

## Harvard Injury Control Research Center Report on Research Projects 2001-2006

Large Research Projects (3)

Small Research Project (1)

Supplemental Small Research Projects (2)

Seed Projects

### Large Research Project 1

**Title of Project:** Evaluation of State-level Firearms Policies

**Project Director:** David Hemenway, PhD, Deborah Azrael, PhD, Matthew Miller, MD, ScD, Lisa Hepburn, PhD

**Institution(s):** HICRC

**Categorization:** Ongoing Major Project, Prevention

**Research Training:** Mary Vriniotis, MS, Steven Lippmann, BS

**Key Words:** Firearms, Evaluation

**Brief Summary of Project:** In the past ten years in the United States, more than 300,000 deaths and over 3 million injuries have been caused by firearms; the total cost of firearm violence in the has been estimated at over 100 billion dollars per year. Many policies at the local, state and federal level have been enacted to address the problem of gun violence and injury, yet evaluations of the impact of these policies have been rare and results far from definitive. This project consists of a systematic program for evaluating public policies, technological innovations and violence prevention strategies involving firearms. Specific aims include: (1) extending and improving earlier work examining the effect of concealed carry firearm regulations on aggregate categories of violent and property crime including murder, rape, aggravated assault, robbery, burglary, and motor vehicle theft using cross-sectional time series data for the 50 United States from 1979 to the most recent available data; (2) evaluating the effect of permissive concealed carry regulations on specific *subcategories* of crime, victims and perpetrators; (3) exploring how observed *patterns* of associations between concealed carry regulations and various crimes accord with existing predictive models from the criminology, economic and public health literatures; (4) examining the relationship between permissive concealed carry regulations and non-criminal outcomes such as rates of suicide and firearm accidents; and (5) evaluating additional firearm-related regulations such as child access prevention laws, waiting period regulations, 'one gun a month' laws, design modification requirements, local rights or preemption laws, secondary sales laws, and others.

### **Status of Each Milestone:** 2001-2006 Milestones:

Meet with Firearm Advisory Committee members Phil Cook, Jeff Fagan, Consultant Brian Wiersema and Harvard Youth Violence Prevention Center statistician Matthew Wand. Status: *Done.*

Gather all remaining data elements through 1999. Status: *Done. All data elements were gathered through 2002.*

Perform data analysis of concealed carry regulations on crime, suicide and unintentional injury. Status: *Done. Data analysis was completed for the evaluation of concealed firearm carrying regulations. Multiple analyses were conducted evaluating the effects of the laws on men, women, adults over age 25 and white men over age 35. Analyses were conducted on various outcomes and under different statistical specifications.*

Gain access to area-identified National Crime Victimization Survey data. Status: *Done*. We applied to and received preliminary approval from the Bureau of the Census to use area-identified NCVS data. However, after further investigation, it was determined that the area-identified NCVS data would not be a valid source of data for our state-level evaluations and we decided not to use these data for this purpose.

Write a paper on the effect of concealed carry regulation on crime, suicide and unintentional injury. Status: *Done*. We presented our findings at the national injury prevention meeting in Atlanta in April 2003. A manuscript was published in a peer-review journal: Hepburn L, Miller M, Azrael D, Hemenway D. The effect of non-discretionary concealed weapon carrying laws on homicide. *Journal of Trauma*.2003; 56(3): 676-681

Gather data on Child Access Prevention Laws (CAP); update all data to 2001 or most recent available data. Status: *Done*. Data were gathered on CAP laws and the additional data elements were updated through 2002.

Begin data analysis on CAP laws. Status: *Done*. Data analysis was completed using longitudinal, state-level vital statistics data.

Submit a second manuscript for publication. *Done*. A manuscript evaluating CAP laws on unintentional firearm has been submitted and accepted for publication. Hepburn L, Azrael D, Miller M, Hemenway D. The effect of child access prevention laws on unintentional child firearm fatalities. *Journal of Trauma*. In press.

Evaluate a recent firearm survey that provides information directly related to the question of the plausible effects of firearm laws. *In progress*. Using data from our 2004 national random digit dial survey on 2800 adults, we have investigated whether adults in states with CAP laws know about the law, and whether they store their firearms more safely than adults in non-CAP states.

### **Description of Major Findings:**

Our findings suggest that concealed carry regulations do not have a statistically significant effect on homicide overall or on firearm homicide; the regulations also have no effect on specific age or gender groups. Further analyses confirmed these findings.

Our CAP law analyses suggest that several states with CAP laws experienced declines in the rate of unintentional firearm deaths for children age 0 to 14 in excess of the national average. The average effect of these laws appears to be driven by the decline in Florida and California, two states that allow felony prosecution. In adults 55-74, a group less likely to have young children in the home (and therefore not targeted by the CAP laws), there is no indication of an effect of CAP laws on the unintentional firearm death rate.

Gun owners in CAP law states are more likely to believe their state has a CAP law, and gun owners with children in CAP law states are more likely to store their guns safely. Such results suggest that the CAP laws may have some beneficial effect.

Significance of Findings: Findings from the concealed carrying law evaluation will contribute methodologically sound evidence to the ongoing debate over the impact of concealed carry legislation on homicide. Results from the CAP law evaluation will inform public health officials and policy makers about the impact of child access prevention laws on unintentional firearm deaths and suicides.

## **Publications and Communications:**

Hepburn L, Miller M, Azrael D, Hemenway D. The effect of non-discretionary concealed weapon carrying laws on homicide. *Journal of Trauma*. 2003; 56(3): 676-681.

Hepburn L, Azrael D, Miller M, Hemenway D. Concealed carry laws and homicide. Presentation at the Safety in Numbers conference, Atlanta, GA, April 2003.

The effect of child access prevention laws on unintentional child firearm fatalities, 1979-2000. Hepburn L, Azrael D, Miller M, Hemenway D. *Journal of Trauma*. In press.

