



Circle of Research and Practice

From Discovery to Delivery: Injury Prevention at CDC

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Injuries rank among the top 10 causes of death for Americans of all ages. The Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control Injury Center has a mission to prevent premature death and disability and to reduce the human suffering and medical costs caused by injuries. To prevent and reduce the consequences of injuries, CDC applies the public health approach to define the injury problem, identify risk and protective factors, develop and test preventive interventions, and ensure widespread implementation and adoption of effective interventions and strategies. In recent years, CDC has emphasized the later steps in this model and the progression from research and “discovery” to “delivery” and dissemination of effective interventions. The CDC Injury Research Agenda and the Guide to Community Prevention Services are featured as examples of the interdependence between practice and research.

Keywords: *injury prevention; CDC; Injury Research Agenda; research to practice; community guide*

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► THE INJURY PROBLEM

Injuries are the leading cause of death for people aged 1 to 44 years in the United States, and among the top 10 causes of death for Americans of all ages. Each year, nearly 150,000 people die from injuries and almost 30 million sustain injuries serious enough to require treatment in an emergency department (Centers for Disease Control and Prevention [CDC], 2001). Children and young adults are the hardest hit, with more than 67% of the deaths of people aged 1 to 24 years resulting from injury (Hoyert, Arias, Smith, Murphy, & Kochanek, 2001). Unintentional injuries result from motor vehicle crashes, falls, poisonings, drownings, fires, pedestrian and bicyclist injuries, suffocation, and strangulation. Violence-related injuries include homicide, suicide, and assault. Although the greatest cost of injury is human suffering, the financial costs are also staggering. Treatment of injuries and their long-term effects account for 12% of medical care spending, totaling \$69 billion (in 1993 dollars) (Bonnie, Fulco, & Liverman, 1999).

► CDC'S ROLE

The Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control (<http://www.cdc.gov/injury>) has a unique role among federal government agencies with activities in in-

jury prevention. Where others may have a regulatory or enforcement role, CDC is a scientific agency concerned with preventing non-occupational injury and disability through public health research and practice. We support and conduct science to understand the causes of injuries and how they occur, and we apply the findings to design, support, and evaluate injury prevention programs. Much of this work requires active partnerships to shape research initiatives, develop recommendations and practice guidelines,

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communicate the benefits of prevention, and deliver effective programs.

CDC uses science to develop recommendations for public health policy and program recommendations. For example, when CDC's extramural research showed that bicycle helmets were as much as 85% effective in preventing head injury (Thompson, Rivara, & Thompson, 1989), CDC developed a set of bicycle helmet recommendations (CDC, 1995). These recommendations provided practitioners in state and local health departments, pediatricians, politicians, advocates, and others with practical strategies for implementing programs and policies to encourage bicycle helmet use.

► USING THE PUBLIC HEALTH MODEL

The CDC Injury Center has a mission to prevent premature death and disability and to reduce the human suffering and medical costs caused by injuries. To prevent and reduce the consequences of injuries, we use the public health approach to define the injury problem; identify risk and protective factors; develop and test preventive interventions; and ensure widespread implementation and adoption of effective interventions and strategies. Inherent within this model (see Figure 1) is the need both to discover what works in injury prevention and to apply this knowledge to practice. The model progresses from the discovery of burden and mechanisms of injury (left side of the figure) to the delivery of effective interventions (right side of the figure).

► MOVING FROM DISCOVERY TO DELIVERY

In the formative years of the CDC Injury Center, most of the work in unintentional injury focused on the left side of the public health model: defining the injury problem, identifying risk and protective factors, developing epidemiologic tools, conducting surveillance, and funding efficacy research. Examples of this work included foundational research necessary to understand the biomechanics of trauma, developing a surveillance system to capture all non-fatal injuries presented to emergency departments, and conducting research into the efficacy and effectiveness of devices like bicycle helmets, smoke alarms, and break-away bases in sports.

Although our work continues to involve research leading to new discoveries in injury prevention, the CDC Injury Center has more recently focused on the development and testing of intervention and dissemination strategies such as smoke alarm installation programs, community-based efforts to improve child passenger safety, and the dissemination of strategies for

