What is evidence-informed practice and how is it different than evidence-based practice?

Evidence-informed public health is “the process of distilling and disseminating the best available evidence from research, context and experience, and using that evidence to inform and improve public health practice and policy.”¹ It is the process and practice of making decisions and creating change to promote health and well-being. This is different from classically defined evidence-based practice that, in principle, suggests practice decisions are made from clinical research studies. Over the past few decades, it has been recognized that there is much to be gained from the evidence of prevention in ‘real world’ practice, including evidence from practitioners, stakeholder, knowledge users, and other resources. In the current health care environment of scarce resources and competing issues, it is important that existing efforts and resources are focused on programs that are effective and evidence-based. At the same time, it is essential that the injury prevention community values the evidence generated from and with the people that implement injury prevention practice. To understand the transferability of interventions and why some strategies work in one setting or context and not in others, is important for the practice of injury prevention. Practitioners must “learn to effectively transfer good practice to other settings/contexts.”²
Why focus on evidence-informed practice?

Evidence-informed injury prevention practice includes a comprehensive approach that includes different types of evidence from both research and practice (see Chapter 2.1 Public Health Approach for more information on the evidence informed public health movement). Following evidence-informed practice includes the actions needed to adopt, implement and evaluate effective interventions to reduce injury, while recognizing the importance of context and the interactions between individuals, communities, policies, and the physical environment. Evidence regarding cost-effectiveness also exists for a number of strategies, and thus provides a significant opportunity to save lives, while saving money at the same time. Without a focus on the use of evidence, clinical practice, individuals, organizations, communities, policy makers, and others “will continue to invest resources in strategies that do not lead to reducing the burden of injury.”

There are several reason why implementing an evidence-informed approach can be complex and challenging, including:

- Resistance to change
- Competing priorities
- Failure to plan solutions effectively
- Lack of capacity or expertise
- Lack of time or resources

- The value of an evidence-informed process is realized when the best available research evidence is combined with the practical expertise of professionals in the ‘real world’.
- With so much to do to address the injury burden in Canada, so little time, and limited resources, there is a need invest in strategies that are most likely to reduce injury.
- Numerous ineffective strategies continue to be practiced across Canada despite evidence that they are not the best use of resources.
- An evidence-informed process is crucial to effective planning and is useful at more than one point in the planning process.
- Evidence from research studies is necessary; however, it is only one part of the process to effect change. The role and impact of the community, and the political and social contexts, drive the successful uptake and implementation of injury prevention practice.
Value is realized when the best available research evidence is combined with the practical expertise of professionals in the ‘real world’. This approach requires that professionals are aware of both best evidence and practical aspects of transferring policies and programs from one setting to another.²

**Strategies to be evidence-informed**

Using an evidence-informed approach in prevention planning ensures that the use of different types of evidence occurs at more than one point in the planning process.³ Knowledge of this process is essential in order to ensure a plan has real impact and uses scarce resources effectively. Section 2 of this resource focuses on the public health approach and suggests ways to use different types of evidence in order to ensure the best programs are selected to address the injury problem at hand.

There are essential components that need to be considered, which include: using the best available research; considering the local health issues and local context; using existing public health resources; and understanding the community and political climate.¹⁴⁻⁶ It is important to recognize that while evidence from research studies is necessary, it is only one part of the process to effect change. The role and impact of the community and the political and social context (e.g. priorities) drives the successful uptake and implementation of injury prevention practice. This section of this resource will further expand on each of these components in more detail.

Finally, it is important in each component to make “the best use of resources by focusing on those strategies most likely to work in finding a good practice that has been proven to be effective.”²

**References**


History of the Public Health Approach

The Canadian Public Health Association has traced the history of public health in Canada over the last 100 years, highlighting a number of important milestones that have been made in the field. Historically, public health concerns in Canada centered on infectious disease outbreaks spreading across the early colonies, including the Montreal smallpox epidemic and the “Spanish influenza”. Scientific discoveries altered the understanding of how infectious diseases are transmitted and can be prevented, motivating a number of growing efforts to stop the spread of disease. These prevention efforts, including the implementation of food and water safety regulations and screening measures, increased sanitation, and improved nutrition, education and immunization efforts, resulted in a decrease in the risk of prevalent communicable diseases impacting communities across Canada. An important characteristic of the Public Health Approach was its increased focus on the upstream factors that contribute to the incidence of infectious disease. While infectious diseases were an important priority, fatal and non-fatal injuries were also prevalent with new risk factors emerging. Approaches being used to reduce risks of infectious disease, however, were not applied in the same way to think about the preventability of injury.

The Public Health Approach was first extended outside the realm of classic disease prevention in the 1980’s. What signaled public health’s entry into the world of preventable injury was seminal work in the application of the Public Health Approach to violence prevention. The public health perspective towards injury was influenced by recognition that injuries are not accidents – they are predictable and preventable events. Applying this
approach to the prevention of injuries brings together multidisciplinary teams including: epidemiologists, health care practitioners, behavioural scientists, biomechanists, rehabilitation specialists, and knowledge translation experts, that create both a systematic and scientific basis to address the significant burden of injury. Despite this movement and recognition that injuries are not accidents, injury continues to be a significantly underfunded and largely understudied area of public health.

The Public Health Approach

The Public Health Approach is first and foremost preventative in nature. It involves understanding the underlying determinants of health problems and developing effective prevention strategies. There are five classic steps in the Public Health Approach including: surveillance; research on risk and protective factors; research on interventions; program and policy implementation; and evaluation and monitoring.\(^2\,^3\) It has been recognized that to successfully prevent injuries, all five functional elements need to be operationalized, but not necessarily in a linear sequence. Closely tied to the public health approach is a series of concepts that have been introduced as part of the evidence-informed public health movement, which are necessary to consider at each of these stages. The following sections in this chapter will review each step in the Public Health Approach. The final section will briefly review principles of the evidence-informed public health movement and demonstrate how it contributes to the five components of the public health approach.

**Surveillance**

The first stage in the Public Health Approach is surveillance. This is a process that begins with defining the injury problem and continues through to systematic data collection. To
accurately describe the burden and impact of injury on Canadians and the Canadian health care system, surveillance measures used include mortality and morbidity data. This ensures that attention is drawn to both the prevalence and severity of injury problems. Injury indicators can also be used to describe the burden of injury problems in Canada. The Child Injury Prevention Injury Outcome Indicators project\(^4\) identified three main indicators that can be used across all injury types and that were found to be most important amongst decision makers: mortality rate; potential years of life lost; and hospital separation rate. These measures are used as indicators of both the burden and severity injury. For example, an increase in mortality due to a specific injury would indicate the need for more effective injury prevention strategies in that specific area. A decrease in mortality may indicate injury prevention strategies are working. A measure such as hospital separations rate gives a value to the burden of injury to the health care system. Tracking the specific trends in injury diagnosis can in turn be used to inform prevention programs. When prevention strategies are implemented with no plans to continue to invest in surveillance, there are no means to evaluate the effectiveness of these strategies or detect inadequacies with respect to implementation.

### Risk and Protective Factors

Unlike mortality and morbidity measures that serve to describe burden across different types of injuries, establishing the risk and protective factors surrounding a particular injury type provides an indication of the underlying behavioral and environmental determinants of an injury problem.\(^5\) For example, important risk factors for drowning that have been established include age, alcohol use, and lack of training.\(^6,7\) Important protective factors for injuries and fatalities resulting from motor vehicle collisions include restraint use.\(^8\) The second stage of the Public Health Approach is to synthesize the evidence of the risk and protective factors for injury.

There are two important types of information on risk and protective factors: 1) the availability of sound evidence of an association between a risk or protective factor and an injury outcome, and 2) information on the prevalence of these factors in the target population. Evidence on risk and protective factors is fundamental to the development of prevention strategies. Limited access to information on the prevalence of specific risk and protective factors within a defined population can challenge efforts to select high-impact prevention strategies. For example, a promotional campaign to encourage the use of seatbelts will not be likely to result in any measureable impact on motor vehicle injuries if the population targeted already has a high compliance rate.
Selecting/Designing an Intervention

The third stage of the Public Health Approach is to develop and/or select effective prevention strategies. Information that is gathered at this stage informs the development or selection of an effective, targeted intervention aimed to reduce the injury risk established at the surveillance stage. Gielen and Sleet (2003) categorized injury prevention strategies into ‘active or behavioral strategies’ and ‘passive or environmental strategies’. This can help practitioners to think about the type of intervention to be designed or selected, and to align efforts to create an inclusive, impactful program to effectively reduce injury. Active behavioural strategies are designed to encourage people to take measures to protect themselves and others from injury. For example, this may include programs designed to prevent fatalities from motor vehicle collisions among infants through educational interventions to promote the use and proper installation of child safety seats. Passive or environmental strategies are designed to change products or environments to prevent injury. For example, this may include the installation of ignition interlocks in vehicles to reduce alcohol-impaired driving and alcohol-related crashes.

The development and/or selection of prevention strategies should coincide with efforts to evaluate impact on behavioural objectives and injury outcomes. At this time, there is a growing body of synthesized literature on the effectiveness of prevention strategies. Prior to developing a new prevention strategy, there is significant value in first reviewing the available evidence on the effectiveness of prevention strategies for a defined injury problem focusing on synthesized literature. Evidence from the behavioural sciences can also support the development of new strategies by identifying the underlying constructs that link behavioural objectives to intervention components.

Research on interventions is an important component of the Public Health Approach; however, a number of prevention strategies are delivered on an on-going basis without any supporting evidence of effectiveness. The delivery of injury prevention strategies with no supporting evidence of effectiveness or efforts to evaluate levels of effectiveness poses the risk of on-going investment in strategies that will not contribute to a measureable reduction in injury risk.
Program and Policy Implementation

A well-thought-out implementation strategy increases the chances of success when an organization or community adopts an evidence-based prevention strategy. The collection and use of this information is critical when applying an evidence-informed approach to prevention practice. There are four core components that can help support the successful implementation of prevention strategies: 1) maintaining the fidelity of existing evidence-based prevention strategies; 2) the careful adaptation of existing strategies for new populations and settings; 3) the development of a well planned implementation strategy; and 4) support to ensure the sustainability of the strategy over time.

Implementation fidelity has been defined as “the degree to which...programs are implemented...as intended by the program developers”. This can be extended to think about how to successfully scale-up existing evidence-based strategies. To ensure that the intended outcomes are met, there is a need to retain the core components and implementation supports that are important for the effectiveness of the program or policy. Carroll et al. (2007) have developed a conceptual framework to understand and measure implementation fidelity based on a review of existing literature. To measure implementation fidelity, one must consider levels of adherence to the details of content including coverage, frequency and duration. This is supported by potential moderators, including the comprehensiveness of policy description, strategies to facilitate implementation, quality of delivery, and participant responsiveness.

The second component worth considering for program or policy implementation is adaptation. Existing evidence-based prevention strategies may be used to target new populations and settings. There is a need to ensure that the components and delivery of the intervention to be applied fits the target population. Considering the adaptation of an existing prevention strategy for a new population, Castro et al., (2004, 2010) outline a range of potential sources of mismatch including different languages, underlying risk profile, urban or rural setting, type of staff, and community readiness that may result in impact of a misalignment between the intervention and the new population. For example, without sufficient levels of community readiness in a new population, there may not be sufficient infrastructure to deliver the program. Various tools are now available to help guide the adaptation of evidence-based prevention strategies.

The third component outlined above is a well-planned implementation strategy. Prevention strategies found to be effective in a controlled setting or specific population may not be effective when scaled-up or targeted towards a new population. There is a need to identify the processes and supports used to successfully implement prevention strategies. Previous evaluations of successful prevention strategies may provide information on specific conditions, resources, and supports used to support delivery. If there is a gap in the availability of this information, generalized implementation science theory and concepts can
guide the development of an implementation strategy. Implementation strategies should be described with the same level of detail as core program components to facilitate replication and measurement of implementation fidelity.

The final component that has been outlined for program and policy implementation is sustainability. Sustainability has been defined as the “degree to which an innovation continues to be used after initial efforts to secure adoption are completed”. Following successful implementation, a prevention strategy may fail to be maintained within an organization or community setting. Initial implementation and sustainability are distinct factors, and require careful consideration at the design stage. A number of internal and external factors can influence a prevention strategies' sustainability following integration into standard practice, including changing priorities and resource availability. To support the long-term success of prevention strategies, there is a need to identify factors that are required to maintain the strategy over time, such as the nature of the strategy, the context in which the strategy will be implemented, and the population that is being targeted.

