low case fatality.[63] The authors found that the method-specific suicide rate decreased and the overall suicide rate declined.[63]

Policy consideration

When developing drug restriction policies, some factors need to be taken into consideration:

- Consideration of case fatality: possibility of switching drug poisoning that has a low case fatality to other means/methods with higher case fatality such as firearms or hanging.
- Availability of antidote: possibility of switching from drugs with very effective antidotes (e.g. acetaminophen) to other drugs without effective antidote.
- Toxicity of drugs: e.g. a generally good prognosis in acetaminophen poisoning even with acute liver failure.
- Toxicity of drugs in children and youth: no fatal cases reported for acetaminophen among children but reports of pediatric ingestion of ibuprofen leading to serious complications.
- Consideration of intentional and accidental drug poisoning together, particularly when developing policies that target children and youth.
- Implication of Canadian experience with lifting the restriction on acetaminophen sale location.
- Identification of leads for the implementation and monitoring of policies/strategies.
- Gathering of all suicide data (location, gender, and age specific) available from provincial, regional, and local agencies, hospitals, and other organizations to obtain a better understanding of suicide in Alberta
- Encouragement of co-operation between community members and organizations; education of community members, physicians, and other professional on efforts for preventing intentional overdose.
- Monitoring of adherence to the legislation/regulation; establishment of monitoring systems and planning of evaluation of the public health impact of changes in the legislation/regulations considered at the time of policy formation.
- Development of comprehensive provincial data collection systems to monitor trends and methods of suicide pre and post policy/strategy implementation and to provide a solid foundation for future good quality research.
- Public awareness of the regulation and a transparent decision-making process.

There is also a need to consider the best approach to prevent intentional overdose. In the case of acetaminophen, seven options for preventing acetaminophen poisoning were considered.[61]

1. Add methionine to acetaminophen tablets. One such preparation, Pameton, is available.

2. Educate the public regarding the dangers of acetaminophen overdose. Research among adolescents in the United Kingdom and United States suggests that a significant proportion of young adults are unaware how low the potentially fatal dose of acetaminophen can be.
3. Label packets of acetaminophen to highlight its danger in overdose.
4. Change packaging of acetaminophen to blister packs.
5. Restrict sales to pharmacies.
6. Make acetaminophen available by prescription only.
7. Restrict the total quantity of acetaminophen that may be bought at a single purchase.

Each approach has advantages and disadvantages. The United Kingdom chose the last option, restricting the quantity of drug available from a single purchase, as the most pragmatic means for reducing acetaminophen-related suicide and liver failure. However, this may not be the best approach for Alberta.

Research gaps

There are major gaps between what knowledge is required for developing intentional overdose prevention policies/strategies and what is currently available from research. Some important gaps were identified throughout the preparation of this report.

Definition

There are no universal definitions for some important terms related to intentional overdose. The term *intentional overdose* itself was not clearly defined in the literature or in the Alberta provincial suicide prevention strategy documents. Other terms without a clear definition include the age ranges of children, adolescents, youth, young people, or young men. The lack of standardized definitions of these terms leads to the problem of inconsistency in data collection, trend monitoring, and data analyses.

Data collection

Although some data on intentional drug poisoning in Canada and Alberta are currently available, information on the specific medication(s) taken in fatal overdose is not available. Unspecified drugs used for suicide in Canada (Table 1) underscores the difficulty in our current data systems (death certificates or hospital records). To some extent this could be improved by using information from psychological autopsy or toxicity records. According to clinical experts, unspecified data is also an issue for emergency department data collection systems in Alberta.

Questions that remain unanswered include:

- What are the commonly used drugs for intentional overdose in Alberta?
- Are there any differences in the drugs used by adults, by children, or by youths for overdose?
- How are these drugs regulated (at both the federal and provincial levels)?

Reported suicide rates among Aboriginal people in some countries (e.g. Australia, Canada, and New Zealand) are higher than that of the general population. However, information about the means and methods used for suicide in this population is lacking. Future efforts in data collection should pay particular attention to this population.

Information system

There is a shortage of efficient information systems to identify suicide prevention strategies, policies, and practices at local, national, and international levels. Means restriction is a measure not only to prevent suicide but also for general public safety (i.e. accidental death by the same means). However, it is very difficult to identify research evidence if literature is searched only from the suicide prevention perspective.

Evaluation of the impact

How to evaluate the impacts of national suicide prevention strategies and policies remains a methodological challenge. Suicide rates are influenced by a multitude of variables, many of which cannot be controlled. In fact, greater reductions in the incidence of suicide have been observed in some cases following naturally occurring socio-economic changes (e.g. major economic fluctuations, wars, changes in political situation) rather than through purposefully implemented national suicide prevention strategies.[36] Future research studies need to control for confounders when evaluating the effect of means restriction strategies in reducing suicide death rates. When unanticipated events occur, the attempts to interpret the results in light of these events must be made.

Death by suicide is a relatively rare event from a statistical point of view, which causes a serious dilemma regarding the choice of the most appropriate measures for evaluating suicide prevention programs. Studies evaluating the effectiveness of suicide prevention programs require very large sample sizes to produce accurate and meaningful results if the only measure of success used is suicide rate reduction.[99]

The measures used to evaluate suicide prevention programs should also include the prevalence of suicide attempts, suicide-related behaviours, changes in predisposing vulnerability, and protective factors. Currently available research studies did not report these outcomes consistently.

Conclusion

Among the eight countries with national means restriction strategies, intentional overdose was addressed, to some extent, in the majority of the national documents. Suicide prevention policies/strategies that contain an intentional overdose prevention component covered a wide range of aspects. These included drug regulation/legislation; awareness education; safe drug prescription, storage, and disposal; risk assessment of the individuals at suicidal risk; development of tracking and monitoring systems; new technology for safe storage of medications; and partnerships among different departments. These policies/strategies were usually developed for the general population and not specifically for children, youth, or young adults.

To address the question about the effects of intentional overdose prevention strategies, a comprehensive literature search was conducted and identified research evidence from three systematic reviews and 10 additional primary studies. Most studies evaluated the impact of drug restriction, including acetaminophen and co-proxamol legislation, and restriction of other drugs such as barbiturates on suicide deaths and suicide attempts. Two US studies examined the effectiveness of parent education, and alcohol policies for youth, respectively.

Results of drug restriction legislations are inconsistent. While some studies indicated that drug restriction strategies were associated with decreased suicide deaths and attempted suicide, other studies found no changes. The discrepancy in research findings may partially be due to the differences in the length of follow-up, selection of before-and-after time periods for comparison, data sources, and sizes of geographic areas selected for assessment.

In Alberta, intentional overdose is the most commonly used method by females and the third most common method used by males for suicide. However, little is known about the classes of drugs commonly used, the toxicity of these drugs and clinical consequences of drug poisoning, availability of effective antidotes, and patterns of the drugs used by children, youth, or young adults.

A provincial intentional overdose prevention policy, strategy, or initiative needs to be developed within a framework that includes problem identification (baseline data collection), search for evidence (effectiveness of preventive interventions), selection from different options (decisions incorporating research evidence and local context), implementation (specification of the lead agencies or individuals, partners, funding and resources), and evaluation (selection of evaluation model, indicators, outcome measures).

Future efforts for Alberta's intentional overdose prevention activities may include:

- baseline data collection of the causes and trends of suicide deaths and suicide attempts in Alberta;

- identification of drugs commonly used for suicide and suicide attempts, particularly those used by children and youth;
- consideration of provincial regulation of those drugs commonly used for suicide and suicide attempts;
- provision of education for physicians and other health professionals on safe prescription for children and youth;
- provision of education for parents, guardians, caregivers, or social workers on safe storage and disposal of the drugs commonly used for suicide and suicide attempts;
- development of assessment tools for identifying individuals, particularly children and youth, who are at risk of suicide and who have easy access to lethal drugs; and
- collaboration of the provincial mental health department with other government departments such as the Department of Education.

In conclusion, various intentional overdose prevention policies and strategies were identified in several western developed countries. Identified intentional overdose prevention policies and strategies are usually embedded in broad suicide prevention policy or strategy documents but are not in stand-alone documents. In general, these policies and strategies in means restriction or intentional overdose prevention do not specifically target children, youths, and young adults. Evaluation of the effects of intentional overdose prevention in reducing suicidal behaviours is a complex task and should incorporate a systematic approach that takes into account all other important factors.

Appendix A: Methodology

Search

Search for Part I: to identify national means restriction policies/strategies

Step 1: Search for published journal review articles and systematic reviews/HTAs

The literature search was conducted by the IHE information specialist (PC). The search was limited to articles published in English between 1998 and 2008. The search was initially conducted in November 2008. This strategy included searches in several bibliographic databases: Cochrane Library, MEDLINE, Centre for Reviews and Dissemination (CRD) databases, EMBASE, PsycINFO, and PubMed. An updated PubMed search was conducted in April 2009.

In addition to the strategy outlined below, reference lists of retrieved articles were reviewed for potential studies.

Table A.1: Database search for Part I

Database and search dates	Search terms ††
Databases	
The Cochrane Library www.thecochranelibrary.com **Edition or date searched:** Issue 4, 2008	suicid* or parasuicid* or self harm or self poisoning in title, abstract, or keywords and policy or legislation or restrict* in title, abstract, or keywords, from 1998 to 2008 suicid* or parasuicid* or self harm or self poisoning in title, abstract or keywords and means or methods in title, abstract or keywords and access* or availab* in title, abstract or keywords, from 1998 to 2008
MEDLINE **Date searched:** 4 November 2008	1. poisoning/ or gas poisoning/ or carbon monoxide poisoning/ or overdose/ 2. exp Analgesics, Non-Narcotic/po [Poisoning] 3. Salicylates/po [Poisoning] 4. Drugs, Non-Prescription/po [Poisoning] 5. self injurious behavior/ or suicide/ or suicide, attempted/ 6. (suicid$ or parasuicid$ or self harm or self poisoning).ti,ab. 7. or/1-6 8. public policy/ or health policy/ or health care reform/ 9. 7 and 8 10. Primary Prevention/ 11. prevent$.mp. 12. pc.fs. 13. or/10-12 14. 9 and 13 15. ((availab$ or access$) adj4 (means or methods)).mp.