## **Large Research Project 2**

**Title of Project:** Outcomes of Elderly Patients Hospitalized after Injury

**Project Director:** David E. Clark

**Institutions:** Maine Medical Center

**Categorization (I):** Acute Care

**Categorization (II):** Major Project

**Categorization (III):** Continuation

**Research Training:** Tomoko Shinoda-Tagawa MD MPH (HSPH); Joseph T. Donohue MD, Salman Ahmad MD, Adam Gorra MD (MMC)

**Key Words:** Wounds, Injuries, Aged, Medicare

## **Brief Summary of Project:**

This project describes the outcomes of older patients hospitalized with injuries. It applies standard methods for classifying injuries and estimating co-morbidity to Medicare data, and evaluates 30-day mortality, hospital mortality, hospital length of stay, and discharge dispositions. Adjunctive analyses have also utilized data from the National Hospital Discharge Survey (NHDS) and other databases to describe long-term trends and develop improved methods of risk-adjustment for administrative data. Variations in outcomes have been evaluated by type and severity of injury, age, sex, comorbidity, geographic region and hospital volume.

## **Status of Each Milestone:**

Preparation of an analytic file based on episodes of care, deriving co-morbidity and injury severity scores for risk adjustment, and linking data from multiple Medicare files and related information (census, hospital, etc.) *Done*.

Publication of two articles describing the general characteristics and outcomes of the fee-for-service Medicare population hospitalized after injury, and comparing them to the general population with and without Medicare coverage (using NHDS). *Done*.

Development of risk-adjustment methods for administrative data, publication of methodologic articles, and participation in a study group on this subject at the National Center for Health Statistics. *Done*.

Completion of the planned analysis of variations in mortality based on hospital volume. *Presented to a national CDC injury control meeting; manuscript prepared and submitted for publication.*

Completion of an analysis of geographic variations in hospital admission and mortality after injury. *Abstract accepted for presentation and further analysis in progress.*

Completion of injury-specific studies of long-term survival after head injury, outcomes after hip fracture, and outcomes after rib fractures. *The first has been presented and accepted for publication and the others are in progress.*

## **Plans for coming year:**

Revision, presentation, and publication of submitted manuscripts described above.

Completion of geographic analysis and publication of a manuscript.

Completion of injury specific analyses of rib and hip fractures and publication of manuscripts.

### **Description of Major Findings / Significance of Findings:**

Older patients constitute an increasing proportion of patients hospitalized after injury; most older patients continue to receive long-term institutional care after hospital discharge attributed to injury (Ref 1). The Washington Post and other newspapers highlighted the major findings of this study concerning trends in hospitalization after injury--older women are displacing young men. Injury prevention in older patients is clearly an important economic priority for society as well as a threat to the health of these vulnerable citizens.

Hospital outcomes can be predicted from demographic and injury characteristics recorded in administrative data (Ref 2,9). Most injuries resulting in hospitalization for the Medicare population involve the extremities, but other injuries have higher mortality. Many injured patients are not discharged home, but receive further institutional care. 30-day survival is much lower than observed hospital survival. The low proportion of records with E-codes is disappointing, but may be due to correctable problems in data processing by CMS (Ref 3). Outcomes research using administrative data is more complicated because of these patterns of care for older patients with injuries.

Medicare inpatient records are representative of the elderly population and can be linked to other data for the same patient to determine health status prior to injury, pre-hospital trauma care, and subsequent medical care or vital status. Injury types differ depending on insurance coverage, but hospital outcomes are similar (Refs 5-6).

When outpatient (Emergency Department) data are used as well as inpatient data, and models are formulated with 30-day mortality (rather than hospital mortality) as an outcome, controlling for age, comorbidity, and injury severity, there does not appear to be any survival advantage for older patients who present first to a low-volume hospital and then are transferred to a high-volume hospital (e.g., a trauma center), compared with those who present first to a high-volume hospital (Refs 7,10). Existing systems of trauma care for this population thus appear to be satisfactory.

Head injury in older patients is associated with very high mortality, which continues after hospital discharge. Late mortality is only partially explained by injury severity, and is higher with increased age, comorbidity, or male sex (Ref 4,8). Realistic predictions of long-term outcome in the Medicare population may be useful for clinicians and families trying to judge the value of acute interventions.

Within the United States, older persons have considerable variation in injury mortality and hospital outcomes by geographic region (Ref 11). We are seeking to measure and explain these differences.

### **Peer-reviewed publications and communications supported by this grant:**

Shinoda-Tagawa T, Clark DE. Trends in hospitalization after injury: Older women are displacing young men. *Injury Prevention* 2003; 9:214-219.

Clark DE, Winchell RJ. Risk adjustment for injured patients using administrative data. *Journal of Trauma* 2004; 57:130-140.

Clark DE, DeLorenzo MA, Lucas FL, Wennberg DE. Epidemiology and short-term outcomes of injured Medicare patients. *Journal of the American Geriatric Society* 2004; 52:2023-2030.

Clark DE, DeLorenzo MA, Anderson KL, Donohue JT. Long-term survival after head injury in Medicare patients. Presented at the American Public Health Association annual meeting, Washington, DC, November 2004.

Clark DE, DeLorenzo MA, Lucas FL, Wennberg DE. Injuries in older Americans with and without Medicare. Presented at the 7th World Conference on Injury Prevention and Safety Promotion, Vienna, Austria, June 2004.

Clark DE, DeLorenzo MA, Lucas FL, Wennberg DE. Injuries in older Americans with and without Medicare. *American Journal of Public Health* 2005; 95:273-278.

Clark DE. Effect of hospital volume on survival of severely injured Medicare patients. Poster presentation, CDC Injury Control Conference, Denver, Colorado. May 2005.

Donohue JT, Clark DE, DeLorenzo MA. Long-term survival after head injury in Medicare patients. *Journal of Trauma* 2006, In press.

Clark DE, Ahmad S. Estimating injury severity using the Barell matrix. *Injury Prevention* 2006 In press.

Clark DE, DeLorenzo MA, Lucas FL, Cushing BM. Medicare data from seriously injured patients show no benefit of initial hospital volume on 30-day survival. Submitted.

Clark DE, Anderson KA, DeLorenzo MA. Regional variation in mortality and hospitalization for injury in Medicare patients. Accepted for 8th World Conference on Injury Prevention and Safety Promotion, Durban, South Africa, April 2006.

