Allen Bolton, Paul Boumbulian, and Ron Anderson

Injury is a major public health problem. Each year, over 143,000 Americans die from injuries. Financially, injuries cost the nation over $44 billion. Public health methods can impact injury through application of technology, policy, education, and incentives. Metropolitan universities have great opportunities as key institutions to assist in reducing injuries within their communities by utilizing their research proficiencies, student and volunteer work forces, and as providers of education and training services.

Public Health Enemy Number One:

Injury in America

One decade ago, the National Research Council and the Institute of Medicine completed a report concluding that injury was the principal public health problem in America at that time. When that statement was officially published in 1985, in *Injury in America,* few considered injury to be a public health concern. That notion is still resisted ten years later. Nonetheless, *Injury in America* captured the attention and respect of some key leaders within the scientific and political communities. Today, this landmark publication is widely considered to be the reason for a fairly rapid escalation in funding and scientific rigor in injury prevention research and the basis on which a multidisciplinary approach to injury prevention was encouraged within the scientific community.

Before 1985, injuries were typically studied in compartmentalized fashion. Engineers studied traffic crashes; sociologists studied violence; pharmacologists studied poisonings; rehabilitation professionals studied spinal cord injuries; and so on. The problems created by this type of separatist approach are perhaps best reflected in the words of Mark Twain, "If your only tool is a hammer, all problems look like nails."

Injury in America challenged such turf-oriented, narrow views of injury and encouraged broader participation and cooperation among scientific disciplines in injury prevention research. The report also prompted the federal government to designate the Centers for Disease Control and Prevention (CDC) as the lead agency to stimulate

multidisciplinary research in injury prevention. During the past ten years, the CDC has funded a handful of "centers of excellence" in injury research. All are affiliated with major urban and metropolitan universities. These centers are required to incorporate varied disciplines in the study of how injuries occur and may be prevented.

Significant injury problems are found in urban settings. Such problems have plagued cities for decades, if not centuries. However, multidisciplinary techniques utilizing local academic resources have seldom been employed on a large scale. Metropolitan universities, because of their location and intellectual resources, have multiple opportunities to become engaged in injury prevention activities within their cities while furthering their own research and community service agendas. This article will examine the state of the injury problem and the underlying public health principles of injury prevention. It will then examine how metropolitan universities can become significant partners for injury prevention with their urban communities.

A Problem of Enormous Magnitude

Injury is defined as physiological damage resulting from exposure to mechanical, thermal, or chemical energy. It may also be due to the absence of heat or oxygen. Even though there is some variation among cities, the primary causes of injury, morbidity, and mortality in urban areas throughout the United States are motor vehicles, falls, violence, fires, drownings/near drownings, and poisonings. Injuries occur within these categories according to particular age, race, or geographic trends.

The annual death toll from injuries in the United States is greater than the number of American lives lost during the 9-year Vietnam conflict. Injury is the leading cause of death for ages 1 through 44. It is the fourth leading cause of death for the entire human life span. It is responsible for more than 60 percent of all childhood deaths and more than 80 percent of adolescent deaths in the United States. Injury death rates for those aged 75 and older are higher than for any other age group. Each year in the United States, 143,000 people will die, 2.3 million will require hospitalization, and another 30 million will require some form of medical treatment as a result of injury. Roughly one in four Americans is injured seriously enough every year to require some form of medical treatment. That is equivalent to 170,000 medically treated injuries and 400 deaths per day in the United States.

The cost of injury to our society is staggering. In the United States, direct health care costs for injuries exceed $44 billion each year. Another $113 billion in indirect costs, such as lost wages, lifestyle modifications in living and transportation arrangements, and compensation for pain and suffering, is incurred. In Dallas County, Texas, a population of nearly 2 million residents, annual direct costs for only the fraction of injuries that require hospitalization exceeds $225 million each year. Approximately one-third of all trauma patients have no method of paying for their medical treatment. Therefore, public resources are utilized to cover this enormous

health care cost—nearly $15 billion per year nationwide, $75 million in Dallas County alone.

Injury as a Public Health Problem

Public health has historically been the discipline responsible for promoting and protecting the health of the population overall, in contrast to medicine, which has been responsible for protecting and restoring the health of individuals within the population. However, during the past quarter-century, public health has been required to provide individual health care services where shortfalls in the health care delivery system occurred. This has caused confusion among the public about the true purpose of public health. To avoid such confusion hereafter, it is the original mission of public health, i.e., population-wide diagnosis and intervention, that is relevant to injury prevention efforts. The population-wide prevention services of public health have traditionally made the greatest contributions to improving health in society.

