



HARBORVIEW
INJURY PREVENTION
& RESEARCH CENTER

Current Projects

Fall 2005

Acute Care
Biomechanics
Epidemiology
Rehabilitation
Training & Education

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Acute Care

Development and Validation of Trauma System Audit Filters

Key Investigators: Melissa Schiff, M.D., Ph.D., and Avery Nathens, M.D., Ph.D., M.P.H.

University of Washington Department of Epidemiology

Funding Source: Centers for Disease Control and Prevention (HIPRC Center Grant)

The rationale of any trauma system is to provide a coordinated, predictable and multidisciplinary approach to managing the injured patient. To operate effectively and efficiently, a trauma system must undergo monitoring, evaluation and improvement as defined by performance improvement (PI). While the American College of Surgeons audit filters were developed as standards of care for trauma patients that have focused on PI in individual trauma centers, none of the filters were designed to monitor the trauma system as a whole. The investigators hypothesize that a set of audit filters that evaluate the trauma system can be identified, and that these filters will be sensitive to identifying deviations in the integrated function of the trauma system and will optimize patient outcomes as defined by mortality, morbidity and resource utilization. The development and validation of these trauma filters will provide quality improvement measures by which trauma systems and trauma care can be evaluated in the future.

Development of an Essential Trauma Care Program

Principal Investigator: Charles Mock, M.D., Ph.D.

University of Washington Department of Surgery

Funding Source: Centers for Disease Control and Prevention (HIPRC Center Grant)

Injury has become one of the leading causes of death and disability throughout the developing world, however, policy responses for both prevention and treatment have been minimal. In terms of treatment, there are many low-cost improvements that could be made to strengthen the care of injured persons. These could be made by developing an “Essential Trauma Care” program, similar to what has been done for other global health problems. Such a program would seek to better define what trauma treatment services should realistically be made available to almost every injured person in a given area. This program would then seek to develop ways to assure the availability of these services by strengthening the inputs of: (i) training and manpower; (ii) supplies and equipment; and (iii) administration and organization. The broad goal of this project is to develop such an Essential Trauma Care program.

Effects of Leukoreduction on Infectious Risk in Trauma

Principal Investigator: Avery Nathens, M.D. Ph.D., M.P.H.

University of Washington Department of Surgery

Funding Source: National Institute of Health

Many severely injured patients survive their initial resuscitation only to experience subsequent nosocomial infection and multiple organ failure, two of the most frequent causes of excess morbidity in this population. Several lines of clinical and experimental evidence implicate allogeneic blood transfusion, a critical component of resuscitation, in the development of these sequelae. This study will evaluate whether transfusion of leukoreduced blood products will reduce the incidence of infection and multiple organ failure in critically injured patients.

Evaluating Pelvic Hemorrhage

Principal Investigator: C. Craig Blackmore, M.D., M.P.H.

University of Washington Department of Radiology

Funding Source: Agency for Healthcare Research and Quality

Pelvic fractures are a major cause of serious injury and death for patients who sustain high-energy trauma. A method of predicting pelvic hemorrhage would aid in triage of injured patients, select patients for immediate angiography, and optimize patient selection for different therapeutic options. This project studies pelvic radiography and other clinical findings that predict major pelvic hemorrhage. The goal is to develop a clinical prediction rule that can be used in multiple trauma care settings to expedite appropriate triage and aid in both initial and definitive patient management.

Biomechanics

Crash Injury Research Engineering Network

Principal Investigator: Charles Mock, M.D., Ph.D., M.P.H.

**University of Washington Departments of Surgery and
Epidemiology**

Funding Source: National Highway Traffic Safety Administration

The Harborview Injury Prevention and Research Center (HIPRC) participates as a site in the Crash Injury Research and Engineering Network sponsored by the National Highway Traffic Safety Administration and the automotive industry. As a member of this network, the HIPRC conducts motor vehicle injury surveillance for occupant injuries among restrained passengers in selected

crashes. Detailed crash reconstruction and clinical data are collected and loaded into a national database shared by all sites. Data will be used by researchers and automotive engineers to improve the design and engineering of passenger vehicles.