### Evaluation and Monitoring

The final stage of the Public Health Approach is evaluation and monitoring. To promote successful evidence-based prevention strategies to reduce injuries across Canada, there is a need to focus on collecting information that can help improve the design, delivery, dissemination, and sustained use of evidence-based interventions. This information can also help monitor the fidelity of evidence-based strategies. Evaluation is a critical component within the process of mobilizing an intervention, as it demonstrates its success to funders, the community, and/or individuals committed to reducing injury in Canada. If the intervention does not meet its intended outcomes, evaluation provides the means to identify barriers and make appropriate changes to increase the success of the intervention moving forward.

There are three types of evaluation involved in successful program planning: formative, process and outcome evaluation. Formative evaluation includes activities at the pre-project planning stage and during initial implementation. At this stage, one would first consider the need, fit, resources, evidence, readiness, and capacity related to the intervention under consideration. Program logic models have been recommended as a strategy to support ongoing monitoring and
evaluation and are part of the formative evaluation stage.\textsuperscript{30,31} Traditional logic models define the inputs, processes, and outputs of the prevention strategy connected to the initial, intermediate, and long-term outcomes. Evaluations will typically examine both process and outcome indicators. Outcome indicators focus on measuring how well the prevention strategy met its intended results. Initial, intermediate, and long-term outcomes of a prevention strategy can be examined to inform whether the overall goals of the program have been met.

Process indicators focus on tracking the intensity of what is being delivered (e.g., number of people participating in training sessions) and how participants are responding to the intervention components (e.g., levels of satisfaction with training sessions).\textsuperscript{30} This information can be used to improve the delivery of prevention strategies and explain why the desired outcomes were not met. Information from both process and outcome indicators should play a critical role in the evaluation of an injury prevention strategy. Outcome evaluation asks the important question of whether or not a program was effective.

**Evidence-Informed Public Health**

This final section discusses the evidence-informed public health movement,\textsuperscript{32} which was introduced in the first chapter in this section, and outlines how it relates to the five components from the general Public Health Approach.\textsuperscript{2,3} Both the evidence-informed public health movement and the general Public Health Approach focus on the upstream factors that influence health problems and integrate different types of evidence to inform prevention practice. The evidence-informed public health movement incorporates the five components reviewed above; however, it makes further contributions through advocating for: 1) greater use of this information in public health decision making; 2) a focus on the best available scientific evidence; 3) increased role of the community in decision making; 4) increased focus on evidence-synthesis to mobilize prevention strategies that work as opposed to a sole focus on the development of new strategies; and 5) a more rigorous and critical approach to the use of evidence in practice.\textsuperscript{33} Brownson et al. (2009) provide a comprehensive review of concepts and tools associated with ‘evidence-based public health’.\textsuperscript{33} Other authors have referred to the ‘evidence-informed public health’ movement, using the phrase ‘evidence-informed’ rather than ‘evidence-based’ to acknowledge that decision-making in public health practice should be influenced by available evidence from research but also integrate considerations around the local context, community or political readiness, and available resources.\textsuperscript{32,33}

The evidence-informed public health movement advocates for an increased focus on evidence synthesis, critical appraisal, and evaluation of the strength and consistency of evidence.\textsuperscript{33} Consistent with the Public Health Approach, the process of evidence-informed
public health gathers evidence that draws on injury indicators, risk and protective factors, and research on interventions and their implementation.

By using the evidence-informed public health approach, activities in public health practice are explicitly linked with the underlying scientific evidence that demonstrates effectiveness. It has been argued that components of the Public Health Approach will only be successful if accompanied by strategies and principles of the evidence-informed public health movement.\textsuperscript{32,33}

**Case Study: The Public Health Approach to Traumatic Brain Injury**

The CDC has adopted the public health approach to influence their research and programs targeting traumatic brain injury. In 2005, the CDC published an article that provides an overview of how the public health approach has been used to identify important efforts needed to reduce the impact of this injury type.\textsuperscript{34} They provide an overview of their work across 4 areas including surveillance, identifying risk and protective factors, developing and evaluating intervention, and dissemination information to improve TBI outcomes.\textsuperscript{34}

**References**


2.1: The Public Health Approach
The Three E’s of Injury Prevention

In the era following World War II, a number of industrial safety programs began. Many of these were organized around a model believed to have been developed by the U.S. military during the war years, called the Three E’s of Safety: Education, Enforcement, and Engineering. As injury prevention began to emerge as a distinct discipline, the model of the Three E’s was often incorporated into the design of prevention programs in the community, in addition to those in the workplace.
**Education**

The basic concept behind education is that the public, given information or skill training, will retain what has been taught and use it to reduce the risk of injury. Examples of educational interventions include an initiative that trains and counsels parents to reduce the risk of household pediatric injuries by reducing exposure to prescription medications and household cleaning agents\(^1\) or strategies aimed at promoting the use of booster seats to reduce the risk of injury from a motor vehicle collision.\(^2\)

**Enforcement**

Enforcement strategies include the creation and enforcement of laws, regulations, and policies aimed at reducing injuries. These strategies are generally effective when enforced; however, they are often a contentious public issue as opponents often characterize them as limiting personal freedoms. Examples of enforcement interventions include graduated driver licensing;\(^3\) the banning of a consumer product that has been determined to be too risky for general use (such as baby walkers or three-wheeled all terrain vehicles) or the mandated use of a product designed to reduce injury, such as bicycle helmets.\(^4\)

**Engineering**

Engineering strategies involve the development or modification of products and environments to make them safer. It involves modifying some aspect of a product or the environment. Generally, engineering efforts are very effective. Examples of engineering approaches include a change in residential hot water heaters that are installed at a medium water temperature rather than high, in order to reduce the risk of scald injuries from overly hot tap water;\(^4\) the installation of ignition interlocks in vehicles to reduce recidivism among convicted drunk drivers;\(^5\) or traffic calming features incorporated into residential neighbourhoods.\(^6\)

The major contribution of the 3 E’s model of injury prevention has been the shift in focus from injuries being seen as the sole responsibility of the person injured, to the recognition that others (e.g., employers, supervisors, equipment manufacturers, policy makers, designers of the built environment, whole community) have a collective responsibility to prevent injuries. Multi-faceted initiatives that use more than one strategy have the greatest chance for success.\(^4\) For example, community-based, multi-faceted interventions to prevent falls have been cited in the literature as effective programs for seniors.\(^7\) In recent years, there have been efforts to expand this model to embrace a more multi-faceted, health promotion orientation by adding more E’s such as: Economics, Evaluation, Enablement, and Empowerment; however none of these alternative models have been commonly adopted.
The Spectrum of Prevention

In 1983, Dr. Larry Cohen introduced a multi-factorial model called the Spectrum of Prevention. The model is comprised of six interrelated levels and was designed to shift focus beyond individual educational interventions to a multi-factorial approach. Briefly, the spectrum consists of: strengthening individual knowledge and skills; promoting community education; educating providers; fostering coalitions and networks; changing organizational practices; and influencing policy and legislation. These are arranged in a rough hierarchy, with interventions at the higher-level of the spectrum being more efficient in terms of effort per person impacted, and are generally more effective than those lower down in the hierarchy. However, the levels are interrelated, and those interventions most likely to succeed will be those that address multiple levels in the spectrum.  

Figure 5
The Spectrum of Prevention*

Cohen and Swift define the first level of the spectrum, building individual knowledge and skills, as “enhancing an individual’s capability of preventing injury or illness and promoting safety.” This is analogous to education, the first E of the 3 E’s. An example of action or a program at this level of the spectrum would be a program offered to teach individuals in the safe operation of a new piece of technology, or the instruction sheet provided with most consumer goods. The second level of the spectrum, promoting community education, is an extension of the above individual approach to include situations where information is provided to a larger audience. Examples include public awareness campaigns and social marketing efforts directed through mass or social medial channels. Educating providers is

the next level, defined by Cohen and Swift as, “informing providers who will transmit skills and knowledge to others.” Examples of this strategy include providing training to professionals, such as delivering the Canadian Injury Prevention Curriculum to Health Promotion staff in public health units, as well as various ‘train-the-trainer’ peer leadership and mentorship programs. Fostering coalitions and networks is the fourth level of the spectrum, which acknowledges that to successfully and effectively reduce injuries requires effort from multiple individuals and groups. Building effective teams, coalitions, alliances, and networks that consist of people from a variety of disciplines and interest in the program to reduce injury can be seen to be a prevention intervention in its own right, and has been previously discussed in this section (See Chapter 2.1 Public Health Approach) as an important component of any successful multi-factorial injury prevention effort. Examples of fostering coalitions and networks include the Canadian Collaborating Centres for Injury Prevention. Finally, the sixth level, changing organizational practices, is described by Cohen as the most often forgotten level of the spectrum. It involves working for change in policy and procedure at an organizational level, ranging from educational institutions or law enforcement, through to changing practices and norms in the corporate sector. This level is also analogous to the enforcement E in the 3E’s of injury prevention. Examples range from changes in enforcement strategies by running sobriety checkpoints to reduce drunk driving, and to improving the occupational health and safety culture to reduce the risk of occupational injury within a large company. Changes in municipal, provincial/territorial, or federal laws, as well as formal policies and standards is also a focus of the sixth level of the spectrum. Examples range from the creation of municipal alcohol policies for public events, to adopting consumer product safety legislation and empowering government agencies to issue recalls of hazardous products.

As with the three E’s of injury prevention, the Spectrum is a tool that encourages prevention practitioners to think beyond individual education. Both models encourage the use of multiple strategies focused at more than one level, in order to achieve the highest degree of effectiveness.

References


The Public Health Approach is widely used by prevention researchers and practitioners as a systematic way to estimate the burden of a problem, evaluate risk and protective factors, and to develop and evaluate interventions. As introduced in Section 2.1, the five steps involved in the Public Health Approach include: 1) surveillance; research on 2) risk and protective factors; 3) designing/selecting interventions; 4) program and policy implementation; and 5) evaluation and monitoring. Also mentioned in Section 2.1, is the evidence-informed public health movement, and its close tie to the Public Health Approach. This chapter will discuss the process to operationalize the first step in the Public Health Approach, defining an injury problem, and will suggest a process to gather this information that aligns with the evidence-informed public health movement.

**Ways to Define an Injury Problem in Canada**

There are traditional ways to define incidents in public health related to injury prevention and they include: incidence, prevalence, and the burden of injury. Alternatively, there is also the use of ‘injury indicators,’ which are operationalized to define the burden of specific injury problems in Canada, as developed by the Canadian Injury Indicators Development Team. There are different types of indicators classified as outcome, risk, and policy indicators. Outcome indicators draw on incidence, prevalence, and burden of injury data that can help describe an injury problem in Canada. Risk indicators capture data regarding risk and protective factors that include data on, for example, child restraint use, seatbelt use, bicycle helmet use, and measurable aspects of playground safety, such as surface performance. These are the underlying behavioral and environmental factors that injury prevention
programs are designed to address. Finally, there are policy indicators that include data that pertain to legislation and policies currently in place.

The following sections outline the most common data types used for outcome indicators to define an injury problem: incidence, prevalence, and the burden of injury; as well as the systematic approaches to attain this information. Outcome indicators can help support a strategic planning process by identifying where the top injury problems are. This data can also be used to monitor trends in the top injury problems in Canada. Outcome indicators can also be used routinely in the development of communications to the public about injury prevention.

**Incidence.** Incidence is defined as the number of new cases of a given condition occurring within a defined population.² It is usually represented as a rate, calculated by the number of injuries divided by a population over a given period of time. For example, the rate of Emergency Department visits for young children (0-4) injured in Ontario from 2002-2003 was 12,410 per 100,000.³ Other common ways to measure incidence is the number or rate of hospitalizations or deaths. These can also be called morbidity rates (which commonly use health care utilization measures), and mortality rates (which calculate the number of deaths).

**Prevalence.** Prevalence is defined as the number of cases of a given condition at a specific point in time. It is similar to incidence, but also considers the duration of a specific condition. Prevalence is generally used to define infectious or chronic diseases and rarely used as a measure in injury. This is in part because of the difficulty in defining how long an injury lasts and when and if an injury moves from an acute to chronic phase.

**Burden of Injury.** Increasingly, the burden of injury is being chosen as the optimal way to define an injury problem. Calculating burden takes into account how much it costs the health care system to care for people who are injured at the time of their injury.⁴ The strength of this approach is that it also calculates costs in terms of time lost from work, damages to person and property, and the ongoing cost of disability that results from the injury.

