
INJURY AND VIOLENCE PREVENTION IN RURAL AREAS

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SCOPE OF PROBLEM

- Age-adjusted injury and unintentional injury death rates are higher in rural areas than urban areas.^{1,2}
- Unintentional injuries are the fifth leading cause of death and are more prevalent in rural areas.³
- Motor vehicle deaths and occupational injuries are higher in rural areas.²
- The 40 percent of agricultural work-related fatalities accounted for by minors far outweighs the small percentage of minors in agriculture, eight percent.^{4,5}

GOALS AND OBJECTIVES

The Healthy People 2010 (HP2010) goal for this focus area is to “reduce injuries, disabilities, and deaths due to unintentional injuries.”⁶ For the purposes of this review, the following Healthy People 2010 objectives are addressed:⁶

- 15.1. Reduce hospitalization for nonfatal head injuries.
- 15.3. Reduce firearm-related deaths.
- 15.4. Reduce the proportion of persons living in homes with firearms that are loaded and unlocked.
- 15.5. Reduce nonfatal firearm-related injuries.
- 15.7. Reduce nonfatal poisonings.
- 15.8. Reduce deaths caused by poisonings.
- 15.13. Reduce deaths from unintentional injuries.
- 15.14. Reduce nonfatal unintentional injuries.
- 15.15. Reduce deaths caused by motor vehicle crashes.
- 15.17. Reduce nonfatal injuries from motor vehicle crashes.

- 15.19. Increase use of safety belts.
- 15.27. Reduce deaths from falls.
- 15.29. Reduce drownings.
- 15.32. Reduce homicides.
- 15.33. Reduce maltreatment and maltreatment fatalities of children.
- 15.34. Reduce the rate of physical assault by intimate partners.
- 15.36. Reduce sexual assaults.
- 15.38. Reduce physical fighting among adolescents.
- 20.1. Reduce work-related injury deaths.
- 20.2. Reduce work-related injuries.

Unintentional injuries were the fifth leading cause of death overall in 2001.³ While injury and violence are prevalent in both rural and urban areas, differences exist across urbanicity in the cause and type of injury. The prevalence of high-risk occupations, such as those agriculturally related, and greater travel distances place rural residents at heightened risk for occupational and motor vehicle injuries. The need to address injury and violence in this population is evidenced through the Rural Healthy People 2010 survey in which accidental injury and violence was tied for 13th rank with immunization and infectious diseases as a rural health priority by state and local rural health leaders in considering the 28 Healthy People 2010 focus areas.⁷ There were no significant differences in rates of nomination across the four geographic regions of the country.

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PREVALENCE

In this review, injuries are classified as intentional or unintentional—a categorization scheme used by the World Health Organization’s 2002 World Report on Violence and Health.⁸ In this context, *unintentional injury* includes injuries related to traffic (motor vehicle, safety belt use, and all-terrain vehicles), occupational and work related (focusing on agriculture, mining, forestry, and fishing), firearms, drowning, falls, burns, and poisonings. *Intentional injury* includes interpersonal violence (pertaining to youth, family, and intimate violence) and homicide.

Unintentional Injuries

Traffic Injuries

Deaths due to motor vehicle-related injuries are a leading cause of unintentional injuries. Higher motor vehicle death rates are found in rural areas than in urban areas, particularly in the West and South.^{2,9} An analysis of data from the National Highway Traffic Safety Administration’s Fatal Accident Reporting System (FARS) and the U.S. Census Bureau between 1977–1996 found the rural motor vehicle crash death rate (58.1 percent) was higher than the urban rate (41.9 percent).⁹ Failure to use safety belts is an important factor in unintentional injuries and deaths.¹⁰ Farm residents are less (or have been found to be less) likely to regularly wear safety belts than residents in metropolitan areas.¹¹ Another contributor to traffic injuries and deaths is use of all-terrain vehicles (ATVs). Rural residents, farmers, and men have been found more likely to have ridden an ATV in the last year than urban residents.^{1,11} While ATVs can be used on farms for work-related activities, they are commonly used for recreation, where more injuries occur.¹² Children less than 16 years of age account for approximately 36 percent of ATV-related deaths in the United States.^{13, 14}