Table A.1: Database search for Part I (cont'd)

Database and search dates	Search terms ††
Databases	
	16. (restrict$ or reduc$ or limit$).mp. 17. 15 and 16 18. ((restrict$ or reduc$) adj3 means).mp. 19. 17 or 18 20. 7 and 19 21. Drug Packaging/ 22. (or/2-6) and 21 23. Legislation, Drug/ 24. 'Drug and Narcotic Control'/lj [Legislation & Jurisprudence] 25. 23 or 24 26. 7 and 25 27. 14 or 20 or 22 or 26 28. 27 not (comment or letter).pt. 29. limit 28 to (english language and yr='1998 - 2008')
CRD Databases (DARE, HTA, and NHS EED) **Date searched:** 4 November 2008	1. suicid* OR parasuicid* OR self harm OR self poisoning 2. MeSH Suicide EXPLODE 1 2 3. self injurious AND behavior 4. MeSH Self Injurious Behavior EXPLODE 1 5. MeSH Poisoning 6. MeSH gas poisoning 7. MeSH carbon monoxide poisoning 8. #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 9. polic* OR legislat* OR restrict* 10. MeSH Health Policy EXPLODE 1 2 11. MeSH Legislation, Drug EXPLODE 1 2 12. MeSH Drug Packaging EXPLODE 1 2 3 13. #9 OR #10 OR #11 OR #12 14. #8 AND #13 15. #8 AND #13 RESTRICT YR 1998 2008 16. means OR methods 17. restrict* OR reduc* OR limit* 18. #8 AND #16 AND #17 RESTRICT YR 1998 2008 19. access* OR availab* 20. #8 AND #16 AND #19 RESTRICT YR 1998 2008

Table A.1: Database search for Part I (cont'd)

Database and search dates	Search terms ††
Databases	
EMBASE – Ovid platform (Licensed resource) **Date searched:** 4 November 2008	1. suicidal behavior/ or self poisoning/ or suicidal ideation/ or suicide/ or suicide attempt/ 2. intoxication/ or carbon monoxide intoxication/ or drug overdose/ or gas poisoning/ 3. (suicid$ or parasuicid$ or self harm or self poisoning).ti,ab. 4. 1 or 2 or 3 5. health care policy/ 6. health care planning/ or policy/ 7. 5 or 6 8. 4 and 7 9. 'prevention and control'/ or prevention/ or primary prevention/ 10. prevent$.mp. 11. 9 or 10 12. 8 and 11 13. ((availab$ or access$) adj4 (means or methods)).mp. 14. (restrict$ or reduc$ or limit$).mp. 15. 13 and 14 16. ((restrict$ or reduc$) adj3 means).mp. 17. 15 or 16 18. 4 and 17 19. drug packaging/ 20. drug legislation/ 21. 19 or 20 22. (1 or 3) and 21 23. 12 or 18 or 22 24. 23 not (letter or note).pt. 25. limit 24 to (english language and yr='1998 – 2009')
PsycINFO **Date searched:** 4 November 2008	1. Attempted Suicide/ or Suicide Prevention/ or Suicide/ 2. self injurious behavior/ 3. drug overdoses/ 4. toxic disorders/ or carbon monoxide poisoning/ 5. (suicid$ or parasuicid$ or self poisoning).ti,ab. 6. or/1-5 7. prevention/ or drug abuse prevention/ or preventive medicine/ or primary mental health prevention/ or suicide prevention/ 8. 6 and 7 9. health care policy/ or policy making/ or health care reform/ 10. 8 and 9 11. ((availab$ or access$) adj4 (means or methods)).mp. 12. 6 and 11 13. 10 or 12 14. limit 13 to yr='1998-2009'

Table A.1: Database search for Part I (cont'd)

Database and search dates	Search terms ††
Databases	
PubMed **Date searched:** 4 November 2008	12. #11 not assist* 11. Search #8 OR #11 Limits: Publication Date from 1998 to 2008, English 10. Search #6 OR #9 9. Search #3 and (#7 OR #8) 8. Search (access* OR availab*) AND (means OR methods) 7. Search restrict* AND (means or methods) 6. Search #3 AND #4 AND #5 5. Search prevent* 4. Search policy OR policies OR regulation* or legislat* 3. Search #1 AND #2 2. Search (in process[sb] OR pubmednotmedline[sb] OR publisher[sb]) 1. Search suicid* OR parasuicid* OR self harm OR self poisoning
Centre for Suicide Prevention database **Date searched:** 12 November 2008	1. Reviewed lists of abstracts provided by CSP librarian for the following searches 2. All Text Fields = 'restrict' AND NOT subjects_txt = 'availability of means' AND Type = 'All Types' AND Location = 'All Locations' Ordered By Siec Number 3. subjects_txt = 'availability of means' AND Type = 'All Types' AND Location = 'All Locations' Ordered By Siec Number
Health Technology Assessment Resources	
AETMIS, www.aetmis.gouv.qc.ca **Date searched:** 5 November 2008	Suicide; suicidal; overdose; poisoning; self harm
CADTH, www.cadth.ca **Date searched:** 5 November 2008	Suicide; suicidal; overdose; poisoning; self harm
Institute for Clinical and Evaluative Sciences (ICES), Ontario, www.ices.on.ca/ **Date searched:** 5 November 2008	Suicide; suicidal; overdose; poisoning; self harm
Health Technology Assessment Unit at McGill, www.mcgill.ca/tau/ **Date searched:** 5 November 2008	Browsed list of publications
Medical Advisory Secretariat, www.health.gov.on.ca/english/providers/program/mas/mas_mn.html **Date searched:** 5 November 2008	Browsed list of publications
CCE, www.med.monash.edu.au/healthservices/ cce/ **Date searched:** 5 November 2008	Browsed list of publications

Table A.1: Database search for Part I (cont'd)

Database and search dates	Search terms ††
Databases	
Health Quality Council, Saskatchewan, www.hqc.sk.ca/ **Date searched:** 5 November 2008	Suicide; suicidal; overdose; poisoning; self harm
NZHTA, nzhta.chmeds.ac.nz/ **Date searched:** 5 November 2008	Browsed list of publications
MSAC, www.msac.gov.au/ **Date searched:** 5 November 2008	Suicide; suicidal; overdose; poisoning; self harm
NICE (UK), www.nice.org.uk/ **Date searched:** 5 November 2008	Suicide; suicidal; overdose; poisoning; self harm
Search Engines	
Google **Date searched:** 5 November 2008	Suicide and 'restriction of means'; Suicide and 'means restriction'

†† "*", "# ", and "?" are truncation characters that retrieve all possible suffix variations of the root word e.g. surg* retrieves surgery, surgical, surgeon, etc.

; are used to separate search terms that were searched separately

Step 2: Identification of national policies/strategies from review articles

Titles of national policies/strategies were extracted from the following review documents, several of which were identified in Step 1:

1. Anderson M, Jenkins R. The challenge of suicide prevention: an overview of national strategies. *Disease Management and Health Outcomes* 2005;13(4):245-53.
2. Centre for Suicide Prevention. (2004) *A summary of national, state and provincial strategies for the prevention of suicide*. Calgary, AB: The Centre, 2004. Available from: *http://www.suicideinfo.ca/csp/assets/SummaryofNationalStateandProvStrategies.pdf*.
3. De Leo D, Evans, R. National suicide prevention strategies. In: *International suicide rates: recent trends and implications for Australia*. City: Australian Institute for Suicide Research and Prevention, 2003:77-89. Available from: *www.health.gov.au/internet/main/publishing.nsf/Content/1D2B4E895BCD429ECA2572290027094D/$File/intprev.pdf*.
4. Jenkins R, Singh B. National suicide prevention strategies. *Psychiatria Fennica* 1999;30:9-30.
5. Platt S, McLean, J, McCollam A, Blamey A, Mackenzie M, McDaid D, et al.. Review of national strategies for suicide prevention. In: *Evaluation of the first phase of Choose Life: the national strategy and action plan to prevent suicide in Scotland*. City: Scottish Executive, 2006:161-80 (Annex 1). Available

from: http://*www.chooselife.net/web/FILES/Research&Reviews/choose_life_evaluation2006_phase_1.pdf.*

6. World Health Organization. *Suicide prevention in Europe: The WHO European monitoring survey on national suicide prevention programmes and strategies.* Copenhagen: WHO, 2002. Available from: *www.euro.who.int/document/E77922.pdf.*

Step 3: Access to documents from the Centre for Suicide Prevention

Searched through the Centre for Suicide Prevention, Suicide Information and Education Collection, catalogue to identify additional strategies.

Search terms used include: National AND prevention AND strategy; national AND prevention AND strategies; National AND prevention AND plan; National AND prevention AND plans; National AND prevention AND policy; National AND prevention AND program.

Step 4: Internet searching

Search terms used include: National AND suicide AND (policy or program or strategy or plan) and [various country names if identified as having strategies by reviewing documents in step 2].

Websites retrieved by the searches include those in the following list. When documents from specific countries were not retrieved but a strategy had been mentioned in the review documents retrieved in step 2, government websites for those countries were targeted individually.

Useful organization websites were also derived from a list in Appendix 3 of Palmer S, editor. *Suicide: Strategies and Interventions for Reduction and Prevention.* London: Routledge, 2008.

Websites viewed:

- World Health Organization: *www.who.int/en/*
- World Health Organization, Regional Office for Europe: *www.euro.who.int/*
- World Health Organization, Suicide Prevention (SUPRE): *www.who.int/mental_health/prevention/suicide/suicideprevent/en/index.html*

International association websites

- European Alliance Against Depression: *www.eaad.net/hun/index.php*
- European Network for Suicidology: *www.uke.uni-hamburg.de/extern/ens/*
- International Association for Suicide Prevention: *www.iasp.info*
- International Academy of Suicide Research: *www.depts.ttu.edu/psy/iasronline*
- Mental Health Europe: *www.mhe-sme.org/en/about-mental-health-europe.html*
- SafetyLit Injury Prevention Literature Update: *www.safetylit.org/index.htm, safetylit.org/index.htm*
- Suicide Prevention International: *www.spiorg.org/index.html*

European Union countries

BELGIUM

- Belgian suicide and mental health centre: *www.zelfmoordpreventievlaanderen.be/*
- Unit for suicide research, University of Ghent: *http://www.eenheidvoorzelfmoordonderzoek.be*

BULGARIA

- Department of Health, Bulgaria: *www.mh.government.bg*
- Government of Republic of Bulgaria: *www.government.bg/fce/index.shtml*

DENMARK

- Danish National Board of Health: *www.sst.dk/default.aspx?lang=en*
- Centre for Suicide Research, Denmark: *http://www.selvmordsforskning.dk/Web/English*

ESTONIA

- Government of the Republic of Estonia: *www.valitsus.ee/?lang=en*
- Estonian Legal Language Centre: *www.legaltext.ee/indexen.htm*

FINLAND

- National Institute for Health and Welfare, Finland: *www.stakes.fi/EN/index.htm*
- Painatuskeskus Finland: *www.painatuskeskus.com*
- National Institute for Health and Welfare (Finland): *www.stakes.fi/EN/Julkaisut/index.htm*

FRANCE

- Ministère de la Santé: *www.sante-jeunesse-sports.gouv.fr*

GERMANY

- Nationales Suizid Praventions Programm: *www.suizidpraevention-deutschland.de/Home.html*
- German Research Network on Depression and Suicidality (Kompetenznetz Depression, Suizidalität): *www.kompetenznetz-depression.de*

HUNGARY

- Government of Hungary: *www.magyarorszag.hu/english*
- Hungarian Prime Minister's Office: *www.meh.hu/english*
- Ministry of Health, Hungary: *www.eum.hu/english*

IRELAND

- Department of Health and Children, Ireland: *www.dohc.ie*
- Department of Social and Family Affairs, Ireland: *www.welfare.ie/EN/Pages/default.aspx*
- Irish Association for Suicidology: *www.ias.ie*

- National Office for Suicide Prevention: *www.nosp.ie*
- National Suicide Research Foundation Ireland: *www.nsrf.ie*

LITHUANIA

- State Mental Health Centre, Lithuania: *www.vpsc.lt/vpsc_anglu/administration.htm*

NETHERLANDS

- Government of Netherlands: *www.government.nl*
- Health Council of the Netherlands: www.gezondheidsraad.nl/en
- National Institute for Public Health and Environment: *www.rivm.nl/en*
- Trimbos Instituut, Netherlands Institute of Mental Health and Addiction: *www.trimbos.nl*
- Unit for Suicide Research (Netherlands): *www.eenheidvoorzelfmoordonderzoek.be*