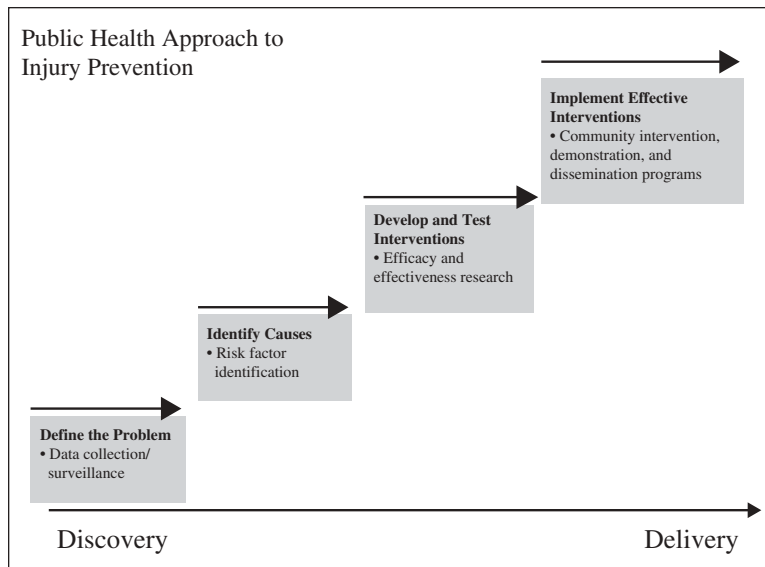


FIGURE 1 Public Health Approach to Injury Prevention

effective fall-prevention interventions. This shift reflects an emphasis on moving from discovery to delivery, from the left side of the public health model to the right side.

As a field, we know a great deal about preventing injuries. For example, we know that certain injury prevention strategies work, such as graduated licensing for teen drivers (Simons-Morton & Hartos, 2002) or sobriety checkpoints to reduce alcohol-impaired driving (Elder et al. 2002). Yet individuals and communities are often reluctant to adopt and maintain such measures (Fell, Ferguson, Williams, & Fields, 2001). In the next few years, the Injury Center aims to increase its investment in research that looks at how best to implement, sustain, and disseminate information about proven interventions, and science that leads to a more complete understanding of the intervention elements required for program success.

► THE IMPORTANCE OF PRACTITIONER ADVICE

CDC solicits input from practitioners on all aspects of our work in injury prevention, regardless of where it falls on the continuum of the public health model. Practitioners provide us with valuable information about what works in communities and why. They tell us about competing priorities and offer suggestions for the best way to increase the uptake and maintenance of effective prevention strategies. We engage practitioners to ensure that we are studying the right risk factors, focusing on the most important injury topics and priority populations, developing the most critical partnerships, and delivering programs that are of value to communities. Effective translation from discovery to delivery requires practitioner input. Every step on the public health

model is sensitive and responsive to practitioner advice.

► THE CIRCLE OF RESEARCH AND PRACTICE

Two recent examples from the CDC Injury Century that demonstrate the practicality of applying the circle of research and practice are

- *The CDC Injury Research Agenda*, and
- *The Guide to Community Preventive Services (Guide)*.

The first example will describe how the needs and concerns of practitioners informed our research priorities (one half of the circle). The second example illustrates how our evidence-based research and recommendations from the *Guide* were driven by practitioners and how the results have affected injury control programs, policies, and practices (the other half of the circle).

CDC Injury Research Agenda

The *CDC Injury Research Agenda* (National Center for Injury Prevention and Control, 2002) was the result of an 18-month process to develop a blueprint that reflected the CDC Injury Center's highest research priorities for the next 5 to 10 years. It was developed with extensive input from practitioners in the field, academic researchers, national nonprofit organizations, and other federal agencies who had a stake in injury prevention (http://www.cdc.gov/ncipc/pub-res_research_agenda/agenda.htm).

This blueprint to prevent injuries and their resulting disabilities, deaths, and costs was designed to guide research in seven key areas of injury prevention and control:

- injuries at home and in the community;
- injuries in sports, recreation, and exercise;
- injuries in transportation;
- intimate partner violence, sexual violence, and child maltreatment;
- suicidal behavior;
- youth violence; and
- acute care, disability, and rehabilitation.

The agenda identified priorities for each area—those research issues that CDC must address to fulfill its pub-

lic health responsibilities. By defining research needs, CDC expects to maximize efficient and effective use of resources and encourage collaboration among researchers and practitioners.

Many people helped develop the research agenda. In each of the seven working groups, 8 to 10 outside experts worked extensively with CDC to plan, write, discuss, and revise research themes and specific research questions. Practitioners were involved in each work group—they attended meetings with researchers, discussed priorities from their perspective, and helped revise and finalize documents.

A Research Agenda Steering Committee was formed to oversee the process and add its thoughtful perspectives. The committee included both injury researchers and state injury control practitioners, a mix that was invaluable in shaping the agenda. Hundreds of people contributed advice and provided comments on a web-based online draft of the agenda, whereas others

► MESSAGE FROM THE ASSOCIATE EDITORS

The Circle of Research and Practice Department welcomes the opportunity to continue our discussions on the links between health promotion practice and research. We are particularly delighted to contribute to this injury prevention focus issue of *Health Promotion Practice* with this article outlining the path “From Discovery to Delivery”—another way of imagining the circle.