Occupational Injuries

The overall 2001 U.S. occupational fatality rate is 4.3 per 100,000 (after excluding the September 11, 2001 fatalities).¹⁵ The highest occupational fatality rates occur among workers in the mining,

agriculture, forestry, and fishing industries.^{2, 16-20} Workers in these sectors also have the highest rates of machine-related deaths and motor vehicle deaths.¹⁹

In 2000, agriculture, forestry, and fishing had an incidence rate of 6.8 per 100 full-time equivalent (FTE) workers of nonfatal occupational injuries and illnesses, for a total of 103,400.^{21, 22} Sprains and strains were the leading injuries and accounted for over 33 percent of injuries in agriculture, forestry, and fishing.²³ A review of a rural emergency department found that agricultural work-related injuries accounted for as many as 12.5 percent of 12,000 injuries. Occupational injuries were found more likely to occur among older people and men.¹⁷ Farmers, with a mean age of 54, are at heightened risk of occupational nonfatal and fatal injury.²⁴⁻²⁵ One study found farmers over 55 years of age had an injury rate of 9 per 100 farmers.²⁶ Occupational injury death rates in agriculture are largely due to motor vehicle incidents including tractors and collisions, as well other farm machinery accidents.²⁷ Pesticides and herbicide exposure represent another occupational hazard.

The impact of work-related unintentional injuries in agriculture among youth is significant because youth working in agriculture account for 8 percent of the population, but they account for 40 percent of work-related fatalities among minors.^{4, 5} The rate of work-related agricultural fatalities for youth ages 15–19 is 12.2 per 100,000 FTE, with higher rates among males than females.²⁸⁻³⁰ The highest rates per 100,000 of fatal injury to children occur in crop production in the Midwest, South, and West.^{28, 29} In the Northeast, the highest rates of fatalities occur in livestock production.^{28, 29} The main causes of injury to youth on farms are falls, transportation-related incidents, and “being struck by objects.”³¹⁻³³ The leading causes of death are machinery accidents and electrical current.⁵

Injuries Due to Firearms

Firearm-related injuries contribute to both unintentional and intentional injuries. In 1999, the overall age-adjusted death rate for firearm injuries

was 10.6 per 100,000, with the largest rate (21.6 per 100,000) among ages 20–24.³⁴ Urban rates of unintentional firearm injuries were found to be 10 times higher than nonurban (28.3 per 100,000 versus 2.4 per 100,000). In rural counties, nonfatal firearm injuries occurred most often at home compared to urban counties where injuries occurred most often in the streets.^{35, 36} The unintentional firearm mortality rate is higher (1.0 per 100,000) in nonmetropolitan counties than metropolitan counties (0.5 per 100,000).^{2, 37}

Drowning

An average of 32 childhood farm drownings occur annually, a rate comparable to that of urban areas.³⁸ Fatalities were most common in the South and Midwest, with the West and Northeast having the lowest rates. From 1986–1997, six states accounted for 45 percent of drowning incidences: Texas, Mississippi, Missouri, Oklahoma, Georgia, and North Carolina.³⁸ Approximately a third of deaths were among children between zero to four years old, and 87 percent of deaths were among boys, making the rate of death 3.8 times higher for boys than for girls.^{5, 38, 39} Adolescents have also been identified as at risk for drowning.^{40, 41}

Falls, Burns, and Poisonings

Falls, burns, and poisonings are also significant causes of unintentional injuries. In 1995, poisonings were the third leading cause of injury deaths, accounting for 11 percent of injury deaths. In 1995, unintentional poisoning deaths had an age-adjusted death rate in metropolitan counties higher than nonmetropolitan counties, 3.5 compared with 2.0 per each 100,000.² Certain rural groups may be more vulnerable to poisonings, such as farm workers who are exposed to pesticides and other chemicals.⁴² Falls were the fourth leading cause of injury death in 1995, and 93 percent of such deaths were due to unintentional injuries.² Falls from farm vehicles were a significant source of fatalities involving farm vehicles.²⁷ Age is also a strong factor in the occurrence of falls from injuries, particularly among the rural elderly and very young children.^{43–45} Deaths

due to burns were the seventh leading cause of injury deaths in 1995, and the majority (89 percent) were unintentional injuries. Children in metropolitan counties had a slightly higher burn injury rate (363 per 100,000) than nonmetropolitan (296 per 100,000).⁴⁶