SLOVENIA

- Government of the Republic of Slovenia: *www.gov.si*
- European Mental Health Promotion Database: Slovenia: *www.hp-source.net/report.html?mode=COUNTRY&country=25&module=imhpa*

SWEDEN

- Swedish National Institute of Public Health: *www.fhi.se*
- Karolinska Institutet: *ki.se/ki/jsp/polopoly.jsp?l=en&d=13243/english*
- Lund University: *www.lu.se/lund-university*
- National Programme for Suicide Prevention: *ki.se/ki/jsp/polopoly.jsp?d=17407&l=en*

UNITED KINGDOM

- Department of Health, UK: *www.dh.gov.uk/en/index.htm*
- Department of Health, Social Services and Public Safety, Northern Ireland: *www.dhsspsni.gov.uk*
- Scottish Government: *www.scotland.gov.uk/Home*
- Welsh Assembly Government: *new.wales.gov.uk/?lang=en*
- Centre for Suicide Prevention (Manchester): *www.medicine.manchester.ac.uk/psychiatry/research/suicide/prevention/*
- Centre for Suicide Research, University of Oxford: *cebmh.warne.ox.ac.uk/csr/*
- Injury Observatory Britain & Ireland: *www.injuryobservatory.net/index.html*
- National Institute for Mental Health in England: *www.nimhe.csip.org.uk/*
- UK Statute Law Database: *www.statutelaw.gov.uk/Home.aspx*

Other European Countries

ICELAND

- Directorate of Health, Iceland: *www.landlaeknir.is/?PageID=945*
- Ministry of Health, Iceland: *eng.heilbrigdisraduneyti.is/*

GEORGIA

- Parliament of Georgia: *www.parliament.ge/index.php?lang_id=ENG&sec_id=1*

NORWAY

- Norwegian Board of Health Supervision: *www.helsetilsynet.no/templates/sectionpage____ 5499.aspx*
- National Centre for Suicide Research and Prevention, University of Oslo: *www.med.uio.no/ipsy/ssff/english/index_english.html*

SWITZERLAND

- Ipsilon (Initiative for the Prevention of Suicide in Switzerland): *www.ipsilon.ch*
- As of August 2008, Switzerland had no national policy: (*www.swissinfo.org/eng/news/social_affairs/Young_Swiss_hold_European_record_for_gun_suicide.html?siteSect=201&sid=9421609&cKey=1219301059000&ty=st*)

UKRAINE

- Odessa National University: *www.onu.edu.ua/?type=en&action=iipo_psih*
- Web portal of Ukrainian government: *www.kmu.gov.ua/control/en*
- Ministry of Health (in Ukrainian): *www.moz.gov.ua/ua/i/*

North America

CANADA

Canadian Association for Suicide Prevention: *www.casp-acps.ca/home.asp*

Centre for Suicide Prevention (Calgary): *www.suicideinfo.ca*

Health Canada: *www.hc-sc.gc.ca/index-eng.php*

Honouring Life Network: *www.honouringlife.ca/*

BC Council for Families: *www.bccf.ca*

BC Ministry of Children & Family Development, Preventing Youth Suicide: *www.mcf.gov.bc.ca/suicide_prevention/index.htm*

UNITED STATES

National Strategy for Suicide Prevention: *mentalhealth.samhsa.gov/suicideprevention/policy.asp*

American Association of Suicidology: *www.suicidology.org*

American Foundation for Suicide Prevention: *www.afsp.org*

Indian Health Service American Indian and Alaska Native Suicide Prevention: *www.ihs.gov/NonMedicalPrograms/nspn/*

Substance Abuse and Mental Health Services Administration: *mentalhealth.samhsa.gov*

Suicide and Mental Health Association International: *suicideandmentalhealthassociationinternational.org*

Suicide Prevention Action Network USA: *www.spanusa.org*

Suicide Prevention Resource Center: *www.sprc.org*

National Centre for Suicide Prevention Training: *training.sprc.org*

Other Countries

AUSTRALIA

- Australian government: *www.health.gov.au*
- Australian Institute of Family Studies, Australian Government: *www.aifs.gov.au/institute/pubs/ysp/evaluation.html*
- Department of Health and Ageing, Australian Government: *www.health.gov.au*
- Australian Institute for Suicide Research and Prevention: *www.griffith.edu.au/health/australian-institute-suicide-research-prevention*
- Australian Network for Promotion, Prevention and Early Intervention for Mental Health: *auseinet.flinders.edu.au/*
- Australians Creating Rural Online Support Systems: *www.acrossnet.net.au/default2.asp*
- Living Is For Everyone: *www.livingisforeveryone.com.au*
- Mental Health in Australia, Australian Government: *www.mentalhealth.gov.au/internet/mentalhealth/publishing.nsf/Content/home-1*
- Ministerial Council for Suicide Prevention: *www.mcsp.org.au*
- Australian Suicide Prevention Information and Research Exchange (ASPiRE): *129.96.218.253:81/mcsp/libquery2.htm*
- Prevention of Depression and Suicide: *www.gavoorgeluk.be/en/home.php*
- Suicide Prevention Australia: *www.suicidepreventionaust.org/Home.aspx*

NEW ZEALAND

- New Zealand Ministry of Health: *www.moh.govt.nz/moh.nsf?OpenDatabase*
- Ministry of Social Development: *www.msd.govt.nz*
- Suicide Prevention Information New Zealand: *www.spinz.org.nz/page/5-Home*

CHINA

- Hong Kong Government: *www.gov.hk/en/residents/*
- Hong Kong Jockey Club: Centre for Suicide Research and Prevention: *csrp.hku.hk/web/eng/index.asp*

JAPAN

- Ministry of Health, Labour and Welfare: *www.mhlw.go.jp/english/index.html*
- National Institute of Mental Health: *www.ncnp.go.jp/nimh/english/index.html*
- Search Japanese Government Websites: *websearch.e-gov.go.jp/cgi-bin/common.cgi?CONFFILENAME=common.conf.E&TEMPLATE=keyword_E.html*

SRI LANKA

- Sri Lanka Sumithrayo: *www.srilankasumithrayo.org/index.html*
- Official website of the government of Sri Lanka: *www.priu.gov.lk*
- Ministry of Healthcare and Nutrition: *www.health.gov.lk*

ISRAEL

- Ministry of Health, Israel: *www.health.gov.il/english/*

Countries for which no documents were retrieved:

- Albania
- Andorra
- Armenia
- Austria
- Azerbaijan
- Belarus
- Bosnia and Herzegovina
- Croatia
- Czech Republic
- Cyprus
- Former Yugoslav Republic of Macedonia
- Greece
- Italy
- Kosovo
- Latvia
- Liechtenstein
- Luxembourg
- Malta
- Moldova
- Monaco
- Montenegro
- Poland
- Portugal
- Romania
- Russia
- San Marino
- Serbia
- Slovakia
- Spain
- Turkey
- Vatican City State

Search for Part II: to identify intentional overdose prevention policies/strategies and effectiveness studies

Step 1: Search for intentional overdose prevention policies/strategies at provincial/state/regional levels

A comprehensive search was conducted to locate intentional overdose prevention policies and strategies developed at the provincial, state, and regional levels in the eight countries (Australia, Canada, England, Ireland, New Zealand, Sweden, and Wales) with existing national means restriction policies or strategies as identified in Part I of this report.

Reviewed Centre for Suicide Prevention report A Summary of National, State, and Provincial Strategies for the Prevention of Suicide: *www.suicideinfo.ca/csp/assets/SummaryofNationalStateandProvStrategies.pdf*

SIEC database: searched by regional name

Google searches: suicide prevention (provincial or regional)(strategy or policy or plan or program)
(Name of province, state, or county) AND suicide prevention strategy

Canada

Health Canada: *www.hc-sc.gc.ca/index-eng.php*

Canadian Association for Suicide Prevention: *www.casp-acps.ca/home.asp*

Mental Health Commission of Canada: *www.mentalhealthcommission.ca/Pages/index.html*

Centre for Addiction and Mental Health: *www.camh.net*

SafeCanada: *safecanada.ca/link_e.asp?category=10&topic=120*

Ontario Association for Suicide Prevention: *www.ospn.ca*

Government of British Columbia: *www.gov.bc.ca*

Government of Manitoba: *www.gov.mb.ca*

Government of New Brunswick: *www.gnb.ca*

Government of Newfoundland and Labrador: *www.gov.nf.ca*

Government of Nova Scotia: *www.gov.ns.ca*

Government of Ontario *www.ontario.ca*

Government of Prince Edward Island: *www.gov.pe.ca*

Government of Saskatchewan: *www.gov.sk.ca*

Government of Yukon: *www.gov.yk.ca*

United States

State-level suicide prevention plans were located from the Suicide Prevention Resources Center (SPRC) website: *www.sprc.org/stateinformation/plans.asp*

Australia

Searched through AUSEinet database for "suicide prevention": *www.auseinet.com/resources/index.php*

Living Is For Everyone: *www.livingisforeveryone.com.au/home.html*

New Zealand

Welling government: *www.wellington.govt.nz*

Canterbury suicide project, University of Otago Christchurch: *www.chmeds.ac.nz/research/suicide/public.htm*

UK Counties

County names for England, Ireland, Scotland, and Wales derived from lists provided by the Office for National Statistics, UK: *www.ons.gov.uk/about-statistics/geography/products/geog-products-area/names-codes/administrative/index.html*

England

Google searches:

"suicide prevention" site:nhs.uk

County suicide prevention strategy site: uk

"primary care trust" "suicide prevention"

"partnership trust" "suicide prevention strategy"

(county name) "suicide prevention"

IRELAND

Ireland Health Service Executive – mental health and suicide prevention publications:

www.hse.ie/eng/Publications/services/Mentalhealth/

No strategies at the county level, but four social services boards with regional strategies:

"social services board" "suicide prevention"

"social services board" "protect life"

Wellnet 'Investing for Health', Northern Ireland Executive: *www.wellnet-ni.com/publications.php*

National Office for Suicide Prevention: *www.nosp.ie*

SCOTLAND

Local area action plans all available for download from the Choose Life website: *www.chooselife.net/xLCLP/LCLP_Home.asp*

WALES

Welsh Assembly Government website: *wales.gov.uk/?skip=1&lang=en*

National Public Health Service for Wales: *www.wales.nhs.uk*

National Public Health Service for Wales, publications database: *www2.nphs.wales.nhs.uk:8080/FrontEndInt.nsf*

SWEDEN

Google searches:

"northern region" "suicide prevention strategy"

"Stockholm-gotland" "suicide prevention strategy"

"south eastern region" "suicide prevention strategy" Sweden

"southern region" "suicide prevention strategy" Sweden

Uppsala orebro "suicide prevention strategy"

"western region" "suicide prevention strategy" Sweden

Step 2: Search for systematic reviews/HTAs and primary studies on effectiveness

Details of database searches were described above in the search strategy for Part I (step 1). An updated PubMed search was conducted on 21 April 2009 to retrieve most recent literature. Reference list of the retrieved studies were browsed to find more studies.