#### **Related publications and invited presentations:**

Clark DE. Injuries in the Elderly. Multiple Surgical, Medical, Geriatric, Nursing, etc. conferences at Maine Medical Center, 2002-2005.

Clark DE. Increasing importance of the elderly in a trauma system. Poster presentation, World Conference on Injury Prevention and Control. Montreal, Canada. May 2002.

Clark DE, Chu MK. Increasing importance of the elderly in a trauma system. *Amer J Emerg Med* 2002; 20:108-111.

Wildner M, Sangha O, Clark DE, Döring A, Manstetten A. Independent living after fractures in the elderly. *Osteoporosis International* 2002; 13:579-585.

Clark DE. Injuries in the older population. New England Regional Trauma Conference. Burlington, Massachusetts. November 2004.

Clark DE. Injuries in the older population. Harvard Injury Control Research Center Seminar Series. Boston, Massachusetts. January 2005.

Clark DE. Injuries in the older population. Northeast Injury Prevention Network. Newton, Massachusetts. July 2005.

Expert Group on Injury Severity Measurement, National Center for Health Statistics. Discussion document on injury severity measurement in administrative datasets. May 2005. Accessible at [www.cdc.gov/nchs/injury.htm](http://www.cdc.gov/nchs/injury.htm).

Wildner M, Döring A, Meisinger C, Clark DE. Frakturen im höheren Lebensalter – eine Herausforderung für Prävention und Gesundheitsförderung. *Gesundheitswesen* 2005; 67:S180-S186.

### **Large Research Project 3**

**Title of Project:** Low-Dose Alcohol, Cold Medicines and Maritime Safety

**Project Director:** Jonathan Howland, PhD, MPH

**Institutions:** Harvard Injury Control Research Center & Boston University School of Public Health

**Categorization (I):** Prevention

**Categorization (II):** Major Project

**Categorization (III):** Continuation

**Research Training:** Not Applicable

**Key Words:** Alcohol, Injury, Occupational Performance

#### **Brief Summary of Projects:**

**Study 1 - Very Low Dose Alcohol:** Low doses of alcohol, such as having one or two drinks with lunch, represent a potentially important, but relatively unexplored, source of injury and error in the workplace. Although these low-level exposures may yield only low-risk impairment at the level of the individual, in aggregate the effects might be considerable because of the prevalence of exposures. In other words, many people at low risk may yield as many errors as a few people at high-risk (e.g., intoxication).

Our previous two completed low-dose studies have shown significant decrements in simulated merchant operation when maritime academy cadets were dosed with alcohol at levels between 0.04-0.05 blood alcohol concentration (BAC). Since 0.04 g% BAC is by Federal regulation the per se level for intoxication for operation of several types of commercial vehicles (trains, merchant ships and aircraft) and nuclear power plants, our findings raise the question of whether performance decrements would occur at lower BACs.

We are conducting a dose-response, placebo-controlled randomized trial testing the effects of three low-dose alcohol exposures (0.02, 0.03, 0.04 g% BAC) on occupational performance. As with our previous research, our occupational model is merchant ship operation, as measured by ship training simulators. Secondary hypotheses explore whether family history mitigates the effects of alcohol on performance and whether a sustained attention/reaction time test, as measured by the psychomotor vigilance test (PVT), detects low-level dosing status and predicts with simulator performance scores.

**Study 2 - Medications Study:** Our second study focuses on the effects of commonly used medications on mariner performance. Again, our hypothesis is that low risk for impairment from these products may be offset by prevalence of use. Two recent events have underscored the potential contribution of OTC and prescription medications to maritime disasters. The first involved a tugboat hitting, and destroying, a bridge over the Arkansas River. Fourteen motorists perished. Benadryl use by the pilot was implicated in the crash. More recently, a NYC ferry hit, at full speed, the docking station at Staten Island. 11 people were killed. The pilot was taking Tylenol PM, Tramadol (for back pain). He was also taking Triamterene (for high blood pressure) and Ambien for insomnia. This combination of medications resulted in the pilot becoming unconscious as the ferry entered the terminal. We are conducting a trial to measure the effects of the Transdermal Scopolamine patch, a medication commonly used by mariners for sea sickness, on mariner performance. Again, occupational performance is measured using maritime training simulators.

## **Status of Each Milestone:**

**Study 1:** Progress of this study has been slowed by several factors. First, we spent a year attempting to implement the study in the U.S., at Maine Maritime Academy. Problems with participant recruitment and the quality of the training simulator used to measure outcomes resulted in abandonment of that site. Accordingly, permission was sought to implement the study at Kalmar Maritime Academy, in Sweden. Permission was granted but it took several months for Kalmar to obtain the necessary FWA for human subject's protection. For two years, we have successfully implemented the study in Kalmar. All data have been entered into the database and double entered. We worked with the original simulator operator to determine inter-rater reliability as a new simulator operator is working with our trial. He determined that the scoring by the new operator was comparable to his own scoring and no further training was required. We are also working with our Data Analyst to start producing some preliminary analyses on the dataset. Recruitment diminished somewhat during 2005-2006 because a smaller than usual class of maritime cadets was available. Nevertheless, to date 87 (of the target 147) participants have completed Study 1. Sixteen participants took part in the trial in the last round in April 2005. We have begun recruitment efforts for April 2006, including visiting the class of eligible engineer cadets to provide information about the trial and to answer questions. We anticipate enrolling 12 participants for the balance of year 7.

**Study 2:** To date, we have enrolled and completed data collection on 24 participants. We have enrolled our target of 8 participants, per research week in Kalmar, in May 2005, November 2005, and February 2006. During Year 8 we have also developed a double entry MS Access database.

**Description of Major Findings:** No findings to report at this time.

**Significance of Findings:** Not yet applicable.

Publications & Communications:

The following manuscript (May 2006), reports on our previous HICRC study of the residual effects of heavy drinking on next-day occupational performance:

Rohsenow DJ, Howland J, Minsky S, Arnedt JT. Effects of heavy drinking by maritime academy cadets on hangover, perceived sleep, and next day ship power plant operation. *Journal of Studies on Alcohol*. In press 2006.