Epidemiology, the study of the distribution and determinants of human diseases and injuries, is the primary public health discipline that helps identify which conditions threaten the health of society. At the beginning of the twentieth century, the leading causes of death and of lost years of productive life in America were infectious diseases and injuries. But by the 1920s and 1930s, improvements in sanitation, housing, and other public health measures had significantly reduced the death toll from infectious diseases. Consider, for example, gastroenteritis, one of the leading causes of death in America in 1910. About that same time, the technique for pasteurizing milk was invented and the nation's first Water Quality Drinking Act was implemented. Within 10 years death rates from gastroenteritis had fallen dramatically. With the progress of these and other public health interventions aimed at communicable diseases, injury then became the greatest cause of lost years of productive life—a position it continues to occupy in 1995.

While injuries have been known to be a leading cause of human death and suffering throughout this century, the willingness of scientists and policymakers to address injuries through prevention has been slow in coming. The primary reason for this delayed response is society's prevalent misconception that injuries are "accidental," random, uncontrollable events that can neither be predicted nor prevented. In general, society has been taught that injuries are "acts of God" instead of the result of acts of man. This misconception is manifested in two different ways: fatalism and determinism.

Fatalism is the belief that, regardless of personal choices, one's course in life is uncontrollable. For example, research has demonstrated that many young inner-city African-American males believe that they will not live beyond their early 20s. Many have witnessed homicides, domestic violence, drug trafficking, and other illegal ac-

tivity. They may feel "destined" to repeat these behaviors which often lead to fatal outcomes. Their responsiveness to any new prevention opportunities in life is therefore shaded or overshadowed by their fatalistic attitudes.

Determinism is a feeling of "it will not happen to me." Many individuals believe the risk of injury to themselves or their family members is so remote and unpredictable that they readily disregard available prevention measures. Or they may believe their personal behaviors or skills will prevent them from being injured. A PTA board member in Texas was discussing her organization's support for a proposed statewide bicycle helmet law when she reflected this idea. While she insisted that her own children wear bicycle helmets when riding, she indicated that she and her husband never wore helmets because they "were very careful and knew how to ride bikes."

Another factor that influences the public's acceptance of injury as a public health problem is the manner in which some injuries can most effectively be controlled. In some instances, effective injury prevention strategies involve policies or regulations. Many in society do not accept policies aimed at changing human behaviors as legitimate means of preventing injuries. As an example, motorcycle helmet use laws are known to be an effective method of reducing motorcycle crash-related deaths by 50 percent or more. Yet, in many states and in the federal government, these laws and the federal incentives that keep them in place are continually challenged by those who believe government should not mandate such behaviors. Ironically, studies have demonstrated that a high proportion of individuals wishing to engage in these types of behaviors lack medical insurance. Consequently, when they become injured, their medical care is likely to be sponsored by the very government whose intervention they oppose.

In general, opposition to laws that protect the public from certain injuries are in contrast to the public support for laws that protect the public from the threat of certain human diseases such as rubella (i.e., mandatory immunizations for school-age children). Even policies aimed at human diseases that are behavior-related have met with an increasing level of public support. For example, ordinances banning smoking and "sin" taxes on tobacco products (interventions aimed at reducing risk for cardiovascular diseases and some cancers) have gained public acceptance during the past decade.

No Overnight Remedy

The ways in which factors interrelate in society to produce optimum conditions for injuries to occur are often deep-rooted and complex. The epidemiology triangle provides a framework for examining the many factors that converge to produce injuries. The epidemiology triangle, in essence, states that injuries are produced when agent (the mechanism of injury—e.g., a car, a firearm, a bicycle), host (atti-

tudes and behaviors of the individual being injured), and environment (the physical, political, and social environments in which the injury occurs) factors converge. An intoxicated, unbelted motorist (host) driving a small high-horsepower sports car (agent) on a two-lane, dimly lit roadway at night (environment) produces a situation in which injury is probable. Altering one or more of these factors reduces the likelihood of injury. It is the task of injury prevention specialists to understand what these factors are, how they are related, and thereby identify the point(s) of intervention or "weak link(s)" in the causal chain of injury producing events.

Once weak links are identified, they can be used as leverage points for intervention. Four types of intervention strategies can be considered. These strategies have been used separately or in various combinations to address injury problems.