Intentional Injuries

Interpersonal Injuries

Violence among youth is a leading cause of intentional injuries, and data suggest an increasing trend in this category of injuries. The National Youth Gang Center estimates more than 24,500 gangs were active in more than 3,330 jurisdictions across the United States in 2000.⁴⁷ Thirteen percent of smaller cities reported persistent gang activity compared to only 7 percent of rural counties—a strong contrast to 100 percent of law enforcement agencies in larger cities reporting such gang activity.⁴⁸

Family and intimate partner violence, including domestic violence, sexual assault, child abuse, and elder abuse, is a problem in urban and rural areas.⁴⁹ In rural areas, victims of domestic violence were “more likely to report they knew the perpetrator,”^{50, 51} were older (mid-40s versus mid-30s), twice as likely to be currently involved in an abusive relationship (25 percent versus 12 percent),⁵² and more likely than urban victims to seek help from clergy.⁴⁹ There are conflicting data about the differences in domestic abuse among adults in rural and urban areas, ranging from no difference to significantly higher rates in urban areas.⁴⁹ The rate of child abuse was higher in rural areas, although the difference did not remain when variables such as race and family income were held constant.⁵³ Finally, rural-urban comparisons of prevalence of elderly abuse are difficult given the dearth of comparative information on this subject. Nonetheless, it is important to pay attention to this issue given the increasing and disproportionate numbers of elderly people residing in rural areas. One out of four older Americans live in rural areas, making up 15 percent of the total rural population compared to 11 percent of metropolitan areas.^{51, 54}

Homicide

In 1999, the homicide death rate was significantly higher for ages 15–24 (13.2 per 100,000) than among other age groups.³⁴ National data show that across all categories, increasing urbanization is strongly associated with higher homicide rates.^{20, 55} Rural homicides are more likely to involve firearms than urban homicides.⁵⁶⁻⁵⁸ In 2000, homicide was the leading cause of death for young African-American males and the second leading cause of death for young Hispanic males.^{15, 20, 59, 60} The disproportionate numbers of homicides among young African-American and Hispanic males is also apparent in rural areas.⁶¹

IMPACT

In 2001, unintentional injuries were among the fifth leading cause of death overall and the leading cause of death for people ages one to four and 25–34.⁶²⁻⁶³ Deaths due to motor vehicles are a leading cause of unintentional injuries, and the motor vehicle

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death rate is higher in rural areas than urban areas. The agriculture, mining, forestry, and fishing industries have among the highest occupational fatality rates.^{2, 17, 18, 23} In addition to deaths among adults, youth also experience occupation fatalities, especially in agriculture. Youth account for 40 percent of work-related fatalities in agriculture.⁴ For youth and adults, the unintentional firearm fatality rate is higher in nonmetropolitan counties than metropolitan counties.³⁷ Unintentional drowning-

Youth account for 40 percent of work-related fatalities in agriculture.⁴

related fatalities were found to be most common in the South and Midwest.³⁸

Intentional injuries due to homicide show the South has the highest homicide rates; areas in the Northeast and

Midwest have greater urban-rural disparities in homicide rates.²⁰

The majority of data related to injury morbidity is limited to a few areas of unintentional and intentional injuries, such as occupational injuries—specifically, agriculture and family violence. Falls from vehicles, falls among the elderly, as well as poisonings from pesticide use were also found to be significant contributors to morbidity.^{27, 42, 64} Falls, burns, and poisonings were also significant causes of unintentional injuries.^{42, 43, 65, 66} In addition, firearm-related injuries among children in rural areas may be increasing.^{67, 68}

The unintentional firearm fatality rate is higher in nonmetropolitan counties than metropolitan counties.³⁷

Unintentional injuries involving family and intimate partner violence show a link between injuries and related illnesses such substance abuse and mental illnesses.⁶⁹⁻⁷⁴ There are also negative consequences for children who witness domestic violence, including psychological problems, behavioral problems, cognitive difficulties, mental health problems, substance abuse, post traumatic stress disorder, and other trauma-related symptoms.⁷⁵⁻⁷⁹

BARRIERS

Unintentional injuries due to motor vehicles in rural areas were found to be affected by factors such as time of driving (dusk, dawn, night), by delayed reporting and discovery of accidents, the fact that rural areas are less likely to have trauma systems or trauma centers, and they are less likely to have health professionals experienced in major trauma.^{9, 10, 80, 81}

Social isolation is also a barrier for rural residents seeking services, particularly for the elderly and for victims of domestic abuse. Cultural factors may also impact treatment-seeking behaviors; for example, rural women may be more likely to seek help from clergy than counselors about domestic violence.