For many years now, the Centers for Disease Control and Prevention, National Center for Injury Prevention and Control, has been committed to research and practice connections in developing national, state, and local programs. In the following article, Dr. David Sleet, Krista Hopkins, and Sarah Olson review the critical links along the continuum they call “discovery to delivery,” noting the reciprocal contributions of practitioners and researchers at each of four key points. The authors' discussion of the importance of practitioner participation while building a research agenda for injury prevention and control, as well as their key role in translating evidence-based research into practice, enhances what is being offered in the related articles and other department columns in this theme issue. Their recommendations for practitioners, researchers, organizations, and funders add to our understanding of the circle of research and practice.

We thank our authors and welcome your comments and suggestions on future topics for this department.



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attended public meetings and provided input that proved vital to the agenda-setting process.

Implementing this agenda will be challenging. The funds allocated for injury research and programs are not at all commensurate with the size of the injury problem. But the investment we made in our research agenda to seek practitioner advice in setting the priorities will make a difference. More practitioners will see the relevance of discovering new knowledge about priority injury risks, and more researchers will see the relevance of research relating to effective implementation and dissemination strategies.

The Guide to Community Preventive Services

The *Guide* (<http://www.thecommunityguide.org>) is an initiative sponsored by the U.S. Department of Health and Human Services to evaluate the effectiveness of community- and population-based interventions. The *Guide* aims to promote evidence-based public health practice in the United States and is being prepared under the auspices of the Task Force on Community Preventive Services, a 15-member non-federal, independent panel of experts in research and public health practice.

To assess which community-based interventions are effective in reducing motor vehicle injuries, CDC scientists conducted systematic reviews on 13 community-based interventions to reduce alcohol-impaired driving, increase child safety seat use, and increase general safety belt use. These reviews were used by the task force to develop recommendations for community implementation of effective interventions. The reviews and recommendations were published in a research journal supplement (Zaza & Thompson, 2001). In 2003, they will be compiled into the *Guide*, which will serve as a resource for policy makers and public health practitioners. The findings will also be used to support or expand local programs to prevent motor vehicle injury and to promote the adoption, maintenance, or strengthening of state and national laws.

The task force issued recommendations for five interventions to reduce alcohol impaired driving: sobriety checkpoints, minimum legal drinking age laws, “zero tolerance” laws for young drivers, training programs for people who serve alcohol, and 0.08% blood alcohol concentration (BAC) laws (Dinh-Zarr et al., 2001; Shults et al., 2001; Zaza et al., 2001).

The systematic review of the effectiveness of 0.08% BAC laws revealed that states that lowered the legal BAC for drivers from 0.10% to 0.08% reduced alcohol-related fatalities by a median of 7%, which translated to 500 lives saved annually. These findings were helpful in the debate that led Congress to pass a new national standard for alcohol-impaired driving. In October 2000, President Clinton signed the fiscal year 2001 transportation appropriations bill, requiring states to pass a 0.08% BAC law by October 2003. By September 2002, 32 states had enacted 0.08% BAC laws.

Other organizations, such as Mothers against Drunk Driving, were able to use these results to further reinforce their own messages about what is needed to reduce alcohol-impaired driving. CDC is also supporting implementation of the recommendations by practitioners, such as funding states and American Indian tribes to implement effective strategies from the *Guide* in their local settings.

► **NEXT STEPS**

The field of injury prevention and control has changed dramatically in the past two decades. The landmark publications *Injury in America* (National Academy of Sciences, 1985), *Meeting the Challenge* (National Committee on Injury Prevention and Control, 1989), and *Reducing the Burden of Injury* (Bonnie, Fulco, & Liverman, 1999) set new directions for the field, and helped to create and sustain CDC’s Injury Center.

Reducing the burden of injury requires both sound research and sound practice. We will need mentors in research and mentors in practice. We will need to introduce students to injury research early, both in the classroom and through hands-on experience in the community, and to improve linkages between classroom and community learning, perhaps by expanding the application of supervised field work to include injury prevention.

The next steps will include cultivating opportunities for researchers and community practitioners to exchange ideas and develop stronger partnerships. Many activities can serve these goals—training programs linking researchers with practitioners; new investigator awards; injury fellowships for practitioners; broadening information technology, including data and practice clearinghouses; and interdisciplinary collaborations. Funding agencies such as CDC and others in the private sector can assist in these efforts by providing incentives for researchers and health departments to work together and by encouraging researchers to look for participatory research opportunities in the community. Practitioners can assist, too, by becoming active in research projects. It is only through strengthening this link between research and practice that discovery of new knowledge will lead to delivery of effective programs.

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