Epidemiology: Risk Factor Research

Risk Factors for Postpartum Suicide and Parasuicide

Principal Investigator: Melissa Schiff, M.D., M.P.H.

University of Washington Department of Epidemiology

Funding Source: American Foundation for Suicide Prevention

The investigators will determine the risk factors for suicide and suicide attempts among women in the postpartum year. Using vital records data, they will identify all childbearing women in Washington state from 1989 to 2001 who die or are hospitalized in the postpartum year for suicide attempts. These women's hospitalization and death certificate data will be linked to their live birth or fetal death certificate data. The investigators will compare the postpartum women who attempt or complete suicide to normal postpartum women to determine the differences in their demographic information, including age, education level, marital status, number of prior pregnancies and their outcomes, current pregnancy complications and outcomes, prenatal use of cigarettes and alcohol, and psychiatric history.

Effectiveness of Designated Driver Programs

Principal Investigator: Frederick Rivara, M.D., M.P.H.

University of Washington Department of Pediatrics and Epidemiology

Funding Source: Centers for Disease Control and Prevention

The National Highway Traffic Safety Administration reports that 17,013 people died in alcohol-related crashes in 2003, and the annual cost of these crashes has been estimated at \$51 billion. Most DWI offenders report that they were drinking at a bar or restaurant before their arrests, and people aged 21-34 are more likely to do their drinking in bars than are drinkers at other ages. The investigators will determine if designated driver and safe-ride home programs, which have been organized in communities throughout the U.S., are effective in reducing crashes, DWI citations, injuries and fatalities in this demographic. Dissemination of the study findings will be an important part of this project.

The Impact of a Primary-Enforcement Seat-Belt Law on Health Care Costs in Washington State

Principal Investigator: Beth Ebel, M.D., M.Sc., M.P.H.

University of Washington Department of Pediatrics

Funding Source: Washington Traffic Safety Commission

Seat belts are highly effective at preventing motor vehicle injury, reducing the risk of death by as much as 73 percent, and the risk of serious injuries to the head, chest and abdomen by as much as 81 percent, 52 percent and 60 percent, respectively, relative to unrestrained occupants. Primary-enforcement seatbelt laws, under which vehicles can be stopped and cited for seat-belt law violations alone, are much more effective than secondary enforcement laws. The aim of this project is to estimate the medical costs, by category of payer, for crash injuries involving unrestrained motor vehicle occupants as compared with restrained occupants in the state of Washington, and to estimate the cost savings resulting from the primary enforcement seat belt legislation.

Improving Injury Prevention Capacity in the Child Death Review Process

Principal Investigator: Brian Johnston, M.D., M.P.H.

University of Washington Department of Pediatrics

Funding Source: Health Resources and Services Administration

Child Death Review Teams (CDRTs) review unexpected child deaths and are charged with recommending strategies to prevent similar deaths in the future. Most CDRTs, however, lack the data and resources they require to generate scientifically sound prevention recommendations after reviewing an injury death. The investigators in this study will develop an evidence-based guide to best practices in the prevention-orientation review of child injury deaths; bring emergency-medicine regional injury prevention coordinators (RIPCs) onto local CDRTs as the experts in injury prevention, and develop and test a computer-based decision support tool that will allow the RIPCs and the local CDR teams to link data collected in the context of child death review to evidence-based injury prevention options and resources for promoting the implementation of these options.

Justice System Response and Recurrence of Partner Violence

Key Investigators: Victoria Holt, Ph.D, and Mary Kernic, Ph.D.

University of Washington Department of Epidemiology

Funding Source: Centers for Disease Control and Prevention

Intimate partner violence (IPV) is a common occurrence in the US, with an estimated 1.5 million women experiencing a total of nearly 5 million physical or

sexual assaults by their intimate partners annually. Following police-reported IPV incidents, a variety of case-disposition options are employed, yet there is no consensus about the deterrent effect of specific criminal justice system actions as currently applied. In addition, impact on likelihood of future victim injury has not been reported. This study is designed to evaluate the effect of IPV case disposition on risk of subsequent IPV and IPV-related injury.

