State Injury Indicators Report

Second Edition — 1999 Data

Editors

Christopher Thomas, MS, CHES
Jacqui Butler, MPA
Megan Davies, MD
Renee Johnson, RPT, MSPH

Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

February 2004

The *State Injury Indicators Report, Second Edition — 1999 Data* is a publication of Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

Centers for Disease Control and Prevention
Julie L. Gerberding, MD, MPH
Director

National Center for Injury Prevention and Control
Sue Binder, MD
Director

The editors acknowledge the following individuals who helped review this report:

Robert Anderson, PhD
Lee Annest, PhD
Kim Blindauer, DVM, MPH
Julie Bolen, PhD
Victor Coronado, MD, MPH
Alex Crosby, MD, MPH
Ann Dellinger, PhD, MPH
Lynda Doll, PhD
Lois A. Fingerhut, MS
Julie Gilchrist, MD
Robin Ikeda, MD, MPH
Steve Kinchen, BS, ICS
Melvin Kohn, MD, MPH
James Mercy, PhD
Len Paulozzi, MD, PhD
Kavitha Raman, BDS, MPH
Richard Sattin, MD, FACP
David Sleet, PhD
Ellen Sogolow, PhD
Cecil Threat, MPH
Roger Trent, PhD

We also thank Jane Mitchko, Sandra Bonzo, Marilyn Kirk, and the staff of the Office of Communication Resources, National Center for Injury Prevention and Control, for contributing to the production of this report.

Suggested Citation: Thomas C, Butler J, Davies M, Johnson R, *State Injury Indicators Report, Second Edition — 1999 Data*. Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2004.

Contributors

Arizona Department of Health Services

Ardis Decker, MPH

Tim Flood, MD

California Department of Health

Art Ellis, MA

Jennifer Harper, MSPH

Roger Trent, PhD

Colorado Department of Public Health and Environment

Holly Hedegaard, MD, MSPH

Katy Meng, PhD

Delaware Health and Social Services, Division of Public Health, Office of Emergency Medical Services

Steven Blessing, MA

Tripthi M. Mathew, MD, MPH

Florida Department of Health

Steve Dearwater, MS

Georgia Department of Human Resources, Division of Public Health

Kristen Mertz, MD, MPH

Vietdoan Nguyen, MPH

Manxia Wu, MD, MPH

Denise Yeager

Hawaii Department of Health

Dan Galanis, PhD

Eric Tash, MPH

Kansas Department of Health and Environment

Carol Moyer, MPH, RN

Julie Sergeant, MSEd

Kentucky Cabinet for Health Services, Department for Public Health

Michael Singleton, MS

Louisiana Department of Health and Hospitals, Office of Public Health

Giesle Hall, BS

Commonwealth of Massachusetts, Department of Public Health

Patrice Cummins, MPH
Holly Hackman, MD, MPH
Victoria Ozonoff, PhD

Michigan Department of Community Health

Fawzia Ahmed
Linda Scarpetta, MPH

Minnesota Department of Health

Anna Gaichas, MS
Mark Kinde, MPH
Mark Phillips
Jon Roesler, MS
Minnesota Hospital and Healthcare Partnership

Nebraska Health and Human Services

Keith Hansen
Ming Qu, MEd

New Mexico Department of Health

Barbara F. Chatterjee, MS
Ajoy Kumar, MBBS, MPH
New Mexico Health Policy Commission
State of New Mexico, Santa Fe, New Mexico

North Carolina Department of Health and Human Services

Jeanne Givens, MSSW
Catherine Sanford, MSPH
Dorothee Schmid, MA
Bradford Woodard, MS

North Dakota Department of Health

Carmell Barth
Rod Gilmore

Ohio Department of Health

Nan Migliozzi, MSN
Edward Socie, MS

Oklahoma State Department of Health

Pam Archer, MPH
Jeffrey Carlisle
Kristen Eberly, MPH
Sue Mallonee, MPH, RN
Tracy Mankin, MPH

