The Impact of Injury Control Research Centers: Advancing the Field of Injury and Violence Prevention

Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

Disclaimer: *The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.*

Report Summary

Injury Control Research Centers (ICRCs) engage universities and medical centers in a national effort to reduce the public health burden of injury and violence. They are a key component of the Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control's (Injury Center) extramural research portfolio, complementing other work conducted and funded by the Injury Center which manages them. Since their inception in 1987, ICRCs have profoundly changed the landscape of the field of injury prevention and have reduced the occurrence of injury and violence across the nation.

The strength of their core infrastructure and capacity, high level expertise, and their diverse partnerships have enabled ICRCs to make substantial contributions to both research and practice. By integrating their core areas of expertise—research, training, and outreach—they have had a greater impact than they would have had otherwise, conducting any of these activities alone. Their integrated capacity and purpose has positioned them at the forefront of the national response to the major public health problem of injury and violence. The effectiveness of the comprehensive research center model that underpins the ICRC program provides singular justification of the need for continued investment in the ICRC program.

Background

The purpose of this report is to:

- Provide a brief overview of the ICRC program.
- Highlight a sample of ICRC achievements and success stories.
- Reflect on the vision for the future.

This report offers insight into the ICRC program as it was originally conceived and the impact of a few selected ICRC activities. It is organized into the following sections:

- Section I: a brief introduction about the public health problem of injury and violence and the need for prevention research.
- Section II: description of the ICRC program—its origins, conceptual model, and currently funded universities and medical centers.
- Section III: the program's core functions—research, training, and outreach—and features short illustrative stories on the impact some of the ICRCs have had in each function.
- Section IV: examples of the impact ICRCs have had on three of the center's current top priorities: preventing youth sports concussions, opioid overdoses, and motor vehicle injuries. (The aim of these larger stories is to illustrate the comprehensive nature of the ICRCs' work and how the three functional areas operate in tandem to create impact that would likely otherwise not be possible if implemented separately.)
- Section V: plans for continuing this important work in future years.

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I. Introduction

Value of Injury Research

Injuries and violence are among the leading causes of death for all Americans, regardless of age, race, or economic status. In the first half of life, more Americans die from violence and injuries—such as motor vehicle crashes, falls, or homicides— than from any other cause, including cancer, HIV, or the flu. Millions more survive injuries each year, leaving many to face life-long mental, physical, and financial problems.

Public health researchers have uncovered strategies to prevent these injuries and their consequences yet significant gaps in our knowledge remain. Filling these gaps can only be accomplished through focused research that helps clarify what is possible, what is not, and how to intervene effectively.

Public Health Burden of Injury

Nearly 199,800 people die from injuries each year—nearly one person every 3 minutes.[1]

Two and a half million people were hospitalized and more than 26 million people were treated in emergency rooms as a result of violence and injuries in 2014.[1]

Violence and injuries cost more than $671 billion in medical care and lost productivity each year.[2]

Translating Research into Practice

Research is necessary, but not sufficient to reduce injuries and violence. To truly have an impact, research must inform decision making about programs and policies and facilitate wise investments of prevention dollars and resources. Widespread adoption of effective interventions can best be achieved by building and sustaining a strong public health infrastructure—one that includes training a cadre of skilled professionals, leading strong collaborative networks, and providing technical assistance to bridge science with practice.

Examples Of Effective Prevention Strategies

Seat belts have saved 330,507 lives between 1975 and 2014.[3]

School-based programs to prevent violence have been shown to reduce the likelihood of violent behavior by 29 percent among high school students and by 15 percent across all grade levels.[4]

Ignition interlocks to keep drinking drivers off the road can reduce the rate of re-arrest among drivers convicted of driving while impaired by alcohol by 67 percent.[4]

Tai chi and other exercise programs have been shown to reduce falls by as much as half among participating older adults.[4]

Building the injury prevention field

Federal responsibility for protecting Americans from injury and violence rests with the Centers for Disease Control and Prevention's (CDC) National Center for Injury Prevention and Control (Injury Center). The Injury Center leads the nation in building the field of injury prevention through coordinated research, translation, and evidence-based practice.

To extend its reach and leverage resources, the Injury Center looks to universities and medical centers throughout the nation engaged in similar pursuits. Funding some of these institutions as Injury Control Research Centers (ICRCs) leverages an extensive network of researchers and practitioners not only in research, but also in the translation and dissemination of that research through training, outreach and technical assistance, and through coordinating vast multidisciplinary networks. Collectively in 2015, the ICRCs trained more than 275 students and conducted more than 187 injury-focused research studies.

Public Health Burden of Injury

ICRCs are an extension of CDC's injury prevention effort, expanding the network of researchers and practitioners devoted to advancing injury prevention by conducting research and translating science into action.