Psychiatric Morbidity and Intimate Partner Violence

Principal Investigator: Mary Kernic, Ph.D.

University of Washington Department of Epidemiology

Funding Source: National Institute of Mental Health

The research concerns the effects of family violence on the psychological health of victims of intimate partner violence (IPV) and their children. Research will include gathering information on the effect of a father's involvement on child psychiatric morbidity among families with histories of male-perpetrated IPV, and whether more restrictive child custodial arrangements are associated with decreased psychiatric morbidity and distress among victims of IPV and their children. The investigator will also evaluate the association between the level of restrictiveness of child custody arrangements on the abusive parent and the psychiatric sequelae of IPV victims and their children.

Epidemiology: Prevention Research

Increasing Booster Seat Use in At-Risk Communities: Tailored Communication and Behavior Change

Principal Investigator: Beth Ebel, M.D., M.Sc., M.P.H.

University of Washington Department of Pediatrics

Funding Source: Robert Wood Johnson Foundation

For children, motor vehicle crashes remain the leading cause of serious injury and death. Many injuries are preventable if children are properly secured in child restraints, including booster seats. Communities in which children are at highest risk of injury may be slowest to adopt new technologies, and Latino parents may face additional financial, cultural and language barriers, for which targeted interventions may be required. The investigators are conducting several studies whose overarching goal is to explore effective means to change injury-risk behaviors for Latino children. They will explore barriers to booster seat use, identify key determinants of child passenger safety behaviors in Latino families, develop a targeted booster seat intervention for these families, and test the effectiveness of this targeted intervention relative to provision of generic booster seat information, using a randomized controlled design.

Prevention of Intimate Partner Violence: Victim Support Team Evaluation

Principal Investigator: Mary Kernic, Ph.D.

University of Washington Department of Epidemiology

Funding Source: Centers for Disease Control and Prevention

According to the National Violence Against Women Survey, approximately 1.8 million women will be victimized by a male intimate partner in the U.S. each year, suffering more than 5 million incidents of stalking, physical assault and rape. Despite strong advances in the understanding of the epidemiology of intimate partner violence (IPV), evaluation research on IPV interventions is still in its infancy. The investigators will assess the preventive effects of an existing crisis-intervention program, the Seattle Police Department's Violence Support Team, which is designed to identify and refer victims of IPV to needed services, assist with providing information on the next steps in the criminal justice response to the incident, and safety planning. The aim of the study is to examine the effectiveness of the team in lessening future adverse outcomes by promoting improved evidence collection, prosecution, and access to preventive services related to IPV.

Injury Free Coalition for Kids of Seattle

Principal Investigator: Brian Johnston, M.D., M.P.H.

University of Washington Department of Pediatrics

Funding Source: Robert Wood Johnson Foundation

Following the model of injury control pioneered by Dr. Barbara Barlow at Harlem Hospital 20 years ago, this project is part of a network of hospital-based injury prevention programs in 25 cities nationwide. The S model uses local data to identify pressing local injury problems. Community coalitions are brought to bear on the issue, using proven prevention strategies and local resources. Evaluation is a crucial component in all evidence-based interventions to address targeted issues, with careful evaluation to demonstrate the worth of the program. The investigators hope to identify causes of geographic disparity in childhood injuries and to work with community groups to target and eliminate excess injury risk.

Head Injury in Relation to Ski Helmet Use

Principal Investigator: Beth Mueller, D.P.H.

University of Washington Department of Epidemiology

Funding Source: Centers for Disease Control and Prevention

Approximately 600,000 ski- and snowboard-related injuries are reported annually in the U.S., a number that has been increasing due to the growing popularity of snowboarding. It is estimated that up to 15 percent of these are head injuries, accounting for the majority of related deaths. Given that helmet use significantly decreases the risk of serious head injury among bicyclists, the use of ski helmets may similarly prevent serious brain

injuries and deaths. Because the extent to which ski helmets may reduce head injury occurrence among skiers and snowboarders is currently unknown, an accurate estimate of helmet effectiveness is critically important for the development and implementation of any intervention campaigns. The investigators will conduct a case-control study to investigate the relationship of ski helmet use and head injury occurrence among skiers and snowboarders involved in falls or collisions. They will use National Ski Patrol data from several ski areas to measure the association of ski helmet use with head injury occurrence, and with the occurrence of brain injury; and investigate the extent to which any helmet-injury association differs among skiers and snowboarders, or by age group.