Oregon Department of Human Services, Oregon Public Health Services

Janice D. Alexander, PhD
Melvin Kohn, MD, MPH

South Carolina Department of Health and Environmental Control

Lou-Ann Carter, MS
Georgette Demian, MPH
Mary Glover

Texas Department of Health

Tammy Sajak, MPH
David Zane, MS

Utah Department of Health

Trisha Keller, MPH, RN
Michelle Moskos, PhD, MPH, HSA
Tong Zheng, MS

Vermont Department of Health

Stephanie Courcy, MPH
Caroline Dawson, MS, MPA

Washington State Department of Health

Mary Le Mier, MPH

Wisconsin Department of Health and Family Services

Vinod Daniel, MBBS, MPH
Linda Hale, RN, BSN, CEN, EMT
Joseph Olson, BS

Table of Contents

Foreword

The Centers for Disease Control and Prevention (CDC) Injury Center, The Council of State and Territorial Epidemiologist (CSTE), and the State and Territorial Injury Prevention Directors' Association (STIPDA) are pleased to bring you this second edition of the *State Injury Indicators Report* with 1999 data. Twenty-six state health departments voluntarily participated in this surveillance effort. The data inside represent continued progress toward routine surveillance and reporting of injury indicators in all states. This second edition incorporates data from a greater number of states and includes data on the poisoning indicator, with both gender and age-specific rates. The indicators were calculated by using state-level data from death certificates and hospital discharge records coupled with data from several national surveillance systems. As more states join in this surveillance, we can present a broader picture of the burden of injuries and better identify priorities for prevention. We look forward to increased state participation in future reports.

Introduction

Injury surveillance is one of the most important and basic elements of injury prevention and control. It helps determine the magnitude of injury morbidity and mortality, the leading causes of injury, and the population groups and behaviors associated with the greatest risk. Surveillance data is fundamental to determining program and prevention priorities. Furthermore, this data is crucial for evaluating the effectiveness of program activities and for identifying problems that need further investigation.

Fifty-nine million injuries were reported in 1995, resulting in 37 million hospital emergency department visits and 2.6 million hospital discharges. Injuries also accounted for 37% of all hospital emergency department visits, and about 8% of all short-stay hospital discharges. That year, 147,891 people died from injuries: 61% from unintentional injuries, 21% from suicides, and 15% were homicides. Death from injury is the leading cause of years of potential life lost before age 75 in the United States.[1]

The mission of public health includes prevention, mitigation, assuring that the injured have access to treatment, and reducing injury-related disability and death.[1] Its scope encompasses injuries involving any mechanism (e.g., firearm, motor vehicle, and burn), and includes both intentional and unintentional injuries. An important part of the public health mission is to emphasize that injuries are preventable and to dispel the misconception that injuries are unavoidable.

Recognizing the need for more comprehensive injury surveillance data, the State and Territorial Injury Prevention Directors' Association (STIPDA) produced *Consensus Recommendations for Injury Surveillance in State Health Departments* in 1999.[2] These recommendations were developed by a working group representing STIPDA; the Council of State and Territorial Epidemiologists (CSTE); Centers for Disease Control and Prevention (CDC) and its National Center for Injury Prevention and Control (NCIPC); and the National Association of Injury Control Research Centers (NAICRC).

Consensus Recommendations identifies 14 specific injuries and injury risk factors to be placed under surveillance by all states and 11 data sets to monitor these injuries and risk factors. The goal is to improve state-based injury surveillance to better support injury prevention programs and policies. By enhancing and standardizing injury surveillance at the state level, its integration with overall public health surveillance as part of the National Public Health Surveillance System (NPHSS)[3] will be much easier. In tandem with the *Consensus Recommendations*, CSTE and STIPDA developed injury indicators that were formally adopted for inclusion in NPHSS.[4,5] The NPHSS injury indicators add to other indicators developed by CSTE for chronic diseases and other areas.[4]

What is an Injury Indicator?

An injury indicator describes a health outcome of an injury, such as hospitalization or death, or a factor known to be associated with an injury, such as risk or protective factor among a specified population.

Methods

Because injury rates often vary dramatically by sex, overall age-adjusted rates for hospitalization and fatal indicators were calculated as the weighted average of the male and female rates for each indicator:

$$\text{Overall Rate} = \frac{\left[\text{Age-Adjusted Male Rate} \times \text{Male Population}\right] + \left[\text{Age-Adjusted Female Rate} \times \text{Female Population}\right]}{\text{Male Population} + \text{Female Popluation}}$$

However, in low-incidence indicators, it was not always possible to calculate a stable rate for females. In these cases, the overall age-adjusted rate was calculated using the sum of the male and female cases and the sum of the male and female populations by age within the state.