II. Program Overview

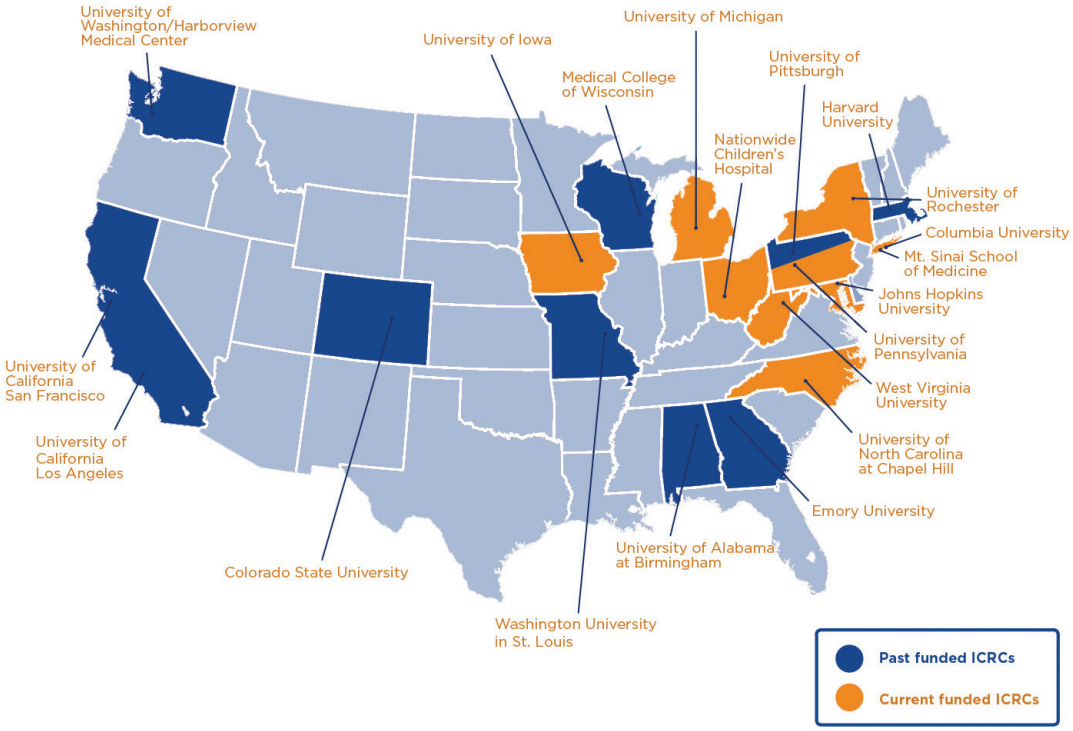
Origin of ICRCs

The ICRC program began in 1987 and has grown substantially since its inception—from four centers in 1987 awarded approximately $500,000 per center each year to 10 centers in 2016 awarded approximately $800,000 per center annually.[i] Below is a historical map of all ICRCs ever funded. Typically, ICRCs are funded for 5 years through an externally-reviewed, competitive process. Congress recognizes their value and importance and currently appropriates $9 million to the CDC ICRC program "... to support core operations; conduct the research necessary to fill gaps in the evidence base for developing and evaluating new injury control interventions and improving translation of effective interventions; conduct training of injury control professionals; and undertake other programmatic activities to reduce the burden of injury."[5]

For every $1 invested by CDC in 2015, ICRCs garnered an average of $5.30 in additional funds from other sources to do groundbreaking, meaningful work.

This federal investment has been estimated to have yielded a substantial return of leveraged additional funding, enabling ICRCs to expand their work and to extend their impact. For every $1 invested by CDC in 2015, ICRCs garnered an average of $5.30 in additional funds from other sources to do groundbreaking, meaningful work. Indeed, it is this core investment that provides the crucial infrastructure and foundation from which ICRCs bring together key stakeholders in their communities and engage in meaningful and comprehensive injury and violence prevention.

Figure 1. CDC - Funded Injury Control Research Centers, 1987–2017



i. In 2014, CDC's Injury Center also funded one developmental center at the University of Pennsylvania (at $450,000) that has a slightly smaller scope than the typical ICRC and is meant to help build the capacity of a newer center that has not been previously funded towards functioning as a larger center.

CDC Injury Control Research Centers (ICRCs), 2016

Center for Injury Epidemiology and Prevention
Columbia University

Johns Hopkins Center for Injury Research and Policy
Johns Hopkins University

Mount Sinai Injury Control Research Center
Icahn School of Medicine at Mount Sinai

Center for Injury Research and Policy
Research Institute at Nationwide Children's Hospital

University of Iowa Injury Prevention Research Center
University of Iowa

University of Michigan Injury Center
University of Michigan

University of North Carolina Injury Prevention Research Center
University of North Carolina

Penn Injury Science Center
University of Pennsylvania

Injury Control Research Center for Suicide Prevention
University of Rochester

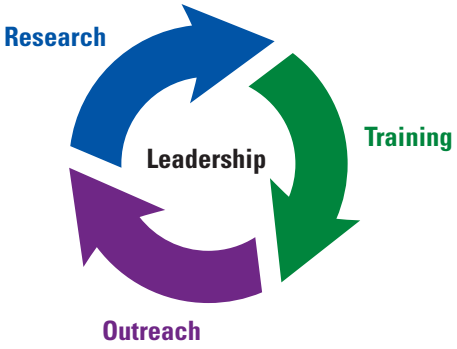
West Virginia University Injury Control Research Center
West Virginia University

Program Goals

The goals of the ICRC program are clear and consistent:

- To conduct innovative, relevant research on injury and violence prevention,
- To train the current and next generation of researchers and practitioners,
- To provide leadership and coordination around multidisciplinary, integrated injury and violence prevention efforts,
- To connect science and practice through knowledge translation and technical assistance to injury and violence prevention programs through outreach efforts, and
- To serve as a regional resource for science-based injury and violence information.
- To learn more: http://www.cdc.gov/injury/erpo/icrc

ICRC Model



Collectively, the ICRCs form a national network of academic, public health, medical, and community partners that conducts prevention research and promotes the widespread use of evidence to improve injury and violence prevention policy and practices. Their work embraces a multifaceted approach that not only focuses on strategies that will have the greatest benefit for whole communities or populations, but also seamlessly connects science and practice. Universities and medical centers are best situated to do this work because their core missions emphasize research, education, and service.

The ICRCs focus on three core functions—research, training, and outreach—accomplished through strong networks and partnerships. The following section offers specific examples of ICRC activities in these functional areas.

Research. ICRCs are on the scientific front line. They are comprised of some of the leading experts in the field who conduct cutting-edge, multidisciplinary research on the causes, outcomes, and prevention of violence and injuries. ICRC research furthers the Injury Center's research priorities and extends its reach into the community.

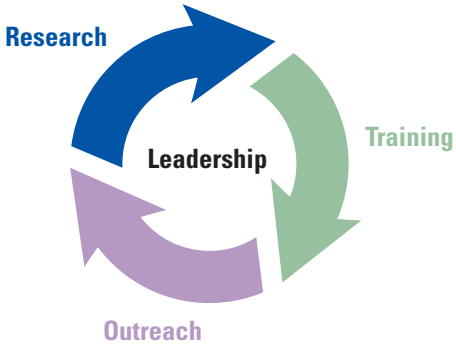
Training. ICRCs train and develop the current and next generation of researchers and public health professionals. This helps ensure that there is no shortage of qualified practitioners and researchers and that injury and violence prevention research continues to grow by addressing new and emerging problems, and by reaching vulnerable and high risk populations.

Outreach. ICRCs connect with state health departments, health professionals, and various other stakeholders to help translate research findings into effective policies and practices. They conduct data collection and analysis for partner organizations, reach out to partners to identify emerging injury and violence issues in need of further research, implement and evaluate interventions in the community, and work with local, state, tribal, and national leaders to support and inform effective injury prevention policy and responses. ICRCs also often serve as regional resources for practitioners, other researchers, and the public.

ICRCs are more than just the sum of their parts. They generate synergy that extends beyond each of their individual functions, which positions them as leaders in the advancement of injury and violence prevention research and practice. They often serve a leadership role in bringing together multiple stakeholders from different disciplines, perspectives, and agencies to tackle critical injury problems. ICRCs contain a strong administrative core of staff and resources which serve as a hub for coordinating networks for action and facilitating strong partnerships. They are comprised of respected scientific experts in their content areas and are uniquely positioned to be effective knowledge brokers and objective, trusted conveners. ICRCs integrate research and practice to spur more effective action through applied, translational, and other relevant research and active engagement with community partners. They provide leadership that combines their injury topic and core areas of expertise—research, training, and outreach—and exemplify the intrinsic value of the comprehensive research center model as an essential asset for continuing to advance the field of injury and violence prevention.