One measure of the burden of injury is Disability Adjusted Life Years, or DALYs. This combines two concepts – the years of life lost due to premature death, as well as the adjusted quality of life due to years living with a disability as a result of injury. The Global Burden of Disease study presents data on DALYs for many health conditions around the world, including those resulting from injury and violence.⁴

### Locating the Best Available Research Evidence

The first step to locate the best available surveillance data is to clearly define the problem at hand by setting an operational, measureable, and answerable research question.² Injury is a
problem across the lifespan, so it is important to define the problem for the specific population under study to determine who is at increased risk. Previous Canadian research suggests there is substantial variation in who sustains an injury by age, sex, geographic location, and socio-economic status.\textsuperscript{5} Clearly defining the problem by taking all of these factors into account will help focus the search strategy at the stage of evidence gathering. The evidence-informed process recommends framing a research question/problem using the following four elements: population, intervention, comparison, and outcome (PICO).\textsuperscript{2}

PICO has been used traditionally in the process of gathering evidence to examine if/how an intervention works within a particular population, e.g. does enhanced enforcement intervention or program increase seat belt use in licensed Canadian drivers? However, PICO can be used as a tool to assist practitioners in a process to gather surveillance data required to establish the burden of injury at hand. There are variations of PICO, applicable to causation and qualitative studies that can help in the second stage of the Public Health Approach to understand the strength of association between and risk or protective factors. For example, PICO is used in cases to examine causation (e.g., does cellular phone use increase motor vehicle collisions in licensed Canadian drivers), where “I”, intervention is replaced by “E”, examination of an exposure as a causal factor for an outcome. Finally, there is PS, specific to creating literature search questions for qualitative research where the problem being examined may not include an intervention or comparison group. Population remains the same as in PICO, where the population of investigation is identified, but the intervention and comparison elements are replaced with “S”, situation, e.g. what is the experience of obese children ages 11 – 15 years when they participate in a neuromuscular training program designed to decrease sport related injury?

**Conclusion**

Defining the problem is one important step in the Public Health Approach to preventing injury. When considering how to define the problem, it is important to understand what type of data will be used: Is it incidence, prevalence, or burden that is being considered? It is also important to understand mortality and morbidity, as well as ongoing disability resulting from injury. Finally, defining a specific, answerable, searchable question is part of a focused strategy to find the highest quality research evidence available on injury burden.
References


As outlined in Chapter 2.3.1 (Surveillance: Defining the Injury Problem), first stage of the Public Health Approach is to define the injury problem at hand. This includes a process to gather information from injury surveillance data and other sources. After the injury problem has been defined and a specific question has been formed to help gather evidence to support efforts to reduce the injury problem, the next step in the process is to identify the underlying risk and protective factors. This section discusses the importance of determining both risk and protective factors specific to an injury problem. Understanding the factors that contribute to the issue is a necessary part of prevention that helps practitioners plan prevention programs. The objectives set out in intervention planning will focus on changing or enhancing the established risk or protective factors. The intervention designed or selected will then be based on proven practices to address that risk or protective factor.

**Risk and Protective Factors**

Earlier sections in this resource described the various determinants of health and their relationship to injury. A determinant is a word used to describe factors that control or influence an outcome. A determinant can place an individual or community at greater, or lesser, risk. The key determinants described in Section 3.0 of this resource are examples of risk and protective factors for injury. A risk factor is defined as any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury. For example, across most injury types, low socioeconomic status is associated with increased

risk of injury. Studies report that children and youth are more likely to suffer fatal and non-fatal injury as the result of a motor vehicle collision. Studies carried out in Europe demonstrate a strong link between socioeconomic status and injuries/deaths from falls, burns, drowning and poisoning in children and youth. In addition, males and younger age groups are more at risk for suicide if they have poorer socioeconomic status.

Most often in the literature, risk and protective factors for injury are broken down by injury type. For instance, speed is a significant risk factor for a motor vehicle related injury. Falling from a significant height on hard playground surfaces increases the risk of injury and fracture, compared to standing height. (See Chapter 4.4.2 on Children's Falls). Older men are more at risk of dying from a fall than older women, whereas older women are much more likely to be hospitalized because of a fall, compared to older men.

Compared to risk factors, protective factors are those variables that act to protect an individual from the risk of injury. Higher socioeconomic status is the most cited factor to reduce the risk of injury, except for injuries related to sports and recreation. As stated in the Chapter 3.0 Key Determinants of Injury, this may be due to greater exposure to both sport participation and access to organized sport. The use of seat belts and child restraint systems are established protective factors against motor vehicle crash related injuries, bicycle helmets are protective against brain injury in bike crashes, and exercise to establish strong muscles in seniors is protective against falls and fall related injury.

Often, determinants of injury work together, potentially adding to the risk for injury. For instance, families with lower education levels, lower income and poor housing are more at risk for injury. Just as these variables at one end of the spectrum increase a person’s chances of being injured, at the other end of the spectrum they act as a protective factor against injury (i.e., a variable associated with a decreased risk for injury). The higher the education level and income status, along with secure and safe housing, the less risk of suffering an injury. This is true across all injury types except sport and recreation injury, as noted above.

How an Injury Happens

Although injuries happen in a quick moment, there are determinants that were in place before the event occurred. Dr. William Haddon, a physician in the United States and a pioneer in injury prevention was the first to view injury as an epidemic that can be studied and thus eliminated, once all the factors affecting the situation were identified. Dr. Haddon clustered factors that contribute to an injury under the headings ‘host’, ‘agent’, and ‘environment’ (both social and physical). In addition, Dr. Haddon inferred that a timeline was involved in the injury process: factors are at play before the event, during the event, and after the event. The result of Dr. Haddon's thinking was the creation of a grid that captures pre-event, event, and post-event factors under the headings of host, agent, and social and physical environment.
Injury prevention planners can use this tool, called Haddon’s Matrix, to think about risk and protective factors that can influence a particular injury event. Community partners who have used this tool to assess how to prevent youth suicide found that it helped them to see beyond individual factors to the role that the community could play in halting these events. It also helps avoid the tendency to jump to a solution or an intervention before critically assessing all the factors that contribute to an injury event. (See Figure 7 for an example of a completed Haddon’s Matrix).

In order for an injury to occur, there needs to be a connection drawn between all three factors in Haddon’s Matrix. Using child poisonings as an example, the goal of prevention is to break that connection between the host and the agent (e.g., child resistant packaging of medication); or between the host and the environment (e.g., medications are kept in locked cupboards); or between the agent and the environment (e.g., container has only non-lethal quantity of medication).

**The Timeline.** By identifying pre, during, and post factors in an injury timeline, one can begin to identify primary, secondary, and tertiary prevention opportunities. For some injuries,
tertiary prevention (i.e., prevention that occurs after an injury has occurred, which prevents re-injury and increases quality of life in persons who have suffered an injury) is critical.

The Host. In any particular injury event, factors at the level of the host including age, sex, and physical, cognitive, and emotional development, is important information used to estimate the risk of injury. Understanding the factors that are associated with increased risk for injury allows practitioners to develop or select prevention strategies to increase safety from both a passive and active behaviour change level (See Chapter 2.3.3 Selecting or Designing an Intervention). In addition, there are many factors that play a role in an individual’s decision to participate in behaviour that may increase their risk for injury. Chapter 3.2.1, Risk Perception and Risk Mitigation, explores the various theories and factors that influence a person’s behaviour. No two individuals are the same, nor will they necessarily act in the same way in any given, potentially injurious situation. Some will heed rules and prevention strategies and always obey them, while others will not. Some are more curious and some feel the need to seek risk. For instance, some children will never try to access the dishwasher detergent under the sink while others, if left unattended, will figure out how to access and ingest it.

Risk occurs in a situation where a person can recognize and evaluate the situation and decide on a course of action. Risk taking involves participation in an activity with uncertainty of the outcome and requires a person’s choice to participate in the activity or not. Injury prevention efforts have the goal to eliminate hazards and mitigate risks. Adults should try to eliminate risks that children cannot see or manage without removing all risks, so that children are able to meet challenges and choose to take risks in relatively safe play settings. This means finding a balance between those risks that foster learning and the risks that can result in serious injury.11,12

The resiliency of the individual is also an important factor to consider when thinking about risk and protective factors for individuals. This topic was well described in the Resiliency chapter of this resource (See Chapter 3.6.2). Some families and communities seem to demonstrate a resiliency to injury, regardless of the existence of factors that increase their risk for injury. For example, an individual or community that reports low socioeconomic status may not be at higher risk for injury. Strong social supports despite low incomes, or few jobs in this case, may be protective factors. A child who has good self-esteem and receives consistent parenting does well in school even though his caregivers have little education and income.13

In order to develop self-esteem and confidence (both of which are contributors to resiliency), children need to be exposed to risk. There is emerging evidence to suggest that imposing too many restrictions on children’s outdoor play hinders their development.14 There is a paradigm shift in some parts of the world from implementing strategies that keep children “as safe as possible” to “as safe as necessary”, encouraging risky active play.14 The United

2.3.2: Steps in the Public Health Approach - Identifying Risk and Protective Factors

Canadian Evidence-Informed Practice Model

Canadian Injury Prevention Resource
Kingdom has developed a resource that shows play providers “how to replace current risk assessment practice that fully takes into account the benefits to children and young people of challenging play experiences”.\(^\text{15}\)

There is evidence to suggest a link between the development of anxiety disorders and the lack of exposure to risk as children.\(^\text{16}\) Rather than limiting a child’s exposure to risk, creating opportunities for children to learn to manage risk increases their sense of competency to mitigate fear.\(^\text{16}\) Children who engage in risky active play (i.e., play in which there is a risk for injury from falling, speed, interacting with dangerous tools or elements, rough and tumble play, and play where children could be out of sight from adults) are hypothesized to develop better resilience, a known protective factor for a number of life’s risks (See Chapter 3.6.2 on Resiliency for more information).\(^\text{16}\)

**The Agent.** The terms “risk” and “hazard” are often used interchangeably to refer to the “agent” in the injury triangle. A hazard is a source of harm that a person may not be able to recognize and as a result, may increase their risk of injury. For example, the lead in paint or toys that children put in their mouths, presents a poisoning hazard. The sources of hazards can be chemical, mechanical, thermal, electrical, and radiation. Some have added the absence of vital energy (e.g. heat, air) to this list.\(^\text{17}\) Examples of environmental hazards include: uneven stairs (mechanical hazard) that increase the potential for a fall; hot coffee near a toddler (thermal hazard) leading to a scald; a live wire (electrical hazard) that increases the chances of being electrocuted; prolonged unprotected sun exposure could cause sunburn (radiation hazard); and drowning is an example of the absence of vital energy (the result of the absence of oxygen to the brain).

**The Environment.** The environment – both physical and social – is the context within which the injury event occurs. The physical environment may be easier to identify (e.g., road conditions, weather, and the time of day associated with motor vehicle collisions). The social environment could include other factors involved or present at the time of injury, whether there were distractions that influenced the behavior of the host, such as loud music or too many people causing distraction of the driver in a vehicle. In addition, the attitudes and/or beliefs of the host and community, about injury prevention are also important factors to consider. The balance between risk reduction and healthy risk taking is a critical factor in all aspects of the environment.
Haddon’s Matrix Example

Below is an example of a completed Haddon’s Matrix. Practitioners should not worry about getting the various factors in the “correct” boxes, as factors in this matrix may fit in more than one. It is more important to think of as many factors as possible.

**Figure 7**

**Example of a Completed Haddon’s Matrix for Child Poisoning**

<table>
<thead>
<tr>
<th>Person</th>
<th>Cause</th>
<th>Environment: Physical</th>
<th>Environment: Social</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Event</strong></td>
<td><strong>Age</strong></td>
<td><strong>Type of medication</strong></td>
<td><strong>Was the medication within reach?</strong></td>
</tr>
<tr>
<td><strong>Will the poisoning occur?</strong></td>
<td><strong>Gender</strong></td>
<td><strong>Amount of medication available and accessible to child</strong></td>
<td><strong>Where is medication stored (in a purse or briefcase?)</strong></td>
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<tr>
<td><strong>Skill level of child (i.e. dexterity to open a ‘child resistant’ packaging)</strong></td>
<td></td>
<td><strong>Type of container (blister pack versus bottle, or medicine put into another container)</strong></td>
<td><strong>Type of closure</strong></td>
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<tr>
<td><strong>Perception of child (i.e., do they understand the difference between candy and medications?)</strong></td>
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<tr>
<td><strong>Tendency toward risk-taking behaviours?</strong></td>
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There are many examples of Haddon’s Matrix on Parachute’s website, found here: http://www.parachutecanada.org/child-injury-prevention.

