

Rural Versus Urban Prevalence of Intimate Partner Violence-Related Emergency Department Visits, 2009-2014

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Purpose

The purpose of this study was to determine rural-urban disparities in prevalence of intimate partner violence-related emergency department visits using a nationally representative sample of emergency room visits for the years 2009-2014. Differences by U.S. Census region and gender were also analyzed.

Background

Intimate partner violence (IPV), also referred to as domestic violence, includes physical violence, sexual violence, stalking, psychological aggression, and reproductive control by a current or former boyfriend or girlfriend, domestic partner, or spouse.¹ IPV affects women disproportionately. Although lifetime prevalence of IPV is similar for women (37.3%) and men (30.9%), women experience a greater number of incidents and more severe physical abuse.² IPV is a major public health issue that adversely impacts physical and mental health and quality of life.³⁻⁵

Previous data are equivocal regarding rural-urban disparities in prevalence of IPV.^{6,7,8} Recent data indicate prevalence might be similar in rural and urban populations, but hospitalizations related to IPV are greater in rural areas, suggesting difficulty accessing preventive services to intervene before violence escalates.⁸⁻¹⁰ Areas with few services are also associated with higher levels of IPV-related homicide.¹⁰

A handful of studies have examined rural-urban disparities in IPV prevalence in the U.S.⁷⁻¹⁰ Rural and low-income communities are especially affected by lack of access to preventive services for IPV, including access to regular health care and routine screening for IPV. Additionally, victimization by intimate partners is largely underreported. Research suggests that this might be a greater problem in small and close-knit rural communities.^{11,12}

Key Findings

- ◆ Between 2009-2014, there were an estimated 156,945 emergency department visits in the U.S. for patients ages 15-64 with a “battering and other maltreatment by spouse or partner” (ICD-9-CM E967.3), averaging 26,158 visits per year in this 6-year period.
- ◆ Prevalence of intimate partner violence-related emergency department visits among those between the ages 15-64 was higher in rural versus non-rural areas in all regions except the Midwest (15.5 vs. 11.9 per 100,000 population).
- ◆ Women made up 93% of intimate partner violence-related emergency department visits among patients ages 15-64 in urban areas, compared to 95% in rural areas. Men in rural areas made up only 5% of intimate partner violence-related emergency department visits compared to 7% in urban areas.
- ◆ Rural men and women admitted to the emergency department with an intimate partner violence-related diagnosis were more likely to be in the lower half of the income distribution (87% vs. 59%) and to have public health insurance (48% vs. 44%) than their urban counterparts.

There is a need for more recent nationwide data to understand rural-urban disparities in IPV and inform policy recommendations aimed at preventing IPV and improving health outcomes for persons exposed to IPV.¹³

Methods

Data Sources and Variables

In this retrospective analysis, we examined the prevalence of IPV-related emergency department (ED) visits by rural and urban status and U.S. Census regions using discharge data from the National Emergency Department Sample (NEDS)¹⁴ for the years 2009-2014. One of the most distinctive features of the NEDS is its large sample size, which allows for analysis of relatively uncommon events. This analysis uses six years of data to allow comparisons across rurality and census regions, from 2009 to 2014, which was the last calendar year the NEDS used ICD-9-CM diagnostic codes for the entire year.

The NEDS is the largest all-payer ED database in the U.S. It provides a 20% stratified sample of ED visits that yields national estimates of hospital-based ED visits. The NEDS is part of the Healthcare Utilization Project (HCUP)¹⁵ sponsored by the Agency for Healthcare Research and Quality (AHRQ). The NEDS is designed to be nationally representative of ED care in the U.S. For this study, the analysis was limited to patients ages 15-64 with an IPV-related ED visit. This age group includes the main working and reproductive ages.

IPV-related visits were identified using International Classification of Disease, Ninth Revision, Clinical Modification (ICD-9-CM) diagnostic codes. Patients ages 15-64 with an External Cause of Injury code (e-code) for “battering and other maltreatment by spouse or partner” (E967.3) in any of the four e-codes contained in the NEDS were included in the analytic sample. Primary diagnoses associated with visits coded with E967.3 were also examined to identify top diagnoses associated with IPV-related injuries. Primary diagnosis refers to the condition mainly responsible for the ED visit. The Clinical Classification Software (CCS) was developed by the AHRQ¹⁶ to group ICD-9-CM diagnostic codes into more manageable

clinically meaningful diagnoses categories.