III. Impact by Function

This section highlights salient examples of the impact and benefit that ICRCs have had to date in each of the three key functions: research, training, and outreach.



A. Impact of Research

Preventing Violence through Blight Remediation

The recent economic downturn and job losses have left many U.S. cities with blighted neighborhoods full of abandoned lots and buildings. The University of Pennsylvania Injury Science Center (Penn Injury Science Center) has conducted groundbreaking experimental research that is based on principles from Crime Prevention through Environmental Design[ii] and has studied the impact of low-cost repairs to abandoned buildings and vacant lot greening on residents' health, safety, and quality of life. For the past decade, the Penn Injury Science Center has partnered with Philadelphia and a half dozen other cities around the United States to study what happened when these cities used inexpensive, readily implemented interventions to clean, repair, and green nearly 10,000 abandoned buildings and vacant lots. These blight remediation programs are straightforward and quickly implemented—graffiti and trash removal, simple installation of new windows and doors, planting grass and trees, and installing basic wooden fences—yet immediately evident to grateful city residents (see Figure 2). Because these interventions are easy to scale and transplant to many different urban environments, the Penn Injury Science Center has now completed large, randomized controlled trials of these same abandoned building and vacant lot remediation strategies in other communities, even beyond Philadelphia, with additional federal and private funds.

ii. Crime Prevention through Environmental Design (CPTED) is a multidisciplinary approach to crime prevention that influences offender decision making and deters criminal behavior through the design and maintenance of the built environment.

Figure 2. Before-After Examples of Abandoned Building (a and b) and Vacant Lot (c and d) Remediations.

The impact of these simple improvements is remarkable. City-wide, areas around remediated abandoned buildings had a 39 percent drop in gun assaults, 19 percent drop in other assaults, and a 16 percent drop in nuisance crimes.[6] Vacant lot greening also led to significant, long-term reductions in gun violence (8 percent drop) and vandalism, and residents' reporting less stress and more exercise.[7] Every dollar invested in these remediation programs returned anywhere from $5–$333 in violence related-costs that had been averted.[8] Further, city residents are more connected to their neighborhoods and to one another: both illegal activity and firearms are no longer sheltered after blighted urban spaces are changed, sometimes within the span of a few weeks.[8,9] Word of the projects' successes has also spread, leading the Penn Injury Science Center to now link with partners in Louisiana, Michigan, New Jersey, Ohio, Virginia, and other states in remediating hundreds of additional blighted spaces in new cities and evaluating the impact.

To learn more:
Penn Urban Health Lab
Penn Injury Science Center

Addressing Teen Dating Violence Before It Begins

In 2015, one of every 10 U.S. high school students reported being sexually or physically victimized during a date in the last year.[10] To address this issue, researchers at the University of North Carolina Injury Prevention Research Center (UNC IPRC) designed Safe Dates, a teen dating violence prevention program for middle and high school students. Safe Dates is highly engaging and interactive and helps teens recognize the difference between caring, supportive relationships and controlling, manipulative, or abusive dating relationships.

UNC IPRC researchers tested the program in 14 public schools. The results showed a significant reduction in both perpetration of dating violence and victimization. Adolescents participating in the program also reported less acceptance of dating violence, stronger communication and anger management skills, less gender stereotyping, and greater awareness of community services for dating abuse. Four years after the program, adolescent participants reported far less dating violence victimization and perpetration (56 percent to 92 percent less) than other students.[11] Additional research showed that Safe Dates also reduced peer victimization and weapon carrying behavior among youth who participated 1 year after receiving the intervention.[12]

As a result of the program's proven success, Safe Dates has become one of the most extensively used and endorsed teen dating violence programs. It is designated as a Model Program by the Substance Abuse and Mental Health Services Administration and, in 2006, was selected for the National Registry of Evidence-based Programs and Practices (NREPP), a prestigious national registry that promotes the adoption of scientifically proven behavioral health interventions.[iii] This highly rated model has been adopted in more than 20,000 locations and has reached more than 1.68 million youth in the United States, Canada, Chile, Greece, Iceland, Ireland, Japan, the Netherlands, Switzerland, Taiwan, Thailand, and the United Kingdom. In addition, Safe Dates has been added to CDC's 2016 Technical Package to Prevent Sexual Violence.[13] This package helps communities and states design effective prevention activities and represents a select group of strategies with the greatest potential to reduce sexual violence and its consequences.

To learn more:
University of North Carolina Injury Prevention Research Center

Strengthening Interdisciplinary Collaboration with Expert Research Teams

The University of Iowa Injury Prevention Research Center (UI IPRC) which is based in the College of Public Health, brings together experts in many different fields to discover ways to prevent injuries and violence in rural communities. UI IPRC has been recruiting and attracting new faculty, collaborators, and community partners over the past several years, which has created a network of 66 researchers representing 23 departments in the Colleges of Public Health, Medicine, Engineering, Liberal Arts and Sciences, and Pharmacy. Researchers are organized into Expert Research Teams and approach problems creatively in six focus areas:

1. acute care
2. interpersonal violence
3. intervention and translation research
4. emerging issues in rural injury
5. international issues
6. road traffic safety

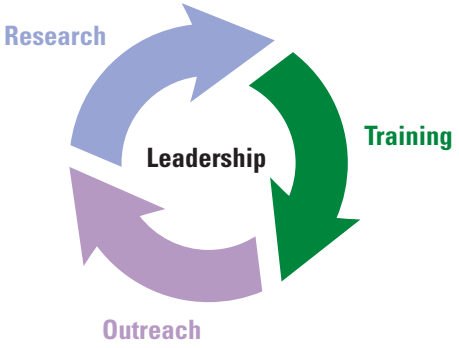
iii. Inclusion in these databases and registries, which are meant to be credible and reliable sources of information about evidence-based interventions for practitioners and policy makers, demonstrate the level of rigor and effectiveness of the program.

As just one example in road traffic safety, the UI IPRC partnered with Blank Children's Hospital and the Public Policy Center to evaluate an intervention for parents to improve communication with and supervision of their teens who were learning to drive—particularly in rural settings. Participating teens reported a 21 percent decrease in risky driving. The program is now being translated into workplace wellness programs of three Iowa companies and has garnered $3.5 million in additional funding.