Technology

Some of the most effective injury interventions have been technological changes in products or environments such as roadways. The addition of head restraints or headrests to all automobiles in the late 1960s has resulted in an estimated 64,000 fewer head and neck injuries per year in the United States. Airbags in automobiles have saved many thousands of lives since they started becoming more readily available in new cars in the early 1990s. Safety is a design consideration in all products from toys to furniture, food and drug packaging, residential or commercial construction, roadways, and playgrounds.

Technological interventions are generally considered to be the most effective means of preventing injuries, even though they are passive interventions. That is, they provide protection from injury through no action of the individual whose life is being protected.

Policy

Policies, regulations, laws, or ordinances are another means of protecting the public from certain injury producing events. In 1974, in a effort to conserve fuel, the federal government encouraged states to set their maximum speed limits to 55 mph. When states decreased speed limits, automobile fatalities, particularly on rural interstate highways, dropped dramatically.

In cities with local bicycle helmet ordinances, the proportion of cyclists who wear helmets has increased manyfold and bicycle-related head injuries have been reduced. Likewise, cities with fencing ordinances for residential swimming pools have reduced the number of drownings and near drownings of small children.

Regulatory interventions are effective but somewhat less so than technological interventions. One reason is that with regulations there is some action required by the individual being protected, which means that individuals cannot assume an entirely passive role. Additionally, the effectiveness of regulations is highly dependent

upon the manner and consistency of enforcement efforts. Examinations of the first statewide mandatory child restraint laws revealed that compliance was directly proportional to the level of police enforcement (i.e., the number of citations issued).

Education

By themselves, educational interventions are generally considered to be the least effective of the prevention strategies. The real value of education appears to be as a complementary effort to other types of intervention strategies. The placement of smoke detectors in homes, a technological intervention, is effective initially, but the lasting value of this intervention is enhanced when education encouraging individuals to routinely replace smoke detector batteries is provided.

There are a few educational interventions that have proven effective as single strategies to prevent certain injuries. For example, the "Willy Whistle" curriculum has yielded a reduction in childhood pedestrian injuries among its elementary school-age target population. The Injury Prevention Project of the American Academy of Pediatrics is a one-on-one counseling/educational program that has also been shown to be a cost-effective method of reducing specific childhood injuries. But such efforts must reach a large number of individuals within the target population, and evaluation schemes must be rigorously designed and implemented in order to document an effect.

Incentives

A fourth type of strategy was recently added to discussions of injury prevention "incentives." Incentives are simply a means of enticing individuals to adopt safety behaviors. Automobile insurance companies that offer policyholders lower premiums if they wear safety belts are utilizing an incentive strategy to promote a safe behavior. On a grander scale, by withholding federal highway funding from states that had not adopted 21 as the legal minimum drinking age, the federal government was practicing an incentive strategy to reduce injuries. In both examples the incentives are economic.

None of these four strategies, independently or in combinations, should be viewed as "quick-fix" solutions to injury problems. Regardless of the intervention strategies chosen, injury rates are unlikely to fall overnight. And once rates have fallen within the target range, intervention strategies must be continually reinforced; otherwise the effect is likely to be temporary. Injury prevention at the community level requires extensive commitment, cooperation, and patience from the community itself. The strategies alone, without being anchored in the infrastructure and culture of a community, have little hope of being effective or even sustained.

Safe Communities Approach

The Safe Communities strategy is a method of mobilizing community partnerships to identify and solve local injury problems. Many types of individuals and agencies are necessary in such partnerships, but the involvement of metropolitan universities is absolutely critical to the success of a process by which injuries are targeted for intervention at the community level.

The Safe Communities approach process is being promoted internationally by the World Health Organization that has received widespread acceptance and replication in other countries, although the United States has been slow to adopt this method of injury prevention. The Safe Communities model is based on the realization that community-level programs hold the key to reducing and preventing injuries. Strategies for a safe community will vary from location to location because they are based on needs and assets that are specific to each community.