Table A.2: Update search for effectiveness studies

Databas	Search terms
PubMed **Date searched:** 21 April 2009	4. Search #1 AND #2 AND #3 Limits: Publication Date from 1998 to 2009 3. Search provinc*[ti] OR regional[ti] OR national[ti] OR state[ti] OR states[ti] OR state-level[tiab] 2. Search assessment[tiab] OR evaluat*[tiab] OR impact[tiab] OR analysis[tiab] 1. Search suicide prevention OR 5. Search #1 AND #2 AND #3 AND #4 Limits: Publication Date from 1998 to 2009 4. Search means[tiab] OR restrict*[tiab] OR access*[tiab] OR availab*[tiab] 3. Search assessment[tiab] OR evaluat*[tiab] OR impact[tiab] OR analysis[tiab] 2. Search suicide prevention 1. Search policy OR policies OR strateg* OR action plan OR action program OR legislat* OR regulat*
Centre for Suicide Prevention SIEC Database **Date searched:** 21 April 2009	Evaluation, assessment

In addition, Google was searched using the following search terms:

1. suicide prevention national (strategy or policy or plan or program) (evaluation or assessment)
2. suicide prevention (provincial or regional)(strategy or policy or plan or program) (evaluation or assessment)

Results were scanned and relevant documents were retrieved.

Study selection

Part I – National means restriction policy/strategy documents

Inclusion criteria

Documents that met all of the following criteria are included:

- International/national suicide prevention policy/strategy/framework documents that have addressed means restriction
- Published in English or German, from 1998 onward

Exclusion criteria

Documents that met any of the following criteria are excluded:

- Suicide prevention policy/strategy documents at state or provincial levels

- Documents written in languages other than English or German
- Documents that did not address means restriction

Part II – Intentional overdose prevention strategy/policy/practice documents

In Part I of the report, eight countries (Australia, Canada, England, Ireland, New Zealand, Sweden, United States, Wales) with existing national means restriction policies/strategies were identified. Part II of the report further identified intentional overdose prevention policies/strategies from the eight countries.

Inclusion criteria

National, provincial, state, or regional suicide prevention strategy or policy documents that covered intentional overdose component

Exclusion criteria

National, provincial, state, or regional suicide prevention strategy or policy without intentional overdose component

Part II – Effectiveness research evidence

Inclusion criteria

Study type: systematic review/HTA report, primary studies including randomized controlled trials (RCTs), nonrandomized controlled trials, ecological studies

Note: An article was deemed to be a systematic review if it met al.l of the following criteria as defined by Cook et al. in 1997:[100]

- focused clinical question;
- explicit search strategy;
- use of explicit, reproducible, and uniformly applied criteria for article selection;
- critical appraisal of the included studies; and
- qualitative or quantitative data synthesis.

Target population: children, youth, or young adults, parents, guardians, physicians

Intervention: strategies or policies to reduce access to lethal doses of prescribed or OTC medications or alcohol

Comparator: any other suicide prevention strategies

Outcome: at least one of the following:

- Short-term outcome (< 2 months): knowledge and skills, opinion, satisfaction

- Medium-term outcome (3 to 6 months): well-being, attitude, behaviour
- Long-term outcome (> 1 year, 2 to 5 years): reduction in suicide deaths or suicidal attempts

Exclusion criteria

- Studies that focused on means restriction strategies other than intentional overdose
- Studies that focused on illicit drugs

Quality assessment

No formal methodological quality assessment was performed due to time constraints. However, important methodological limitations of the included studies are discussed.

Data extraction and synthesis

Data from each of the included documents were extracted by one researcher (BG).

For Part I of the report, data extraction was conducted according to a policy analysis framework that includes five components: defining the problem, searching for evidence, considering options, implementing options, and evaluating impact.

For Part II of the report, data extracted from the identified provincial, state, or regional suicide prevention strategy documents include goals, objectives, actions, or recommendations related to intentional overdose prevention. Data extracted from effectiveness studies include study design, study objective, target population, intervention, results and conclusions.

A qualitative data synthesis was performed for this report.

Appendix B: Excluded Documents

Table B.1: Excluded national suicide prevention documents

Country/Title	Reason for exclusion
Belgium 2006 Flemish Suicide Prevention Action Plan 2006-2010	Unable to retrieve
Denmark National Programme for Prevention of Suicide and Suicide Attempt in Denmark	Unable to retrieve
Estonia Estonian Proposal of an Action plan for Preventing Suicidal Behavior	Unable to retrieve
Finland 1996 National Board of Health. Suicide can be prevented: a target and action plan for suicide prevention (book chapter)	Does not address means restriction
France 2005 Ministère de l'Emploi et de la Solidarité. National Strategy to Address Suicide (2000-2005) (report)	Does not address means restriction (in French)
Germany 2007 Deutsche Geselischaft fur Suizidpravention. National Suicide Prevention Program for Germany (report). Available from: *www.suizidpraevention-deutschland.de/Download/suizidpraevention.pdf*	Does not address means restriction (in German)
Greenland 2004 Proposal for a National Strategy for Suicide Prevention in Greenland (report). Available from: *www.peqqik.gl/upload/rapport_-_engelsk.pdf*	Proposal
Japan 2002 *Jisatsu-yobou-ni-mukete-no-teigen*	Unable to retrieve
Lithuania 2003 Government of the Republic of Lithuania. Suicide Prevention Programme 2003-2005 (report). Available from: *www.vpsc.lt/vpsc_anglu/Suicideprogr.doc*	Does not address means restriction
Norway 1996 Norwegian Board of Health. National Plan for Suicide Prevention (report). Available from: *www.helsetilsynet.no/upload/Publikasjoner/skriftserien/national_plan_suicide_prevention_ik-2539.html*	Does not address means restriction
Norway 2001 Mehlum L, Reinholdt NP. Norwegian Plan for Suicide Prevention Follow-up Project 2000-2002: Building on Positive Experiences (report)	A follow-up study
Scotland 2002. Choose life: A National Strategy and Action Plan to Prevent Suicide in Scotland (report). Scottish Executive. Available from: *www.scotland.gov.uk/Resource/Doc/46932/0013932.pdf*	Does not address means restriction
Sri Lanka, 1997 National Policy and Action Plan on Prevention of Suicide	Unable to retrieve
Ukraine 2007 Odessa National Mechnikov University. How We Can Reduce Suicides in Ukraine: Draft of the National Action Plan (report). Available from: *www.humeco.org.ua/pdf/1_eng.pdf*	Does not address means restriction

Table B.2: Excluded province/state/regional strategy/policy documents that did not address intentional overdose

AUSTRALIAN STATES OR TERRITORIES
• Australia Capital Territory (ACT): Suicide Prevention – Managing the Risk of Suicide 2005-2008: A Suicide Prevention Strategy for the ACT
• New South Wales (NSW) 1999: We Can All Make a Difference: NSW Suicide Prevention Strategy
• Northern Territory 2003: Northern Territory Strategic Framework for Suicide Prevention: A Framework for the Prevention of Suicide and Self-Harm in the Northern Territory.
• Northern Territory Suicide Prevention Action Plan 2009-2011
CANADIAN PROVINCES OR TERRITORIES
• New Brunswick 2007: Connecting to Life: Provincial Suicide Prevention Program
• Nova Scotia 2006: Nova Scotia Strategic Framework to Address Suicide
• Nunavut 2003: Our Words Must Come Back to Us
• Manitoba: Reclaiming Hope: Manitoba's Youth Suicide Prevention Strategy
UNITED STATES
• Alabama 2004: Alabama Suicide Prevention 2004
• Colorado 1998: Colorado Suicide Prevention and Intervention Plan
• Connecticut 2005: Connecticut Comprehensive Suicide Prevention Plan
• Florida: Florida Suicide Prevention Strategy 2005-2010
• Georgia 2001: Suicide Prevention Plan: Saving lives in Georgia – Together We Can
• Hawaii: Hawaii Injury Prevention Plan 2005-2010
• Idaho 2003: Idaho's Suicide Prevention Plan
• Illinois 2007: Illinois Suicide Prevention Strategic Plan
• Indiana 2004: Indiana Suicide Prevention State Plan
• Iowa: Iowa Plan for Suicide Prevention: 2005 to 2009
• Kansas 2006: Kansas Plan to Reduce Suicide
• Kentucky 2005: Preventing Suicide: Kentucky's Plan
• Louisiana 2001: Louisiana STAR Plan
• Maine 2007: Youth Suicide Prevention Program Plan
• Maryland: Maryland Suicide Prevention Model
• Missouri: Missouri Suicide Prevention Plan: A Collaborative Effort Year 2005-2010
• New Mexico 1999: Hope for the Heart: New Mexico Youth Suicide Prevention Plan
• North Dakota 2005: North Dakota Suicide Prevention Plan
• Ohio 2002: Ohio's Suicide Prevention Plan
• Oklahoma 2000: Oklahoma State Youth Suicide Prevention Plan
• Pennsylvania: Youth Suicide Prevention Plan
• Pennsylvania: Adult Suicide Prevention Plan
• Pennsylvania: Older Adult Suicide Prevention Plan
• Utah 2004: Utah Injury Strategic Plan
• Virginia 2004: Suicide prevention Across the Life Span: Plan for the Commonwealth of Virginia
• Washington 1995: Youth Suicide Prevention Plan for Washington State
BRITISH COUNTIES
• Coventry and Warwickshire 2007: Combined Suicide Prevention Strategy
• Gloucestershire Healthy Living Partnership: Preventing Suicide in Gloucestershire – A Strategy for Action 2006-2010.

Table B.2: Excluded province/state/regional strategy/policy documents that did not address intentional overdose (cont'd)

NORTHERN IRELAND REGIONS
• NHSSB/NIFHP Suicide Prevention Strategy Protect Life – Action Plan 2009/2010 (Northern Ireland) • Southern Health and Social Care Trust Revised Interagency Action Plan. Protect Life: Northern Ireland Suicide Prevention Strategy. • Western Health & Social Services Board Suicide Prevention Strategy Action Plan 2008-2009 (Northern Ireland) • Eastern Health & Social Services Board Suicide Prevention Action Plan 2009-2010
SCOTLAND
Strategies for the following counties were identified: Aberdeen City, Aberdeenshire, Angus, Argyll and Bute, City of Edinburgh, City of Glasgow, Clackmannanshire, Dumfries and Galloway, Dundee City, East Ayrshire, East Dunbartonshire, East Lothian, East Renfrewshire, Falkirk, Fife, Highland, Inverclyde, Midlothian, Moray, North Ayrshire, North Lanarkshire, Orkney Islands, Perth and Kinross, Renfrewshire, Scottish Borders, Shetland Islands, South Ayrshire, South Lanarkshire, Stirling, West Dunbartonshire, Western Isles, and West Lothian. No county-level Choose Life strategy included mention of restricting access to means for intentional overdose. All were excluded.