In addition, road traffic safety team efforts have led to safer roadways locally, nationally, and internationally. The UI IPRC conducts the Iowa Child Passenger Safety Seat Survey, funded through the Governor's Highway Traffic Safety Bureau, and has leveraged this design to conduct child passenger occupant surveys in other communities internationally, some of which have led to hospital-based programs to increase child restraint use. This example highlights the wide reaching impact that ICRC research conducted in local settings can have nationally and internationally.

To learn more:
University of Iowa Injury Prevention Research Center

B. Impact of Training



Developing the Next Generation of Researchers and Practitioners

Johns Hopkins Center for Injury Research and Policy (CIRP) plays a critical role training and developing the next generation of researchers and public health professionals. The center has graduated thousands of students at all levels of training, from undergraduate to post-doctoral since its creation in 1987. Faculty affiliated with the center offer the most graduate courses in injury and violence prevention anywhere in the world. These courses, now number 25, cover topics such as transportation safety, youth violence, substance abuse, and trauma care, and the multiple disciplines used in injury research and practice such as epidemiology, law and policy, behavioral science, and communication. They reach 300–400 undergraduate, masters, and doctoral students annually. As a result, the center contributes to the supply of qualified practitioners and researchers dedicated to ensuring that injury and violence prevention research continues to flourish and that it tackles new problems as they emerge.

Johns Hopkins CIRP-mentored doctoral graduates (at least 3–4 per year) secure faculty positions at prestigious institutions throughout the country, most recently in Colorado, Massachusetts, Maryland, and Illinois. They continue to conduct research, publish papers in highly regarded journals, and present their work at key national meetings. Doctoral graduates have also secured leadership positions in health care and public health settings. For instance, in the last 5 years, one of the center's graduates has gone on to become a trauma research manager at a large Level 1 trauma center; another serves as Director of Health Research and Innovation for a global healthcare design firm. And a third is the Social Science Research Analyst for the Office of Planning, Research and Evaluation in the Department of Health and Human Services (DHHS) Administration for Children and Families. Finally, the Johns Hopkins ICRC has provided doctoral and post-doctoral training to at least seven individuals who have gone on to become directors of other ICRCs, illustrating the important role centers can have in developing and grooming the next cadre of injury prevention scholars and leaders.

The core of Hopkins' training and professional development is its award-winning Summer Institute (SI) that has trained nearly 800 participants.This premier training program was honored in 2013 with the Ellen P. Schmidt Award from Safe States Alliance, the leading professional organization for state-based injury and violence prevention practitioners. SI alumni form a strong, active, and growing network for sharing knowledge and applying skills in their communities. SI participants and graduates hold leadership positions in federal agencies, such as DHHS, state health department violence and injury prevention programs, and in local agencies, such as emergency medical services and trauma centers.

To learn more:
Johns Hopkins Center for Injury Research and Policy

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Reaching Broad Audiences with Cutting-Edge Science

The University of Michigan Injury Center (UMIC) sponsors a series of day-long summits to teach diverse audiences about significant topics in injury and violence prevention, most recently sport concussions and prescription drug overdose. The Sport Concussion Summit was held in September 2015 to coincide with the start of the fall sports season, and featured invited experts who explored the latest science on sports concussions and relevant issues beyond the playing field. The summit focused on researchers, clinicians, practitioners, policy makers, and members of the media—but also welcomed athletic trainers, coaches, athletes, students, and parents.

A full house of more than 200 people attended, with an additional 210 across the globe participating virtually by live webcast—some as far away as Turkey and the Ukraine. UMIC responded to strong demand by posting links on its website to presenters' slides, videos of presentations, and additional resources. The presentations had more than 2,500 views between October 2015 and May 2016. To further increase awareness, UMIC produced a 10-minute video called "Concussion 101," featuring interviews with summit speakers, which has had more than 1,200 views to-date on their YouTube channel. The video has been lauded by the Brain Injury Association (BIA) of Michigan and the National Collegiate Athletic Association (NCAA) and has been posted prominently on both organizations' websites. The BIA is also showing it at local movie theaters. "Our concussion summit was a great example of work only a center can do that reaches beyond a single study," noted UMIC's Director, Dr. Rebecca Cunningham. "It had wide appeal, using innovative strategies to reach professional, lay, and public audiences with the latest science."

To learn more:
University of Michigan Injury Center

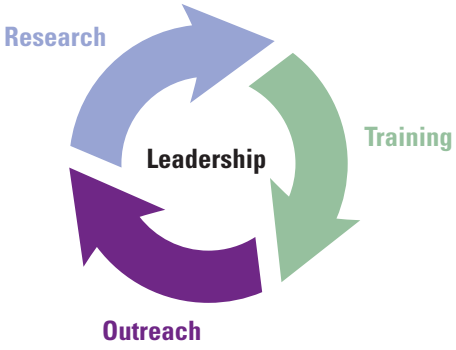
Building Teams for Action

The University of North Carolina Injury Prevention Research Center (UNC IPRC) uses a highly innovative model for training practitioners and networks of community advocates to build community capacity for injury prevention. The InjuryFree NC Academy, designed and implemented collaboratively with the NC Department of Health and Human Services Injury and Violence Prevention Branch, teaches teams of NC injury practitioners applied research skills through hands-on implementation of an actual intervention. Unlike traditional courses, participants are grouped into cross-disciplinary teams of 3–4 people from diverse organizations (e.g., health department, law enforcement, hospital outreach) who work together on an injury or violence problem of mutual interest. As one recent example, during the first session of one academy, teams worked on teen driver safety, the second session focused on preventing prescription drug overdose, the third on sexual violence and child maltreatment in support of NC's Essentials for Childhood initiative' and the fourth on suicide prevention. Teams convened at UNC for 2 days of training, divided evenly between instruction from guest experts and group sessions in which they worked with an assigned facilitator and coach to plan their intervention. Teams then implemented their programs in local communities, connecting with their coaches on monthly calls and returning to campus after 6 months to share progress. So far, the academy has trained 30 teams for a total of 141 individuals. InjuryFree NC Academy teams have:

- designed, implemented, and evaluated a brain and spinal cord injury prevention Curriculum in 10 middle schools in Georgia,
- launched a child advocacy center for Orange County, NC,
- obtained funding and implemented an innovative curriculum designed to teach safe driving principles to high school driver education students. The program extends the principles underlying successful Graduated Driver Licensing laws using a multidisciplinary team made up of a health care provider, first responder, and law enforcement officer, and
- developed a systematic method of surveillance and assessment in high schools in the region to prevent and intervene with teenagers who are at risk for suicide, with technical assistance and support from InjuryFree NC Academy faculty and another participating academy team.