The Safe Communities process requires that communities approach injury prevention in five sequential steps. First, a needs and assets assessment is conducted to determine where injury problems and community-based resources exist. Local data and community input are obtained and analyzed in this step. Second, community coalitions are formed and mobilized based on the injuries that will be targeted. Where possible, Safe Communities taps into existing coalitions and infrastructures instead of creating new entities within communities. By utilizing existing data and coalitions, the Safe Communities process is a method of improving the efficiency of communities' resources. Third, interventions are identified or designed. The process requires that a thorough search be conducted to determine if effective interventions exist to target specific injuries. If so, such interventions are presented to community coalitions for consideration and, if necessary, modification. Fourth, the selected intervention(s) are implemented within the community. And fifth, process and outcome evaluations are conducted to determine if the intervention(s) is successful.

The Safe Communities process has been proven to be an effective and efficient method of preventing injuries. Total injuries in some communities where this strategy has been employed have decreased by 28 percent. Reductions as high as 45 percent have been recorded in some target populations, such as that of preschool children. One Swedish community reduced bicycle-related head injuries for all ages by 25 percent over a four-year period. Similar reductions are occurring in Australia, Canada, and other locations where Safe Communities has been employed.

Roles for Universities in Urban Settings

Metropolitan universities are often located in sections of urban areas where injury rates are high. Violence is usually most prevalent in these downtown areas. Falls and house fires are commonly associated with the older structures typically

found within the inner perimeters of city limits, often surrounding college campuses. Motor-pedestrian and motor-pedicycle incidents are also prevalent in these settings. Many other injuries are also correlated with urban social and infrastructure problems (such as unemployment, undereducation, poor and/or crowded living conditions, substance abuse, and lack of social services) that affect the environment in which metropolitan universities are located. With these problems literally in the backyards of urban universities, they provide opportunities for institutions of higher learning to utilize their physical and intellectual resources in a manner that is locally relevant.

Many universities located in major urban cities act as if they are in a community but not as if they are a part of that community. For example, scholars have a reputation for assessing the needs of communities and even providing those communities with ready-made solutions to their "problems." But this creates a paternal relationship between universities and communities leading to dependency and a client-oriented approach instead of a partnership, a type of relationship in which change cannot be sustained. To change the relationship into one of collaboration and community empowerment, four potential roles are proposed for metropolitan universities.

Creating Supportive Internal and External Environments

Several characteristics are commonly seen in mature communities: inclusion of diverse people and information, openness to creativity and innovation, and semipermeable boundaries. Within this framework, metropolitan universities are themselves small communities as well as being parts of larger communities within which they function. To begin to create environments supportive of injury prevention, metropolitan universities should start at home, i.e., within the campus community. Is the campus physically safe for students and faculty? What are the attitudes and behaviors of administration, faculty, and students about personal safety? Are policies in place to reduce the risk of injury on university property, at university functions, or in university vehicles? While the impetus for a safe campus community may come from the student or staff ranks at the university (bottom-up), support from the faculty and administration (top-down) is essential for its development.

Metropolitan universities can also play a significant role in creating supportive environments in the larger, external communities in which they exist, and they should serve as co-equal partners in community coalitions. In this capacity, universities can offer their vast resources and expertise as assets from which the community may draw. For example, metropolitan universities are typically a major employer within the community and thus have significant political influence because of their economic and manpower base. Communities should be encouraged to tap into this sphere of influence whenever necessary to bring about infrastructure or policy changes that might impact upon injury prevention efforts.

Utilizing Research Proficiencies

This is a difficult arena in which to play. Universities must be careful that communities are open to utilizing the institution's research skills. Many community groups, perhaps based on previous experience, will be leery of becoming a laboratory for university researchers. If this potential difficulty is overcome, the Safe Communities process, is particularly replete with opportunities for researchers. The needs and assets assessment phase creates opportunities to gather and analyze various forms of data, and analyzing existing databases and conducting original survey research are critical. The phase in which interventions of proven effectiveness are identified can be aided by access to university libraries and to professionals skilled in searching a broad spectrum of literature. Modifying interventions, if necessary, may involve faculty with very specific skills, such as curriculum development or civil engineering. And, the rigor and objectivity of the evaluation process can be greatly enhanced by a variety of the scientific skills found at most universities.

The importance of public health sciences, particularly epidemiology, for understanding and characterizing injuries cannot be overstated. Clearly, any university with a school or department of public health and/or epidemiologists on faculty should be involved in injury research within its surrounding community. However, the complex issues of injury causation are more than epidemiologists alone can study. The social and behavioral sciences can contribute both quantitative and qualitative information that is not routinely addressed by epidemiologists.