Participating states reported on 12 of the 14 injuries and risk factors in *Consensus Recommendations*:

- motor vehicle injuries,
- alcohol involvement in motor vehicle deaths,
- self-reported seat belt and child safety seat use,
- homicide,
- suicide,
- suicide attempts,
- firearm injuries,
- traumatic brain injuries,
- fire and burn injuries,
- self-reported smoke alarm use,
- submersion injuries,
- poisoning.

For some of these conditions and risk factors, multiple sources of surveillance data are recommended; therefore, two or more surveillance indicators are used.

Two conditions in *Consensus Recommendations* are not reported here: traumatic spinal cord injuries and injuries from falls. Surveillance case definitions and recommendations for data sources are not yet final for these injuries. STIPDA is convening its fourth Injury Surveillance Workgroup to develop case definitions for these remaining injuries.

States used a total of five data sets to report on 21 indicators: the Fatality Analysis Reporting System (FARS), the state-based Youth Risk Behavior Survey (YRBS), the Behavioral Risk Factor Surveillance System (BRFSS), state vital records, and state hospital discharge data (HDD).

Fatality Analysis Reporting System (FARS)

FARS, coordinated by the National Highway Traffic Safety Administration (NHTSA), contains data on all fatal traffic crashes that occur in the 50 states, the District of Columbia, and Puerto Rico. To be included in FARS, a crash must involve a motor vehicle traveling on a public roadway and result in the death of a person (either a vehicle occupant or a non-motorist) within 30 days of the crash. The FARS file contains a description of each fatal crash reported. More than 100 coded data elements characterize each crash, the vehicles, and the people involved. NHTSA considers a fatal motor-vehicle crash to be alcohol-related if either a driver or non-occupant (e.g., pedestrian or bicyclist) had a blood alcohol concentration (BAC) greater than or equal to 0.01 g/dL.[6]

FARS does not include non-traffic crashes, such as those occurring on driveways and other private property. It also does not include deaths occuring more than 30 days after the motor vehicle crash. Because BACs are not available for all persons involved in fatal crashes, NHTSA's estimates for the number of alcohol-related traffic fatalities are based on a discriminant analysis of information from all cases for which driver or non-occcupant BAC data are available.[6]

Youth Risk Behavior Survey (YRBS)

YRBS, a component of the Youth Risk Behavior Surveillance System, is managed by the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) at CDC. It is a self-administered, school-based survey conducted biennially in many locations throughout the country among ninth through twelfth-grade students. State and local departments of education and health conduct the survey, and CDC analyzes the data. The YRBS monitors risk behaviors associated with the leading causes of injury and death among teenagers.[7]

YRBS data apply only to youth who attend school. In addition, the extent of underreporting or overreporting of behaviors cannot be determined, although the survey questions demonstrate good test-retest reliability. Interstate comparisons must be interpreted cautiously as methods used to collect YRBS data may vary.[7]

Among the 26 states included in this report, 11 conducted a YRBS in 1999 with overall participation rates of at least 60%. CDC requires a minimum overall participation rate of 60% to generalize a state's population. This report presents weighted data from these 11 states.

Behavioral Risk Factor Surveillance System (BRFSS)

CDC's National Center for Chronic Disease Prevention and Health Promotion also manages the BRFSS. This is a broader ongoing survey. It is a state-based, random-digit-dialed telephone survey of the noninstitutionalized U.S. population over age 17. BRFSS monitors risk behaviors associated with the leading causes of disease, injury, and death.[8]

Because BRFSS is telephone-based, population subgroups less likely to have telephones, such as persons of low socioeconomic status, may be underrepresented. In addition, data are self-reported and may be biased. For risk-reduction factors such as self-reported use or testing of smoke detectors, these data may not uniformly represent safe and effective use.[8]

State Vital Records

Death registration is the responsibility of individual states. The funeral director and the physician who certifies the cause of death are usually responsible for the personal and medical information recorded on the death certificate. The cause-of-death section on the certificate is basically the same in all states, and is organized according to World Health Organization (WHO) guidelines. Local registrars assure that all deaths in their jurisdictions are registered and that required information is on death certificates before sending them to the state registrar. State registrars number and file the death certificates; certificates of nonresidents are sent to their states of residence. All states send death certificate data to the National Vital Statistics System, managed by CDC's National Center for Health Statistics.[9]

Data are limited to what is reported on death certificates. The degree of detail in reporting varies among jurisdictions. In general, death certificate data provide limited information about circumstances of injury incidents or contributing factors. Deaths associated with some injuries, especially suicide, may be underreported.

