

Unintentional Injuries in Childhood



ANALYSIS

Injuries are the leading cause of death among children between ages 1 and 19 in the United States.

- ◆ In 1996, more than 13,000 children and adolescents in the United States died of unintentional (“accidental”) injuries, predominantly motor vehicle crashes, drowning, and residential fires.
- ◆ Unintentional injuries are responsible for more child deaths each year than homicide, suicide, congenital anomalies, cancer, heart disease, respiratory illness, and HIV combined.

Unintentional injuries to children are costly.

- ◆ Unintentional childhood injuries that occurred during 1996 cost society \$66 billion in present and future productivity losses due to premature death or long-term disability, \$14 billion in lifetime medical spending, and \$1 billion in other resource costs.
- ◆ For every fatal injury, approximately 18 children are hospitalized and 233 are treated in emergency departments for nonfatal injuries.

Most unintentional injury deaths to children can be prevented.

- ◆ Simple, proven interventions such as using child car seats and bicycle helmets, controlling traffic in residential neighborhoods, and installing smoke detectors in homes could reduce childhood injury deaths by one-third, representing more than 4,000 deaths to children in 1996 alone.
- ◆ The three key approaches to injury prevention are education, environment and product changes, and legislation or regulation.

Education to promote changes in individual behaviors can have a modest effect in reducing the risk of childhood injuries.

- ◆ Education by health care professionals has increased individual safety behaviors including car seat use, smoke detector ownership, and safe tap water temperature, at least for a time.

- ◆ Community-based education in schools, neighborhoods, and cities, often combined with economic incentives, has increased the use of bicycle helmets and car seats among children, but programs should be more widespread.

Environment and product modifications that make children's physical surroundings, toys, and clothing safer can dramatically decrease the incidence of childhood injuries, though many such efforts are not widespread.

- ◆ The use of child-resistant caps for medications and household poisons, and limiting the number of pills in medication vials have virtually eliminated poisoning deaths to children under five years old.
- ◆ Traffic calming to reduce or slow the speed of traffic in neighborhoods reduces the risk of pedestrian injuries, perhaps by more than 60%.
- ◆ Swimming pool fences with self-latching gates prevent roughly 40% to 70% of swimming pool drowning and near-drowning incidents in young children.

Legislation and regulation are among the most powerful tools to reduce childhood injuries, and most environment and product design changes require legal action. Many existing laws, however, are not fully enforced or have loopholes that limit their effectiveness, and some effective laws have not been adopted in every state.

- ◆ Car seat laws in all 50 states increase the use of car seats, which prevent about 71% of automobile crash-related deaths to infants and young children, but most states do not require appropriate protection for children between the ages of about four and eight years old.
- ◆ Even though research has shown that bicycle helmets are 85% effective at reducing head injuries, 35 states lack bicycle helmet laws.
- ◆ Regulations requiring flame-retardant children's sleepwear have substantially reduced clothing burns, though current efforts to relax this standard may result in their reappearance.

Deficiencies in four areas have stymied injury prevention efforts of the past and continue to be a problem today:

- ◆ The absence of reliable data on nonfatal injuries to allow proper targeting of interventions.
- ◆ The lack of training to prepare a multidisciplinary group of professionals to enter the field of injury prevention.
- ◆ Inadequate funding for injury research and prevention given the magnitude and cost of the unintentional injury problem.
- ◆ The lack of coordinated prevention efforts by public and private agencies.

Reducing the rate of child injury deaths in the future will require the dedication of individuals to implement what we know works, the determination of communities to create environments where children can grow up safely, and the public and private dollars to support injury prevention research and to disseminate effective interventions.

RECOMMENDATIONS

RECOMMENDATION 1

Pediatricians and other health care providers should incorporate education about safety practices into routine health visits using positive behavioral counseling. To encourage this, private insurers and state Medicaid programs should adequately reimburse for counseling, and the National Committee for Quality Assurance should make counseling for injury prevention a measured indicator of the quality of health plans.

RECOMMENDATION 2

Effective community-based injury prevention programs grounded in a health behavior framework, such as those shown to increase bicycle helmet and car seat use, should be implemented in every community. New programs based on these models need to be developed and evaluated in communities to target other prevalent child and adolescent injury problems such as pedestrian injury, drowning, and motor vehicle injury associated with the misuse of car seats and seat belts for small children.