**Determining Which Risk and Protective Factors to Address**

Determining the underlying risk factors for an injury problem is important as they help practitioners and researchers establish the necessary components to develop or select interventions to prevent injury. For example, speed is a significant risk factor for motor vehicle collisions that causes significant injury to drivers, passengers, and vulnerable road users, such as pedestrian and cyclists. Understanding that speed is a risk factor is important as it is used later in the Public Health Approach to select or design interventions to reduce collisions. There are many strategies to reduce speed such as the implementation and enforcement of speed limits.

To determine the risk and protective factors for an injury outcome, it is important to use a process to gather, critically appraise, and synthesize evidence. Often, this process is available in the form of high level syntheses or systematic reviews that establish associations between risk factors and injury outcomes. For example, a recent systematic review and meta-analysis on the association of joint injury, sport activity, physical activity, obesity, or occupational activities as predictors for osteoarthritis demonstrated that those with a previous joint injury were at an over 3-fold increased risk of developing knee osteoarthritis, and were at over 5 times the risk of developing hip osteoarthritis later in life. These studies provide practitioners with the required information to build successful intervention options.

It is not only important to understand the relationship between a risk factor and an outcome, but the strength of the relationship as well. Statistical methods are used to provide evidence of an association with a risk factor and an outcome, and then to assess the strength of that association. As demonstrated with the example above, the association with injury and osteoarthritis is stronger with hip osteoarthritis over knee osteoarthritis. This information is also helpful to practitioners and researchers to understand how to select appropriate interventions to reduce the injury burden. For example, there is a high level systematic review that established a 74% increased risk for fatal motor vehicle injuries with a 0.02% increase in blood alcohol concentration. Understanding that drunk driving increases
a person's risk of fatal injury may place a precedence to implement an intervention to address drunk driving over another risk factor for motor vehicle collisions.

Finally some risk and protective factors are more modifiable than others. For example, a person's age or sex is a non-modifiable risk factor for many injuries. However, there are modifiable factors such as a person's self-esteem, physical and mental competency, physical fitness, and understanding and perception of risk, to name a few. An example to help place modifiable versus non-modifiable risk factors into perspective is to look at younger males as a particular risk for motor vehicle collisions. The non-modifiable risk factor in this scenario is age and sex; however, what can be modified is the people they drive with, when they get their driver's license, the time of day they can drive, zero tolerance for alcohol, etc. This example is a program called graduated driver's licencing and it has been demonstrated as an effective strategy to reduce the incidence of youth injuries and deaths from motor vehicle collisions.\textsuperscript{20}

**Conclusion**

Identifying risk and protective factors is the second step in the Public Health Approach. It is important for both practitioners and researchers to understand the relationship of the determinants of health as risk or protective factors to manage and mitigate the risk of injury. Haddon's Matrix is an excellent tool to help practitioners capture and visually represent the potential risk and protective factors involved in the injury timeline, resulting in prevention of the incident or the mitigation of the effects of the injury. Once practitioners have identified which risk and protective factors are modifiable, they can work within the context of an ecological approach to develop or select an intervention to reduce the injury burden.

**References**


Steps in the Public Health Approach to Injury Prevention
Selecting or Designing an Intervention

The next step of the Public Health Approach is selecting/designing an intervention. This step exists after identification of the injury problem, the at-risk population, and the risk and protective factors that influence the level of risk. The information drawn from these previous stages is important as the selection or design of an intervention is dependent on knowing the burden of injury and the risk and protective factors. For example, understanding that motor vehicle collisions represent a significant burden of injury in the Canadian population, and that risk factors such as driver inattention, speed, and substance abuse while driving are all risk factors that increase the risk of collision, are important to consider when selecting or designing a specific injury prevention intervention to reduce the injury problem.

To select or design an intervention in response to an injury problem, practitioners and researchers should understand the different forms that injury interventions can take and to understand that there is a recommended process to select or design effective interventions from research and non-research literature. This chapter outlines the stage of intervention selection in the Public Health Approach, and recommends a process to accomplish this that aligns with the evidence-informed public health movement (please see Chapter 2.1 for more information on the Public Health Approach).

Types of Interventions

Injury prevention strategies are broadly classified into a number of approaches. The concept of the Three “E’s” of injury prevention was discussed earlier in this section.
(see Figure 4). Briefly, interventions can be classified as having an education, enforcement or engineering focus. The traditional three “E’s” of injury prevention have been broadened in recent years to include “Economics” and “Environment” as additional approaches for intervention strategies. As each approach has strengths and weaknesses, developing intervention strategies that incorporate two or more “E’s” will ensure a more effective intervention. Another useful resource in understanding the different types of interventions is to use Haddon’s Countermeasures.

**Haddon’s Countermeasures**

As discussed in the previous chapter, risk and protective factors were established in association with an injury outcome. It was recommended that practitioners search the literature for high-level syntheses and systematic reviews to establish these associations and to understand the strength of the association between a risk factor and an outcome. In addition, Haddon’s Matrix was a tool suggested to think about the risk and protective factors that may be amenable to change to reduce the risk of injury.

Haddon also created what was called the “Ten Countermeasures” that align with the matrix (i.e., pre-event, event, post-event), designed to understand how prevention could interfere with the transfer of energy causing injury. The countermeasures align with primary, secondary, and tertiary prevention (see Figure 8) and can be used to further inform the selection of an intervention.

The countermeasures provide an opportunity to expand our list of potential interventions to generate interesting and innovative interventions beyond those we might normally consider. Application of Haddon’s Matrix and Countermeasures moves the focus of injury prevention interventions beyond the individual and encourages consideration of other intrapersonal and environmental risk factors that could be changed to reduce injury.

Another aspect of an injury prevention intervention is to consider how much effort is required by an individual to minimize the risk of injury. It is important to understand the kind of intervention planned for implementation. An intervention can be an active or passive strategy. Active or behavioural strategies provide the structure to prevent injury on an individual level. In other words, the intervention encourages individuals to use strategies to protect themselves from injury. Buckling a seat belt, placing medication in a locked cabinet or anchoring a bookcase to the wall are active interventions to prevent injury. The second, called passive or environmental strategies, do not rely on an individual making a choice or acting to prevent an injury. Examples of passive interventions include the implementation of speed bumps and the installation of air bags in motor vehicles. Passive interventions are present regardless of the behaviour of an individual and therefore, provide a high degree of protection from injury. Implementation of passive strategies is often challenging as they may
Figure 8
Haddon’s Ten Countermeasures and Examples\textsuperscript{13,14,15}

**Pre-event (Primary Prevention)**
1. Prevent the creation of the hazard  
   e.g., ban on the manufacture of wheeled baby walkers, ban on three-wheeled all terrain vehicles
2. Prevent the release of the hazard  
   e.g., prevent the sale of wheeled baby walkers, introduce graduated driver’s licensing
3. Separate the person and hazard in time or space  
   e.g., implement segregated cycle lanes, locating high volume roadways away from residential neighbourhoods
4. Place a barrier between the person and hazard  
   e.g., implement mandatory 4 sided pool fencing, create safety guards on work-related machinery

**Event (Secondary Prevention)**
5. Reduce the amount of the hazard  
   e.g., reduce speed limits, decrease water temperatures on hot water tanks
6. Modify the rate or spatial distribution of the hazard  
   e.g., bicycle helmets, blister packaging for medication, seat belts, air bags
7. Modify the basic qualities of the hazard  
   e.g., implement energy absorbing surfacing in playgrounds, replace roadway lighting infrastructure with breakaway light poles
8. Strengthen the resistance to the hazard  
   e.g., implementing a warm-up program for sport and recreational participation, implementing standards with building and fire codes

**Post-Event (Tertiary Prevention)**
9. Begin to counter the damage already done by the hazard  
   e.g., installing smoke detectors, providing rapid treatment in the form of first aid
10. Stabilize, repair and rehabilitate the object of the damage  
    e.g., providing/having access to emergency medical facilities, acute care and rehabilitation facilities

take years of design or engineering to develop and may require enactment of(changes to legislation to become adopted. Most injury prevention interventions lie on a continuum between passive and active and designing or selecting an intervention should focus on multiple levels of influence, potentially incorporating a number of strategies with differing levels of required effort. Both active and passive strategies can be applied if using an ecological model for injury prevention. Ecological modelling for injury prevention can provide the greatest uptake of interventions as they address both the environmental
changes to reduce injury and the strategies needed to convince policy makers and/or individuals to enforce or uptake the intervention.

Levels of Intervention

Intervention strategies are designed to target a population on an individual level, organizational level, community, or public policy level. Often, successful interventions occur on multiple levels of influence including those that target the individual, changing the environment, implement policy and apply enforcement (i.e., interventions that utilize an ecological model). There are many strategies that exist in the intervention literature, what is important is to consider are only those that have demonstrated significant levels of effectiveness. Without a program demonstrating that it actually works, efforts to implement them are futile (see section below on the process to select or design interventions).

Ecological Models for Injury Prevention

The process of selecting interventions to tackle an injury problem should be considered from many angles through an ecological model approach. The idea behind ecological modeling is that there are many factors that influence individual behaviour. In addition, there may be interaction of these influences across all levels. Ecological models focus on a specific behaviour where a collection of activities are implemented on multiple levels and where the most relevant influencers are utilized. Levels of influence are intrapersonal, interpersonal, organizational, community and public policy.

Figure 9
Ecological model for health promotion

![Ecological model for health promotion](image-url)
Intrapersonal level interventions focus on the target population’s knowledge, perceptions, attitudes, intentions and skills around a defined behaviour; for example, providing information to a child on the importance of wearing a bicycle helmet to prevent head injury when cycling. Interventions designed to target prevention at the interpersonal level consider the influence of the target population’s social groups and their contacts such as family, healthcare providers, work colleagues, etc., that have considerable influence on individual behaviour choices. Interventions designed on an organizational level focus on programs, systems and policies in specific settings. An example of an organizational intervention would be a hospital program that ensures new parents have the proper car seat installed upon hospital discharge with their new born, or a ski hill reducing prices for patrons wearing helmets. Community level interventions encourage collaborative action for change between multiple sectors. Community interventions can use coalition and advocacy groups, common messaging and practice, media events, etc. to encourage the adoption of an injury prevention strategy. An example of a community intervention is where a multi-sectoral group made up of representatives from public health, enforcement, local business, schools and the local municipality, plan, advertise and host a bicycle rodeo focusing on proper use of helmets and safe cycling. Finally, the public policy level includes the development and enforcement of laws and regulations that fall under federal, provincial and municipal jurisdictions. It also includes the development and enforcement of policies within various businesses and organizations. An example of this level of influence is the development, revision and enforcement of the Canada Consumer Product Safety Act. This act prevents unsafe products to be imported or sold in Canada.

The Ottawa Charter for Health Promotion supports an ecological approach to prevention noting that, “health promotion demands coordinated action by all concerned: by governments, by health and other social and economic sectors, by non-governmental and voluntary organizations, by local authorities, by industry and by the media.” The Charter indicates that health promotion action includes building healthy public policy, creating supportive environments (physical and social), strengthening community action through information and funding support, developing personal skills and reorienting health services to focus more on prevention than clinical and curative services.

**Behaviour Change Theory**

The final consideration when selecting or designing an intervention to reduce injury is to understand and integrate behaviour change theory into program planning. Leaders in injury prevention have spoken to the lack of integration of behavioural science theory to injury prevention practice. Applying evidence specific to behavioural sciences when applying an intervention can increase the effectiveness of the program.
An important goal for injury prevention interventions is to change behaviour that increases a person’s risk for injury. Behaviour change happens on different levels. A researcher may target specific at-risk populations and identify the associated risk and protective factors and disseminate their work to encourage individuals to adopt injury-preventing behaviours. A prevention organization may use the media to promote injury prevention awareness and encourage safe behaviours (e.g. use social media to encourage the use of helmets in cycling and snow sports) or collaborate with industry to ensure that a particular product is safely designed and easy to use. Behaviour change theories provide insight into how and when behavioural changes can be achieved in a population or setting.9 There are theories and models that explain processes and necessary components to facilitate change in individuals, communities and organizations.9 There are also theories and models that guide the development and implementation of healthy public policy and communication strategies that support and motivate change.9 Using theories and models to guide the content and process of an injury prevention intervention increases the likelihood of positive outcomes.9 It is ideal to have a general understanding of a broad range of different theories and how they can be applied to various contexts and situations.6,9


Applying behaviour change principles to injury prevention interventions can be done in a variety of ways. Two tools for achieving behaviour change are discussed briefly below: social marketing and developing health public policy.