We are working on other manuscripts derived from our HIRIC studies, one on the psychometric properties of a hangover scale we have developed for our research and another on the frequency and risk factors for hangovers among young adults dosed at comparable levels of different alcoholic beverages.

Below are the conference abstracts from this past year supported in part by HICRC.

*Using the Psychomotor Vigilance Test (PVT) to Detect the Residual Effects of Alcohol*

Jacey Greece, MPH, Alissa Almeida, MPH, Donald Allensworth-Davies, MSc, Damaris Rohsenow, PhD, J. Todd Arnedt, PhD, Sara Minsky, MPH, Jonathan Howland, PhD  
American Public Health Association Annual Conference 2005, Philadelphia  
(Presented)

*Are Federal regulations on alcohol use safe?*

Alissa B. Almeida, MPH, Jacey Greece, MPH, Sara Minsky, MPH, Donald Allensworth-Davies, MSc, Jonathan Howland, PhD, MPH, Damaris Rohsenow, PhD, J. Todd Arnedt, PhD, Jan Snöberg  
Midwest Political Science Association Meeting 2006, Chicago  
(Accepted)

*Unanticipated Sources of Human Error in Operating Systems*

Jonathan Howland, PhD, MPH, Damaris Rohsenow, PhD , Jan Snöberg, Master Mariner, Sara Minsky, MPH, Jacey A Greece, MPH, Alissa Almeida, MPH  
European Safety And Reliability Association Annual Conference 2006, Estoril, Portugal  
(Accepted)

*Residual effects of heavy drinking on maritime performance*

Jonathan Howland, PhD, MPH  
Världssjöfartens Dag [World Maritime Day conference], Göteborg, Sweden  
(Presented)

*Effects of alcohol congeners on sleep disturbance*

Alissa B. Almeida, MPH, J. Todd Arnedt, PhD, Damaris Rohsenow, PhD, Donald Allensworth-Davies, MSc, Jacey Greece, MPH, Sara Minsky, MPH, Eileen Mahan, RPT, Jonathan Howland, PhD, MPH  
Associated Professional Sleep Societies Annual Conference 2006, Salt Lake City, Utah  
(Submitted)

*Does Family History of Alcohol Problems Moderate the Residual Effects of Heavy Drinking on Sustained Attention/Reaction Time?*

Sara Minsky, MPH, Donald Allensworth-Davies, MSc, Jacey Greece, MPH, Alissa Almeida, MPH, Damaris Rohsenow, PhD, J. Todd Arnedt, PhD, Jonathan Howland, PhD  
American Public Health Association Annual Conference 2006, Boston  
(Submitted)

*Bourbon Vs. Vodka Effects On Next-Day Hangover, Attention/Reaction Time and Vigilance Lapses*

Jonathan Howland, PhD, MPH, Jacey Greece, MPH, Alissa Almeida, MPH, Donald Allensworth-Davies, MSc, Damaris Rohsenow, PhD, J. Todd Arnedt, PhD, Sara Minsky, MPH,  
Research Society on Alcoholism Annual Conference 2006, Baltimore  
(Accepted)

*Alcohol Effects On Next-Day Ship Power Plant Performance, Hangover And Perceived Sleep Quality*

Damaris Rohsenow, PhD, Jonathan Howland, PhD, MPH, Sara Minsky, MPH, J. Todd Arnedt, PhD  
Research Society on Alcoholism Annual Conference 2006, Baltimore  
(Accepted)



## **Small Research Project I**

**Title of Project:** Intentional Injury Among Urban Youth

**Project Directors:** Stephen Buka, ScD. & Beth E. Molnar, ScD

**Institution(s):** HICRC; Society, Human Development & Health

**Categorization (I):** Prevention

**Categorization (II):** Small Research Project

**Categorization (III):** Continuation

**Research Training:** David Rehkopf, ScD, Recent Graduate; Josie Lehrer, ScD – Recent Graduate; Angela Paradis, ScD Candidate; Joanna Almeida, ScD Student; Sonia Jain, ScD Candidate; Shalini Tendulkar, ScD Candidate; Magdalena Cerda, ScD Candidate

**Key Words:** Intentional Injury, Youth

**Brief Summary of Project:** Youth violence is a major public health problem in the U.S. This project involves 6,000 youth residing in 80 Chicago neighborhoods. It is determining the prevalence of intentional injury and examining correlates of intentional injury at the community, school, family and individual levels. Capitalizing on its longitudinal design, the study also examines the relationship between intentional injury and subsequent problems including medical treatment and psychiatric disorders. Ongoing longitudinal studies include identification of protective factors associated with lower violent perpetration by youth, including dating violence and other aggressive acts, and protective factors associated with lower substance abuse and its related problems, including driving under the influence. This study, embedded in a large multi-disciplinary on-going study, will increase our understanding of multi-level risk factors for and prevalence and sequelae of intentional injury among one of the most vulnerable populations: urban youth.

**Status of Each Milestone:** Data analysis is ongoing

**Description of Major Findings:** Analyses are focused in three areas.

### **Category A: SUICIDE:**

The most recent product from this work is a systematic review of studies linking the socioeconomic status of areas with suicide deaths, recently published in *Psychological Medicine* (Rehkopf & Buka, 2006). Reviewing 86 studies from 1897-2004, we found that there is a consistent relationship between high poverty/high unemployment areas and rates of suicide deaths, suggesting that prevention efforts should be targeted to those areas.

Previous publications include: a) a 2003 publication in the *Journal of Epidemiology & Community Health* entitled “Lethality of firearms relative to other suicide methods: a population based study” (Shenassa, Catlin, & Buka, 2003); and b) a peer-reviewed symposium for the 70<sup>th</sup> annual meeting of the Society for Research in Child Development “The development of youth suicide: risk and prevention in early life, the family and community” (Buka & Molnar, 2003).