Program to Prevent Shaken Baby Syndrome and Infant Abuse: The Period of PURPLE Crying

Principal Investigator: Frederick Rivara, M.D., M.P.H.

University of Washington Department of Pediatrics

Funding Source: Doris Duke Charitable Foundation

The period of PURPLE Crying Program is an early intervention project to develop the capacity of existing primary health care systems to prevent shaken baby syndrome and, more generally, the physical abuse and neglect of infants. The need for this project results from new knowledge about the properties of infant crying that change our understanding of its common significance for early development and parenting; and evidence that crying is likely the most common stimulus for infant shaking and abuse. The project tests a new intervention designed to change the knowledge and behavior of every new parent, and to provide health-care practitioners with the knowledge, skill and materials to effectively educate new parents about infant crying and thus reduce abuse.

Dissemination of Booster Seat Community Intervention

Principal Investigator: Beth Ebel, M.D., M.Sc., M.P.H.

University of Washington Department of Pediatrics

Funding Source: Centers for Disease Control and Prevention

Use of age-appropriate child restraint systems is among the array of effective strategies that have reduced the toll of unintentional injury to children over the past 25 years. Use of booster seats can be effectively increased using a community-based campaign, yet communities in which children may be at highest risk may be slow to adopt this new technology. Special efforts are needed for families and children in these communities. The goal of these three interrelated studies will be to develop a deeper understanding of behavioral barriers to booster seat use, develop a targeted intervention based on participatory research to booster seat use, and test the effectiveness of the intervention in a controlled trial. The investigators will focus on disseminating their effective booster seat program on Latino families, the fastest growing population in the U.S.

Improving Firearm Storage Practices in Alaska Native Villages

Key Investigators: David Grossman, M.D., M.P.H., and Thomas Koepsell, M.D., M.P.H.

University of Washington Department of Health Services

Funding Source: Centers for Disease Control and Prevention (HIPRC Center Grant)

Rates of suicide among young Alaska Native males are over ten-fold higher than among a similar age cohort in the rest of the U.S. A high proportion of these deaths are associated with firearms. Firearms are an important part of the subsistence lifestyle of this population, however restriction of access to guns by youth may be a promising strategy to reduce the likelihood of suicides in this population. Recent work by the HIPRC has shown that locked guns are associated with a 73% reduced risk of suicide, compared with unlocked guns. A recent pilot project to improve the storage of guns in southwest Alaska increased the proportion of households having all guns locked from 15% to 85%. The aims of this study are to estimate the prevalence of firearm ownership and of specific firearm storage practices among residents living in the Bristol Bay and Yukon-Kuskokwin regions of southwest Alaska, and to work with the Alaska Native health corporations to plan and execute a randomized trial of an intervention to improve firearm storage practices among residents of selected villages.

Antilock Brakes and Traffic Crash Injuries

Key Investigators: Peter Cummings, Ph.D., M.P.H., and David Grossman, M.D., M.P.H.

University of Washington Department of Epidemiology

Funding Source: Centers for Disease Control and Prevention (HIPRC Center Grant)

A few studies have tried to estimate the association between the presence of antilock brakes in a vehicle and either the risk of a crash or risk of injury in a crash. To date, there is little evidence that antilock brakes are effective. The investigators are conducting a case-control study to estimate the association between the presence of an antilock brake system in a passenger vehicle and the risk of a traffic crash injury. Data from a large insurance carrier will be used for the study. The analysis will adjust for potential confounding factors related to the car and the driver-owner. The final risk ratio estimates will be useful in understanding how antilock brakes may contribute to a reduction in traffic crash injuries.

Long-Term Health Effects of Domestic Violence

Key Investigators: Robert S. Thompson, M.D., and Frederick Rivara, M.D., M.P.H.