Rurality in this study was determined using the National Center for Health Statistics (NCHS) urban-rural classification scheme for counties^{17,18} as shown in **Table 1**. Six classification levels range from most urban to most rural: large central metros (≥ 1 million residents, with most of the population in a principal city), large fringe metros (≥ 1 million and no large central metro), medium metros (250,000-999,999), small metros (50,000-249,999), micropolitan areas (10,000-49,999), and non-core areas ($< 10,000$). Micropolitan and non-core areas were considered rural; all other classifications were considered urban.

To adjust for population size, prevalence of ED visits per 100,000 population were estimated per rurality level and census region. Population estimates for the 2009-2014 period were obtained from the Centers for Disease Control (CDC) Wonder population online database. It contains county-level population counts produced by the U.S. Census Bureau in collaboration with the NCHS.¹⁹

The NEDS contains data per ED visits across the U.S. To preserve confidentiality, the NEDS does not include unique identifiers. Thus, it is possible individuals may be represented in multiple visits in a given year. This study was reviewed by the Texas A&M Institutional Review Board (IRB2016-0761M). All analyses were conducted using Stata MP version 16.0.²⁰ Analyses accounted for the NEDS weights and survey design to produce national and regional estimates.

Results

Between 2009 and 2014, there were 156,945 (95% CI: 148,158; 165,731) ED visits in the U.S. that included an ICD-9-CM E967.3 code for battering by an intimate partner or spouse. This represents an average of 26,158 visits per year in the six-year period. Eighty-two percent of these visits occurred to men and women ages 15-64 residing in urban areas and 18% to rural residents. **Table 1** presents the main demographic characteristics of IPV-related ED visits by urban and rural residence for men and women ages 15-64.

Table 1. Demographic characteristics by Rural Classification: Men and Women Ages 15-64 with IPV-related ED visits (ICD-9-CM code E967.3), 2009-2014

| | Urban Areas | Rural Areas | Significance |
|-------------------------------------|-----------------------------|--------------------------|---------------|
| <i>N</i> = 156, 945 | 127,958 | 27,838 | |
| IPV visits per 100,000 population | 11.9 | 15.5 | 0.000 |
| Age, mean (SD) | 34.7 (10.7) | 34.4 (10.3) | <i>NS</i> |
| 15-24 | 20% | 20% | |
| 25-49 | 68% | 69% | |
| 50-64 | 12% | 11% | |
| Gender | | | |
| Women | 92.8% | 94.8% | 0.0000 |
| Men | 7.2% | 5.2 % | |
| Median household income by zip code | | | |
| Lowest | 33% | 50% | 0.0000 |
| 2 nd quartile | 26% | 37% | |
| 3 rd quartile | 24% | 11% | |
| Highest | 17% | 2% | |
| Payer | | | |
| Medicare | 6% | 8% | 0.0007 |
| Medicaid | 38% | 40% | |
| Private Insurance | 26% | 23% | |
| Self-paid | 30% | 29% | |
| Outcome | | | |
| More than one injury | 55% | 57% | 0.038 |
| Severity, mean (SD) | 2.04 (0.2) | 2.06 (0.4) | <i>NS</i> |
| Admitted to the hospital | 4.9% | 4.5% | <i>NS</i> |
| Deaths | 2.7 per 1,000 IPV visits | 4.3 per 1,000 IPV visits | <i>NS</i> |
| Total charges, Median (Range) | \$1,774 (\$101 - \$105,327) | \$1,466 (\$101-\$38,958) | 0.0000 |

The rate of IPV-related ED visits among the population ages 15-64 was significantly higher among residents of rural areas compared to residents of urban areas (15.5 vs. 11.9 per 100,000 pop). Women made up 93% of IPV-related visits in urban areas compared to 95% in rural areas. Men in rural areas made up only 5% of the IPV-related ED visits compared to 7% in urban areas. The mean age of patients with an IPV-related diagnosis was 34.5 years old. There were no significant differences in the age of rural and urban patients with an IPV-related ED visit.

The main age difference was by gender (not shown in Table 1), with men being about four years older than women (38.3 vs. 34.5). While most patients with IPV-related visits were adults 25-49 years old, adolescents and young adults ages 15-20 made up one fifth of the female patients with IPV-related ED visits.