Table B.3: Excluded effectiveness studies and the reasons for exclusion

Study	Reason for exclusion
REPORTS	
Hinbest 2001. Youth Suicide Prevention in British Columbia: Putting Best Practice into Action – Evaluation report	Did not address intentional overdose
Victoria Evaluation 2003. Evaluation of the Victorian Suicide Prevention Response: Summary Report.	Did not address intentional overdose
Queensland 2004. Queensland Government Suicide Prevention Strategy 2003-2008: Key Achievements Summary Report.	Did not address intentional overdose
SYSTEMATIC REVIEWS	
Daigle. Suicide prevention through means restriction: assessing the risk of substitution – a critical review and synthesis. *Accident Analysis and Prevention* 2005;37:625-32.	Did not meet Cook's criteria for SR
Gould et al. Youth suicide risk and preventive interventions: a review of the past 10 years. *Journal of the American Academy of Child & Adolescent Psychiatry.* 2003;42(4):386-405.	Did not meet Cook's criteria for SR; did not address intentional overdose
Crowley et al. 2004. Youth suicide prevention. *Evidence briefing.* 2004.	Did not meet Cook's criteria for SR
JOURNAL ARTICLES	
Bellanger et al. Might the decrease in the suicide rates in France be due to regional prevention programmes? *Social Science & Medicine* 2007;65(3):431-41.	Suicide prevention programs under evaluation did not contain intentional overdose prevention component
Bialas et al. The impact of nationally distributed guidelines on the management of acetaminophen poisoning in accident and emergency departments. *Journal of Accidental Emergency Medicine* 1998;15:13-7.	Focused on management but not prevention of acetaminophen poisoning

Table B.3: Excluded effectiveness studies and the reasons for exclusion (cont'd)

Gunnell et al. The impact of pesticide regulations on suicide in Sri Lanka. *International Journal of Epidemiology* 2007; 36:1235-42.	Focus on pesticide but not drug overdose
Kerkhof AJ. The Finnish national suicide prevention program evaluated. *Crisis* 1999;20(2):50, 63.	No information on intentional overdose
Leenaars AA, Lester D. The impact of suicide prevention centers on the suicide rate in the Canadian provinces. *Crisis*. 2004;25(2):65-68.	No information on intentional overdose
Morgan et al. Paracetamol (acetaminophen) pack size restrictions and poisoning severity: time trends in enquiries to a UK poisons centre. *Journal of Clinical Pharmacy and Therapeutics* 2007;32:449-55.	Outcome measure was overall poisoning, data on intentional overdose not reported separately
Morrell et al. The decline in Australian young male suicide. *Social Science & Medicine* 2007;64(3):747-54.	No information about intentional overdose prevention
Poon et al. Impact of legislative changes on patterns of antipsychotic prescribing and self-poisoning in Scotland: 2000-06. *Journal of Toxicological Sciences* 2007;32(1):1-7.	Not for intentional overdose
Roberts et al. Influence of pesticide regulation on acute poisoning deaths in Sri Lanka. *Bulletin of the World Health Organization* 2003;81(11):789-98.	Focus on pesticide but not drug overdose

Appendix C: Data Extraction Tables for Part I

Table C.1: Goals/objectives/actions on means restriction identified from national suicide prevention strategy

Country	Goals/objectives	Actions
Australia, 2007 **A framework for prevention of suicide in Australia** Prepared by Australian Government, Department of Health and Ageing	**Goal:** To reduce access to means of suicide, to reduce inappropriate media coverage of suicide, and to create stronger and more supportive families, schools, and communities (universal intervention, target: whole population)	Six action areas, none of them addressing means restriction
Canada, October 2004 **The CASP blueprint for a Canadian national suicide prevention strategy** Prepared by the Canadian Association for Suicide Prevention	**Goal:** To reduce the availability and lethality of suicide methods **Objectives:** • Increase the proportion of primary care clinicians, other health care providers, and health and safety officials who routinely assess the presence of lethal means, including firearms, drugs, poisons, and other means in the home, and who educate about actions to reduce associated risks • Educate the public to reduce access to lethal means • Support/advocate for the development and use of technology to reduce the lethality of means, e.g. firearm locks, carbon monoxide shut-off controls, bridge barriers, medication containers • Educate the public about the specific risk of harm and death by suicide any time there is a firearm in the home or otherwise available • Advocate for necessary legislation to support these objectives	

Table C.1: Goals/objectives/actions on means restriction identified from national suicide prevention strategy (cont'd)

Country	Goals/objectives	Actions
England, 2002 **National suicide prevention strategy** Prepared by Department of Health **Aim:** To support the achievement of the target to reduce the death rate from suicide and undermined injury by at least a fifth by the year 2010 **Implementation plan:** responsibility of the National Institute for Mental Health in England (NIMHE)	**Goal:** To reduce the availability and lethality of suicide methods **Objectives:** • Reduce the number of suicides as a result of hanging and strangulation • Reduce the number of suicides as a result of self poisoning • Reduce the number of suicides as a result of motor vehicle exhaust gas • Reduce the number of suicides on the railways • Reduce the number of suicides as a result of jumping from high places • Reduce the number of suicides using firearms	**Hanging and strangulation** **Actions under way:** • Redesign of cell windows and furniture to reduce ligature points (in prison) • Removal of non-collapsible curtain rails or potential ligature point from in-patient psychiatric wards **Actions to be taken:** • Environmental auditing of in-patient psychiatric wards • Future research into hanging in community settings **Self poisoning** **Actions under way:** • Reduced pack size for over-the-counter sales of acetaminophen and Aspirin (started September 1998) **Actions to be taken:** • Plan to discuss the possible introduction of a safety warning and helpline number on over-the-counter packs of acetaminophen and Aspirin • Explore the feasibility and likely benefits of promoting the safe disposal of unwanted medicines by the public and the recalling of unused prescribed antidepressants by clinicians **Motor vehicle exhaust** **Actions under way:** • Introduce catalytic converters in motor vehicles **Actions to be taken:** • Monitor the rate of suicide by this method • Continue to liaise with the car industry regarding potential future modifications to vehicle design and monitor international research in this area

Table C.1: Goals/objectives/actions on means restriction identified from national suicide prevention strategy (cont'd)

Country	Goals/objectives	Actions
		Railway **Actions to be taken:** • Work with stakeholders on the potential for developing safety measures on railways, e.g. improved barriers • Separate recording of railway suicides to aid monitoring • Develop guidance on actions to be taken at 'hotspots' for suicide on railways **Jumping from high places** **Actions under way:** • Posted contact number on bridges and high places **Actions to be taken:** • Develop guidance on actions to be taken at 'hotspots' for suicide from high places **Using firearms** **Actions to be taken:** • A national collaboration of experts in suicide research will oversee a program of research; an early priority will be a study of suicides using firearms
Ireland 2005 **Reach out** **National strategy for action on suicide prevention** Prepared by Health Services Executive (HSE), the National Suicide Review Group, and the Department of Health and Children	**Goal:** To reduce the risk of suicidal behaviour among high-risk groups and vulnerable people **Action area 22:** Restricting and reducing access to means **Objective:** To limit access to the means and methods of self harm and suicide Action to reduce access to methods of self harm, while being a general population measure, is aimed at reducing risk among vulnerable and distressed people or people at a high risk of engaging in self harm	**Actions to be taken:** • Determine the risk of suicidal behaviour associated with prescription and over-the-counter medication, with a view to developing, implementing, and evaluating recommendations on the availability, marketing and prescribing of these medications • Provide facilities and promote the safe disposal of unused and unwanted medicines, building on the work in relation to the disposal of unwanted medicines properly (DUMP) project in the HSE South Western Area, Eastern Region

Table C.1: Goals/objectives/actions on means restriction identified from national suicide prevention strategy (cont'd)

Country	Goals/objectives	Actions
		• Facilitate and encourage discussions between the NARGC (National Association of Regional Game Councils) and the Gardai in relation to developing safer ways of licensing and storing firearms and ammunition and of disposing safely of unused or unwanted medicines • Establish whether there are specific places and types of place that are associated with suicidal acts and, where feasible, implement ways of restricting access, improving safety, and promoting help seeking • Formalize links between Irish water safety and the suicide prevention and mental health promotion services of the HSE to advance work in meeting shared objectives
New Zealand, June 2006 **New Zealand suicide prevention strategy 2006-2016** Prepared by the Ministry of Health	**Goal:** To reduce access to the means of suicide	**Areas for actions:** • Promoting compliance with firearms control regulations • Investigating ways to reduce the lethality of motor vehicle emissions • Encouraging the adoption of safer dispensing of medications and other lethal chemicals commonly used in suicide and suicide attempts • Promoting the adoption by local government and other agencies on safe urban design, e.g. jump sites • Promoting safe building design for residential institutions that are housing people with a high risk of suicide, such as psychiatric in-patient units and corrections facilities • Promoting vigilance among families and friends of people who have made suicide attempts to limit access to means of suicide

Table C.1: Goals/objectives/actions on means restriction identified from national suicide prevention strategy (cont'd)

Country	Goals/objectives	Actions
Sweden, June 2007 **A national program for suicide prevention** Prepared by Swedish National Institute for Public Health (government)	**Goal:** To limit access to the means of suicide	• A possible strategy for suicide prevention is to limit access to the means of suicide, such as certain drugs, household gases, gases from motor vehicles, and weapons • Limited access to methods of suicide can be accomplished through safety measures in physical environments such as unprotected locations at high elevations and unsecured traffic environments in road, railway, and subway systems • Limitations to the means of suicide in certain arenas in society, such as prisons, health care institutions, and special housing for those in need of care
United States 2001 **National strategy for suicide prevention: goals and objectives for action** Prepared by the United States Department for Health and Human Services **Target year:** 2005	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm. **Objectives:** • Increase the proportion of primary care clinicians, other health care providers, and health and safety officials who routinely assess the presence of lethal means (including firearms, drugs, and poisons) in the home and educate about actions to reduce associated risks • Expose a proportion of households to public information campaign(s) designed to reduce the accessibility of lethal means, including firearms, in the home • Develop and implement improved firearm safety design using technology where appropriate • Develop guidelines for safer dispensing of medications for individuals at heightened risk of suicide • Improve automobile design to impede carbon monoxide-mediated suicide • Institute incentives for the discovery of new technologies to prevent suicide	**Ideals for action:** • Develop an emergency department screening tool to assess the presence of lethal means in the home • Develop standardized practices for law enforcement response to domestic emergencies that assess for the presence of lethal means and advocate their removal or safe storage • Incorporate discussions of firearm risks and safe storage practices as a standard element of well-child care encounters • Educate parents about how to appropriately store and secure lethal means of self harm • Develop educational materials to make parents aware of safe ways of storing and dispensing common pediatric medications • Design reliable ignition shut-off sensors that respond to potentially lethal levels of carbon monoxide • Provide incentives for the discovery of new technologies such as annual awards and recognition by professional organizations

Table C.1: Goals/objectives/actions on means restriction identified from national suicide prevention strategy (cont'd)

Country	Goals/objectives	Actions
Wales 2008 **A national action plan to reduce suicide and self harm in Wales 2008-2013** Prepared by Welsh Assembly Government	**Objective:** To restrict access to the means of suicide • Where possible take steps to control the environment and limit access to the means of suicide • All custody and mental health in-patient settings in which people at risk of suicide and harming themselves may be detained should be risk assessed and all potential aids to self harm/suicide e.g. ligature points and points that may be used for self strangulation made safe	**Supporting actions:** • Work with planning and building authorities to ensure that access to identified high-risk buildings, bridges, open water, etc., that constitute suicide 'hotspots' is restricted and where appropriate safety barriers are in place • Work with local authorities and British Transport Police to identify geographical suicide hotspots,' and take measures to restrict access to roads and railways in these locations • Continuing examination of the evidence base for the effectiveness of restricting access to the means of suicide • In-patient services should be provided, including removal or covering points of ligature; ward structure and layout should facilitate observation of patients assessed as being at risk of suicide • Poison and police services strategy to reduce suicide and self harm • Development of a task and finish group to consider the actions necessary to limit access to the means of suicide and the development of signage and promoting access to telephone helplines in suicide hotspots