Group Health Cooperative, Center for Health Studies, and University of Washington Departments of Pediatrics and Epidemiology

Funding Source: Agency for Health Care Research and Quality

Domestic violence (DV) is a major societal problem, affecting up to 25 percent of women in their lifetimes, yet knowledge of the impact of DV on health-care utilization and on health status is only rudimentary. This study will assess the impact of DV over an 11-year period on health-care utilization and cost for adult women and their children. Female victims of DV and their children will be compared to a group of non-victims to determine the effect of DV on physical and mental health status, social functioning, and health-risk profiles. This information will be important in convincing health care plans to institute programs for abused women.

Raise the Alarms: A Trial of Smoke Detector Types

Key Investigators: Beth Mueller, D.P.H., and David C. Grossman, M.D., M.P.H.

University of Washington Department of Epidemiology

Funding Source: Centers for Disease Control and Prevention (HIPRC Center Grant)

Residential fires are responsible for the majority of fire-related deaths in the U.S. Smoke detectors are recognized to be an economical and efficient injury intervention, capable of reducing risk of death by up to 70 percent. It's estimated that the great majority (>90%) of U.S. homeowners report having at least one smoke detector, however in homes where alarms are installed, it has been found that 20% - 50% are non-operational. They may be installed in sub-optimal locations, decreasing their effectiveness in preventing injuries should a fire occur. Using existing data from a previous study, the investigators will explore aspects of smoke detector maintenance, accuracy of self-reported smoke detector information, and fire-safety practices among low- to middle-income families. Results of this study will help identify possible barriers to ownership and maintenance of working smoke detectors, and will assess the accuracy of self-reported smoke detector information.

King County Booster Seat Campaign

Key Investigators: Frederick Rivara, M.D., M.P.H., and Beth Ebel, M.D., M.Sc., M.P.H.

University of Washington Department of Pediatrics and Epidemiology

Funding Source: Washington Traffic Safety Commission

Traffic crashes are the leading cause of death for children between 4 and 8 years of age, yet most children are improperly restrained while they ride. Although children this age are still too small to be protected by adult seat belts, booster seats provide protection until these children are big enough to be properly restrained by adult seat belts. This campaign, a collaboration between the HIPRC, Children's Hospital and Regional Medical Center, the Washington Traffic Safety Commission, and Safety Restraint Coalition, promotes the use of booster seats in the greater Seattle metropolitan area. The campaign includes a broad-based public outreach effort involving news media, a coupon program, and the support of a local retailer. This approach will be rigorously evaluated for effectiveness and can provide for potential replication across the U.S.

Rehabilitation

The Prevalence and Implications of Sleep Apnea in Acute, Traumatic Tetraplegia

Principal Investigator: Stephen Burns, M.D.

University of Washington Department of Rehabilitation Medicine

Funding Source: National Institute on Disability and Rehabilitation Research

Persons with chronic tetraplegia have a prevalence of sleep apnea that is 10 times greater than the general population. There is evidence that atypical risk factors are involved, treatment is more difficult, and the health consequences may be more severe in this population. The prevalence of sleep apnea in acute spinal cord-injured patients has not been determined. Untreated sleep apnea in acute tetraplegia patients has the potential to adversely affect participation in rehabilitation and adjustment to disability. This prospective study will determine the prevalence and implications of sleep apnea in acute traumatic tetraplegic patients undergoing rehabilitation at the Northwest Regional Cord Injury System at Harborview Medical Center.

Training & Education

Harborview Injury Prevention and Research Center (HIPRC) faculty provide training to students, health-care professionals and the public, including the following:

Workplace Violence Web Site

Principal Investigator: Mary Kernic, Ph.D.

This site will provide worldwide access to the statistics, research, prevention strategies, best practice guidelines and policies critical to understanding and ultimately preventing workplace violence.

Surgical Critical Care Fellowship

Program Director: Ronald Maier, M.D.

This two-year fellowship enables physicians to work with HIPRC faculty on injury-prevention research methods and other topics related to trauma. First-year fellows work toward their M.P.H. degrees at the UW School of Public Health and Community Medicine. In the second year, they complete their initial research projects and conduct additional clinical research.

Graduate Course in Injury Epidemiology

Lead Instructor: Peter Cummings, M.D., M.P.H.