### **Category B: WEAPON CARRYING:**

We recently published a study in the *Journal of Epidemiology and Community Health* on the potential utility of using neighborhood-level data on gun-related homicides and suicides as indices of gun availability. The study used data from 837 participants between the ages of 17 and 22, residing in 170 different neighborhoods. Gun availability was measured by whether they had carried a gun and whether they perceived gun access to be easy in their neighborhood. A 10% change in the proportion of homicides committed by a gun in a neighborhood was associated with a 20% increase in both the odds of reported gun access and reported gun carrying. However, the proportion of firearm related suicides was not associated with either self-reported measure. We concluded that the proportion of firearm related homicides, but not

firearm related suicides, is a useful predictor of gun availability across neighborhoods. (Shenassa & Buka, 2006)

A previous study found that neighborhood collective efficacy was inversely associated with youth carrying concealed firearms, while social disorder and physical disorder were positively associated with gun carrying. We concluded that youth interventions to improve neighborhood conditions may be efficacious in preventing firearm carrying. This study was published in the *Archives of Pediatrics & Adolescent Medicine* (Molnar, Miller, Azrael, Buka 2004).

### **Category C: CORRELATES AND CONSEQUENCES OF VICTIMIZATION:**

The most recent article focused on the subsequent violent behavior among girls who experienced violent victimization, We found that girls who had experienced violent victimization were more than twice as likely to perpetrate violence at follow-up; however, in neighborhoods that were relatively affluent and non-violent, the odds of perpetration associated with victimization were four times higher than in those characterized by homicides and concentrated poverty. This article was published in the *Archives of Pediatrics & Adolescent Medicine*. (Molnar, Browne, Cerda, Buka, 2005)

Another forthcoming paper is a psychometrics study of measures of exposure to violence to be published in the *Journal of Community Psychology*. (Brennan, Molnar, Earls) Findings include recommendations for inclusion and exclusion of certain items, reliability and validity results, and confirmation that there are three distinct scales within the measure: (1) witnessing, (2) victimization, and (3) heard about violence to others.

A study in progress examines the higher rates of sexual victimization and risky sexual behaviors among girls who identify as “mostly heterosexual” compared with those who identify as “100% heterosexual.” One out of four “mostly heterosexual” girls compared to one out of 14 “heterosexuals” had been raped in their lifetimes. This study appeared as an abstract for the upcoming Society of Adolescent Medicine meeting in the *Journal of Adolescent Health* and an accompanying manuscript is in preparation.

Another study in progress is a doctoral dissertation paper by our supported student Sonia Jain, focused on neighborhood-level assets associated with lower rates of dating violence. This work was submitted as an abstract for the 2006 meeting of the American Public Health Association (Jain, Subramanian, Buka, Molnar, 2006)

Previous publications include (1) neighborhood predictors of parent-to-child physical aggression published in the journal *Child Maltreatment* in 2003 and awarded the distinction of “Most Outstanding Paper of 2003” by the journal’s editorial board; (2) neighborhood violence and reduced physical activity published in 2004 in the *American Journal of Health Promotion*. Other manuscripts are under development and/or review, including a study of the role of physical and sexual abuse in the development of substance abuse and dependence, and identification of protective factors associated with reduced aggression and delinquency in girls.

**Significance of Findings:** As a whole, this program of research adds to the growing body of knowledge about the prevalence, determinants, and risk factors for intentional injury among and perpetrated against urban youth. In particular, this research has yielded novel insights regarding the role of neighborhood level processes that contribute to – and that could help prevent – the occurrence of these injuries. Results from this work have been presented at local and national meetings and have been published and are in press in leading peer reviewed research journals. The products from the work described above all draw heavily on theories of neighborhood-level, contextual influences on youth intentional injury. In our paper in *Psychological Medicine*, we developed and applied a new method of analysis for synthesizing literature on contextual influences on suicide rates. In our paper on the measurement of

exposure to violence, we present a valid and reliable measure for the field to use in future studies. In all of our analyses, we apply recently developed multi-level, hierarchical data analysis techniques and more recently, propensity score matching, and are further disseminating use of these methods to the field.

### **Publications and Communications:**

(In press) Brennan RT, Molnar BE, Earls F. Refining the measurement of exposure to violence (ETV) in urban youth. *Journal of Community Psychology*.

(2006) Austin SB, Roberts AL, Molnar BE. "Mostly heterosexual" and heterosexual young adult females: comparisons of sexual violence victimization history and sexual risk behaviors in a community-based urban cohort. *Journal of Adolescent Health*. 38(2): 121.

(2006) Shenassa ED, Daskalakis C, Buka SL. Utility of indices of gun availability in the community. *J Epidemiol Community Health*. 60(1): 44-49.

(2006) Rehkopf D, Buka S. The association between suicide and the socio-economic characteristics of geographical areas: a systematic review. *Psychological Medicine*. Vol. 36: 145-157.

(2005) Molnar BE., Browne A., Cerda M., Buka SL.. Violent behavior by girls reporting violent victimization: A prospective study. *Archives of Pediatrics and Adolescent Medicine*. Vol. 159 (6), 731-739.

(2005) Molnar B., Roberts A., Browne A., Gardener H., Buka S. What girls need: Recommendations for preventing violence among urban girls in the U.S. *Social Science & Medicine*; 60: 2191-2204.

(November, 2006 – abstract submitted) Neighborhood-level predictors of dating violence: Could collective efficacy stop the intergenerational transmission of violence? Annual meeting of the American Public Health Association, Boston, MA.

(November, 2005) Molnar BE, Cerda M, Roberts AL, Buka SL. Family, peer & neighborhood assets: Effects on perpetration of violence among urban girls. Annual meeting of the American Public Health Association, Philadelphia, PA.

(October, 2005) Molnar BE. Child/adolescent exposure to violence: What can we learn about neighborhoods? Invited speaker at annual meeting of the Association for Schools and Curriculum Development, San Francisco, CA.

(September, 2005) Molnar BE. Exposure to violence in multiple contexts. Invited speaker at *Prevent Child Abuse America*, Chicago, IL.

Molnar BE, Miller MJ, Azrael D, Buka, SL. Neighborhood Predictors of Concealed Firearm Carrying Among Children and Adolescents: Results from the Project on Human Development in Chicago Neighborhoods. *Archives of Pediatrics & Adolescent Medicine* 2004; 158: 657-664.

Molnar BE, Gortmaker SL, Bull FC, Buka SL. Unsafe to play? Neighborhood disorder and lack of safety predict reduced physical activity among urban children and adolescents. *American Journal of Health Promotion* 2004; Vol. 18(5): 378-386.