Barriers within organizations may also exist. For example, a study showed a majority of domestic abuse victims would like to approach the issue with their physicians; yet another study showed that 42 percent of internal medicine residents felt unprepared to deal with domestic violence issues.⁸²

PROPOSED SOLUTIONS

A critical step toward decreasing the incidence of injury and violence-related mortality and morbidity is the improvement and coordination of surveillance activities. Currently, data on injury are mainly collected at the national level and not the state or local levels.⁸³ The surveillance systems at the state level that do exist vary and are not uniform.¹⁹ In addition to surveillance, the populations of interest need to be well defined and classified.

Education campaigns in rural areas can be effective in addressing domestic violence and child abuse.⁸⁴ Violent behavior prevention programs targeting boys and girls at very young ages have also been shown to be effective in decreasing violence behavior during the later teen years.⁶⁰ In areas of injury and violence where surveillance data as well as effectiveness studies are scarce, particularly along a rural and urban division such as elderly abuse, public education and awareness raising may be a critical first step. Such programs could focus on educating the public at large about the abuse, how to identify it, and where to seek help.⁸⁵ This could help alleviate the problem of underreporting, which is caused by several factors including denial, embarrassment, a victim's cognitive or physical inability to seek help, as well as ageism.^{86, 87} Primary care providers may be best suited to identify and report victims of elder abuse since such patients use health care services more often, and that may be their only social contact.⁸⁸

Finally, it is important to note that regardless of the injury and violence area being assessed, rural regions vary in the causes and prevalence of injury and violence morbidity and mortality.^{10, 89} Programs and policies should match local characteristics as closely as possible; one solution will not work for all rural areas.

SUMMARY AND CONCLUSION

Overall, age-adjusted injury and unintentional injury death rates are higher in rural areas than urban areas.^{1, 2} Rural disparities in injury and violence appear to be more prevalent among unintentional rather than intentional injuries. Mortality rates are higher in rural areas in accidents involving motor vehicles, safety belt use, and all-terrain vehicles. The same is also true in occupational injuries, especially since mining, agriculture, forestry, and fishing have the highest fatality rates of all industries.

Unintentional firearm fatality rates are also higher in rural areas, although intentional firearm fatality rates (for example, in homicides) are higher in urban areas. The remaining unintentional injuries either had similar prevalence rates in both urban and rural areas, had higher rates in urban areas, or data were insufficient to suggest a difference. This includes unintentional injuries caused by drowning, falls, burns, and poisonings. Intentional injuries are not significantly more prevalent among rural populations. Youth violence and homicide are more common in urban areas, while family and intimate partner violence occurs in similar rates in urban and rural areas. Family and intimate partner abuse victims face additional barriers in seeking services in rural areas. In addition to disparities in prevalence, disparities exist in risk factors between urban and rural areas. Although age, for example, is related to incidence of injury in most settings, age may present additional risks for injury among rural residents engaged in high-risk occupations, e.g., aging farmers. Rural geographic isolation affects the provision and seeking of services, for example, by affecting the availability of experienced health professionals and availability of educational, preventive and treatment programs, and facilities. Social isolation is also a barrier for rural residents, particularly for the elderly and for victims of domestic abuse.

It is important to understand the disparities in prevalence and risk factors among rural populations and to incorporate explanatory factors for such disparities in the development, implementation, and evaluation of programs and policies aimed at injury and violence prevention. Urban programs may not be

effective in rural areas, and programs effective in one rural area may not be effective in another rural area. Improved surveillance of morbidity and mortality data, a clearer definition of populations studied, and more evaluation of program effectiveness are essential to meet the Healthy People 2010 goals for injury and violence reduction among rural populations.

MODELS FOR PRACTICE

The following models for practice are examples of programs utilized to address this rural health issue.

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