**Social Marketing**

Social marketing has been utilized for more than three decades in the fields of public health and injury prevention (most notably road safety), achieving overall significant success. Social marketing is not a science, but rather a professional practice which relies on multiple scientific disciplines to create programs designed to influence human behavior on a large scale.23 Social marketing most often targets complex social behaviors, with delayed and distant benefits to audiences who usually do not recognize a problem, and are not seeking a solution. Like other professional practices, social marketing uses science extensively, but also relies heavily on experience. The most successful social marketing campaigns are
developed within a framework of enquiry where scientists, practitioners, and artists work collaboratively to develop creative ways to change behaviour for social good.

Formal definitions of social marketing vary as different authors emphasize different aspects of its concepts and principals. French et al. define social marketing as “the systematic application of marketing, alongside other concepts and techniques [e.g. behavioural change and communication theories], to achieve specific behavioural goals, for a social good.”

French et al. present eight benchmark criteria to describe the key concepts and principles of social marketing: behavioural focus; customer orientation; theory informed; developing insight; segmentation; understanding the exchange; the competition; and methods mix. A more classic description of social marketing is the “Four P’s:” product, price, placement and promotion which describe its broad, strategic elements.

French et al.’s benchmark criteria of behavioural focus requires one to articulate a desired behaviour that is realistic and measurable. The desired behaviour would be referred to as the product in the traditional description of social marketing.

In order to acquire a customer orientation, details must be gathered about the target audience’s social context, the challenges they face and their coping mechanisms. This information can be collected through questionnaires, interviews and direct observation of the target audience and through existing research or contacts who work with the audience. To increase the possibility that the intervention will influence the target audience, concepts from one or more behavioural change theories must be learned and applied. The possibility of affecting change is also enhanced by developing insight which is gaining an understanding of the target audience’s beliefs, attitudes as well as barriers and enablers to change. Insight can also be achieved by understanding people who already do the behaviour that is being promoted. Segmentation is grouping people according to characteristics, attitudes and behaviours. By identifying a specific target group, well-tailored, effective interventions can be developed.

Understanding the exchange is knowing if the target audience will derive sufficient value from maintaining or changing the desired behaviour. Value and costs can include time, effort, money and social consequences. Value and costs are referred to as “price” in the classic social marketing terminology. Exchanges can be positive in that persons who perform the defined behaviour get physical, social or psychological benefits. On the other hand, exchanges can be negative in that individuals are penalized, or have social disapproval for not performing the desired behaviour. An example of a positive exchange is parents receiving a gift certificate for a stationary walker (e.g., exersaucer) or jumper, in exchange of a baby walker (note that baby walkers are prohibited and are not allowed to be imported, sold, or advertised in Canada). Parents may receive social approval from health professionals and/or peers as well as comfort knowing that a risk for injury has been eliminated. A negative exchange example is a levy put on baby walkers making them more
expensive compared to stationary walkers or jumpers. Exchanges can also vary in the
degree to which the target audience has to consciously weigh the consequences of
behavioural options. For example, speed bumps are a passive exchange to control
speeding. A more conscious decision or “active exchange” is a fine for speeding, as persons
may evaluate the chances of getting caught in their behaviour decision making process.

“The competition” refers to factors that work against the desired behaviour. Forces that
promote counter-behaviour can be internal or external. For example, people’s beliefs,
attitudes and habits are internal factors that may counter desired behaviour change, and
social norms, advertising and environments are examples of external factors. Practitioners
must think about the competition against behaviour change from social marketing
perspective for initiatives to be effective.

Information collected for French et al.’s “benchmark criteria” provides direction
for the remaining classic social marketing concepts, “place” and “promotion”. “Place” refers to where
the target audience is reached with “product” information and to where the voluntary exchange takes place.
By having a full understanding of the audience as well as their influencers and environment, information and/or
any equipment may be “placed” strategically to enhance the behaviour’s desirability and convenience.
For example, placing information on the prevention of ski and snowboarding injuries to children in popular parenting or ski/snowboarding magazines may have more influence than having it presented on an injury prevention organization’s website.

“Promotion” refers to the communication and messaging aspects of a social marketing intervention.
Promotional strategies usually communicate important information about the “product”, the costs and benefits of the “product” and/or how barriers to the “product” can be overcome.
Again, information collected for “benchmark criteria” would direct what kind of messages would be used and how they would be delivered.

French et al.’s remaining benchmark criteria is “methods mix” and this principle of social marketing states that behavioural goals are more likely achieved by implementing a number of multi-component interventions that are tailored, evidence and insight-led. This concept reinforces, yet again, that when selecting an intervention, activities should be implemented on multiple levels of influence that reflect sound, scientific research, contextual and experiential evidence. The development of a social marketing strategy provides for focus on a social problem as well as affording a framework for taking action. The strategy below is an
2.3.3: Steps in the Public Health Approach - Selecting or Designing an Intervention

**PROBLEM:**
Q. What is the social problem I want to address?
A. To reduce the number and severity of ladder-use injuries in the workplace.

**BEHAVIOUR:**

*Objective:*
Q. What action do I believe will best address that problem?
A. To increase compliance to ladder use safety rules in 100% of ladder use work in the workplace.

*Audience:*
Q. Who is being asked to take that action?
A. All workers in the workplace.

**OVERALL STRATEGY:**

1. **Better understand the current ladder use behaviour of workers**
   - Look for any differences related to those that do and do not currently comply with safe ladder use rules
   - Identify perceived barriers and benefits to current ladder use safety compliance
   - Identify who influences workers’ decision making about safe ladder use
   - Identify perceived barriers and benefits to adopting safe ladder use behaviour
   - Identify what workers say would work to have them adopt safe ladder use behaviour

2. **Re-frame the problem**
   - Make employer aware of data on the number of unsafe ladder use behaviours, injuries and near misses
   - Change the “framing” of the problem from acceptable ladder use to unsafe/contrary to policy ladder use
   - Pose the question: what are these workers thinking?

3. **Identify specific behaviours that will help workers change**
   - Identify specific worker behaviours that could be brought under co-worker influence
   - Identify specific worker behaviours that could be brought under supervisory control

4. **Energize workplace management and supervisory staff**
   - Use management and supervisory staff to lead, model and promote use of ladder safety rules
   - Use management and supervisory staff to enforce use of ladder safety rules
   - Look for ways to make the new enforcement compatible with existing workplace safety operations

5. **Create behavioural social marketing campaign directed at workers, management and supervisors**
   - Ensure the involvement of workers, management and supervisors in the creative process of developing and deciding on campaign messages, channels and materials
   - Develop leading and lagging indicators to monitor and evaluate the campaign

6. **Implement, publicize and monitor/evaluate the campaign**
   - Be flexible and ready to respond to new information and unanticipated developments
   - Stay or change course as appropriate
example of a social marketing intervention to reduce ladder use injury within a workplace.

Policy

Legislation and enforcement have been identified as a type of intervention that can have significant impact on changing behaviour. This section provides a brief overview of how implementing policy can be used to advocate change. Please see chapter 2.3.4 Program and Policy Implementation for more information about how policies are implemented.

Policy is the intentions, decisions or actions that an authority has or will express through laws, regulation, procedures, guidelines or rules.\(^1\) Policy stimulates social change through rules that support voluntary adoption of a behaviour.\(^1\) Christoffel and Gallagher\(^1\) (2006) indicate that because “it’s the law” many people comply with the legal requirements simply out of citizenship obligations and because the law communicates social expectations that establish social norms which direct behaviour.\(^1\) Seat belt legislation is an example of a policy which has been effective to change behaviour. Transport Canada indicates that “seat belt use has increased over the past 25 years so that now 95% of Canadian vehicle occupants in all seating positions wear belts, and this includes those people in urban and rural areas based on surveys conducted in 2009 and 2010.”\(^1\) To further facilitate adopting new behaviour, efforts must be made to ensure that the behaviour is encouraged and easily adopted by the target audience as described previously by social marketing principles.

When considering policy, we often think of legislation and public policies set by a level of government; however guidelines, procedures, rules and policies can also be developed by organizations, institutions, and even within families and individuals. These make up the other domains of policy. We are all familiar with the family rules we had as children – many around injury prevention issues such as wearing bicycle helmets, riding in a car seat, and looking both ways before crossing the street. At the organizational/institutional level, policies could include workplace guidelines around safe equipment use, or school polices concerning management pick up and drop off areas to ensure safe pedestrians crossing. The domains of policy that we may be seeking to influence will be dependent on our interventions. For the remainder of this discussion, the focus will be on influencing public policy but the same principles would apply to any domain of policy.

There are a large number of factors that affect the creation of public policy. While evidence can influence policy, it is not the only influence. Other influences include positive or negative media coverage, party politics, lobbyists and pressure groups, values and traditions, and resources.\(^1,16\) Many of these factors align with those discussed in the social and political context chapter (See Chapter 2.4 Political and Social Context of Injury Prevention). The interaction of various factors sometimes results in compromises that results in the implementation of only partial best evidence. For example, in Alberta, the injury prevention...
community advocated for all-ages bicycle helmet legislation. Legislation was passed; however, it requires only those under 18 years of age to wear a helmet.

Selecting/Designing an Intervention to Reduce Injury

With limited resources, prevention practitioners want to ensure the intervention selected is going to reduce the injury problem and/or facilitate uptake of injury prevention behaviours. This chapter has outlined some important concepts in selecting or designing an intervention. This section provides guidance on the process of selecting or developing an intervention to increase the likelihood of positive outcomes. It is important to align this stage of the public health approach with the process of evidence-informed public health.

The National Collaborating Centre for Methods and Tools defines evidence-informed public health as “the process of distilling and disseminating the best available evidence from research, context and experience, and using that evidence to inform and improve public health practice and policy.” The premise of this definition is that an evidence-informed decision cannot be made with evidence found in research alone. Evidence for the suitability and potential success of an injury prevention intervention should also include observations and understandings of the target audience, their social, political and physical environments as well as the resources available.

The National Collaborating Centre for Methods and Tools offers a model to search for a suitable, evidence-based injury prevention intervention. The most important step in the process to select an intervention is to ensure that the intervention chosen reflects sound, scientific research, contextual and experiential evidence. This process is completed by reviewing the highest level of scientific evidence to identify an existing intervention, specific to the population targeted. Practitioners can find this information from library databases and catalogues or through organizations that collect, evaluate and/or synthesize published injury prevention research. Examples of such organizations include SafetyLit®, Health Evidence™, the Cochrane Collaboration and the Canadian Best Practices Portal. If there are only primary studies that have not been evaluated or synthesized, and/or if there is limited knowledge about research design and evaluation, there are tools available to use to evaluate the quality and relevancy of the research collected. The Critical Appraisal Tools Program as well as McMaster University’s Health Evidence Tools, provide checklists to determine the
quality of studies including systematic reviews, and qualitative or quantitative primary studies.\textsuperscript{12}

Where an effective intervention specific to a target population is not available, a practitioner can select an intervention that demonstrates effectiveness for a different population, and use a process of adapting the intervention to the target population at hand. Important in this process are evaluation components, used to determine if the adaptation was successful to both implementation planning outcomes (i.e., process outcomes) and injury outcomes (i.e., intermediate and long-term outcomes) (see Chapter 2.3.5, Evaluation and Monitoring). A researcher may also note that an intervention for the specific risk factor under study is not available, or published interventions may not have demonstrated a sufficient level of effectiveness. Researchers in this case would use the public health approach, aligned with the evidence-based public health movement to design an intervention for the target population.\textsuperscript{11}

References


Introduction

Developing or selecting effective programs to implement is a key component in the injury prevention pathway and is a key stage in the public health approach. Transferring programs into real world settings, ensuring their fidelity, and maintaining their sustainability, however; is a complex, yet necessary component of this process that is often not considered. Therefore, implementation planning and the evaluation of a program’s implementation are intertwined and should be included in intervention development. This chapter focuses on the approach to both program and policy implementation and suggests a process for implementation planning.

Program and policy implementation planning should be intentional, systematic, and evaluative because designing an effective intervention to obtain significant outcomes requires more than simply learning, applying, and reporting information.\(^1\,2\) Successful implementation planning involves an evidence-informed approach, working within a team of researchers, stakeholders and knowledge users who will review scientific evidence and consult best practice, those who work in the field, and members of the target population.