Almost two thirds (64%) of IPV-related patients lived in a zip code with a median household income in the two bottom quartiles of the income distribution. For

rural residents, those in the lower half of the income distribution made up 87% of the IPV-related ED admissions compared to 59% of urban residents. This is not very different from the income distribution for the overall ED patients ages 15-64 in urban and rural areas. Medicaid and self-payment were the main sources of payment for IPV-related ED visits, especially in rural counties. Rural patients with an IPV-related ED admission were more likely to have public insurance than urban patients (48% vs. 44%) and less likely to have private insurance (23% vs. 26%). This is different than for the overall ED patients ages 15-64 that have lower rates of public insurance (38% for urban residents vs. 41% rural residents), mainly due to lower rates of Medicaid than IPV-related patients of the same age. On the other hand, non-IPV ED users are more likely to have private insurance (37% among urban residents vs. 34% among rural residents). Among women, Medicaid was the most common payment source, while men were more likely to self-pay.

Rural patients admitted to the ED with an IPV-related diagnosis were 10% more likely to report multiple injuries than urban patients (95% CI: 1.005; 1.2), but when looking at the injury severity score, there are no significant differences in severity between urban and

rural residents admitted to the ED with an IPV-related diagnosis. About 5% of patients with ED visits with an IPV-related diagnosis were admitted to the hospital, with no significant differences by rurality. Approximately three out of every 1,000 patients with an IPV-related ED visit died in the hospital. There were no significant differences in IPV-related mortality between urban and rural areas, but IPV-related ED mortality rates were significantly higher in the Midwest (6.2 per 1,000 patients) than in the other census regions. Men with an IPV-related ED visit were 2.5 (95% CI: 1.5; 4.2) times more likely to die than their female counterparts (2.7 out of every 1,000 women compared to seven out of every 1,000 men). The total cost per IPV-related ED visit ranged from \$101 to \$105,327, with a median cost of \$1,715 (not adjusted to current inflation and costs). The median cost per IPV-related ED visit was significantly higher for urban residents compared to rural residents; an average of \$308 higher (95% CI: \$236; \$380) per visit.

Figure 1 presents total ED visits with an IPV-related diagnosis and prevalence of IPV-related ED visits per 100,000 in population ages 15-64 by rural-urban classification. Prevalence was highest in rural (micropolitan and non-core) areas and lowest in large fringe metro areas.

Figure 1. IPV-Related Emergency Department Visits (E967.3) per 100,000 Residents Ages 15-64 by Rural Classification, 2009-2014