Molnar BE, Buka SL, Brennan RT, Holton J, Earls F. A multi-level study of parent-to-child physical aggression: Results from the Project on Human Development in Chicago Neighborhoods. *Child Maltreatment* 2003; 8(2): 84-97.

Shenassa, E., Catlin, S. & Buka, S. Lethality of firearms relative to other suicide methods: A population based study. *Journal of Community Epidemiology & Community Health* 2003; 57: 120-124.

Molnar BE, Buka SL, Kessler RC. Child sexual abuse and subsequent psychopathology: Results from the National Comorbidity Survey. *American Journal of Public Health* 2001; Vol. 91(5): 753-760.

Molnar BE, Berkman LF, Buka SL. Psychopathology, child sexual abuse, and other childhood adversities: Relative links to subsequent suicidal behavior in the U.S. *Psychological Medicine* 2001; Vol. 31: 965-977.

Molnar B, Rehkopf D, Buka S: Neighborhood, family and individual predictors of youth suicide: results from the Chicago Neighborhoods Study. Presentation at the Society for Research in Child Development, April 2003.

Yu J, Norberg N: Modifiable risk factors for suicidal behavior. In Eaton W and Buka SL, Modifiable determinants of psychiatric disorders, NIMH working paper.

### **Small Research Project II (Supplemental)**

**Title of Project:** Estimating the Cost of Employing Partner Violence Perpetrators

**Project Director:** Emily Rothman, ScD

**Institutions:** Boston University

**Categorization (I):** Prevention

**Categorization (II):** Small Research Project

**Categorization (III):** Project Complete

**Research Training:** Not applicable

**Key Words:** Intimate Partner Violence, Batterers, Workplace Violence

**Brief Summary of Project:** The purpose of this project is to develop a measurement tool for use in occupational settings that will identify perpetrators of intimate partner violence and assess productivity level. The project involves conducting background research necessary for developing the survey items, creating a pilot survey, administering the survey to workers, and assessing the validity of the measure.

**Status of Each Milestone:** During the past year, data collected from Maine Department of Labor employees was analyzed and the results were written up with Phaedra Corso, ScD, a health economist at the U.S. Centers for Disease Control and Prevention (CDC). The resulting manuscript was reviewed and approved by the CDC. It has been submitted to a peer-review journal.

**Description of Major Findings:** It has been demonstrated that intimate partner violence (IPV) victimization is costly to employers, but little is known about the economic consequences associated with employing perpetrators. This study investigated propensity for partner abuse as a predictor of missed work time and on-the-job decreases in productivity among a small sample of male employees at a state agency (N=61). Results suggest that greater propensity for abusiveness is positively associated with missing work, experiencing worse productivity on the job, and poorer health, controlling for level of education, income, marital status, age and part-time vs. full-time employment status. In the unadjusted regression analyses, Propensity for Abuse (PAS) scores predicted the number of times respondents were late to work, missed days of work because of fights with intimate partners, came to work despite being too sick, tired, stressed or injured to be productive, the number of times that they made mistakes on the job, and their self-assessed general health status. Controlling for respondent education level, income, age, marital status and employment status (full-time vs. part-time), respondents' PAS

scores positively predicted coming to work despite being too sick, tired, injured or stressed to be productive, making mistakes on the job, and poor general health. The composite measure of missed work time (including number of sick, personal or vacation days and number of times late or early to work and number of excessive breaks) was also statistically significantly related to PAS score in both unadjusted and adjusted analyses. In the unadjusted analysis, for every one unit increase in PAS score, the average number of these missed work events reported by the respondent increased by 0.43 (95% CI: 0.14-0.73).

**Significance of Findings:** Our findings suggest that individuals prone to aggression against their intimate partners may be more likely than non-abusive employees to be absent from work or miss portions of the workday, to under-perform when they are on the job, to be feeling ill, and to make mistakes on the job. This is consistent with prior research that indicates that men who batter partners also experience more negative stress at work than non-partner-violent men (Barling & Rosenbaum, 1986). Our findings are also consistent with the two prior exploratory studies that found that batterers reported frequent absences from work and commonly made errors on the job (Maine Department of Labor, 2004; Rothman & Perry, 2004). Therefore, although the idea of “helping” batterers may be less palatable to corporations than the idea of providing resources for victims, employers may be well advised to consider devoting at least some of their EAP or human resources budget to helping IPV perpetrators recognize their need for services. Finding ways to assist perpetrators of IPV through the workplace can be more challenging initially than establishing victim services and victim-oriented policies. At this time, there are fewer models for policies and practices, and fewer materials (e.g., brochure templates, posters, etc.) targeting perpetrators than there are victims. On the other hand, some perpetrator-oriented policies and materials do exist and there are several organizations in the U.S. that will provide consulting services to employers to help them implement both (for example, see the websites for the DV Initiative or the Corporate Alliance to End Partner Violence at [www.dvinitiative.com](http://www.dvinitiative.com) and [www.caepv.org](http://www.caepv.org) respectively).

**Publications & Communications:** Not applicable.

### **Small Research Project III (Supplemental)**

**Title of Project:** Effect of Parental Supervision on Unintentional Injuries

**Project Director:** Edmund Shenassa, ScD

**Institutions:** Miriam Hospital

**Categorization (I):** Prevention

**Categorization (II):** Small Research Project

**Categorization (III):** Continuation

**Research Training:** Not applicable

**Key Words:** parental supervision, housing conditions, injury

**Brief Summary of Project:** This study examines whether parenting skills and parental supervision are linked with the risk of injury among children, independent of housing conditions.

**Status of Each Milestone:** Data analysis is ongoing

**Description of Major Findings:** None yet applicable.

**Significance of Findings:** None yet applicable.

**Publications & Communications:** Reading R, Haynes R, Shenassa E. Neighborhood influences on child injury risk. *Children, Youth and Environments*. 2005; 15:165-185.