Table C.2: Policy gaps in means restriction

Methods for suicide	Potential measures[57]	Current actions
Hanging	There are very limited opportunities to restrict access to means of hanging in general population settings. The following may be used in institutional settings: • Removal or modification of attachment points that may be used for hanging • Removal or restriction of clothing, materials, and possessions which may be used for hanging • Assessment of suicide risk • Close surveillance and monitoring of those at high risk of suicide • Where practicable, not using single cells for housing those at risk of suicide • Consideration of safety features in design of new institutional facilities	• Redesign of cell windows and furniture to reduce ligature points (in prison) • Removal of non-collapsible curtain rails from in-patient psychiatric wards • Institutions with existing policies for preventing suicide include prisons, residential units of Children, Youth, and Family Care and Protection and Youth Justice, police cells, court cells and psychiatric in-patient units • New Zealand police and the Department of Corrections provide some 'suicide safe' cells for detainees, prisons have 'at risk units', and psychiatric in-patient units are built to safety guidelines
Self poisoning	**For drugs and poisons** • Limit the size of prescriptions • Elimination of automatic refills of prescriptions • Blister packaging, in preference to loose packaging • Given equivalence of effect, encouragement of prescribing of drugs that are less toxic in overdose • Reduce prescription charges (to encourage smaller scripts) • Hold a regular amnesty, or other means of encouraging return on out-of-date or unused medications and poisons • Educate to return unused medications (and poisons), directed particularly at mental health staff, including community care workers, domiciliary psychiatric nurses, and general practitioners. **For acetaminophen** • Restrict the number of tablets in each packet • Use strip package rather than loose package • Limit the current wide availability of the medication by, for example, withdrawing acetaminophen from supermarket sales, restricting sales to pharmacies, or making it available only as a prescribed medication	• Regulation on acetaminophen; reduced pack size for over-the-counter sales of acetaminophen and Aspirin, and co-proxamol in England and Ireland • Disposal of unwanted medication properly (DUMP) project in Ireland • Data collection on the types of medications used in overdose and ongoing evaluation on the correlation of drugs retuned and medication used for overdose within the DUMP project in Ireland • The Medicines Act 1981 regulates access to all pharmaceutical drugs in New Zealand, including tricyclic antidepressants, opioid analgesics, and acetaminophen • The Medicines Classification Committee, set up under the Medicines Act, makes recommendations to the Minister of Health regarding the classification of medicines and access to medicines by health professionals and the public where concerns arise (New Zealand)

Table C.2: Policy gaps in means restriction (cont'd)

Methods for suicide	Potential measures[57]	Current actions
	• Public education about hepatoxicity with overdose • Public education about the lack of immediacy of effect of overdose • Addition of methionine (an antidote to hepatoxicity)	
Firearms	• Mandatory licensing of gun owners • Registration of firearms • Restriction of gun ownership by minors • Imposition of 'cooling off' period between application to purchase a firearm and sale • Firearms safety training programs and demonstration of proficiency before owner licensing • Safe storage and transport of firearms in locked gun cabinets; legislative power to ensure this • Firearm safety education campaigns focused on risks associated with firearms in the home • Limited licensing period with re-licensing of owners required on a regular basis • Licences issued subject to conditions that permit immediate licence revocation and confiscation of firearms in certain circumstances • Thorough background checks to restrict gun ownership by high-risk persons • Improved weapon 'tracing' systems through firearm labelling techniques and implementation of a national firearms tracking system • Prohibition of manufacturing and importation of high-risk firearms and ammunition • Recording of all sales of guns and transfers of ownership • Sales permitted through licensed firearms dealers only	• Canada Firearms Act in 1977, 1991, and 1995 • New Zealand Parliament is considering proposed amendments to the Arms Act 1983 that would strengthen requirements for secure firearm storage

Table C.2: Policy gaps in means restriction (cont'd)

Methods for suicide	Potential measures[57]	Current actions
Jumping/leaping	• Adding barriers to existing structures where risk of jumping is high, e.g. bridges, multi-storey car parks, hotels, psychiatric hospitals • Incorporating barriers into designs of new buildings and, particularly, new institutional buildings to prevent jumping • Using safety glass for rooftops, where applicable • Restricting window apertures to limit access to high-rise buildings, rooftops, window sills • Erecting fences and safety barriers to restrict access to rail lines • Incorporating safety structures into the design of new metropolitan, including underground, rail transport systems	Posted contact number on bridges and high places (England)
Vehicle exhaust gas	• Use of catalytic converters to minimize emissions of carbon monoxide in vehicle exhaust gas • Modification of exhaust pipes so that they are incompatible with hose attachments • Development of sensors to detect potentially lethal levels of carbon monoxide in vehicles • Development of automatic idling stops, which cut engines after a maximum idling period has elapsed	• Introduction of catalytic converters in motor vehicles (England) • Requirement of all imported cars to have catalytic converters (New Zealand)
Media coverage of issues relevant to methods of suicide	• Development and promotion of media guidelines and resources for reporting suicides • Avoidance of explicit report or discussion of method of suicide in media • Enforcement of existing legislative restrictions against reporting methods of suicide in specific cases • Education of media personnel about the possible impact of media coverage on suicidal behaviour • Encouragement of responsible and accurate media coverage of suicide issues • Encouragement of careful and limited media reporting during possible suicide clusters	

Table C.2: Policy gaps in means restriction (cont'd)

Methods for suicide	Potential measures[57]	Current actions
	• Avoidance of reporting that sensationalizes suicide, glorifies it, or both • Avoidance of prominent coverage of suicide stories • Careful consideration of the content and representation of suicide in dramatic and fictional portrayals • Consultation with suicidologists and clinicians prior to broadcast of fictional or nonfictional stories about suicide • Inclusion of relevant helpline phone contacts in suicide stories	

Appendix D: Data Extraction Table for Part II

Table D.1: Included provincial/state/regional strategies/policies documents

Provinces/states/ regions	Strategies/policies/practices
AUSTRALIA	
Queensland 2003[101]	**New suicide prevention initiatives:** • The Department of Emergency Services will provide suicide prevention education and support for the community through programs such as first responder, drug overdose visitation • Education Queensland and Queensland Health will work together to support school staff in the early identification of risk and the facilitation of appropriate responses to suicidal and self harming behaviour and mental health problems. Specialist alcohol and drug workers will implement the Drug Interventions in School Communities model as a way of responding within a whole-of-school approach to school-age drug-related presentations and referrals.
Victoria 2006[102]	**Proposed actions for suicide prevention in Victoria** **Primary prevention:** • Reduce the availability and lethality of suicide methods, with a focus on pharmaceutical drugs and car exhaust systems
CANADA	
Manitoba 2006[103]	**Goal:** To reduce the availability and lethality of suicide methods **Objectives:** • Increase the number of professionals and family members routinely assessing risk in the home, including assessment for the presence of lethal means (drugs, poisons, etc.) • Support the development and use of tools to reduce the lethality of means (e.g. medication containers) • Review relevant legislation and make recommendations toward any needed changes required to support these objectives
UNITED KINGDOM	
Cornwall and Isles of Scilly 2008[104]	**Goal:** To reduce suicides in high risk groups *Further action to be taken for older people:* • Primary care trust (PCT) prescribing team to promote appropriate medicines disposal and reduce hoarding of medicines • Acknowledge the potential role of pharmacists, who can play a role in promoting mental health to the elderly in the community, through public heath campaigns and Medicines Usage Review **Goal:** To reduce the availability and lethality of suicide methods *Action under way:* • Legal limits on the pack sizes of nonprescription drugs • Phased withdrawal of the prescription-only painkiller co-proxamol • National scheme allows schedule 2 controlled drugs and diazepam to be prescribed in instalments. Cornwall Partnership Trust has expanded this locally for certain drugs *Further actions to be taken:* • Raising awareness among prescribers of relevant NICE guidelines and prescribing for dispensing in instalments • Public awareness campaign to promote safe disposal of unused medicines

Table D.1: Included provincial/state/regional strategies/policies documents (cont'd)

Provinces/states/ regions	Strategies/policies/practices
Coventry and Warwickshire 2007[105]	**Standard:** Appropriate medication Patients at risk of suicide will receive the right medication in the right amounts; they will not receive any more than a 14 day supply, and all discharge letters and care plans will state the appropriate medication and who prescribed it **Recommendation:** For consideration to be given by the clinical division and the relevant operational service groups as to how documentary records can confirm how many days medication was prescribed, incorporating explicit advice to the patient's general practitioner about appropriate prescribing quantities; it is suggested that there is a need to establish a standard discharge medication protocol **Substance misuse services** **Recommendation:** That all clinical staff be trained to be able to assess and respond to poly drug use, in particular to be able: • To assess whether a patient is drinking at hazardous levels • To advise patients on the risks of alcohol/opiates/benzodiazepines and opiates • To develop care plan interventions to address alcohol use • To develop care plan interventions to address benzodiazepine use • To agree on a benzodiazepine prescribing policy
Durham and Darlington 2004[106]	**Goal:** To reduce the availability and lethality of suicide methods **Self poisoning** • A letter was sent to all GPs outlining research evidence (both national and local) recommending the reduced prescribing of medication that is potentially toxic in overdose, namely dothiepin, co-proxamol, and amitriptyline • Audit projects undertaken by pharmaceutical advisers in the six PCTs, County Durham and Darlington Priority Services NHS Trust, and the local acute trust have demonstrated reduced expenditure and hence prescribing of dothiepin, co-proxamol, and amitriptyline
East Lancashire 2005[107]	**Goal:** To reduce the availability and lethality of suicide measures **Reduce the number of suicides as a result of self poisoning** The action plan will ensure prescription of psychotropic medication conforms to NICE guidelines **Recommendations:** • Develop strong links with local communities to number of drug-related deaths and identify illicit substances • Extract data about types of poisoning (data source not specified) and communicate with primary care pharmacy with regard to prescribing issues
Hertfordshire 2008[108]	**Goal:** To reduce the availability and lethality of suicide methods **Current situation:** There are systems in place to reduce the number of persons overdosing on prescribed drugs. These include seven-day dispensing and regular review of prescribed medication and blister packs. Risk assessment for suicide is part of the management of the depressed persons. The new primary care mental health teams should help to reduce attempted suicide and suicide using prescribed drugs. **Three-year aim:** • In the past, at-risk individuals have sometimes been prescribed medication in significant quantities, which they have then taken as a fatal overdose; it is now well understood that the toxicity and amount of the drugs prescribed should be carefully considered when treating those at risk of suicide • It will be important to use the ongoing county-wide suicide audit to gain a greater understanding of the issues such as the number of deaths by poisoning from prescribed drugs and OTC drugs • It is proposed to audit prescribing patterns further in primary care, not only to the number of days of the prescription, but also whether all prescriptions for antidepressants are clinically indicated.