The number and type of cause-of-death fields to which states have access also vary. Two of the states contributing to this report had access to a death certificate database listing only the *underlying* cause of death. In contrast, the other 24 states each had access to a database listing both *underlying* cause of death and *contributing* causes of death. States without access to multiple contributing cause-of-death fields cannot calculate fatality rates for traumatic brain injury (TBI) because the diagnostic codes that make up that case definition reside in the contributing cause-of-death fields.

In 1999, a new classification scheme—the Tenth Revision of the *International Classification of Diseases* (ICD-10)—was implemented in the United States. The Ninth Revision of the ICD (ICD-9), had been in use from 1979 through 1998. The ICD has been revised about every ten years since 1900. The purpose of revisions is to stay abreast of medical advances in terms of disease and injury nomenclature and etiology.[10] ICD-10 differs from ICD-9 in several respects. ICD-10 is more detailed, containing 8,000 categories compared with only 5,000 categories in ICD-9. ICD-10 uses alphanumeric codes compared with numeric codes in ICD-9. Some additions and modifications were made to the chapters in the ICD. Some of the coding rules and rules for selecting the underlying cause of death have also been changed.[10] These changes create a discontinuity in cause-of-death statistics between 1979–1998 and those from 1999 forward.

The CDC's National Center for Health Statistics (NCHS) is carrying out comparability studies to measure the effects of the newly revised ICD on the comparability with the previous revision of mortality statistics by cause of death.[10] These studies involve the dual classification of a single year's mortality data, i.e., classifying the underlying cause of death on mortality records by both the new revision and the previous revision. The key element of a comparability study is the comparability ratio, which is derived from the dual classification. It is calculated by dividing the number of deaths classified by the new revision by the number of deaths classified by the previous revision. The resulting ratios represent the net effect of the new revision on cause-of-death statistics. NCHS has released preliminary estimates of comparability ratios using the "List of 113 Selected Causes of Death" (113-cause list). The number 113 refers to the number of mutually-exclusive categories in the list. The 113-cause list actually contains a total of 135 cause-of-death categories, including accidents (unintentional injuries), intentional self-harm (suicide), and assault (homicide).

Preliminary results show comparability ratios for intentional self-harm and assault (homicide) are very close to 1.0. For unintentional injuries, a comparability ratio of 1.0303 indicates an increase in death rates of 3% due to the revisions. Virtually all of this increase involves shifts from natural causes in ICD-9 to unintentional injuries in ICD-10 resulting from changes in coding rules that assign injury as unintentional injury. Within the category unintentional injury, motor vehicle crashes (MVC) deserve special attention. The preliminary MVC comparability ratio was 0.8527. The reason for this 15% decrease is that in ICD-10, the injury must involve a "motor" vehicle. In ICD-9, in the absence of

the term "motor" when a vehicle crash was reported as occurring on a highway or road, the *assumption* was to classify the crash as involving a motor vehicle. The ICD-10 convention does not allow this assumption and classifies such crashes as involving unspecified vehicles (other land transport accidents). However, for U.S. data, it has been decided that if the crash occurred on a highway or road, classification to motor vehicle accident is appropriate. This change in classification was effective in the United States with the release of preliminary NCHS 1999 mortality data and results in a revised comparability ratio of 0.9754. This ratio is only applicable to data in which the classification change for motor vehicle crashes was implemented.[10] **Some states' final death files do not include this change**. **For this reason, motor vehicle crash deaths are not reported as a 1999 indicator. Since all the indicators are calculated from state databases, the rates would not be comparable.**

In this report, only one state—Arizona—did not implement ICD-10 for 1999 death data. Since the rates for Arizona, based on ICD-9, are not directly comparable to the rates reported by the other 25 states, death rates for Arizona are not displayed for 1999.

Comparability ratios can be used as factors to adjust mortality statistics for cause of death classified by ICD-9 to be comparable to rates for the same causes classified by ICD-10. **The ICD-10 mortality rates displayed in the *State Injury Indicators Report, Second Edition — 1999 Data* should not be compared directly to those displayed in the first *State Injury Indicators Report*, which displayed 1997 and 1998 mortality rates based on ICD-9.** The preliminary comparability ratios published by NCHS can be applied to the mortality indicators only for those conditions in which the code groupings are exactly the same in both the 113-cause list and the fatal indicator definition (fatal fire-related injuries, homicide, and suicide).