## Seed Projects

### Seed Project 1

**Title of Project:** Arizona Child Fatality Review Data

**Project Director:** Deborah Azrael, PhD

**Institution(s):** HICRC

**Summary of Project:** Most states in the U.S. have review teams that investigate deaths of children in order to learn the specific circumstances of the deaths, and their preventability. Yet despite extensive resources devoted to information gathering, these teams do not make these data available to researchers, and the data are rarely used to inform epidemiologic research. In this project, HICRC is working with the Arizona Child Fatality Review Team to analyze five years of data on violent death of children in Arizona. The purpose of the analyses is to contribute new information about firearm-related and intentional deaths among children, and to explore the utility of Child Fatality Review Team data as an injury surveillance source.

**Major Findings:** Initial analyses focused on youth suicide. White youths were more likely than non-white youths to use a gun to commit suicide, as were youths who had not experienced a life crisis or expressed suicidal thoughts in the past. Findings suggest that, relative to youth who use other means, youth who commit suicide with a gun may be more impulsive.

**Publications:** Azrael D, Hemenway D, Miller M, Barber CW, Schackner R. Youth suicide: insights from five years of Arizona child fatality review team data. *Suicide and Life Threatening Behavior*. 2004; 34:36-43.

Project complete

### Seed Project 2

**Title of Project:** Measuring Violence and Injury between Intimate Partners

**Project Director:** Erika Lichter, ScD

**Institution(s):** HICRC

**Summary of Project:** Based on current research, it may be unclear whether men and women are equally violent in partner relationships. However, most studies reporting equivalent levels of violence within couples fail to consider the type and severity of violence inflicted and received. The current project is the first to use weighted data on dating aggression to assess gender differences in perpetration and victimization.

**Major Findings:** Adolescent girls were more likely than boys to have been seriously or frequently victimized by a dating partner. Without the weighting system, differences in the level of victimization for girls and boys were not significant.

**Publication:** Lichter EL, McCloskey LA. Adolescent dating aggression: a longitudinal study of the effects of exposure to marital violence. Submitted. Project complete.

### Seed Project 3

**Title of Project:** Health Care Costs of Child Injuries

**Project Director:** Michael Ganz, PhD

**Institutions:** HICRC

**Summary of Project:** Using data from the Medical Expenditure Panel Survey, this project describes the medical care utilization and expenditure patterns of child injuries.

**Major Findings:** We estimate injury prevalence for 1996–1998 at 18.5%, corresponding to about 15–16 million children per year. Older age, male, white, non-Hispanic, insured, and having (or having a mother with) a mental health condition were associated with risk of injury. Family size was inversely related to risk of injury; family income was not. Children in the West were more likely to have been injured and those in the South were least likely. Urban children were less at risk for injury. Injured children were more likely to have incurred expenses and had significantly higher total charges/expenditures and family out-of-pocket expenses.

**Publications:** Ganz ML, Kalinich ML. Estimating the prevalence and cost of childhood injuries using the Medical Expenditure Panel Survey. *Pediatric Research*. 2003; 53(4):1299 (April Supplement)[Abstract].

### Seed Project 4

**Title of Project:** Social Factors and Unintentional Childhood Injury in Low Income Children in Northeast Brazil

**Project Director:** Pamela Surkan, MS

**Institutions:** Department of Maternal and Child Health

**Project Summary:** The goal of this study is to help identify factors contributing to childhood injuries in a low-income Brazilian community. A cross-sectional study was conducted on unintentional injury in children between 6-24 months in Teresina. Approximately six-hundred primary caregivers were randomly sampled from low-income communities and interviewed about family demographics, caregivers' psychosocial characteristics, details of children's accidents during the preceding two weeks, accidents for which the child went to a doctor, or any other accident during the child's life.

**Major findings:** Twenty-eight percent of participating households reported their children had an accident during the two previous weeks. Of these accidents, by far the most prevalent type of accident were falls (78%), and 35% of these falls were reported to be from beds or hammocks. A disproportionate number of accidents occurred while children were sleeping (approximately 1/3 of all falls). Other accidents included cuts, motor vehicle collisions, burns and contact with animals.

Broken objects (chairs, toys, etc.) were often involved, the baby was often alone at the time the accident occurred, toddlers were frequently cared for by another child (often an older sister), and falls from bed often resulted when there were several children sleeping together. Lack of childcare opportunities and baby-safe environments appear to be related to many childhood accidents.

### Presentations:

Surkan P, Vieira Carvalho LM. 'Unintentional Injury in Children aged 6-24 months in Teresina, Piaui, Brazil: A qualitative analysis' Poster: Society for Public Health `Education 54<sup>th</sup> Annual Meeting, Nov 14-16, San Francisco, CA, 2003.

## **Seed Grant 5**

**Title of Project:** Creation of a Prison Research Collaborative

**Project Director:** Angela Browne, Ph.D., Lead; Steven Lippmann, Research Coordinator

**Institutions:** Harvard Injury Control Research Center

**Summary of Project:** Founded in 2003, the Prison Research Collaborative (PRC) is made up of six sites with access to state-level data on adult and/or juvenile incarceration, child welfare and abuse-related services, and other related services. Sites include the three U.S. states with the most prisoners (Texas, California, Florida) the two states with the highest incarceration rates (Louisiana and Texas), and the three states with the most children detained (California, Texas, Florida). The PRC conducts within-site and across-site inquiries and responds to outside and governmental inquiries on topics of interest. The overall goal of the Prison Research Collaborative is to foster collaboration among research sites (states and large counties) with access to multiple data sources on incarcerated girls, boys, women, and men in US jails and prisons and their families. The PRC's main focus is on expanding knowledge about the relationship of: (a) abuse and neglect within the family, (b) social service use and child placements, and (c) parental/family circumstances, including incarceration, with (d) subsequent perpetration of violence and criminal justice outcomes for children, teens and adults and (e) resiliency and desistance. HICRC serves as the Coordinating Center for the PRC.

**Training:** Former HICRC Yerby Fellow Shairi Turner, MD, MPH assisted Dr. Browne on this project. At the conclusion of her fellowship, Dr. Turner left to become Chief Medical Director of Florida's Department of Juvenile Justice, with the physical and mental health of over 10,000 incarcerated children under her care.