This is a course in injury epidemiology at the University of Washington School of Public Health and Community Medicine. A syllabus is available on the HIPRC website (www.hiprc.org).

Injury Methods Research Course for Public Health and Medical Professionals

Lead Instructor: Peter Cummings, M.D., M.P.H.

This week-long course, offered by the UW Educational Outreach Program, is designed for professionals who seek a greater working knowledge of research methods they can use to study injuries. A syllabus is available on the HIPRC website (www.hiprc.org).

Principles of Injury Research, Control and Prevention

Lead Instructor: Melissa Schiff, M.D., M.P.H.

This course will cover general principles of injury research, including Haddon's matrix, injury classification and rates, injury surveillance, injury research

methods and the three E's of injury control and prevention: education, environmental modification, and enforcement. These general principles will be applied to the study of specific areas of unintentional and intentional injury, including motor vehicle crashes, pedestrian-, fall-, fire-, and sports-related injuries, drowning, youth violence, family violence, homicide and firearms, suicide, and alcohol use and injuries.

Injury Control International Activities

Principal Investigator: Charles Mock, M.D., Ph.D., M.P.H.

Capacity Building for Injury Control in Vietnam

This collaborative project involving faculty at the Harborview Injury Prevention and Research Center and the Hanoi School of Public Health will establish links between the two programs, including planning the specifics of an injury-control course to be taught in Hanoi. The weeklong course will involve lectures, discussion, exercises, and presentation of ideas for pilot projects by participants.

Strengthening Emergency Medical Services (EMS) Project—Hanoi, Vietnam

The University of Washington, Harborview Medical Center and the HIPRC is working in partnership with Counterpart International and the Hanoi Department of Health Services to implement a project to strengthen Hanoi's EMS system. Goals include: institutionalizing EMS training in Hanoi through the establishment of an EMS training center; improving the quality of EMS service delivery; and upgrading clinical hospital equipment and ambulances in Hanoi.

Strengthening Injury Control Research in Ghana

The broad goal of this project is to develop a model program to strengthen the training and research capacity for injury control in Ghana by educating a cadre of outstanding scientists in cutting-edge research methods and training techniques. This will facilitate the development of successful and sustainable research and training activities across the spectrum of injury control, including surveillance, prevention, and treatment. The specific aims of this program are to:

- Provide training in the form of three short courses in-country and short, intermediate, and long-term degree training at the UW for 12 highly qualified Ghanaian scientists and professionals on methods for high-quality injury research and implementation of effective injury control programs.
- Support the development of rigorous research on high priority injury-related health problems, the findings of which will be instrumental in strengthening the policies and practice of injury control in Ghana.

- Assist Ghanaian scientists and professionals to become capable, productive, and respected participants in international injury research, and to develop research structures and training programs to further the goals of reducing injury morbidity and mortality in Ghana and elsewhere in Africa.

Other International Projects

An injury-control course oriented for the circumstances of developing countries. Thus far, this has been conducted three times in Monterrey, Nuevo Leon, Mexico in collaboration with the Instituto Tecnologico y Estudios Superiores de Monterrey. Over 150 professionals have attended it from a variety of disciplines, including medicine, public health, education and law enforcement.

Mock and colleagues in Ghana have developed a week-long continuing medical education course in trauma treatment, oriented for the circumstances of rural hospitals in Africa. This has been a collaborative effort involving the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana. It has been conducted in Kumasi annually for the past five years and attended by over 100 doctors from rural hospitals throughout Ghana.

Traffic Safety Training

Principal Investigator: Charles Mock, M.D., Ph.D, M.P.H.

Lead Instructor: Rob Kaufman

In collaboration with the Washington State Traffic Safety Commission, the HIPRC offered an advanced course on motor-vehicle collision dynamics and occupant kinematics for crash reconstructionists from the state patrol and local law-enforcement agencies from throughout Washington.

HIPRC Seminar

Current and proposed projects by HIPRC faculty and staff, as well as work by investigators at other institutions, are the focus of one-hour weekly seminars attended by HIPRC faculty, staff, students, and outside colleagues.