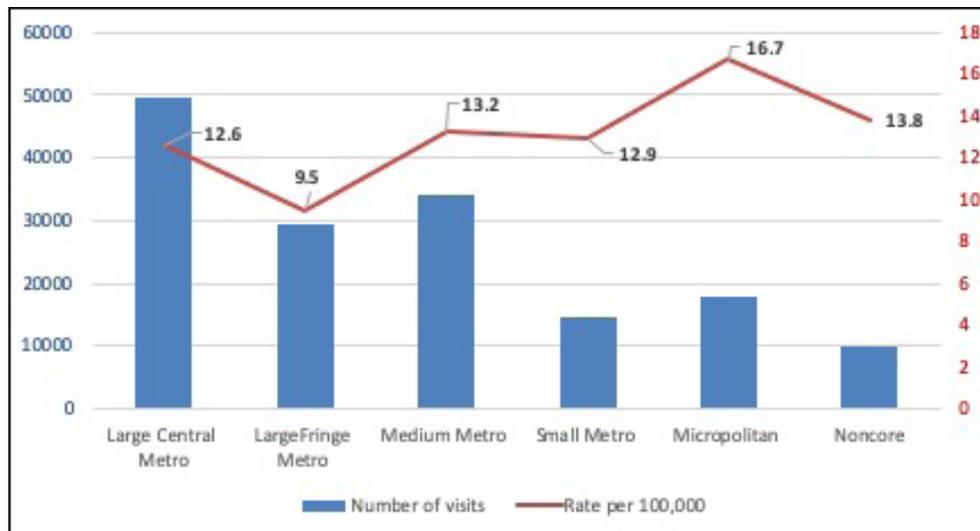


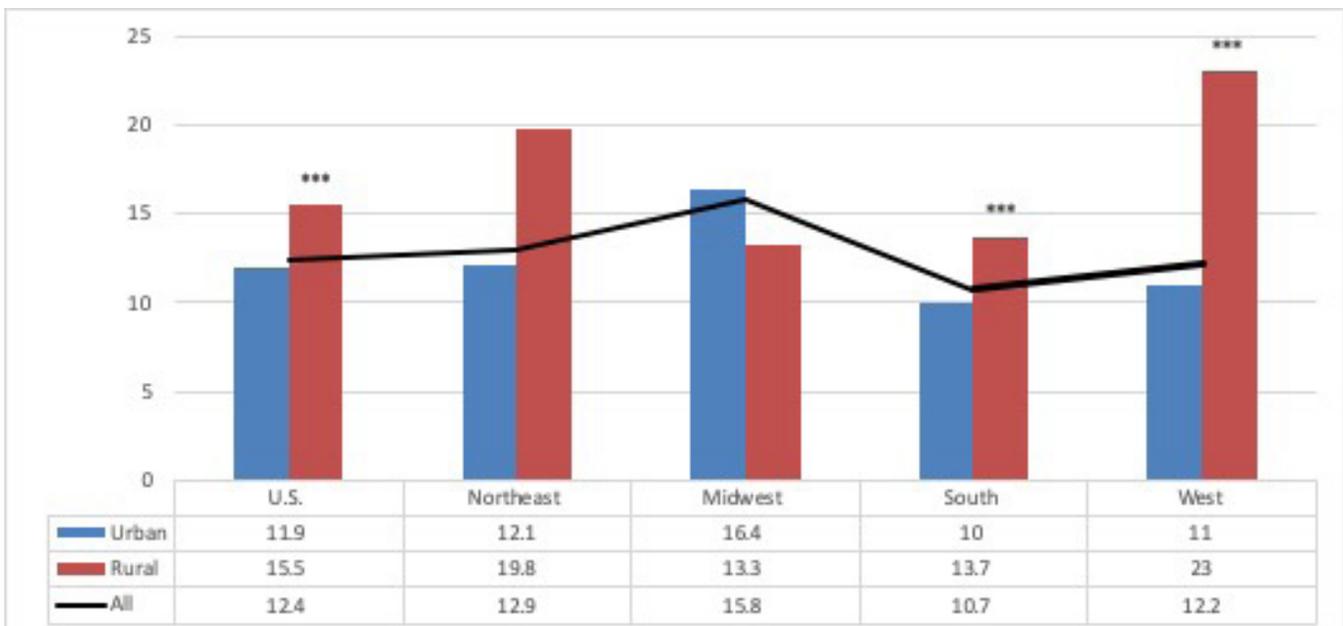
Table 2 shows IPV-related ED visit prevalence per 100,000 population ages 15-64 by rural classification and gender. The prevalence of IPV-related ED visits was significantly higher for women in rural versus non-rural areas, while prevalence for men was slightly higher in urban areas compared to rural areas but not statistically

significant. Prevalence of IPV-related ED visits among the 15-64 years old population was 13 times higher for women than men. The gender difference was significant across all levels of rurality and higher in rural versus non-rural areas.

Table 2. IPV-Related Emergency Department Visits (E967.3) per 100,000 Residents Ages 15-64 by Rural Classification, 2009-2014

| Rural Classification | | Male | Female | All |
|----------------------|---------------------|------|--------|------|
| Urban Areas | All Urban Areas | 1.8 | 21.9 | 11.9 |
| | Large Central Metro | 2.1 | 23.0 | 12.6 |
| | Large Fringe Metro | 1.3 | 17.6 | 9.5 |
| | Medium Metro | 1.8 | 24.5 | 13.2 |
| | Small Metro | 1.8 | 24.1 | 12.9 |
| Rural Areas | All Rural Areas | 1.6 | 30.1 | 15.5 |
| | Micropolitan | 1.9 | 32.1 | 16.7 |
| | Noncore | 1.1 | 27.2 | 13.8 |

Figure 2. IPV-related Emergency Department Visits (E967.3) per 100,000 Residents Ages 15-64 by Census Region and Rural Classification, 2009-2014



*** rural/urban differences significant < 0.05

Figure 2 (page 5) shows prevalence of IPV-related ED visits by rural classification and region. The highest regional rate of IPV-related ED visits was in the Midwest with 15.8 visits per 100,000 residents ages 15-64. The Midwest was also notable for the highest prevalence of IPV-related ED visits in metropolitan areas and the lowest prevalence in non-metropolitan areas. The Midwest region had the largest percentage of rural population ages 15-64 (23%), followed by the Southern region where 17% of the population ages 15-64 lived in rural areas¹⁹. IPV-related ED visit prevalence was higher in rural versus non-rural areas in all regions except the Midwest. The highest prevalence of IPV-related visits was in rural areas in the West and Northeast regions. These two regions also had the lowest percentage of rural residents among their population ages 15-64, 9% and 8% respectively in 2009-2014.¹⁹ Rural-urban differences in the rates of IPV-related ED visits, however, were only statistically significant at the national level, and in the South and the West regions. Despite apparent rural and urban differences in the rates of IPV-related ED admission in the Northeast and the Midwest regions, the large standard errors result in non-significant differences.