State Hospital Discharge Data (HDD)

More than half of all states maintain databases of hospital discharge records for all non-federal, acute care hospitals within their borders.[11] The information collected varies from state to state. Many states use the standard uniform billing form (UB-92) as the basis for their hospital discharge database. Some states use only a subset of variables from the UB-92 for their databases, while a few collect additional variables.

The UB-92, developed by the National Uniform Billing Committee, includes the following data elements:

- patient's age,
- sex,
- zip code,
- admission date,
- length of stay,
- total charges,
- principal diagnosis,
- up to eight additional diagnoses.

For diagnoses resulting from injuries, external cause of injury (E-code) is also coded. E-codes, which are listed in the *International Classification of Diseases-9 Clinical Modification* (ICD-9 CM) describe several aspects of an injury: intentionality; mechanism; and, for unintentional causes of injury, location of occurrence.[12]

Although HDD have been collected in some states for many years, their use for public health surveillance has been limited. HDD indicators for injury are based on a case definition that is being used for only the second time by multiple states. Each state reports comparable information about injury hospitalizations. Thus, the strengths and limitations of the case definition and data are not yet well-characterized. Several caveats should be noted:

- The data are generated from forms used to bill for hospital services. Quality assurance practices for these data vary from state to state.
- Not all states mandate that hospitals report HDD. Even in those that do, participation rates and requirements vary regarding the data elements to be reported, including the reporting of E-codes. It is difficult to determine the hospital participation rate in HDD collection because the total number of hospitals changes often, as they merge or close and new ones open.
- Among the states in this report, there is wide variation in coding percentages for E-coding for injury-related diagnoses; completeness ranges from 53% to 100%. Incomplete external cause coding not only leads to low rates of injury, but it can also introduce bias. Currently, there are few studies to indicate whether the underestimates presented here are biased.
- The percentage of E-coding for injury hospitalizations is increasing in many states. When comparing hospitalization rates within one state over several years or between states in the same year, it is critical to take into account the percentage of E-coding for each year. Many states will have a factitious increase in injury hospitalization rates as their percentage of E-coding increases.
- A person might be counted more than once for one event, as with intra-hospital transfers between services. While many states have developed probability algorithms to eliminate such duplications, these algorithms differ, limiting comparability. Therefore, states contributing to this report were asked to leave suspected duplicates in the data set for this analysis. The rates displayed in this report reflect *numbers of hospitalizations*, rather than *numbers of people hospitalized*. The exceptions to this are California and Michigan, where HDD are generated in such a way that duplicate admissions were not available for inclusion in the analysis.
- Unlike the system for death certificates, no standard system exists to forward hospitalization data on nonresidents to their states of residence. This is a particular problem when trauma centers or other referral centers are just across state borders; injured residents may be hospitalized in the neighboring state without any record of their hospitalizations entering the HDD of their state of residence.

To remind readers of the limitations of HDD and to assist in the interpretation of HDD-based indicators, the first figure displaying rates calculated from HDD in each section of this report includes a section entitled "Factors Affecting Representativeness of State Hospital Discharge Data Sets for Injury Surveillance." This section of the first figure displays the percentage of hospitalizations with E-codes, if the state includes readmissions, if they are impacted by cross-border

hospitalizations, and for the completeness of hospital participation. As the use of HDD for injury surveillance has developed only recently, this table will be included with any figure displaying rates calculated from HDD.

Future Efforts

The *State Injury Indicators Report, Second Edition — 1999 Data* represents great progress in standardizing state-based injury surveillance reporting. Participation has grown from 12 to 26 states. The report includes 12 of the 14 injuries and injury risk factors recommended for surveillance in *Consensus Recommendations*. Future reports should include all 14, once case definitions have been developed for surveillance of traumatic spinal cord injuries and falls. This report displays death and hospitalization rates by sex and age, which provide more detail for identifying populations at risk. States participating in this report look forward to refining current indicators and defining new ones, as we learn from the experience of producing each *State Injury Indicators Report*.

The data contained in this report are readily available in most states through national surveillance systems such as FARS, or through analysis of state data sets, such as death certificates or HDD. We expect the proportion of states represented in subsequent reports to increase as state injury surveillance systems become more comprehensive.