Implementation planning is involved early in the public health approach. Clearly identifying the problem to be addressed, understanding the population at risk, and outlining the risk and protective factors within the population of interest are important elements where implementation planning is integrated. Implementation strategies such as creating an implementation team, developing an action plan, and developing and maintaining partnerships and collaboration, can be planned at this stage. By considering an
organization's current strategies, interventions, and activities, complimentary program goals and objectives will lead to greater chances of the program's success. Most importantly, identifying the processes and supports needed and intermediate and long-term outcomes will lead to greater implementation success.

Core Components of Implementation

Program success depends on effective methods for implementing and evaluating a prevention program. Implementation planning is a process that is not necessarily linear; however, there are some preliminary steps that are recommended. There are four core components that can help support the successful implementation of prevention strategies: 1) a well planned implementation strategy using an action plan; 2) maintaining the fidelity of existing evidence-based prevention strategies; 3) adaptation of intervention for new populations and settings; and 4) efforts to measure and increase sustainability over time.

Implementation Strategy

The first step is to ensure that there is a well-planned implementation strategy. Outlining a specific strategy to ensure necessary factors for successful implementation is important. The strategy should include efforts to ensure the fidelity of the program being implemented, ease and documentation of the adaptation of the program to the target population, and sustainability of the program over time. This can be done by on-going information gathering, and is suggested in this section of this chapter as a stage-by-stage approach; however, implementation can be thought of as a non-linear process. For instance, some stages may be skipped and re-visited at a later date. Other times, unanticipated events may occur which have implications on the success of a program (e.g., personal reasons causing a team member to take time away from the program). Realizing such issues and being attentive to details is supportive of a well thought out implementation strategy. To map the processes and supports needed, practitioners or researchers can create an implementation action plan. An action plan assists implementers to think about the necessary inputs to support the intervention, the core activities that are markers of success of the program, and the resulting outputs.
Developing an Action Plan

**Action plans** are often used in implementation planning and follow similar guidelines for logic model development, as outlined in the Evaluation and Monitoring chapter (Chapter 2.3.5). Action plans can be used to visually highlight the implementation strategies by outlining the necessary internal and external processes involved. There are many sources of information to help practitioners develop action plans; one in particular, from the National Implementation Research Network has many resources and tools for practitioners specific to implementation action planning.*

It is important to outline all of the formative, process and outcome indicators involved in program implementation. These measures are used to evaluate the implementation and effectiveness of the program. Formative indicators include the pre-project planning activities that should be thought about at the initial implementation stage. Formative indicators should include the need, fit, resources, evidence, readiness and capacity related to the intervention under consideration. Implementers should think about conducting a needs assessment at the pre-planning stage to increase uptake and adaptation of the program when implemented. (See Chapter 2.3.5 Evaluation and Monitoring for more information on conducting a needs assessment). Process evaluation measures the success implementing the core components of a program as they were intended. Process indicators answer the following types of questions throughout the implementation process: Which components of the program have been implemented? What existing resources are there to support the implementation of this program? What decisions were made to commit to adopting the program? Outlining the process indicators in an action plan is one way of mapping out program plans and setting up implementation evaluation measures. It is important to consider that implementation planning should be created with the implementation team and reviewed by a working group. This is also an effective method for communicating the stages of the program to partners and stakeholders.

Establishing an Implementation Team

Coordinating an **implementation team** and working group should be one of the first activities when thinking about implementing a program or policy. The implementation team should be made up of at least three partners who have expertise in:

- the field of the injury the program relates to,
- undertaking innovative program implementation,
- knowledge of implementation science/theory, and/or
- use of implementation in practice, and/or organization and system changes.1

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It is also a good idea to invite organizational supports on the team, such as:

- a practitioner or individual with expertise in the area of the injury of interest,
- management to lend leadership and knowledge on policy information (e.g., liability),
- administration to assist with human resource and structural issues,
- representatives from a healthcare sector or other sectors (e.g., community services, transportation) to play a lead role and discuss mandates related to your program, and
- regional authority, provincial, community, federal, and national supports as they can advise on from a variety of perspectives (e.g., a community versus national).

**Establishing Working Groups and other Partnerships**

A working group can complement the implementation team. Working group members are those that participate in the program, and also potentially benefit from participating. Working group members could include specialists, members of the community, and participants from the program. Representatives of the target population and those who work with the target population must also be included into the working group. Working groups members provide valuable information, including constructive criticism (perceived and actual barriers to the minimizing the injury prevention issue, best approaches, etc.) to better inform and tailor the program to increase readiness for change among the target population. Once the working group members have been identified, the implementation team could distinguish standing and non-standing contributing members to clarify members' roles.

Developing action plans helps implementers think about implementation stages for a new or adapted program, as well as the factors that must be considered in this plan. There are different stages in the action plan that align with the stages of implementation: exploration (or needs assessment), installation (or adaptation), initial implementation, and full implementation. As mentioned earlier in this chapter, there are three forms of evaluation specific to implementing a program or policy change. Specifying the evaluation measures within the action plan can help in the process of implementing and later evaluating the program. There is **formative evaluation**, **process evaluation** and **outcome evaluation**.
Formative indicators describe the pre-programming or initial implementation outcomes that often focus on efforts to increase capacity and available resources where the program is being implemented. Process indicators describe outcomes that are specific to program activity and implementation. Outcome evaluation measures the effectiveness of the program. Implementers should think about the short-term, intermediate, and long-term outcomes of a program.

When thinking about the implementation outcomes, the following are just some of the questions to consider:

❖ **Formative: When is the best time to implement such a program?** Is there interest and readiness from the public, health region, or government to address this issue immediately? Consider seasons, workload, fiscal year, funding cycles, program fit, etc.

❖ **Process: Who is the target population?** Who benefits from the program? How is this population different from the population where the intervention has been shown to be effective?

❖ **Outcome: What is the targeted change from implementing such a program?** Increased knowledge? Behaviour change? Skill development? Environmental modification?

### Considering the Organization’s Philosophy, Values, and Principles

❖ Is the program part of the organization's mandate?

❖ Are the goals and objectives of the program consistent with the values of the overseeing organization?

❖ Re-visit the target population: are there any sub-populations that should be considered in light of the program’s philosophies, values, and core principles?

❖ Consider broader issues, such as population and organizational readiness, as well as other current events which may affect the implementation process.

### Fidelity

Implementers must be aware about the necessary components of a program to ensure effectiveness. Often, practitioners will select an effective intervention from their literature review that was implemented in a population different from their target population. It is important at the stage of program implementation to measure how the program is being initially implemented and then to what degree the components are maintained. **Fidelity** is defined as “the degree to which...programs are implemented...as intended by the program developers”. A program’s success relies on the core components that support the interventions effectiveness therefore, ensuring fidelity is a core component of an
implantation plan. There are many frameworks in the literature that support ways to measure implementation fidelity.\textsuperscript{11}

**Adaptation**

Adaptation is another important component to think about and evaluate when implementing a program. As mentioned in the previous section, practitioners are best suited to choose an existing evidence-based prevention strategy that was shown to be effective. Often, these strategies were implemented in a population other than the target population. In this case, implementers must consider adapting the program to fit their target population. Implementers should also document and evaluate the adaptation of the existing prevention strategy. This helps future implementation of the program to save time and valuable resources. There are a number of things to consider when adapting an existing program to a new target population. These include differing environments, staff, resources, and setting where the program is being implemented, and the underlying risk profile of the population.\textsuperscript{12} There are a number of tools and resources for practitioners to use to guide the adaptation of evidence-based prevention strategies.\textsuperscript{12-14}

Regardless of the type of intervention being implemented, implementation strategies should address the specific conditions, resources, and supports in place that can be used to promote implementation. The success of a program involves the implementation team strategizing about the existing conditions and resources available. Resources include the staff, their capacity and demands that may interfere or compliment the implementation of an intervention. In addition, resources and supports such as the costs associated with program implementation also need to be projected. There are costs due to resource packages (e.g., training materials, schedules, etc.), equipment, staff time, materials, and administrative processes that must be thought of when implementing a program. Practitioners and researchers can use generalized implementation science theory and concepts to guide the development of an implementation strategy.\textsuperscript{15} Implementation strategies must be detailed documents that contain the strategies required that align with the core program components. This will ensure the implementation efforts can be replicated and set up to measure fidelity.

Below are some tips to keep in mind when thinking about the implementation strategy:\textsuperscript{3}

a) Determining specific dates for program implementation
b) Communication protocols in cases of gaps, challenges, and barriers during implementation

c) Leadership engagement to sustain the new program

d) Regularly scheduled meetings, phone calls, or emails to maintain communication for ongoing feedback and opportunities for any changes to the implementation plan

e) Monitoring of the implementation process to assess if the program should be continued or modified and any implications for uptake. To do so, consider the program's:

- perceived usefulness by all involved individuals,
- time allocation, and
- sustainability, both internally and externally, and what resources would be necessary.

Sustainability

The final core component important in program or policy implementation is sustainability. Factors that support and impede sustainability are important to think about and measure during the implementation stage (and in the implementation action plan) as it provides practitioners with the necessary information to understand the context in which a program continues, or does not continue, after implementation efforts are complete. Some factors that contribute to sustainability include changing priorities and resource availability. To support the long-term success of prevention strategies, practitioners should identify the factors that maintain the strategy over time considering the nature of the strategy, the context in which the strategy will be implemented and the population that is being targeted. In addition, it is useful to identify the factors in place where a program is not sustained, as these factors may not necessarily be the opposite of those that are identified to sustain it. Often, programs are implemented into a local community or specific population and the adherence or commitment to continue the program dwindles over time.

The successful implementation of a program and its subsequent sustainability are distinct issues, which should be considered at the intervention design or selection phase. In doing so, the indicators of success for the initial implementation and the sustainability of the program can be considered and strategically evaluated, thus lending to a holistic approach in
ensuring the success and fidelity of the program. A number of factors influence sustainability following initial implementation into program maintenance. The factors that ensure the success of a program over time need to be identified and collected by program or policy implementers.

**Conclusion**

Practitioners charged with implementing effective injury prevention programs into real world settings must consider the context within which the program is being implemented to adapt the program to increase uptake and sustainability, at the same time, maintaining the program’s fidelity. Implementation planning and the evaluation are key components to this process and should be considered early on in an evidence-informed approach to injury reduction.

**Recommended Resources and Readings**


National Collaborating Centre for Methods and Tools
http://www.nccmt.ca/

National Implementation Research Network
http://nirn.fpg.unc.edu/

Implementation Research: A Synthesis of the Literature http://nirn.fpg.unc.edu/resources/implementation-research-synthesis-literature

Knowledge Transfer & Implementation of Evidence-Based Practice in Children's Mental Health

Public Health Ontario – Online Health Program Planner

**References**


7. State Implementation and Scaling-up of Evidence-based Practices Center (SISEP) and the National Implementation Research Network (NIRN) at The University of North Carolina at Chapel Hill's FPG Child Development Institute.


The previous steps in the Public Health Approach described a process to gather and synthesize different types of evidence to understand the injury problem, assess the risk and protective factors, select or design an intervention to address the injury problem, and a way in which to set up that intervention for success. The last, and equally important, stage of the Public Health Approach is evaluation. Evaluation is the measurement of the effectiveness of interventions and their implementation efforts. Evaluation is a critical component of the Public Health Approach as it provides information on intervention delivery, effectiveness, and utility in the population targeted. The results of an evaluation are often needed to justify resources dedicated to it, or to reflect on the selected intervention to determine if a greater impact could be made in the community.

There are three types of evaluation that align with the evidence-informed public health movement and the Public Health Approach: formative evaluation, process evaluation and outcome evaluation.

**Formative Evaluation**

The first type of evaluation is called formative evaluation. This includes activities at the pre-project planning stage and during initial implementation. It is important for researchers and practitioners to understand that evaluation planning begins this early, as this ensures that all indicators to be used in both implementation and intervention evaluation are set in place. At this stage, one would first consider the need, fit, resources, evidence, readiness and capacity...
related to the intervention under consideration.\textsuperscript{3} A needs assessment is an important part of implementing an intervention into a target population and should be conducted to determine what the real programming needs are in the community. Taking the time to conduct such an assessment can save wasted time and effort by ensuring that the selected program activities are focused on important outcomes, and that resources will be matched appropriately. (Please see Chapter 2.3.3 Selecting or Designing an Intervention for more information on how to conduct a needs assessment).