Table D.1: Included provincial/state/regional strategies/policies documents (cont'd)

Provinces/states/ regions	Strategies/policies/practices
	Action plan (2008-2011): Agree on the responsibility of community and PCT pharmacists in ensuring the safest prescribing practice (lead agency: PCT; date for completion: April 2009)
Lincolnshire 2006[109]	**Goal:** To reduce the availability and lethality of suicide **Objective:** Restrict sales/prescription of medications *Action taken:* County-wide trust clinical prescribing group addressed issues, especially regarding venlafaxine and tramadol *Future activity:* To act on further information gleaned from the annual suicide reports and other sources, including the Medicines and Health Care Regulatory Agency *By whom:* Prescribing adviser, Lincolnshire PCT *Date:* Ongoing **Objective:** Revise medication management policy to include guidance on the provision of medications used while people are away from care facilities and risks *Future activity:* Revised policy *By whom:* risk assessment and suicide prevention review group Lincolnshire Partnership Trust *Date:* April 2007 **Advice for people who repeatedly self poison:** • Involve pharmacy services regarding support and advice • Check availability of pharmacy information leaflets/advice
North Cumbria 2001[110]	Possible strategies to reduce means/method availability **Specific measure:** Restriction of the quantity of particular drugs available on prescription and safekeeping of medicines in the home **Intended benefit:** Reduction in deaths from self poisoning
Somerset 2005[111]	**Goal:** To reduce the availability and lethality of suicide methods **Objective:** Reduce the number of suicides as a result of self poisoning **Actions:** • Take steps to promote safer prescribing of antidepressants and analgesics *Indicators:* Review the prescribing of co-proxamol; lead, time scale, and milestones/comments were stated • Promote the safe disposal of unwanted medicines by the public and recall of unused prescribed antidepressants by clinicians *Indicators:* (a) medicines management and waste campaigns already active, (b) community pharmacists accept unused and unwanted medicine from the public • Publicize the health dangers of acetaminophen in overdose *Indicators:* (a) see above regarding co-proxamol, (b) have an incentive scheme in place to encourage prescribers to reduce their prescribing usage; *lead:* primary care trust, South Somerset PCT • Develop awareness about self poisoning among staff working with young people *Indicator:* Include within self harm training package; *lead:* adolescent consultation and treatment service

Table D.1: Included provincial/state/regional strategies/policies documents (cont'd)

Provinces/states/ regions	Strategies/policies/practices
Stoke-on-Trent and Staffordshire 2006[112]	**Standard:** Appropriate medication **Objectives:** • Where any patient is non-compliant with prescribed antipsychotic medication because of side effects, atypical medication is prescribed; if older, less safe medication is prescribed, records must include an explanation for this (current activity not known; target and action required/lead agency or person were specified) • Every patient who has had a history of self harm in the previous three months, is prescribed a supply of potentially toxic medication covering no more than 14 days (current activity: yes; target: achieved; action required/ lead agency or person were specified) • Every care plan and/or discharge letter must include explicit advice to every patient's general practitioner about appropriate prescribing quantities (current activity: no; target, action required/lead agency or person were specified)
UNITED STATES	
Arizona 2001[113]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Objective:** Establish safer methods for dispensing potentially lethal quantities of medications
California 2008[114]	**Goal:** To reduce access to lethal means: Reducing access to lethal means is an important component of suicide prevention when it is integrated with other local, regional, and state-level activities; education about safe storage of potentially lethal means, such as firearms and medication, can save lives
Delaware 2008[115]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **For youth (ages 10 to 24) and middle-aged men, and elderly** **Objectives:** By 2015, increase the number of primary care clinicians, other health care providers, and health and safety officials who routinely assess the presence of lethal means (including drugs) in the home and provide education on actions to reduce associated risk **Strategies:** Educate youth and family about appropriate storage of alcoholic beverages, prescription drugs, over-the-counter medications, and poisons for household purposes **Objectives:** By 2015, advocate for safer methods for dispensing potentially lethal quantities of medications
Massachusetts 2005[116]	**Goal:** To reduce access to lethal means and methods of self harm **Objectives:** • Increase the proportion of primary care, mental health clinicians, and public safety officials who routinely assess the access to lethal means in the home or institutional setting in higher risk situations (persons with depression, persons recently arrested) (mid-term) • Promote safe and secure storage of materials that could be used for self injury, for the purpose of promoting decreased access for persons at risk of self harm (long term) **Suggested strategies:** **Policy:** Support the development of policies that reduce access to lethal means; work with pharmaceutical companies to encourage research and development of new technologies and appropriate barriers to access **Community organizing:** Identify and organize community-based organizations to assist with educating professional, parents, caregivers, and legislators regarding issues of reducing access to lethal means **Education:** Provide training for health, mental health, and public safety professionals on assessing the access to lethal means among persons at risk for suicide behaviour; provide education to parents and caregivers regarding risks associated with access to lethal means

Table D.1: Included provincial/state/regional strategies/policies documents (cont'd)

Provinces/states/ regions	Strategies/policies/practices
	Engineering/environmental: Promote pharmaceutical innovations and other technologies that may reduce the risk of self injury
Michigan 2005[117]	**Goal:** To promote efforts to reduce access to lethal means and methods of suicide **Objective:** Within three years, the Office of Suicide Prevention, working in collaboration with the appropriate professional organizations, will increase the proportion of primary care clinicians, other health care providers, and health and safety officials who routinely assess the presence of lethal means (including firearms, drugs, and poisons) in the home and educate on actions to be taken to reduce associated risks
Minnesota 2000[118]	**Recommendations for methodology and research strategies:** Restricting access to highly lethal methods of suicide **Methodology:** Promote and enforce means restriction (e.g. safe storage of medications and toxic substances)
Montana 2008[119]	**Recommendation:** Restrict alcohol and lethal prescription drugs in youth aged 10 to 24
Nebraska 2006[120]	**Promising practices:** ED means restriction education. ED staffs are trained to provide education to parents of children who are assessed to be at risk for suicide. Lethal means covered include firearms, medications (over-the-counter and prescribed), and alcohol. The content of parental instructions includes (a) informing parent(s), apart from the child, that the child was at increased suicide risk and why the staff believed so; (b) informing parents that they can reduce risk by limiting access to lethal means, especially firearms; and (c) educating parents and problem solving with them about how to limit access to lethal means. **Intervention type:** Treatment; target age: 6 to 19 years; gender: male and female; ethnicity: multiple Nebraska suicide prevention plan: Intervention – Implement the ED means restriction education program to educate parents and problem solve with them about how to limit access to lethal means following an episode in which a child presents with increased risk of suicide
Nevada 2007[121]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Objective:** Educate physical and mental health care providers, senior caregivers, and correctional facilities on the assessment of lethal means in the home and actions to reduce lethal means and suicide risk **Actions:** • Develop printed materials for parents and caregivers to increase home safety after a suicide attempt or known suicide ideation • Encourage facilities and agencies to include home safety material as part of their formal discharge process • Encourage discharge nurses, physicians, law enforcement personnel, first responders, and pharmacists to share information verbally and educate on safety measures relating to safe storage of their family members' medications and the patient's own prescribed medications (implementation plan: suggested partners, benchmark, and timeline)

Table D.1: Included provincial/state/regional strategies/policies documents (cont'd)

Provinces/states/ regions	Strategies/policies/practices
New Hampshire 2004[122]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Objectives:** • Develop and offer training for medical, mental health and public safety professionals on assessing and addressing the presence of medications, drugs, and poisons in the home of those at risk of suicide – work with an interdisciplinary group to develop a training module specifically focused on reducing access to lethal means through assessment and counselling (partner and time specified) – Incorporate the module into the frameworks training and evaluate its effectiveness (evaluation) • Determine means-specific interventions (e.g. public education on lethality of acetaminophen) that could reduce suicidal events – Monitor suicide data to determine if there are clusters of events that are means- or site-specific and report findings to promote effective interventions when appropriate (partners and time specified)
New York 2005[123]	**Goal:** To restrict access to means of self harm • Substitute lethal medications with nonlethal ones. Some medications, such as desipramine, are lethal when ingested in large quantities or when combined with alcohol. Physicians should provide nonlethal medication substitutes, provided the alternative is efficacious for the condition being treated and the patient is at suicidal risk. • Poison-proof your home and clean out the medicine cabinet regularly. Urge consumers to properly dispose of medicines no longer needed and to store safely those that are still needed. Household cleaning agents and pesticides should be kept out of the hands of small children and those at risk for suicide.
North Carolina 2004[124]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Objectives:** • Increase the number of health care professionals who provide counselling to parents of children and adolescents about safe storage of lethal means (e.g. drugs) • Collect and analyze information about the lethal means of suicide in a state-wide data system, including where the agents were obtained and how they were stored • Implement a prescription drug monitoring system in North Carolina • Identify evidence-based interventions to reduce the use of over-the-counter medication for suicide attempts **Action ideas:** • *Individuals:* Understand and apply Child Access Protection law and methods for safely storing medications (prescription and OTC) and poisons in households with minor children and households where children visit • *Schools/communities:* Adopt and enforce on-campus alcohol and firearm possession policies at community colleges, universities, and college campuses
Oregon 2000[125]	**Strategy:** Promote efforts to reduce access to lethal means and methods of self harm **Objective:** Energize Oregonians to restrict youth access to means of suicide by educating them about such vital issues as the importance of removing lethal means (poisons, medications, alcohol, etc) from homes with a youth at high risk of suicidal behaviour **Audience:** All Oregonians, particularly parents/guardians, community gatekeepers, young people, especially those aged 10 to 24, behavioural health care providers, teachers, school administrators, law enforcement, clergy, juvenile justice workers, physicians, public health practitioners, and legislators

Table D.1: Included provincial/state/regional strategies/policies documents (cont'd)

Provinces/states/ regions	Strategies/policies/practices
	Sample implementation activities: • Conduct public forums for parents, guardians, and media on strategies for securing medications, particularly prescription drugs and those stored in large quantities • Increase the proportion of primary care and other health care providers who routinely assess the presence of lethal means (including drugs, and poisons) in the home and educate patients about actions to reduce risks • Conduct a local community assessment to determine the extent to which firearms and other lethal means are stored safely in homes with children and adolescents
Rhode Island 2002[126]	**Awareness:** Raise awareness about the dangers of OTC and prescription medications **Objective:** Promote efforts to reduce access to lethal means and methods of self harm • *Educating providers:* Educate health care providers and health and safety officials on assessment of lethal means in the home • *Changing organizational practices:* Address suicide attempts by OTC medications with providers and pharmacists, e.g. warning labels for prescriptions **Target:** Youth 15 to 24 years old
South Carolina 2005[127]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Objectives:** • Increase the number of health and safety providers who routinely assess the presence of lethal means (including drugs and poisons) in the home and educate on actions to be taken to reduce risks • Increase the number of people exposed to public information campaigns designed to reduce accessibility of lethal means in the household • Develop guidelines for safer dispensing of medications for individuals at heightened risk of suicide
South Dakota 2005[128]	**Goal:** To reduce the danger of lethal means and methods of self harm **Objective:** Use public information campaigns to disseminate safety messages designed to reduce the danger of lethal means and methods of self harm **Recommended action:** Work with the South Dakota Pharmacists Association and other stakeholders to develop and disseminate public information messages about preventing intentional overdose with prescription and nonprescription medicines
Tennessee 2007[129]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Tennessee response:** • Develop an ED-screening tool to assess the presence of lethal means within a place of residence for use in in-patient care, home care, and discharge planning • Encourage discussions of lethal means and safe storage practices in well-child care encounters and in educational programs for young people, parents, and gatekeepers • Develop educational materials to make people aware of safe ways of storing and dispensing medications

Table D.1: Included provincial/state/regional strategies/policies documents (cont'd)