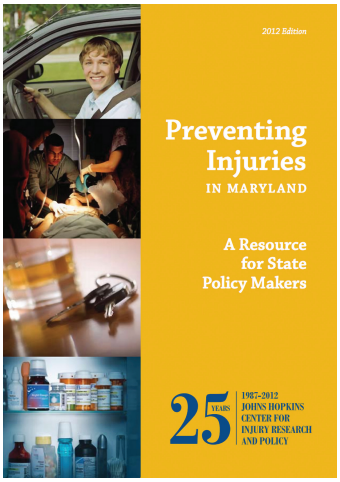
To learn more:
University of North Carolina Injury Prevention Research Center

C. Impact Of Outreach



Using Evidence to Inform Policy

Johns Hopkins Center for Injury Research and Policy has embraced the goal of bringing evidence to the policy process. "Early on, we heard from legislators: 'don't just tell us about the problem, tell us what has been done in a few places with good outcomes. We want real solutions that are going to make a difference,'" said Dr. Shannon Frattaroli, the center's Associate Director for Outreach. The center responded by developing and widely disseminating a resource guide, Preventing Injuries in Maryland: A Resource for State Policy Makers, to help educate legislators about the state's high burden injury problems and proven policy interventions to address them.



"The resource guide is an educational tool and ready reference that someone can quickly scan to learn a lot about an issue," said Dr. Keshia Pollack, the center's Associate Director for Training and Education. The guide uses one-page, bulleted fact sheets to facilitate access to credible resources that inform policy-making.

"We knew that it wouldn't be enough to simply produce the resource guide, so we also engaged in a process to bring this resource to our state capital and to others, and send the message that we are there to help," said Dr. Andrea Gielen, Center Director. The evidence base on fire safety is among the topics covered in the resource which was useful in the adoption of a residential sprinkler law in 2012—the first in the nation. The resource has been used in dozens of presentations and is freely available on the center's website. Over the past 7 years, four versions of the resource guide have been produced to ensure that statistics and issues are up-to-date.

The value of the resource has been recognized widely by other states and countries that have produced similar guides tailored to suit their purposes. North Carolina has produced a Web-based version, and the Great Lakes and Mid-Atlantic (GLMA) Regional Network, which spans 11 states and the District of Columbia, developed two guides—one for the Great Lakes states and one for the mid-Atlantic states. This regional approach affords individual states that lack the resources to produce guides on their own, the chance to inform their policy makers about key injury problems and what the states in their region are doing to address them.

To learn more:

Johns Hopkins Center for Injury Research and Policy

Changing Safety Standards for Laundry Detergent Packets

Laundry detergent packets, first sold in the United States in 2012, have become widely used in homes across the country. Packets tend to be round, colorful, and closely resemble candy—particularly to young children. As packet popularity increased, so has child poisoning associated with this product. Concern over this issue led the Center for Injury Research and Policy (CIRP) and the Central Ohio Poison Center—both based at Nationwide Children's Hospital—to conduct a study in 2014 to quantify the risks. The research showed that from 2012 through 2013, U.S. poison control centers received reports of more than 17,000 children under age 6 who swallowed, inhaled, or were exposed to the chemicals in laundry detergent packets—an average of one child every hour. Seven hundred and sixty nine children were hospitalized during that period and two children died. Other clinical effects included vomiting, coughing or choking, eye pain or irritation, and drowsiness.

CIRP conducted a follow-up study that compared the medical risks and outcomes of exposure to laundry detergent packets with other types of laundry and dish detergents. They found that the harmful effects of laundry packets were significantly higher.

Leadership from Nationwide Children's Hospital's ICRC and their partners shared these results with key legislative and policy audiences, and with parents and industry. Marcel Casavant, MD, a study co-author and Medical Director of the Central Ohio Poison Center, explained that, "laundry detergent packets are small, colorful, and may look like candy or juice to a young child." Based on the data, legislation was introduced in February 2015 by members of the U.S. Congress to require the U.S. Consumer Product Safety Commission (the commission) to set mandatory safety standards for liquid laundry detergent packets.

The bill, called the Detergent PACS (Poisoning and Child Safety) Act of 2015, also allows the commission to adopt a voluntary safety standard by ASTM International, a standards development organization, or to create its own standard. Dr. Gary Smith, director of CIRP and senior author of the studies, provided input on the legislative language to "make sure that all packet makers adopt safer packaging and labeling." In 2015, ASTM International published a voluntary Standard Safety Specification for Liquid Laundry Packets to help reduce unintentional exposures to the contents of the packets, especially by children. After the first study, the Consumers Union recommended that laundry detergent packets not be used, which is only the second time in its history it has made such a strong statement.

As a result of this work, some manufacturers have changed the container of their laundry detergent packets from clear to opaque and have made them less easy to open for children. Other manufacturers began including safety warnings in their ads and on their packaging, advising that laundry detergent packets are a danger to children under 3 years old and need to be stored safely.

Representatives working on laundry detergent packet safety from Canada, Sweden, and New Zealand have requested data from CIRP regarding its studies for use in developing safety policy in their countries.

To learn more:

Nationwide Children's Hospital Center for Injury Research and Policy
News article on CIRP's laundry detergent packet study

IV. Impact on Research Priorities

This section describes the work and impact of ICRCs on three of the Injury Center's top priorities (Injury Center Research Priorities): 1) preventing youth sports concussions, 2) preventing opioid overdose, and 3) preventing motor vehicle injuries. These stories illustrate the value of the ICRC model and the impact that coordinated research, training, and outreach can achieve.

D. Preventing Youth Sports Concussions

Growing national concern about sports-related concussions, particularly among high school athletes, has sparked a movement to address this public health priority. Surveillance data for monitoring national trends, shaping programs and policies, and evaluating their effectiveness are fundamental to this movement. Before 2004, no such reliable data existed. The Center for Injury Research and Policy (CIRP) at the Research Institute of Nationwide Children's Hospital has filled this void with the National High School Sports-Related Injury Surveillance Study (Reporting Information Online [RIO]™). Over the past decade, High School RIO™ has become one of the most valuable resources for capturing information about concussion rates and patterns by sport, gender, and activity. Dissemination of those data in more than 15 scientific journals, the New York Times, and other media outlets has heightened awareness and catalyzed action from public health policy makers and sports governing bodies in the form of legislation, rule changes, and educational efforts. In 2009, High School RIO™ data were used to educate policy makers in Washington State, eventually compelling them to become the first state to pass concussion legislation. Now all 50 states have adopted similar laws.