**Publications, Presentations and Grant Submissions:** The PRC's findings have been presented at multiple meetings of the American Society of Criminology as well as at numerous state- and national-level professional meetings. Two RO1 grant proposals were prepared and submitted. The first was funded.

**Multi-site Research Project:** In 2005, a multi-site research project focusing on outcomes for the children of incarcerated parents was funded by NIJ. This project is conducting a multi-year, multi-generational examination of the risk of child abuse, perpetration of violence, impact of removal of children from their homes, and risks for children of incarceration of their maternal parent. This has become a flagship project for the NIJ, with over a dozen presentations by Investigators and the NIJ Project Officer in the first year. NIJ now is convening a 2006 invitational conference for other funders where preliminary findings will be presented.

The PRC has been successfully launched and funded. This project is complete.

## **Seed Grant 6**

**Title of Project:** Girls' Aggression: Violent Offending Among Girls in Florida

**Principal Director:** Kristin Parsons Winokur, with Angela Browne & Steven Lippmann

**Institution:** Justice Research Center, Florida & Florida Dept. of Juvenile Justice

**Summary of Project:** The primary objective of this large, quantitative, study has been to examine trends in girls' violent offending in Florida. The study includes all first-time female juvenile offenders in Florida for the years of 1990, '92, '94, '96, '98, and 2000, resulting in a sample of 106,740 girls. The study purpose was to explore whether the recent "rise" in violence by girls, as suggested by arrest statistics, reflected an actual increase in violent aggression by girls or was a reflection of changes in interpretation of law, arrest, and sentencing policies.



**Major Findings:** Although the number of girls (and boys) nationally and in Florida who report perpetrating violence in the Youth Risk Behavior Surveillance Study and other non-justice assessments has decreased each year from 1991 through 2003, the number of girls referred to Florida's juvenile justice system continued to increase. As in many states, this is in part a function of no safe alternatives for girls who have committed minor (or no) offenses, but who are physical and sexually unsafe with family members or guardians. Findings from this large, total population, sample demonstrate that arrest increases did not reflect a corresponding increase in violence and severe violence from 1990 to 2000. Girls also were (rated as) less physically aggressive with weapons (-54%), less likely to exhibit poor detention behavior (-29%), and less aggressive in school (-50%) by 2000 than in 1990. Girls who were referred to Florida's DJJ for the first time were mostly referred for minor property offenses and misdemeanor "simple" assaults such as school ground altercations with other girls or disagreements with parents or guardians.

In a second set of analyses, completed in 2005, girls referred for violent offenses were not more likely to recidivate than girls referred for other offenses. Rather, the highest risk for recidivism were girls who were committed to a locked facility, even when violent offense, type of crime, age, race, and other risk factors were taken into account. Study conclusions include the observation that the use of harsh punitive measures such as incarceration for girls seems both contraindicated for healthy and non-violent outcomes and ineffective in terms of recidivism.

**Publications and Presentations:** Findings from the Girls Aggression Project have been presented at meetings of the American Society of Criminology as well as at numerous state- and national-level conferences and at criminal justice and other research and policy organizations. Browne and Winokur also gave a one-on-one briefing on study findings and implications to the Secretary and Deputy Secretary of Florida's Department of Juvenile Justice and conducted Forums on the findings at the Secretary's request.

#### **Seed Grant 7**

**Title of Project:** Assessment of a Domestic Violence Screening Protocol for Oncology Providers

**Project Director:** Jeanne Hathaway, PhD

**Institution:** HSPH, Division of Public Health Practice

**Summary of Project:** The purpose of this study is to assess the rates of domestic violence (DV) screening and disclosure in a large gynecologic oncology clinic that implemented a new DV screening protocol in November 2002. The DV screening protocol called for medical assistants to place a paper "Screening Record" in each patient's chart and for the nurse practitioners to screen all patients for DV and document the results on the Screening Record form.

**Major Findings:** Of the 204 charts abstracted, the majority (62.6%) had a Screening Record present. Of charts with a Screening Record, only 16 (12.4%) had documentation of DV screening. Of these 16, 13 patients reported no DV, two reported past DV, and one reported current DV. Those patients who were screened for DV were significantly more likely than those not screened to have been seen by a nurse ( $p = .01$ ) and to have had five or more clinic visits during the study period ( $p = .04$ ). Patients with cervical cancer were significantly *less* likely to be screened ( $p=.02$ ). Patients screened for DV did not differ significantly from other patients in regards to age, race, primary language, insurance type, marital status, treatment status, stage or grade of cancer.

Nurses reported several barriers to DV screening and documentation, as well as suggestions for improvement. Barriers to screening included forgetting to screen, time constraints, patients having “more pressing issues” lack of privacy, and discomfort with DV screening. Barriers to documentation of DV screening included forgetting, lack of a DV section in the electronic medical record progress notes, concerns about the privacy of DV documentation, and uncertainty around how to word DV documentation. Suggested solutions to these barriers included adding screening questions to patient intake and/or follow-up forms, sending e-mail reminders regarding screening, having medical assistants remind nurses when screening is due, and continued DV trainings. All the nurses said that it would be more convenient for them to document DV in patients’ electronic medical records rather than on the Screening Record form, which came into use several months after the DV screening protocol was implemented.

Overall, the study revealed a number of barriers to implementing DV screening in a large gynecologic oncology clinic. Given low rates of DV screening documentation, rates of DV disclosure could not be accurately assessed. **Several changes to improve DV screening and documentation rates have been implemented in the oncology clinic based on study findings**, including adding DV screening questions to patient intake and follow-up forms, documenting DV screening in patients’ electronic medical records, conducting additional DV trainings, and the addition of a physician to the clinic’s DV Task Force.

Oncology clinics interested in implementing a DV screening protocol may want to consider the following elements:

- develop the protocol with a multi-disciplinary team from your clinic and on-site DV staff,
- provide initial and on-going training for staff conducting the screening,
- cover DV survivors’ perspective on screening during training,
- include DV screening questions on patient intake and follow-up forms,
- provide on-going reminders to staff conducting DV screening and documentation,
- document DV screening on existing paper or electronic forms,
- provide on-site DV services when possible, or establish connections with local DV services, and
- consider upcoming changes in the clinic that may affect screening or documentation.