References

1. Institute of Medicine (US). Reducing the Burden of Injury, Advancing Prevention and Treatment. Washington (DC): National Academy Press; 1999.
2. State and Territorial Injury Prevention Directors' Association (STIPDA). Consensus recommendations for injury surveillance in state health departments. Marietta (GA): STIPDA; 1999.
3. Meriwether RA. Blueprint for a national public health surveillance system for the 21st century. J Public Health Manag Pract 1996;216–23.
4. Council of State and Territorial Epidemiologists. Injury Control and Prevention Position Statement. [accessed 2003 Jul 23]. Available from URL: www.cste.org/PS/Default.htm.
5. State and Territorial Injury Prevention Directors' Association (STIPDA) resolutions, October 1999. [accessed 2003 Jul 23]. Available from URL: www.stipda.org/resol/99nphss.htm.
6. National Highway Traffic Safety Administration. Fatality Analysis System. [accessed 2003 July 23]. Available from URL: www.nhtsa.dot.gov/people/ncsa/fars.html.
7. CDC. Youth risk behaviors, July 2001. [accessed 2003 Jul 23]. Available from URL: www.cdc.gov/nccdphp/dash/yrbs/index.htm.
8. CDC. Behavioral Risk Factor Surveillance System, July 2001. [accessed 2003 Jul 23]. Available from URL: www.cdc.gov/brfss.

9. CDC. Mortality Data from the National Vital Statistics System. [accessed 2003 Jul 23]. Available from URL: www.cdc.gov/nchs/about/major/dvs/mortdata.htm.

10. Anderson RN, Minino AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD-9 and ICD-10: preliminary estimates. National Vital Statistics Reports; 2001:49(2).

11. American Public Health Association. How states are collecting and using cause of injury data. A report of the data committee, Injury Control and Emergency Health Services Section; 1998 Sep.

12. International Classification of Diseases 9th Revision Clinical Modification. [accessed 2003 Jul 23]. Available from URL: www.cdc.gov/nchs/about/otheract/icd9/abticd9.htm.

1. All-Injury Indicators

Surveillance of injuries resulting in hospitalization provides an important perspective on the public health burden of injury morbidity. National surveillance for hospitalizations is based on analysis of the National Hospital Discharge Survey, a national probability sample of hospital inpatient records.[1] In 2000, there were 1.8 million injury-related discharges from short-stay hospitals, accounting for an estimated 6% of all hospitalizations.[2]

Injury hospitalization rates for males and females are similar for all ages combined, but differ considerably within certain age groups. For ages 15 to 24 years, the injury hospitalization rate for males is 3.3 times that for females; for the elderly ages 75 years or older, the rate for females is 1.8 times that for males.[2]

The rates for all-injury hospitalizations displayed here represent hospitalizations when the principal diagnosis was an injury as defined by the inclusion criteria in the appendix. As the inclusion criteria are based on the nature of injury codes only, the percentage of external cause coding in a state's hospital discharge data (HDD) does not affect this rate. State rates for HDD-based indicators are affected by the percentage of hospitalizations with external cause coding, the inclusion of readmissions, the impact of cross-border hospitalizations, and the completeness of hospital participation. Figure 1a contains the section entitled, "Factors Affecting Representativeness of State Hospital Discharge Data Sets for Injury Surveillance" to be used when interpreting the accompanying rates.

Two other factors should be considered when interpreting HDD-based indicators. First, rates represent the number of hospitalizations per 100,000 population, *not* patients per 100,000 population. This is because individuals could have multiple hospital stays during the year, and there is no way to separately identify them. Second, since a small overlap with fatal injury indicators likely exists, this report displays hospitalization rates that include deaths occurring during a hospitalization for injury.