Just the facts

More than 7 million U.S. students participate in high school sports each year.[14] Although these young athletes realize many positive benefits, they also increase their risk of injury, including concussion. Over the past decade, the short- and long-term physical, cognitive, and emotional consequences of concussion have gained widespread national attention, reflected in the media and the recent film, Concussion. Although most sports-related concussions have health-related outcomes of limited severity, more serious outcomes can include long-term neuropsychological dysfunction, dementia later in life, or even death.[15]

What we know about prevention

Despite recent advances in the diagnosis and management of concussion, more information is needed about how to most effectively prevent these injuries.[16] As strategies are designed and tested, reliable surveillance information is needed to evaluate their impact and effectiveness. Without such data, sports governing bodies considering rule changes, researchers studying risk and protective factors, clinicians managing injuries, coaches teaching sports techniques, and groups developing educational materials for parents and athletes can only rely on information from adult athletes, occasional anecdotes relevant to high school athletes, or emotional arguments. Information specific to young athletes must drive efforts to improve their health and safety.

Designing High School Rio™

In 2004, High School RIOTM was designed and tested by the Center for Injury Research and Policy (CIRP) at Nationwide Children's Hospital. Since its inception, this large nationally-representative surveillance system has captured detailed case reports on more than 70,000 injuries among athletes participating in 22 different high school sports. For each injury, athletic trainers providing care to these high school students report information about the injured athlete (age, gender, sport played, etc.), the injury (severity, diagnostic tools employed, types of clinicians involved in care, etc.), and the injury event (mechanism of injury, specific sport activity during which injury occurred, types of protective equipment worn, etc.).

Using data to educate and inform policy

In addition to creating the database and collecting the data, concussion information has been shared actively with researchers, clinicians, policy makers, and sports governing bodies through more than 15 peer-reviewed medical journal articles and more than 40 presentations at national scientific meetings. For the first time, these data allow a full description of the rates of concussion among young athletes by sport and gender. Among other findings, they reveal differences in concussion symptoms reported by girls and boys that a substantial number of high school athletes fail to comply with return-to-play guidelines following concussion, and the potential effectiveness of a heading ban for young soccer players.

As a result of CIRP's active dissemination of information and data, High School RIO™ has also played an important role in educating millions of coaches, parents, and young athletes through the mass media, including stories in nearly all the major U.S. television, radio, and print outlets. A 2007 New York Times article, citing the first High School RIO publication, first alerted the public to this critical problem, generating concern that has only grown since. This lay audience demanded that young athletes be kept safe from brain injury, catalyzing action from public health policy makers and sports governing bodies alike in the form of legislation, rule changes, and educational efforts. Starting in 2009, Washington became the first state to require "removal and clearance for Return to Play" among youth athletes. Now all 50 states have a "Return to Play" law to help protect young athletes.

Leading networks for change

Over the past decade, key partners, supporters, and collaborators have been involved with High School RIO™. Most notable are the CDC's Injury Center, the National Federation of State High School Associations, the National Athletic Trainers' Association, the National Operating Committee on Standards for Athletic Equipment, and several national sports governing bodies. Data are now being used to evaluate several new policies: state-level sports concussion legislation guiding removal from play and return to play policies, recommendations to limit full contact drills in football practice, and state rules requiring helmets to be worn by female lacrosse players. Beyond collecting high-quality, relevant data, CIRP's education and dissemination efforts are having a meaningful impact on the prevention and control of youth sports concussions.

To learn more:

Center for Injury Research and Policy

E. Preventing Opioid Overdose

Naloxone is a rescue medication that can reverse the effects of an opioid overdose and prevent death. The West Virginia University Injury Control Research Center (WVU ICRC) is playing a key role in reducing deaths from the prescription drug overdose epidemic by conducting research on take-home naloxone programs, which have been successful in urban areas, but not studied in rural settings, and by reaching out to communities seeking to reduce the toll of overdose deaths. Findings from WVU ICRC research have informed policies that address liability concerns associated with naloxone distribution programs, supporting their successful adoption and implementation in West Virginia. The WVU ICRC has also used its research findings to educate diverse audiences of key stakeholders, serving as a catalyst for implementing naloxone prevention programs in various agencies, organizations, and programs across the state. It has been instrumental in establishing, facilitating, and supporting prevention programs to combat this fatal epidemic where none previously existed. At least 25 overdose reversals occurred during the first 9 months the program was implemented in 16 counties. The ICRC's success has hinged on its ability to leverage CDC funding, conduct objective science-based research, serve as a knowledge broker and convener, network and partner with key stakeholders, and to provide the catalyst for action.

Just the facts

Every 24 hours in the United States, 129 people die from an opioid-related overdose.[17] West Virginia's overall age-adjusted drug overdose death rate has been on the rise since the late 1990s and is now the highest in the nation (35.6 deaths per 100,000 people in 2014).[18] This alarming rate is associated with increased use of both prescription opioids and certain illicit opioids, such as heroin. While most prescription opioid users do not become heroin users, 3 out of 4 new heroin users report having abused prescription opioids before trying heroin.[19]

What we know about prevention

Safe and informed prescribing practices can reduce overdoses from prescription opioids,[20] but other prevention strategies need to be in place as well. Naloxone is a highly effective prescription drug that can reverse an opioid overdose if administered in time, typically by someone who is on the scene when, or shortly after, an overdose occurs. Over the past two decades, take-home naloxone programs have been tested in many urban cities in the United States, primarily to help reverse the fatal effects of an accidental overdose. These programs feature a brief educational session that teaches drug users and their relatives and friends, how to recognize and respond to an overdose—by calling 911, performing rescue breathing, placing the victim in a rescue position, administering naloxone, and by staying with the person until medical help arrives. Following the educational session, participating physicians write prescriptions for, and may provide naloxone to, program participants. In a recent survey of opioid overdose prevention programs in the United States that use the take-home naloxone approach, the 136 responding organizations represented 644 local sites that distributed a total of 152,283 naloxone kits to laypersons (users, family members, friends, etc.) from 1996 through June 2014. The survey showed that of the 109 organizations that collected reports of reversals, 26,463 were overdose reversals.[21]

Determining the feasibility of take-home naloxone programs in a rural setting
During a review of the literature on overdose prevention, WVU ICRC researchers identified take-home naloxone programs as effective interventions in urban settings, and wondered if such programs could be effective in a rural state such as WV. To determine the feasibility of such programs among prescription opioid abusers in rural WV, the ICRC conducted a study in partnership with the WVU's Clinical and Translational Science Institute and the state's regional Substance Abuse Task Force. Investigators identified demographic and drug use characteristics and attitudes toward overdose prevention and the use of naloxone among nonmedical users of prescription pain medications. Findings showed that take-home naloxone programs could be adapted to WV. Additionally, WVU ICRC researchers prepared a white paper summarizing the evidence in the literature for take-home naloxone programs and outlined policies that other states had adopted to facilitate such programs by protecting participants from liability and prosecution. According to Dr. Jeffrey Coben, former WVU ICRC Director, "We made a conscious decision to conduct a systematic review of the literature and put it out for the world to see. West Virginia was clearly in the middle of an epidemic."