Table 3 shows the prevalence of the five most common primary diagnosis categories associated with IPV-related ED visits for urban and rural areas separately. These five diagnostic classification categories accounted for over 70% of primary diagnoses in IPV-related visits between 2009 and 2014. There were no other noticeable differences in diagnostic codes between rural and non-rural areas or by gender, other than Open wounds of extremities (CCS 236) taking the place of complications of pregnancy among the top five diagnoses among men with an IPV-related ED visit. Two of the top five IPV-related diagnoses (Sprains and strains and Superficial injury and contusion) were also among the top five overall diagnoses for ED visits among men and women ages 15-64. While Screening for mental health and substance abuse (CCS 663) was not among the top five primary diagnoses, it was among the top five secondary ones. It was reported in 13% of IPV-related ED visits without significant differences by rurality.

Table 3. Five Most Common Primary Diagnoses for IPV-related ED Visits (E967.3) for Men and Women Ages 15-64, by Rural Classification

| Diagnostic Codes [†] | Urban areas (%) | Rural areas (%) |
|---|-----------------|-----------------|
| 239. Superficial injury; contusion | 29% | 37% |
| 244. Other injuries and conditions due to external causes | 27% | 21% |
| 232. Sprains and strains | 7% | 8% |
| 235. Open wounds of head, neck, and trunk | 7% | 6% |
| 181. Other complications of pregnancy | 4% | 3% |

[†] ICD-9-CM diagnostic codes grouped using CCS

Discussion

The primary finding in this study was the higher prevalence of IPV-related ED visits in rural areas. These results are consistent with most previous studies.⁷⁻⁹ The finding that women represent 93% of IPV-related ED visits was not surprising, given that multiple sources indicate women are primary victims of IPV and males are primary perpetrators.^{1,22} Nevertheless, other data indicate over one quarter of men have experienced at least one episode of IPV-related physical violence in their lifetime.² Only about 7% of IPV-related ED visits in the present study were for men, and men made up only 5% of the IPV-related ED visits in rural areas. This could be because men in rural areas are less likely to go to the ED after an IPV incident or because IPV e-codes are less likely to be used for men in rural areas. National data indicate severe physical violence against women is higher than against men;² therefore, women may be more likely to require medical care. At the same time, stigma against male victims may mean men are less likely to disclose IPV-related violence or present for medical care.²³ A delay in seeking services could explain the higher in-hospital mortality among men with an IPV-related ED visit compared to women (2.7 out of 1000 women died compared with 7 out of 1000 men). This means that while men are less likely to have an IPV-related ED visit than women, when they do, the visit is 2.5 times more likely to be fatal compared to women with a similar diagnosis.

Prevalence of IPV-related visits in this analysis was highest in patients ages 25-49. However, one fifth of patients were 15-24 years old, indicating prevention programs must target younger individuals. Data from the Youth Risk Behavior Surveillance study (2016) show approximately 10% of high school students had experienced dating violence in the 30 days prior to the survey.²⁴ Most IPV-related patients resided in zip codes below the median household income. This does not necessarily mean low-income residents are more likely to be IPV victims, but they are more likely to have an IPV-related ED visit than residents with higher household incomes. This could be due to higher severity of IPV-related injuries, but also to lack of access to other resources, including preventive

and health care services among low-income populations.

Limitations

This analysis used the ICD-9-CM E967.3 injury code to ensure ED data were specific to injury by a partner or spouse. Use of e-codes is not mandatory in most states and their use is not universal, so the actual number of IPV-related visits in this sample is unknown. Nevertheless, one study found injury codes were used in 89% of HCUP injury-related data examined.²¹

Record-based surveillance is not without its limitations. The NEDS contains data per ED visits across the U.S. but no unique identifiers to account for multiple visits by the same individual. This limits the assessment of the repetitive nature of IPV. It is also well known that only a small fraction of IPV victims seek help from the criminal justice or the health care systems, so results presented in this study are a selected sample of all IPV-related cases, and limited primarily to those for which injury severity prompted an ED visit. Data limitations also prevent accounting for important confounders. The NEDS has limited data on socioeconomic characteristics that have been identified as important social determinants of IPV, including race and ethnicity, education, employment and other social determinants.²⁵ The lack of geographic identifiers did not allow for control of neighborhood characteristics that could account for some rural-urban disparities reported.