Provinces/states/ regions	Strategies/policies/practices
Texas 2008[130]	**Goal:** To promote efforts to enhance safety measures for those at risk of suicide **Objective:** Develop promising or best practice based guidelines and training for health care professionals for safer dispensing of medications in households with individuals at heightened risk of suicide **Strategies:** Support continuing medical education which assists physicians and other health care professionals in making appropriate clinical judgments when prescribing potentially lethal medications to patients at risk for suicide
Vermont 2005[131]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Objective:** Reduce access to lethal means of completing suicide including poisons, medications, alcohol, and other drugs **Recommended strategies:** • Encourage primary care and other health care providers to routinely assess the presence of lethal means (including drugs and poisons) in the home and educate patients about associated risks • Develop a public educational campaign of means restriction to reduce youths' access to lethal means of completing suicide including poisons, medications, alcohol, and other drugs; this entails: – Educating parents and guardians, health professionals, and other adults about links between alcohol/drug use in suicide attempts – Distributing flyers, providing public forums, and media coverage illustrating methods for storing medications, particularly prescription medication and those that are dispensed in large quantities
West Virginia 2006[132]	**Objective:** A campaign to increase efforts to reduce access to lethal means and methods of self harm among people who have been assessed as at risk for suicide will be developed and implemented by 2011 **Strategy:** The West Virginia Council for the Prevention of Suicide will continue to develop and implement activities to readily assess the potential for suicide and reduce access to lethal methods of self harm for people assessed as at risk **Activities:** • Develop and distribute a fact sheet with statistics regarding use of medications and suicide risk for distribution to providers, communities, and individuals at risk • Encourage health care and behavioural health professionals to counsel families and friends about preventing access to means of suicide for persons who have attempted suicide
Wisconsin 2002[133]	**Goal:** To promote efforts to reduce access to lethal means and methods of self harm **Objective:** Increase the proportion of primary care clinicians, other health care providers, and health and public safety officials who routinely ask about the presence of lethal means of self harm, including drugs and poisons in the home, and provide education about actions to reduce associated risks **Sample implementation activities:** Develop and disseminate educational materials to make parents aware of safe methods for storing and dispensing common pediatric and other medications
Wyoming 2002[134]	**Objective:** To increase access to and utilization of population-based and clinical services and programs **Method:** Promote and encourage safe storage of medications and toxic substances

Appendix E: Effectiveness of Intentional Overdose Prevention Strategy

Table E.1: Summary of systematic reviews

Review	Search	Study selection	Study quality	Results/conclusion
Mann et al. 2005[31] **Objective:** To examine evidence for the effectiveness of specific suicide-preventive interventions and to make recommendations for future prevention programs and research	**Database:** MEDLINE, the Cochrane Library, PsycINFO **Search date:** 1966 to 2005	**Inclusion criteria:** Studies that reported on either the primary outcomes of interest, namely suicide death and attempted suicide, suicide ideation, antidepressant prescription rate **Included studies:** Ten systematic reviews/meta-analyses, 83 primary studies; 10 primary studies specifically related to intentional overdose (published between 1972 and 2002): seven on barbiturate restriction; one on acetaminophen packaging change, two on alcohol restriction	Not formally assessed; no discussion on methodological issues associated with the included studies	Suicide death rates have reduced after barbiturate restriction, acetaminophen packaging change, and alcohol restriction
Morgan and Majeed 2005[77] **Objective:** To review previous studies assessing the effectiveness of regulations introduced in 1998 to restrict sales of acetaminophen and reduce acetaminophen poisoning	**Database:** MEDLINE (1996 to 2003), EMBASE (1980 to 2003), CINAHL (1982 to 2003), HIMIC (1993 to 2003), COCH (2003), APC (1991 to 2003), CENTRAL (2003), DARE (2003) **Search date:** See above	**Inclusion criteria:** • English language publication between 1998 and 2003 • Studies conducted in the United Kingdom • Studies assessed changes in any aspect of acetaminophen poisoning due to the 1998 regulations	Study methodological limitations include: • Short follow-up periods (one to two years after the legislation) • No case definition for acetaminophen poisoning • Lack of control group	**Deaths by acetaminophen** poisoning (three studies): One study reported reduction in England and Wales after one year; another reported reduction in 1998 and 1999, but a rise again in 2000 in Scotland; the third reported no change. **Admissions to specialized liver units/liver transplant** (three studies): All three studies reported reduction **Severity of acetaminophen poisoning** (eight studies): Three studies reported reductions, but five did not **Hospital admission for acetaminophen poisoning** (six studies): Five of six studies reported reductions

Table E.1: Summary of systematic reviews (cont'd)

Review	Search	Study selection	Study quality	Results/conclusion
		Included studies: Twelve studies (published between 2000 and 2003); follow-up one to two years in 11 studies; 7 conducted at local level; 3 compared results of acetaminophen with other drugs		**Acetaminophen sales** (two studies): both reported a significant reduction in over-the-counter sales.
Hawkins et al. 2007[30] **Objective:** To review the literature to determine the effectiveness of the legislation, focusing specifically on acetaminophen poisoning	**Database:** MEDLINE (1996 to 2006), EMBASE (1996 to 2006), CINAHL (1982 to 2006) **Search date:** Indicated above for different databases	**Inclusion criteria:** Any study set in the UK from 1998 onward that assessed changes in at least one aspect of acetaminophen poisoning in light of the 1998 legislation **Included studies:** Seventeen (2000 to 2006); three are abstracts only	• Short follow-up periods • Restriction to relatively small areas of the UK • Lack of control group • No clear differentiation between the acetaminophen preparations covered by the legislation and those not	**Deaths by acetaminophen poisoning** (eight studies): Three found reductions; one found an initial reduction followed by an eventual increase; one reported an overall increase; three found no significant difference **Admission to specialized liver units/liver transplant** (seven studies): Five found reduction; two found no change **Hospital admission for acetaminophen poisoning** (seven studies): Reduction: four studies Increase in adult admission: one study Initial decline followed by an eventual increase: one study Decline in acetaminophen admissions but an increase in admissions for non-acetaminophen poisoning: one study **Severity of acetaminophen poisoning** (measured by plasma acetaminophen concentration) (three studies): Decline (not clinically significant): one study No significant difference: two studies **Acetaminophen sales** (three studies): Decline: one study No significant change: two studies

Table E.2: Primary studies included in the two systematic reviews[30,77]

Bateman DN, Gorman DR, Bain M, Inglis JHC, House FR, Murphy D. Legislation restricting paracetamol sales and patterns of self-harm and death from paracetamol-containing preparations in Scotland. *British Journal of Clinical Pharmacology* 2006;62(5):573-81.

Donohoe E, Walsh N, Tracey JA. Pack-size legislation reduces severity of paracetamol overdoses in Ireland. *Irish Journal of Medical Science* 2006;175(3):40-2.

Hawton K, Townsend E, Deeks J, Appleby L., Gunnell D, Bennewith O, et al.. Effects of legislation restricting pack sizes of paracetamol and salicylate on self poisoning in the United Kingdom: before and after study. *BMJ* 2001;322(7296):1203-7.

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Morgan O, Griffiths C, Majeed A. Impact of paracetamol pack size restrictions on poisoning from paracetamol in England and Wales: an observational study. *Journal of Public Health* 2005;27(1):19-24.

Prince MI, Thomas SH, James OF, Hudson M. Reduction in incidence of severe paracetamol poisoning. *Lancet* 2000;355(9220):2047-8.

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Turvill JL, Burroughs AK, Moore KP. Change in occurrence of paracetamol overdose in UK after introduction of blister packs. *Lancet* 2000;355(9220):2048-9.

Table E.3: Summary of the included primary studies

Study	Policy/strategy	Study period	Outcomes
DRUG RESTRICTION – ACETAMINOPHEN			
Kisely et al. 2003[89] Western Australia (WA), Australia	Acetaminophen-containing products were recalled in two periods during 2000. The two recall periods were considered together as a period of acetaminophen restriction	1 January 1996 to 31 December 2001	**Hospital admissions in Western Australia for poisoning with all agents, including acetaminophen:** Hospital admission for acetaminophen poisoning decreased (ss) when sales were restricted in 2000. There was no increase in poisoning with other drugs at the same time. There were similar results when accidental poisoning and deliberate self harm were considered separately.
Balit et al. 2002[67] New South Wales (NSW) and Tasmania, Australia Retrospective comparison	Acetaminophen-containing products were recalled in two periods during 2000. The two recall periods were considered together as a period of acetaminophen restriction.	16 March to 21 May, 6 June to 23 August 1997, 1998, 1999 compared to 2000 (restriction period)	**Number of phone calls for acetaminophen, Aspirin, and ibuprofen deliberate self poisoning (DSP):** There were no ss changes in acetaminophen or Aspirin DSP. Ibuprofen DSP increased (ss). Both data sources demonstrated the same changes.
Morgan et al. 2007[90] United Kingdom	1998 legislation on acetaminophen	1993 to 2004	**Suicide deaths in England and Wales:** Acetaminophen-related deaths declined after 1999. Compound acetaminophen-, Aspirin-, antidepressants-related deaths as well as non-poisoning suicides also declined after 1999.
Gorman et al. 2007[91] United Kingdom	1998 legislation on acetaminophen	1995 to 2002	**Suicide death rates:** These declined in each deprivation quintile following the 1998 legislation, then returned to mid-1990s level. **Nonfatal overdose rate:** These declined in each deprivation quintile following the 1998 legislation, then returned to mid-1990s level.
Sandilands and Bateman 2008[92] United Kingdom	Withdrawal of co-proxamol from the UK market	2000 to 2004 compared to 2005 to 2006	**Suicide death rates:** In Scotland, significant reduction in the proportion of poisoning deaths due to co-proxamol following legislation; most significant in male out-of-hospital deaths.
Nordentoft et al. 2006[94], 2007[93] Denmark	Barbiturates could no longer be prescribed as hypnotics after 1986 Prescription of dextropropoxyphene was restricted in 1987	1970 to 2000 1970-93: ICD-8 codes E950-E959 1994- to 2000, X60-X66 and X68-X69 in combination with the codes T36-T50+T58 in ICD-10	**Suicide death rates:** These increased until 1980, then declined steadily. **Method-specific suicide deaths:** Deaths by drug poisoning decreased before drug restriction. Deaths by other means decreased (hanging, jumping, and cutting).

Table E.3: Summary of the included primary studies (cont'd)

Study	Policy/strategy	Study period	Outcomes
Schapira et al. 2001[95] United Kingdom	Replacement of barbiturates by less toxic drugs such as selective serotonin reuptake inhibitors	1961 to 1965 compared to 1985 to 1994	**Suicide death rates:** Significant decline in women and modest decline in men coincided with the reduction in exposure to carbon monoxide and barbiturate.
ALCOHOL POLICY FOR YOUTH			
Markowitz et al. 2003[96] United States	Alcohol policy for youth: • Excise tax on beer • Measures of alcohol availability • Drunk driving laws	1976 to 1999	**Suicide death rates:** • Increase excise tax on beer associated with reduced suicide deaths in males; no impact on female suicides • Suicides by males ages 20 to 24 years are positively related to the availability of alcohol and negatively related to the drunk driving law • Female suicides not impacted by alcohol availability • Teenage female suicide may be impacted by drunk driving law
PARENT EDUCATION			
Kruesi et al. 1999[97] United States Prospective study	ED staff provided *means restriction education* to parents whose children made an ED visit for mental health assessment or treatment, which include three steps: • Informing parents, away from the child, that the child was at increased suicide risk and why the staff believed it so • Telling parents that they can reduce risk by limiting access to lethal means • Educating parents and problem-solving with them about how to limit access to lethal means	Follow-up: mean 2 (range 0.03 to 5.6) months after the ED visit	**New action:** Receiving means restriction education was significantly associated with new action limiting access to prescribed and OTC medications, but not alcohol.

Abbreviations: DSP: deliberate self poisoning; ED: emergency department; ICD: International Classification of Diseases; NSW: New South Wales; OTC: over-the-counter; ss: statistically significant; WA: Western Australia

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