Raising awareness and serving as a catalyst for effective intervention
The resulting white paper helped educate, mobilize, and unite key stakeholders around the issue of prescription drug overdose prevention.[22] The ICRC's relationship with the Substance Abuse Task Force led to an invitation to share findings in six regional meetings across the state with legislators, key health care and injury prevention professionals, substance abuse treatment and recovery specialists, and state advisory groups and coalitions. Pressure built to find a way to pilot take-home naloxone programs in WV, leading the WVU ICRC to organize a pivotal, state-level meeting with an extensive audience that included legislators, medical practitioners, and other key stakeholders and state programs covering justice and community services, public health, injury and violence prevention, and substance abuse prevention. The Director of Project Lazarus—a well-known North Carolina based nonprofit organization that focuses on overdose prevention—also attended, providing participants with an overview of the comprehensive, community-level overdose prevention model used in NC. Participants agreed on the need to pursue naloxone distribution initiatives in WV. "The ICRC was now in a position of leadership," said Herb Linn, WVU ICRC Deputy Director. "We became 'go to' experts, resulting in invitations to speak to other coalitions and partnerships around the state. We began to learn 'who's who' and to network with key partners."

Translating research into programs and policies

The WVU ICRC's research and subsequent training and outreach activities have leveraged CDC funding to garner additional resources and to spawn several program and policy initiatives that are already saving lives.

- The WVU ICRC provided evidence to policy makers who used the data to inform two key pieces of legislation that were important for implementing naloxone programs in WV. The first bill—Senate Bill 335 (2015)—authorizes naloxone prescriptions to first responders and to active drug users and their family members, friends, and caregivers, and protects health care providers who prescribe them from liability. The second is a Good Samaritan law—Senate Bill 523 (2015)—that provides limited immunity from prosecution for drug users and those who assist them with naloxone. *Both bills were adopted and signed into law in 2015.*
- A substance abuse treatment program in the Eastern Panhandle initiated a naloxone distribution program for patients and their family members and friends on September 2, 2015. Prior to the program launch, discussions with local pharmacists uncovered a major barrier facing this program: the requirement that physicians receive prior authorization before prescribing naloxone vials and syringes to addicted patients. WVU ICRC connected the program director with the State Director of Pharmacy Services, and that requirement was removed, *relieving physicians of the administrative burden and potential liability.* Additionally, WVU ICRC provided donated naloxone administration kits for use by the program.
- A pilot program in designated WV day report centers[iv] for high-risk offenders—either sentenced by drug courts or on probation or parole from the criminal justice system—provides take-home naloxone, in collaboration with the Division of Justice and Community Services, WV Department of Military Affairs and Public Safety. One center in Marion County is now operational, with two others close behind. WVU ICRC and its state partners plan to explore the expansion of take-home naloxone programs to the remaining day report centers across the state.
- A WVU Law Enforcement Naloxone project trains police officers to carry and administer naloxone. The WVU ICRC acquired naloxone administration kits from Project Lazarus and adapted them for use by local police officers. To facilitate successful implementation of the program, the WVU ICRC developed a set of tools and templates, and adapted a state-required training to include additional components tailored for local agencies. The training was designed by WVU's Center for Simulation Training and Education for Patient Safety (STEPS). The WVU ICRC and STEPS have provided these tools to police departments in other counties and are formalizing the toolkit for dissemination to all WV law enforcement agencies. "The toolkit includes a checklist for planning a program, along with a model standing order, naloxone administration protocol, and a reporting form that makes it easier for other police agencies to plan and implement such programs," said WVU ICRC Deputy Director, Herb Linn.
- The WVU ICRC has also initiated discussions in several other high-risk communities in WV that have led to the launch of naloxone distribution in harm reduction programs that offer syringe-exchange and free clinic services, and in additional substance abuse treatment and first responder (law enforcement and fire service) programs.

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iv. Day report centers are alternatives to incarceration for non-violent offenders that provide monitoring, rehabilitative support services, and case management.

In addition, because the WVU ICRC is housed in a university setting, it is well positioned to educate WVU students and professors on overdose and other injury-related issues through classes, grand rounds, and other forums. In Dr. Jeffrey Coben, former WVU ICRC Director's view, "There is no question that this has had a huge impact in our own institution, how it views injury, substance abuse, and overdose." As solid evidence of that institutional commitment, the new Vice President for WVU's Health Science Center recently identified injury prevention as 1 of 4 top priorities for the university and WVU President E. Gordon Gee singled out the Law Enforcement Naloxone Program as a significant achievement of the university on the health care front.

To learn more:
West Virginia University Injury Control Research Center

F. Preventing Motor Vehicle Injuries

Ensuring the safety of children as they walk to and from school was formally recognized as a national priority in 2005, with federal funding of the *Safe Routes to School (SRTS) program*. Eight years earlier, New York City (NYC) implemented the first program in the United States, followed shortly by many other cities. Until recently, however, little was known about SRTS's impact on pedestrian injuries. The Center for Injury Epidemiology and Prevention at Columbia University (CIEPAC) closed this knowledge gap by developing a well-designed evaluation which documented a 44 percent reduction in injuries among children walking to school. CIEPAC used these findings to generate media attention and to spark support among NYC officials for a citywide campaign on pedestrian and traffic safety. The centers' expertise in pedestrian injuries among children has led to invitations to speak and to provide technical assistance at state and national levels. This research, training, and outreach has been supported remarkable policy changes, including the enactment of a city-wide 25 mile-per-hour speed limit and adoption of NYC regulations for better pedestrian safety. Word of CIEPAC's success has spread rapidly to cities throughout the nation, stimulating numerous efforts to make our roadways safe for pedestrians of all ages.

Just the facts

Walking is highly recommended for people of all ages as a healthy form of exercise. Yet, pedestrians— people who travel by foot, wheelchair, stroller, or similar means—are among the most vulnerable users on the road.[23] Every 2 hours, one pedestrian dies from injuries in a traffic crash.[24] As pedestrians, children are at even greater risk of injury or death because of their small size, inability to judge distances and speeds, and lack of experience with traffic rules.[25] Nearly one in every five children under the age of 14 who were killed in traffic crashes were pedestrians.[24]

What we know about prevention

The Safe Routes to School concept began in Denmark in the 1970s. The concept was sparked by concern for the safety of children walking and biking to school and spread internationally to other parts of Europe, Australia, New Zealand, Canada, and the United States.[26] The first U.S. program was started in 1997 in NYC, with other cities not far behind. SRTS is recognized for its mix of education, engineering, and enforcement strategies that help make routes safer for children to walk and bicycle to school, supplemented with motivational strategies to entice more children to walk and bike.