There is also a need to understand the infrastructure that is required to successfully implement the intervention of interest. Developing a logic model is an important step within the formative evaluation stage. A logic model assists evaluators to think about the necessary inputs or resources that are needed to support the intervention, the core activities that are part of the intervention and implementation strategy, the resulting outputs or products of those activities, and the short-term, intermediate and long-term outcomes. As described earlier in this resource, practitioners charged with implementing an injury prevention program should start thinking about evaluation before there is a program to evaluate. A logic model highlights evaluation activities for an organization and can help with visualizing the necessary internal and external processes. It can also help those who are involved in designing and implementing the intervention come to a common understanding of what the intervention is and what impacts it can have on the community. There are a number of resources available to support logic model development.\textsuperscript{*}

Another core activity of the formative evaluation stage is to collect information about the intervention during the initial implementation stage. Plan-Do-Study-Act cycle provides an opportunity to collect information that can lead to ongoing improvements in the delivery of interventions.\textsuperscript{4} It allows adjustments to be made in the early stages of program delivery or to test out different approaches. At the end of the formative evaluation stage, clear documentation and operationalization of the core components of the intervention would be completed and a documented implementation strategy would be in place. Essentially, this provides a road map for others to be able to replicate the intervention and the implementation supports. For example, if the intervention is designed for registered nurses within hospitals to provide educational sessions to new

\textsuperscript{*} The Centers for Disease Control and Prevention provide a number of resources that can help shape the logic model development process: http://www.cdc.gov/eval/resources/#logicmodels
parents on how to properly install car seats, the information and practical skills intended for uptake in new parents should be clearly described, and more generally, what the educational sessions would look like when done successfully should be described as well. During the formative evaluation phase, work would be completed to operationalize the implementation strategy: planning the selection of the registered nurses to deliver the training, how to train the nurses to be effective teachers, and how support systems would be set in place for the nurses to complete the work.

When several Plan-Do-Study-Act cycles are completed, there is confidence in the intervention design, and when clear documentation of the intervention and implementation strategy is complete, process evaluation can then be initiated.

**Process Evaluation**

Process evaluations examine whether or not the core components of the intervention were delivered as planned. Evaluations of intervention effectiveness may report that the intervention failed to produce desired outcomes. Process evaluations are important because they can help understand the results of outcome or summative evaluations. For example, it is informative to look at adherence to the ‘active ingredients’ of the intervention or the core components to understand what parts of the intervention are essential (i.e., required for fidelity). There may also be interest in coverage; for example, asking questions about the target population and feedback specific to the benefits from intervention participation. Process evaluation could also include looking at whether the frequency and duration of program delivery was aligned with the original plans. If a program has low adherence, looking at the strategies in place to facilitate implementation, the quality of delivery, and whether participants are engaged in the program, can be used.

**Outcome Evaluation**

Outcome evaluation asks the question of whether or not a program was effective. There are numerous indicators one might use to measure the short-term, intermediate, and long-term outcomes of a program. Measuring or observing the impacts of a program on the intermediate or long-term outcomes may be more limiting. The sooner that the outcomes of investments can be measured, the better. Initial or short-term outcomes tend to focus on reach and efforts to increase capacity, knowledge, awareness, or the availability of supports. Intermediate outcomes tend to focus on some aspect of behaviour change (e.g., increase use or installation of car seats, use of personal protective equipment). Long-term outcomes or distal outcomes in this field tend to focus on injury outcomes. There may be opportunities to use local, provincial/territorial, and/or national data. Important in this evaluation phase,
and in all process involved with evaluation, is the inclusion of stakeholders, which includes feedback on both the process and outcome evaluation measures.

**Resources Required**

It has been recommended that practitioners and/or organizations set aside a budget that is specific to the costs associated with evaluation. Hiring and managing external consultants to perform evaluations of injury prevention programs is often an expensive and time-consuming process. In addition, external evaluators sometimes fail to appreciate important aspects of a program, and as a result, produce evaluations that are not as useful as they could be. Organizations can develop internal capacity for evaluation. The organizations with this capacity will not have to remain dependent on external resources for this critical function.

**References**


Introduction

The previous chapters in this section have outlined a process to use different types of evidence to tackle an injury problem. An equally important part of the process is to understand and assess the context within which injury prevention initiatives move from theory to practice. For example, if a specific community and their politicians do not see playground injuries as an important safety issue, strategies to prevent these injuries may not be implemented. In this case, practitioners could advocate and raise public awareness regarding the burden of playground injuries. Using techniques such as advocacy and public awareness creates buy-in, and are examples of how both the social and political context can play a significant role in pushing an injury prevention agenda forward.

This chapter will highlight the importance of context in injury prevention practice and how establishing community and political support, understanding other community health issues...
and existing public health resources, all create the necessary pre-conditions to advance injury prevention practice.

Important questions surrounding how the social and political context serves as the underpinning of injury prevention practice, is highlighted in Figure 10. Gathering evidence to answer each of the five questions posed in this model provides the important information about the context in which injury prevention works to select, implement, and monitor evidence-informed practice. As highlighted in previous chapters in this resource, an ecological approach to injury prevention may be the most effective; however, one of the strongest predictors of change is through the generation and enforcement of legislation, standards and policies.

Social Context

It is important to consider a community's perception of an injury problem. As highlighted in Chapter 2.3.5 Evaluation and Monitoring, a needs assessment answers important questions specific to the local context such as: What does the community know about injury prevention? What injury issues are of most concern? For example, if a community has recently experienced the loss of a child due to drowning, this would create the public awareness and concern regarding drowning, in addition to actively supporting changes to prevent this type of injury in the future (e.g., 4-sided pool fencing). Assessing readiness for
change and/or ‘teachable moments’ can open doors, and provide opportunities to introduce new or existing strategies that will benefit the community.

To understand the social context, characteristics within the community that may enable or inhibit the prevention of injury must be considered. Are there ‘known’ truths about injury that the community accepts? For example, do community members have a perception that injuries are “accidents” that tend to happen as a result of bad luck or fate? Are certain injuries viewed as a badge of honour or right of passage, passed down through families? Perceptions or beliefs about injury and injury prevention will affect how messages are received, how much attention is paid, and/or if efforts to reduce the burden of injury are actively disregarded.

One strategy to promote uptake in a community-driven initiative is to find what is called a ‘champion’. A champion is a person from the community, prevention organization, or research team that is engaged in addressing the injury burden and motivated to seek a solution. A champion can be used to promote injury prevention practice by providing perspective on a community’s perception of injury, and on ways to influence injury reduction. A champion is also a person that can play a major role in the uptake, implementation, and evaluation of an injury prevention program. This person contributes significantly to understanding how the injury affects an individual, family, and/or their community, and can help identify other people who can influence uptake and evaluation processes.

Another strategy used to advance injury prevention practice includes an assessment of the available public health resources. This includes human as well as financial resources; both of which are important factors in addressing any social issue. It has been shown that when an issue is identified as a priority and has available or attainable resources dedicated to it, changes will result. There are both benefits and challenges specific to injury prevention in assessing the available resources. One challenge includes the diverse sectors that an injury prevention issue crosses. These include sectors such as health, transportation, education, and justice. Benefits include the opportunity for many champions; people in decision-making positions and volunteers who can influence injury prevention in the community. Challenges include getting everyone on the same page, working towards the same goal, and sharing information. Differing agendas, priorities and levels of control can side track efforts; however, when aligned, efforts result in a successful solution.
Understanding the social context within injury prevention practice that includes the needs of the community, other public health issues of concern, and the available resources, impacts the success of injury prevention efforts. Awareness of these issues plays a significant role in aligning strategies for prevention.

**Political Context**

The other, arguably most influential context to consider when thinking about injury prevention practice is the political context. Injury prevention literature shows the implementation and enforcement of laws and regulations can provide far-reaching and long-term benefits in reducing injuries. Standards, policies, by-laws and legislation are considered enforcement strategies, one of the ‘E’s’ of the 3E approach to injury prevention (See chapter 2.2 for more information on the 3E’s of Injury Prevention).

An enforcement strategy can be implemented at a variety of levels, such as municipal, provincial/territorial, and federal, depending on where the control or jurisdiction is located. Adoption of formal policies by boards and commissions also fall under the umbrella of policy and legislation. The regulation and enforcement of policies and legislation are powerful tools in the prevention of injury; however, policy and legislative solutions must be addressed across the spectrum, or with an ecological approach to injury prevention. Legislation is most effective when used in combination with environmental modification, educational activities, and increasing public awareness.\(^1\)

Injury prevention practitioners must consider several factors to determine their impact on the policy decision-making process. These factors include whether injury is seen as an issue, whether there are champions to move the policy change forward (or naysayers that will need to be convinced), the election cycle, and if there is political will to address the injury issue. By examining these factors opportunities, or “policy windows”, can be identified.

There are four general steps that advocates must take in order to successfully influence the policy-making process.

- **Understand government**: Understanding how government works is the first important step in navigating and working within the political context. Each level of government (i.e., municipal, provincial/territorial, federal) has its own processes and procedures to form and pass legislation. There are prescribed processes by which bills become law or funding requests become part of the budget. When seeking to understand government, it is crucial for injury prevention practitioners to be aware of the level of responsibility (jurisdiction), the decision-making process, current legislation, regulations and policy, and cycles of government. Likewise, each piece of policy, legislation or regulation will need to go through a process of agenda setting, policy formulation, decision-making, policy implementation, and ultimately, policy evaluation.
Determine strategy and tactics: Choosing the best strategy and/or tactics to influence policy is not an ad hoc process, but rather one that involves an in-depth understanding of context and options. Strategy and tactics are generally interrelated; however, they refer to slightly different aspects of a public policy campaign. A strategy is a generalized plan to achieve one's goals and tactics refer to the methods and actions taken to execute the strategy.

In determining strategy and tactics, an injury prevention practitioner will have to determine certain contextual factors that will influence their approach. These include determining: the prevention goal and clarifying the specific request to government; the available resources and limitations; allies and opponents; and whether the campaign is short or long-term.

Build relationships: Relationships play a critical role in navigating both the political and social context. In order to move the policy making process forward, relationships are often the key to accessing and leveraging resources and relevant information. Building relationships can take different forms. First, coalition building brings together groups of people around a specific issue or for a defined purpose, can expand the resources of a given movement, and also increase the likelihood of success by ensuring a broad base of support. A broad and diverse coalition of support can further demonstrate the relevance of an issue and the impact policy action will have on multiple sectors and interests. For the most part, coalitions are external to government. Second, there is building relationships with decision-makers themselves. Decision-makers are the elected officials or those with influence within government bodies that can facilitate the identification of a champion that has access to the inner workings of government. Building relationships is an important component in navigating the government system and attempting to identify and capitalize on policy windows when they arise.

Appeal to government: Appealing to government means not only understanding which issues will interest a decision-maker at any one time, but also knowing how to frame and communicate the injury problem to make it resonate and align with a decision-makers priorities and philosophy. Sources for this information are: official party platforms; involvement of a decision-maker in previous causes and events; a keen understanding of a decision-maker's own personal biases and personal history; and the issues and concerns within a decision-maker's constituency. At the core of appealing to government is also highlighting the return on investment that their involvement and promotion of a policy can garner. Appealing to government also means constructing a narrative or telling a story around the prevention issue that goes beyond the evidence to provide a persuasive, compelling message that necessitates action. For example, tragic incidents can often trigger public concern, demonstrate the human side to the injury issue, and provide a face to the cause. If this concern is effectively channeled, it can
produce a rapid and sustained momentum in a political commitment to injury prevention.

The policy making process is described using two different approaches; the linear and the contextual views of policy making.

A linear view of policy making sees the evolution from evidence to policy as following a sequential path. In this case, four steps are undertaken to reach a policy solution: 1) problem identification is where an injury issue or gap in knowledge surrounding an injury issue is identified; 2) evidence gathering is where the evidence to support the presence of the problem and its accompanying evidence-based solution is compiled; 3) knowledge brokering and transfer is where those who possess the evidence distribute it into the hands of those with the power to influence policy change (i.e., decision makers); and 4) action marks the introduction and implementation of a policy or legislative reform that directly addresses the problem and solutions identified in steps one and two. In this model, decision makers are always receptive to the evidence received.