Sociology, social work, political science, anthropology, demography, criminal justice, engineering, and education are some of the many fields that may offer unique talents and perspectives to collaborative injury prevention efforts. No discipline should be disregarded without careful consideration. Ideally, universities would identify and assign multidisciplinary research teams to work with community groups on injury issues. Such teams would broaden the communities' and the scientists' individual perspectives on the problems being examined and provide a format for cross-fertilization of ideas.

Utilizing the Student and Volunteer Workforces

Students can be a dynamic asset for community-based efforts. They typically bring to communities a refreshing set of characteristics, many of which Gozdz indicated are necessary, such as creativity, innovation, and inclusiveness. Universities may create opportunities for students to meet certain community needs while obtaining academic credit, practical work experience, research proficiencies, or "credits" for fraternal organizations. Because they generally bring a great deal of enthusiasm but little work experience to community settings, student assistants may require quite a bit of supervision. For this reason, some communities may decline student help. The level of supervision that is expected should be discussed with community leaders prior to student placement.

Many universities also provide incentives or recognition for employees who volunteer service to community activities in their "off time." Participation in blood drives and fund-raising drives, e.g., United Way campaigns, has long been encouraged on an institutional basis. Some universities have now moved into "voluntary" university-sponsored work efforts in neighboring communities. In the area of injury prevention, these efforts could involve activities such as smoke detector installation or child safety seat inspections. As good corporate citizens, volunteerism should be encouraged, and perhaps focused, by universities.

Provider of Training Services

Metropolitan universities are institutions of higher learning, and as such should make community needs-based training available to their communities. Providing this type of service to neighboring communities also helps to diminish the ivory tower stigma many universities still have within their cities. With their cadres of articulate specialists in various areas, classroom space, library facilities, and other resources at their disposal, universities can tailor educational opportunities for a variety of community needs and audiences thereby making their institutions accessible and more relevant to the community at large.

Conclusion

In every metropolitan area in the United States, injury is one of the leading public health problems. It is recommended that injuries be addressed locally and in a multidisciplinary fashion. Metropolitan universities are assets of urban communities that can be utilized to help promote and foster community-based injury prevention efforts. The role of metropolitan universities should be substantial if Safe Communities is the particular strategy that local communities select to reduce injuries. Even if metropolitan universities do not offer degree programs in medicine, nursing, or public health, they posses valuable resources that can be used to address local injury problems. By becoming involved, as technical resources and as stakeholders, in community-based intervention efforts, metropolitan universities will help improve their environments while enhancing their academic agenda and community standing.

Suggested Readings

Anderson, R. J., and Smith, D. R. "Challenging the Darkness: Metropolitan Universities in Today's Society." *Metropolitan Universities*, Winter 1993:49-56.

Boumbulian, P. J., and Anderson, R. J. "Survival through Community Service: From Sick Care to Health Care." *Health Management Quarterly*, Fourth Quarter 1994:17-23.

Committee on Trauma Research, National Research Council and the Institute of

Medicine. *Injury in America -- A Continuing Public Health Problem*. Washington, D.C.: National Academy Press, 1985.

Hogness, J. R., McLaughlin, C. J., and Osterwies, M. (Eds). *The University in the Urban Community: Responsibilities for Public Health.* United States: Association of Academic Health Centers, 1995.

Klang, M., Andersson, R., and Lindqvist, K. *Safe Communities -- The Application to Industrialized Countries*. Kinkoping, Sweden: Department of Social Medicine, Karolinska Institute, 1991.

Kretzmann, J.P., and McKnight, J. L. *Building Communities From the Inside Out -- A Path Toward Finding and Mobilizing a Community's Assets.* Evanston, IL: Center for Urban Affairs and Policy Research, Northwestern University, 1993.

Rice, D. T., McKenzie, E. J., Jones, A.S., et al. *Cost of Injury in the United States: A Report to Congress.* San Francisco: Insttitute for Health & Aging, University of California, and Injury Prevention Center, The Johns Hopkins University, 1989.

Stanford, G.G., and Bolton, G.A., "Injury prevention: The Ultimate Solution for Reducing Death and Disability from Traumatic Injury in Dallas." *Dallas Medical Journal*, November, 1994:454-457.

The Fourth Annual Conference of the Coalition of Urban and Metropolitan Universities

"Metropolitan Universities Face the New Millennium"

Contemporary Resort
Walt Disney World
Orlando, Florida

June 20-22, 1996

University of Central Florida

Host Institution

Contact: Office of the President, UCF, Orlando, FL 32816, (407) 823-1823