Implications

Despite its limitations, the NEDS provides nationally and regionally representative data to evaluate disparities in IPV-related ED visits. The detrimental impact caused by IPV-related injuries is supported by documented ED visits in various regions. The IPV literature and IPV-related ED visit data indicate IPV can lead to severe injuries, and even to intimate partner homicide.²⁶ Immediate needs of IPV victims can be met by implementing policy changes in EDs, especially in rural hospitals, to include routine screening and prepare staff to assist in the care of IPV-related ED visits. Given the prevalence of abuse, all healthcare professionals, including ED staff,

should receive essential training on how to recognize and intervene when faced with cases of IPV in their daily practice.²⁷ More importantly, all healthcare professionals must be knowledgeable or, at a minimum, have access to a listing of available community resources for IPV victims and provide the information when appropriate. IPV often escalates to repeated and more violent abuse. Therefore, ED staff without education and training to effectively screen, assess, and treat patients with IPV-related injuries are missing a valuable opportunity to improve the overall health outcomes of patients with IPV-related injuries and potentially save lives.²⁸

The Health Resources and Services Administration (HRSA) has identified training of the nation's health care and public health workforce as the first priority to address IPV.²⁹ Rural areas often have shortages of specialty women's health care providers such as obstetricians and gynecologists.³⁰ The American College of Obstetricians and Gynecologists provided guidelines for routine IPV screening among women since 2012.³¹ Complications of pregnancy was one of the top five diagnoses among IPV-related ED patients ages 15-64, making pregnancy a critical opportunity for screening and intervention for rural women who often lack access to other IPV-related services.³⁰ Rural areas may also experience shortages of mental health care providers to address mental health and substance use issues, both important comorbidities of IPV.³² Workforce initiatives with incentives for health care professionals to work in rural areas have a unique opportunity to improve identification and intervention for persons impacted by IPV and prevention of IPV-related injuries.

A system-wide approach would include not only training of the healthcare workforce, but also access to patient education and linkage to IPV resources. The need for increased community-wide awareness can help mitigate IPV. Data from this study indicate that a fifth of IPV-related ED cases were in adolescents and young adults ages 15-24. IPV-related education and intervention is necessary across the life-course and should include school-based programs that incorporate relationship skills, and bystander intervention, to prevent teen dating violence.^{33, 34} Ad-

ditional education for health care providers on universal screening and intervention for IPV could increase awareness and reduce stigma related to IPV and potentially reduce IPV-related injuries and mortality.

Strategies to address rural disparities in social determinants of health could also be effective.³⁵ Access to health care, stable employment, education, transportation, and social support have potential to prevent or reduce IPV-related injuries. Health care provider screening for social determinants of health that include questions about IPV can identify referral needs for patients to address disparities.³⁶ At the same time, leaving an IPV relationship can adversely impact one's socioeconomic status. Support for persons in IPV relationships is also critical to prevent declining status after leaving an abusive relationship. Providing routine and universal access to screening and education at healthcare facilities, including EDs, can help IPV-victims to become aware of available resources and to plan for safety strategies for their particular situation.^{37, 38}

Policy and legislative initiatives have potential to reduce IPV. For example, rates of IPV-related violence and homicides declined substantially following passage of the Violence Against Women Act (VAWA) in 1994.²² The VAWA provides funding for investigation and prosecution of IPV, training and prevention efforts, including rural efforts. Funding targeted at areas identified in this study might be particularly beneficial. For example, rural IPV-related ED visit prevalence in this study were highest in the West and Northeast. This could be related to the lower percentage of rural populations in these states. States with lower rural populations or lower proportion of residents living in rural areas might be less likely to receive funding for rural IPV resources, which targeted interventions could potentially mitigate.

This study supports earlier findings of higher prevalence of IPV in rural areas by showing higher prevalence of IPV-related injuries in rural versus urban areas in the U.S. Increased awareness, health care and community awareness and education, strategies to address disparities in social determinants of health, and targeted interventions in rural areas can reduce disparities for women and men and prevent IPV-related injury and death.

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