RECOMMENDATION 3

Passive strategies that make children's environments safer, such as traffic calming measures and fences that enclose swimming pools on all sides, should be implemented in all communities and mandated by law.

RECOMMENDATION 4

Uniform legislation should be enacted and enforced in every state to mandate the following safety practices: age-appropriate car seat or booster seat use for children, bicycle helmet use, and residential smoke detectors that are hard-wired or use lithium batteries. The National Center for Injury Prevention and Control should catalog model legislation and state activities for these and other injury prevention strategies.

RECOMMENDATION 5

Information on the cost effectiveness of strategies to reduce injuries to children must be collected to better inform public debate on the merits of these interventions.

RECOMMENDATION 6

The mandatory recording of external cause of injury codes should be required for hospital discharge data systems in all 50 states. Medical providers and hospital information system staff should be trained to use these codes for all admitted instances of nonfatal injuries.

RECOMMENDATION 7

State and local governments, hospitals, and nongovernmental organizations that implement injury prevention programs should require that employees obtain training in the principles of injury control. Funding of these programs should be tied to this training requirement.

RECOMMENDATION 8

National training programs and career development awards for injury control investigators should be developed and funded by federal agencies.

RECOMMENDATION 9

A comprehensive analysis of federal spending on child and adolescent injury prevention and control should be undertaken. Based on this analysis, the knowledge of the magnitude and costs of injuries, and the effectiveness of prevention efforts, federal funding for injury research should be set at a level commensurate with the problem.

RECOMMENDATION 10

A national agenda for the prevention of unintentional injuries should be developed and implemented through coordination of federal efforts across a variety of agencies under the lead of the National Center for Injury Prevention and Control within the Centers for Disease Control and Prevention.

ARTICLE SUMMARIES

The History of Injury Prevention Programs and the Epidemiology of Child and Adolescent Injuries

David C. Grossman, M.D., M.P.H.

Unintentional injuries claim the lives of more children each year than any other cause of death and account for a substantial proportion of child hospitalizations and emergency department visits. The conceptualization of unintentional injuries as a public health problem that is preventable, has gained credibility over the past few decades as effective solutions to reduce the burden of injuries, such as child safety seats, bicycle helmets, and smoke detectors, have been identified. Successful implementation of these strategies, however, requires a clear understanding of the circumstances surrounding injuries, and risk and protective factors. Motor vehicle occupant, drowning, and pedestrian injuries were the cause of more than half of all child unintentional injury deaths in 1996, although rates varied considerably by age. Overall, unintentional injury rates are the highest among adolescents ages 15 to 19, males, children from impoverished families, and minorities. Environmental and behavioral risks, such as unsafe roads, alcohol intoxication, unfenced swimming pools, and the absence of a smoke detector in the home, can be successfully reduced using the appropriate strategies. More widespread diffusion of successful injury prevention strategies among populations at highest risk for injuries is necessary to further reduce the toll on children's lives.

Individual-Level Injury Prevention Strategies in the Clinical Setting

Carolyn DiGiuseppi, M.D., M.P.H., and Ian G. Roberts, M.B., B.Ch., M.R.C.P., Ph.D.

Health care providers working in physician offices, clinics, emergency departments, or hospitals have numerous opportunities to intervene with parents and children, to promote child safety practices that reduce unintentional injuries. This systematic review examined 22 randomized controlled trials that examined the impact of interventions delivered in the clinical setting on child safety practices and unintentional injuries. Counseling and other interventions in the

clinical setting are effective at increasing the adoption of some safety practices—including motor vehicle restraint use, smoke alarm ownership, and maintenance of a safe hot tap water temperature—but not others. Clinical interventions were most effective when they combined an array of health education and behavior change strategies, such as counseling, demonstrations, the provision of subsidized safety devices, and reinforcement.

Community-Based Injury Prevention Interventions

Terry P. Klassen, M.D., M.Sc., F.R.C.P(C), J. Morag Mackay, M.Sc., David Moher, M.Sc., Annie Walker, M.A., and Alison L. Jones

Community-based injury prevention interventions seek to change social norms about acceptable safety behaviors by focusing on altering behavior, promoting environmental change within the community, or passing and enforcing legislation. This systematic review analyzed 32 studies in schools, municipalities, and cities that evaluated the impact of community-based injury prevention efforts on childhood injuries, safety behaviors, or the adoption of safety devices. Most relied on an educational approach, sometimes in combination with legislation or subsidies to reduce the cost of safety devices such as bicycle helmets. Community-based approaches are effective at increasing some safety practices, such as bicycle helmet use and car seat use among children. Common elements of successful community-based approaches that should be replicated in future studies include (1) the use of multiple strategies grounded in a theory of behavior change, (2) approaches that are tailored to meet unique community needs, (3) the inclusion of community stakeholders in the development of interventions, and (4) the use of a randomized controlled design to maximize the trustworthiness of reported findings.