While numerous researchers have examined the programmatic aspects of SRTS and its impact on children's physical activity, little is known about its effect on pedestrian injuries among children walking to and from school. The Center for Injury Epidemiology and Prevention at Columbia University (CIEPAC) took on the task of closing this knowledge gap.

Documenting the impact of SRTS on injuries and cost

CIEPAC conducted a comprehensive, detailed evaluation of the public health impact of the SRTS program in NYC. Results were astoundingly positive: SRTS cut pedestrian injuries among children walking to school nearly in half (a 44 percent decline).[27] Furthermore, the intervention saved the city and its residents $230 million.[28] Recently, the investigators completed their nationwide evaluation of the SRTS program in 16 states and found that SRTS contributed to a 23 percent reduction in school-age pedestrian and bicyclist injuries and a 20 percent reduction in school-age pedestrian and bicyclist fatalities.[29] This research project provided compelling evidence that SRTS traffic-calming efforts are effective in preventing injuries while simultaneously promoting active transportation and health.

Disseminating data strategically

CIEPAC engages in a variety of outreach activities to share available data, including publishing articles and presentations, and disseminating Web-based information. As part of translating and disseminating the SRTS evaluation results more broadly, the center created a website to house descriptions of their methodology along with data and results, and has worked to provide information about the evidence to inform policy and practice. Additionally, researchers published 29 articles in 21 peer-reviewed publications, presented study results at more than 22 local, national, and international forums and conferences, and received considerable media attention, including reports in print, radio, and television, such as the New York Times, Reuters, US News and World Report, ABC News, WYNC radio, Fox News, and other outlets.

Collaborating to change policy and practice

NYC leaders, buoyed by study results, mounted a major citywide campaign on pedestrian and traffic safety called "Vision Zero." CIEPAC's footprint can be found throughout Vision Zero's design, largely due to technical support and guidance provided by its research team. A pivotal symposium on "Vision Zero," sponsored by CIEPAC and the Department of Epidemiology at Columbia's Mailman School of Public Health, assembled stakeholders and a diverse range of prominent local and national leaders to further their thinking and to determine appropriate next steps.

The center's expertise in pedestrian injuries has also been recognized and used at the national level. Dr. Charles DiMaggio, CIEPAC's Director of Injury Prevention and Research, was named to the U.S. Department of Transportation/CDC Injury Surveillance Workgroup 8 on Pedestrian Injuries, a multidisciplinary and multi-organizational body that recommends improvements in state-based surveillance of pedestrian risk.

CIEPAC has been a catalyst for further collaborations and intervention in NYC and beyond. It was part of a successful effort to enact a citywide 25 mile-per-hour speed limit. In addition, testimony from CIEPAC informed the adoption of proposed changes to NYC regulations for better pedestrian safety features in the city's "Taxis of Tomorrow" plan. By further extending their innovative research model to SRTS projects across the nation, CIEPAC will undoubtedly inform many other local efforts to improve pedestrian safety.

To learn more:

Center for Injury Epidemiology and Prevention at Columbia University

V. Future Vision

ICRCs are at the forefront of the national response to the growing problem of major public health importance—injury and violence. Over the past 30 years, ICRCs have made significant strides in preventing injury and violence both locally and nationally. Through strong core infrastructure and diverse partnerships, ICRCs have made substantial contributions to both research and practice. By integrating their core areas of expertise—research, training, and outreach—they have had greater impact than they would have had otherwise conducting any of those activities alone. The success of the ICRC's comprehensive research center model provides singular justification for the need for continued investment in ICRCs throughout the nation.

ICRCs continue to advance the field of injury prevention and to demonstrate the value of the ICRC model. Specifically, the ICRCs have successfully trained hundreds of injury prevention researchers and practitioners, effectively establishing professional pipelines. They have developed longstanding, functional, and productive partnerships with injury and violence prevention practitioners and organizations. They have also conducted meaningful research and have provided expert, scholarly knowledge that has informed and strengthened injury and violence prevention efforts. ICRCs have helped extend and advance CDC's injury prevention efforts. The Injury Center and ICRCs are poised to build on these foundations and accomplishments and will have even greater impact in the years to come.

Like many challenges facing society, injuries and violence occur within a complex, ever-changing tangle of social, political, relational, and economic realities and contexts. Practitioners and decision makers must actively consider these realities in the course of implementing solutions to address injuries and violence. They must be adaptive and nimble, and use approaches that have the highest likelihood of affecting the most people, equitably and sustainably. Practitioners need reliable, timely, and relevant information and support that speaks to the full complexity of their contexts and challenges.

To address these demands and to strengthen the ICRCs' ability to effectively meet the needs of the ever-changing and complex landscape of injury and violence prevention, the Injury Center envisions enhancing the ICRC program to have even broader population-level impact. This involves increased focus, not only on relevant and responsive research, but also on translational research and other approaches that make the most effective solutions actionable in communities. It also involves more comprehensive, systems-level approaches toward reducing injuries and violence. The ICRCs—with their experience, expertise, infrastructure, and partnerships—are ideally positioned to do this work.

As we look toward the future of the program, ICRCs will build on their existing strengths to:

- engage in more collaborative inquiry and action with stakeholders as part of comprehensive, large-scale approaches to injury and violence prevention,
- work in multidisciplinary researcher-practitioner teams that cross organizational and sectoral boundaries to develop, apply, and test solutions that aim towards population-level impact, and
- develop innovative research methods appropriate for new action-oriented, community and practice-based, and participatory approaches.

The Injury Center is laying the foundation for these types of collaborative, comprehensive, and large-scale approaches. For example, we are developing and disseminating technical packages that synthesize the evidence-base around various violence topics to support communities as they make decisions about the most feasible ways to address violence in their contexts. We are also funding and supporting collaborative regional and national injury and violence prevention networks of state health department practitioners and ICRCs. Finally, we are exploring the use of thematic networks of ICRCs to explore timely, cutting edge topics related to these large-scale approaches, such as systems thinking and research and practice integration. These new activities, in addition to the ICRCs' current and past accomplishments, set the stage for an even more effective and relevant ICRC program.

By building on its past successes—only some of which have been highlighted in this document—and leveraging current capacity, the ICRC program of the future will use its comprehensive research center model to advance injury and violence prevention in increasingly innovative ways.

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