Figure 11
Policy-making: A linear view

The linear view of policy making is often considered too simplistic as it fails to take into account the social and political context that impacts the process. In contrast, the contextual view of policy-making provides a realistic and adaptable method for achieving public policy solutions for injury prevention. The contextual view of policy-making accounts for the realities of a decision maker’s subjective view that impacts their ability to take a particular policy approach. These include: 1) the importance and magnitude of public opinion; 2) competing priorities; 3) their own personal biases and preferences; 4) the periodic need for crises management; and 5) the election cycle. All of these factors constitute a real world, ever-changing political environment within which those who wish to influence policy must operate.
Within the contextual view of policy-making it recommends an assessment of the social and political context as a continual search for opportunities or “policy windows”, verses a one-time exercise to promote policy change. In this method, evidence still plays a critical part; any proposed activity should be based on data demonstrating the issue is important, the target population is appropriate, the intervention is effective and demonstrates a return on investment. The contextual view of policy-making uses evidence as one part of a comprehensive approach to sway decision-makers into taking a particular course of action.

Figure 12
Policy-making: A contextual view

Final Thoughts on the Policy and Social Context for Injury Prevention

To develop effective solutions to injury prevention problems, it is essential for practitioners to consider the social and political context. Doing so improves the effectiveness of tools, strategies, and techniques that are required to navigate the policy making process and to implement laws and regulations that can result in sustained reductions in injury rates. There are various situations, people, timing, processes and resources that will impact action and the likelihood of success. To be successful in developing and implementing injury prevention solutions, practitioners require the knowledge and skills for raising public awareness, building relationships with elected officials, and shaping laws and policies. Injury prevention practitioners including health professionals, researchers, knowledge translation...
experts, and other vested people and organizations, have valuable information to contribute to their communities and policy that will make a real difference in the lives of individuals.

**Case Study in Social Context and Policy – The Consumer Product Safety Act**

Canada’s Consumer Product Safety Act illustrates effective advocacy for injury prevention public policy. This movement took into account the social and political context throughout the legislative approval process.

The process of passing the Canadian Consumer Product Safety Act originated with identification of the injury burden, specific to consumer products. Between 1990 and 2007, more than 1.6 million injuries were treated in the emergency departments of the 16 hospitals participating in the Canadian Hospitals Injury Reporting and Prevention Program [CHIRPP] (ages 19 years and younger). From 1997 onward, 46% of emergency visits involved consumer products, including toys, magnets, furniture, and window coverings. Furthermore, for nearly two-thirds of all cases in children under the age of 5, the product was a direct cause of the injury and a contributing factor in one-third of all cases.

Removal of unsafe products from the marketplace was identified as an effective way to reduce the likelihood of these injuries; however at the time, the Consumer Safety Product Act was notably out-dated. The Hazardous Products Act that regulates the import of consumer products into Canada, was more than 40 years old and ill-equipped to be responsive to the realities of a modern, global marketplace; therefore, the legislative renewal process to update the act, based on the burden of injury attributed to imported consumer products was initiated by the Canadian government in 1998.

However, it would not be until 2010, that Canada passed renewed consumer product safety legislation. There are a number of reasons for the length of the process and both social and political factors intervened between the initiation of Legislative Renewal in 1998 and the passage of the Canadian Consumer Product Safety Act in 2010. In 2003, extensive public consultations were conducted and between 2003-2008 other activities such as a survey of Canadian parents that identified the misperception that if a produce was for sale in Canada, it had been tested and was safe. Products continued to be found with safety concerns. In 2008, the 39th Parliament was suspended before being able to pass the first iteration of the consumer product safety legislation, Bill C-52. Following the legislative process, Bill C-52 was reintroduced during the next Parliamentary session. The prorogation of the Government in 2009, again mandated that this second iteration of the legislation, now Bill C-6, was halted mid-way through the legislative process. The legislation was reintroduced under a third iteration, Bill C-36, when Parliament resumed and this time, was passed and received Royal Assent in December 2010. The Canadian Consumer Product Safety Act came into effect in
June 2011.* In the aftermath, numerous public consultations on the regulations within the Act and subsequent evaluation of its effectiveness have been undertaken.

Ultimately, the successful effort to pass the Canadian Consumer Product Safety Act was the result of understanding the social and political context, while utilizing resources at strategic time points in order to capitalize on “policy windows”, such as after a product recall that drew attention to the issue. Understanding government was critical to navigating the many factors that contributed to the delay and several iterations of the policy, while remaining persistent throughout the process. It was also important in ensuring that interested stakeholders were able to contribute to the legislative debate by appearing before committees at the House of Commons and Senate, providing written submissions and meeting with elected members of Parliament. Following procedures to appear before committees or provide submissions was paramount.

Building and sustaining relationships were also important to the process. A coalition of like-minded, but diverse organizations, collaborating and leveraging resources and connections, encouraged the passage of the legislation. These included: Option Consommateurs, a non-profit association whose mission was to promote and protect the basic rights of consumers; Environmental Defence, an environmental action organization, and Safe Kids Canada, a national injury prevention organization focused on unintentional injury in children. These organizations shared resources and information, and communicated coordinated messaging regarding the legislation. Together, they employed strategies and tactics that addressed the social and political context. Meetings were held with elected officials and policy officials, press releases were issued at critical points, opinion editorial/op eds (an article published by an author not usually affiliated with the publication) were written in newspapers familiar to decision-makers, and organizations took part in media events along with the Minister of Health.

An important part of this successful policy change was the social support created to pass the bill. A narrative was developed describing the importance of the legislation that garnered a significant amount of social support. The narrative underscored the need to keep children and families safe, while providing both the government and parents with a specific way to do so. For example, a coalition of stakeholders issued a joint press release addressed directly to the members of the Senate committee during their consideration of the legislation’s second iteration. The release was entitled *Health, Environmental,* and Consumer groups urge the Senate to pass Bill C-6 before the holiday gift-giving season. Released in early December,

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* The Canadian Consumer Product Safety Act contained three key features to modernize Canada’s consumer product safety regime: Prohibiting the manufacture, importation, advertisement or sale of consumer products that pose an unreasonable danger to children and human health; mandatory recall powers for the government to remove unsafe consumer products from the market, the requirement of suppliers to provide test results and safety reports to Health Canada regarding any serious injuries or illnesses resulting from the use of their products; offence related to false packaging or deceptive labeling of unsafe products.
the press release highlighted the importance of the consumer product legislation during a time particularly focused on family – the winter holidays.

References


To understand the importance of engagement in injury prevention, it is essential to look at the overall context within which this work happens. As mentioned in the previous chapter, there is a political and social (local and community specific contexts) context within which injury prevention occurs. In addition, there are a number of other important influences when charged with selecting impactful interventions within a context of scarce resources.

The model below outlines how engagement with the targeted community, the relevant municipal, provincial and/or federal decision makers, and partnerships with key stakeholders and knowledge users is the foundation of an engagement model.

This model places engagement as the outermost layer of the injury prevention process. This is important as it demonstrates how engagement is involved at every stage of applying an evidence-informed approach to prevention. Important to consider in this process, are all of the factors that can create success in program implementation. This includes consideration of the local social and political climate of the community and the available public health resources. Where these considerations are specifically made is in the implementation planning stage of the Public Health Approach (See Chapter 2.1 for more information). This stage provides the information on the important components to include and to adapt information to a local context.
Evidence-informed practice draws attention to the different types of evidence and how it is used in this process, and how evidence can come from more than one source. Specific to engagement, practitioners would use evidence from the information gathered from community members, stakeholders, politicians, decision-makers and partners throughout the Public Health Approach to injury prevention.

Engagement of the community, stakeholders, politicians, decision-makers and partners will help assess the local social and political context (i.e., establishing required conditions for success), and it also ensures a more collaborative approach to building capacity by tapping into the knowledge and expertise of others, identifying champions, and bringing new and existing resources to the table. Depending on the specific injury prevention or safety promotion area of focus, other key stakeholders may be identified and engaged in these activities.\(^1\) Although the health sector is important, it is only one partner in the search for injury reduction. Multi-sectoral action is essential and work needs to be coordinated across
sectors and government ministries. Consideration of each component of the model is important, in addition to an integrated approach to plan actions that effectively prevent injuries and promote safety.\(^1\)

**Professional Frameworks**

There are many frameworks that speak to the process of achieving engagement with different groups. The type of engagement framework will depend on the goal(s) of the group, duration of the work, and the type of people who will be participating. Regardless of the type of framework, the overarching objective is to bring together a group of individuals and/or organizations to work as a collective towards a shared outcome. This could take the form of a defined project, a mechanism to share information, or make connections to others working in similar areas. In addition, the structures of these engagement frameworks can take different forms. They could be set up to have a leader with members connecting to the leader, (traditional top down approach), a hub and spoke format where there is a central coordinator (think of an airport), or a co-creative model where there is no defined leader but rather connections between and amongst the participants.

**Communities of Practice.** A community of practice is a collection of people who engage on an ongoing basis towards a common endeavor. Communities of practice emerge in response to common interest or position, and play an important role in forming their members’ participation in, and orientation to, the world around them. The Canadian Knowledge Transfer and Exchange (KTE) Community of Practice (KTECOP) is an example of a network of KTE practitioners and researchers who share KTE practices and experience, build peer relationships for information exchange and support, build KTE capacity, advance knowledge of KTE effectiveness, and share KTE events, job opportunities and other related KTE activities (http://www.ktecop.ca).\(^2\)

**Networks.** Networks can be very formal or relatively informal in structure. There are innumerable ways of defining and understanding networks; simply, they can be understood as interconnected systems. More specifically, “networks are systems of relatively autonomous actors that are working in concert to achieve shared goals or pursuing individual goals within a shared system.”\(^3\) In Canada there are communities that have achieved the designation of a Safe Community. Each community operates activities in their local area but is part of a larger
network across Canada. This network has shared communication vehicles that allow each community to connect with each other, and Parachute, a national not-for-profit organization designated as an authority of knowledge translation in the injury prevention community. Safe Communities have both individual and shared goals within the network. Individual goals vary; for example, one Safe Community may focus attention on drowning prevention while another may focus on poison prevention; however, the overall shared goals of both Safe Communities is to reduce preventable injuries to local communities. Ultimately, the work of this network addresses a common goal of reducing preventable injuries.

**Collaboratives.** Collaboratives represent the action of working with someone or a group of people, to produce something. Collaboratives typically have a smaller number of people compared to networks and can have structures such as Term of Reference, membership definitions, meeting timetables, etc.

There are a few examples of collaboratives in injury prevention:

- **Canadian Collaborating Centres on Injury Prevention (CCCIP):** Established in 1999, the Canadian Collaborating Centres on Injury Prevention (CCCIP) is a community of practice representing injury prevention centres throughout Canada. Its membership represents all of the provincial injury prevention centres and the leading national injury prevention organizations in Canada. The CCCIP provides a unique opportunity for leading injury prevention professionals to share knowledge and experiences, support individual and collective initiatives, policies, and research, and further the work of injury prevention throughout Canada.

- **Atlantic Collaborative for Injury Prevention (ACIP):** ACIP is a partnership of injury prevention practitioners from both government and non-government organizations. The goal of ACIP is to reduce the burden of injury in Atlantic Canada.

**Committees.** Committees can be defined as “a group of people appointed for a specific function by a larger group and typically consisting of members of that group.” Ideally, a committee is struck for a very specific objective with a defined time limit to achieve the objective. In 2005, the momentum for Federal/Provincial/Territorial action on injury prevention was renewed to facilitate collaboration aimed at enhanced injury prevention. This momentum formed a national injury prevention committee with representatives and injury experts from across Canada called the Injury Prevention and Control Task Group (IPCTG). The purpose of IPCTG was to identify key national injury prevention priorities that could be incorporated into a vision paper for Canada. The vision paper and action plan was completed in 2010 and the committee was subsequently folded.

**Public Engagement.** The previous section in this chapter discussed the different forms that engagement with professionals can take. Just as important are mechanisms to engage the public in injury prevention.
The Community Against Preventable Injuries is a community outreach group to understand the perceptions, knowledge, and behaviours related to injury in Canada. Using the social marketing tool Preventable as a platform, the Community Against Preventable Injuries identified opportunities to engage the public in discussions about preventable injuries. This included scenarios that did not provide direct messages, but encouraged audiences to think about their own attitudes and beliefs about injury. In Alberta, public engagement has been also done at the community level. There are community driven awareness programs that are designed to promote discussion and reflection at that moment of risk, for example, an overturned ATV at a trailhead with the messaging “Before you think you won't need a helmet today, have a word with yourself.”

Conclusion

Engagement of both professionals and the public is essential in the process of injury prevention. Injury prevention is too significant an issue to rely solely on the engagement of only one sector. To be effective in injury prevention, efforts and resources brought from different groups enhance the promotion of preventable injuries.

References