Legislative and Regulatory Strategies to Reduce Childhood Unintentional Injuries

Richard A. Schieber, M.D., M.P.H., Julie Gilchrist, M.D., and David A. Sleet, Ph.D.

Laws and regulations are one of the most effective mechanisms to get large segments of the population to adopt safety behaviors. These have been applied at both the state and federal levels for diverse injury issues. In this article, six legislative efforts are described to demonstrate the pros and cons of the legislative approach to ensuring safety. Three such efforts are aimed at preventing injury-producing events from occurring—mandating child-resistant packaging for prescription drugs and other hazardous substances, regulating tap water temperature by presetting a safe hot water heater temperature at the factory, and graduated licensure. Three other examples illustrate the value and complexities of laws designed to prevent an injury once an injury-producing event does occur—mandatory bicycle helmet use, sleepwear standards, and child safety seat use. The article concludes with specific recommendations, which include assessing the value of laws and regulations, preventing the repeal of laws and regulations known to work, refining existing laws to eliminate gaps in coverage, developing regulations to adapt to changing technology, exploring new legal means to encourage safe behavior, and increase funding for basic and applied research and community programs.

The Cost of Unintentional Childhood Injuries and the Value of Prevention

Ted R. Miller, Ph.D., Eduardo O. Romano, Ph.D., and Rebecca S. Spicer, M.P.H.

Cost data are useful in comparing various health problems, assessing risks, setting research priorities, and selecting interventions that most efficiently reduce health burdens. Using analyses of national and state data sets, this article presents data on the frequency, costs, and quality of life losses associated with unintentional childhood injury in 1996. Unintentional childhood injuries in 1996 resulted in an estimated \$66 billion in present and future work losses, \$14 billion in lifetime medical spending, and \$1 billion in other resource costs. These injuries imposed quality of life losses equivalent to 92,400 child deaths. Several proven child safety interventions cost less than the medical and other resource costs it saves. Thus, governments, managed care companies, and third-party payers could save money by encouraging the routine use of selected child safety measures such as child safety seats, bicycle helmets, and smoke detectors. Yet, these and other proven injury prevention interventions are not universally implemented.

Evaluating Injury Prevention Programs: The Oklahoma City Smoke Alarm Project

Sue Mallonee, R.N., M.P.H.

Evaluation of injury prevention programs can be used to test program strategies, to measure penetration of the program in the target population, and to measure program effects on injury-related morbidity and mortality or the adoption of safety practices. An evaluation of The Oklahoma City Smoke Alarm Project increased the program's success at reducing residential fire-related injuries and deaths by providing data during the program's implementation that allowed for midcourse corrections. The program included the distribution of free smoke alarms in targeted neighborhoods, accompanied by written educational pamphlets and home-based follow-up to test whether alarms were functioning correctly. During the six years following the project, the residential fire-related injury rate decreased 81% in the target population, but only 7% in the remainder of Oklahoma City. This dramatic decline in fire-related injuries in the target area is largely attributed to the free smoke alarm distribution, as well as educational efforts promoting awareness about residential fires and their prevention.

Training Injury Control Practitioners: The Indian Health Service Model

Richard J. Smith III, M.S., Alan J. Dellapenna Jr., M.P.H., and Lawrence R. Berger, M.D., M.P.H.

Many individuals practicing injury control do not receive specific training for their work because of a scarcity of training opportunities. The Indian Health Service (IHS) created an innovative training program for federal and tribal employees. This model emphasizes training that is practical and can be applied immediately to community interventions. Components of the program include the use of experiential instruction, preceptors, and community case studies to train individuals from diverse cultural and educational backgrounds; educational strategies for employed adults; and courses that promote community empowerment. The success of the training model is evident in programs instituted by IHS injury specialist fellowship graduates, whose projects have ranged from drowning prevention in Alaska to fire safety in South Dakota. The IHS training model could be applied in a variety of other community-based settings.

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