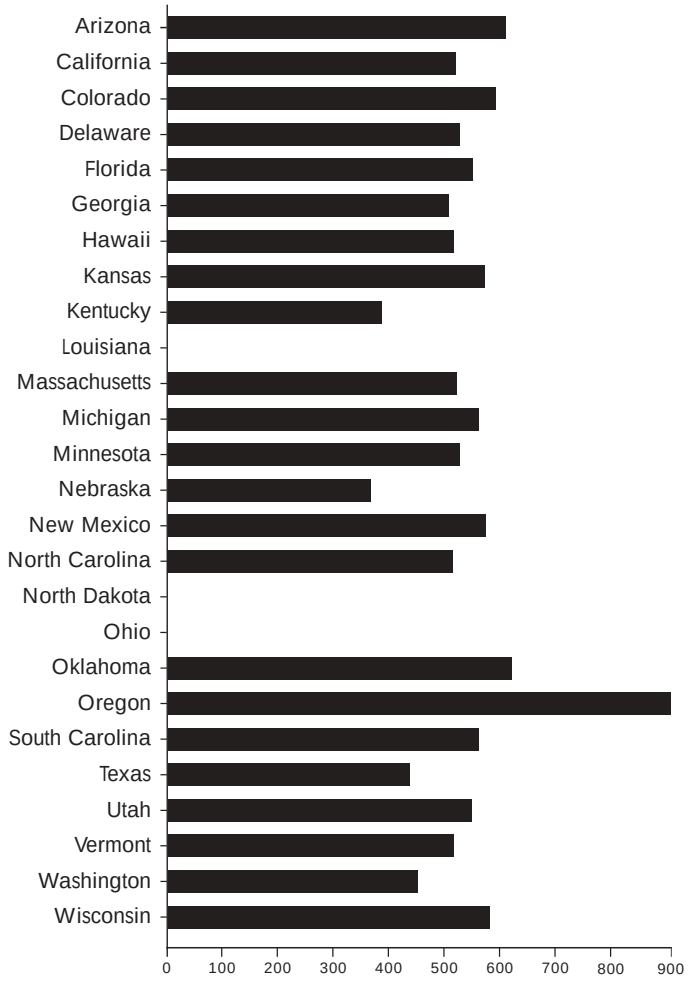
References

1. CDC. Surveys and data collection systems: national health care survey; 2001 Jun [accessed 2003 Jul 24]. Available from URL: www.cdc.gov/nchs/nhcs.htm.
2. National Hospital Discharge Survey 2000 [unpublished] Fingerhut L. National Center for Health Statistics. [personal communication] 2003.

All-Injury Indicators Figures

FIGURE 1a.

All Injury Indicator: Hospitalizations for All Injuries (Overall), 1999



	Number	Rate
Arizona	28,801	600.7
California	165,290	512.5
Colorado	23,080	583.1
Delaware	3,953	519.8
Florida	95,370	541.8
Georgia	36,305	499.0
Hawaii	6,115	509.6
Kansas	16,144	564.4
Kentucky	14,879	380.1
Louisiana	—‡	—‡
Massachusetts	35,012	514.3
Michigan	54,624	553.5
Minnesota	25,570	519.7
Nebraska	6,645	360.5
New Mexico	9,477	564.9
North Carolina	40,274	507.8
North Dakota	—‡	—‡
Ohio	—‡	—‡
Oklahoma	21,592	611.4
Oregon	30,654	894.2
South Carolina	21,382	552.7
Texas	86,727	430.3
Utah	10,252	540.5§
Vermont	3,156	507.9
Washington	25,499	444.7
Wisconsin	31,572	572.3

Factors Affecting Representativeness of State Hospital Discharge Data Sets for Injury Surveillance

State	Percentage of HDD Injury Records with External Cause Coding*	Inclusion of Readmission and Transfers?	Cross-Border Hospitalization†	Incomplete Hospital Participation
AZ	84.0%	Yes	No	No
CA	100.0%	Yes	No	No
CO	98.8%	Yes	No	No
DE	76.0%	Yes	No	No
FL	74.0%	Yes	No	No
GA	91.8%	Yes	Unknown	No
HI	52.9%	Yes	No	No
KS	58.0%	Yes	Unknown	No
KY	68.0%	Yes	**Yes**	**Yes**
LA	‡	‡	‡	‡
MA	95.3%	Yes	No	No
MI	82.3%	Yes	No	No
MN	78.4%	Yes	No	**Yes**
NE	100.0%	**No**	**Yes**	No
NM	48.3%	Yes	Unknown	No
NC	89.1%	Yes	No	No
ND	‡	‡	‡	‡
OH	‡	‡	‡	‡
OK	65.9%	Yes	No	No
OR	67.5%	Yes	No	No
SC	94.1%	‡	**Yes**	No
TX	62.7%	Yes	**Yes**	**Yes**
UT	89.2%	Yes	No	No
VT	85.0%	Yes	**Yes**	No
WA	98.9%	Yes	No	No
WI	97.3%	Yes	No	No

* Incompleteness can lead to bias.

† Subjective assessment by health department staff that a substantial proportion of state residents injured in-state who require hospitalization are hospitalized in a neighboring state.

‡ No data available.

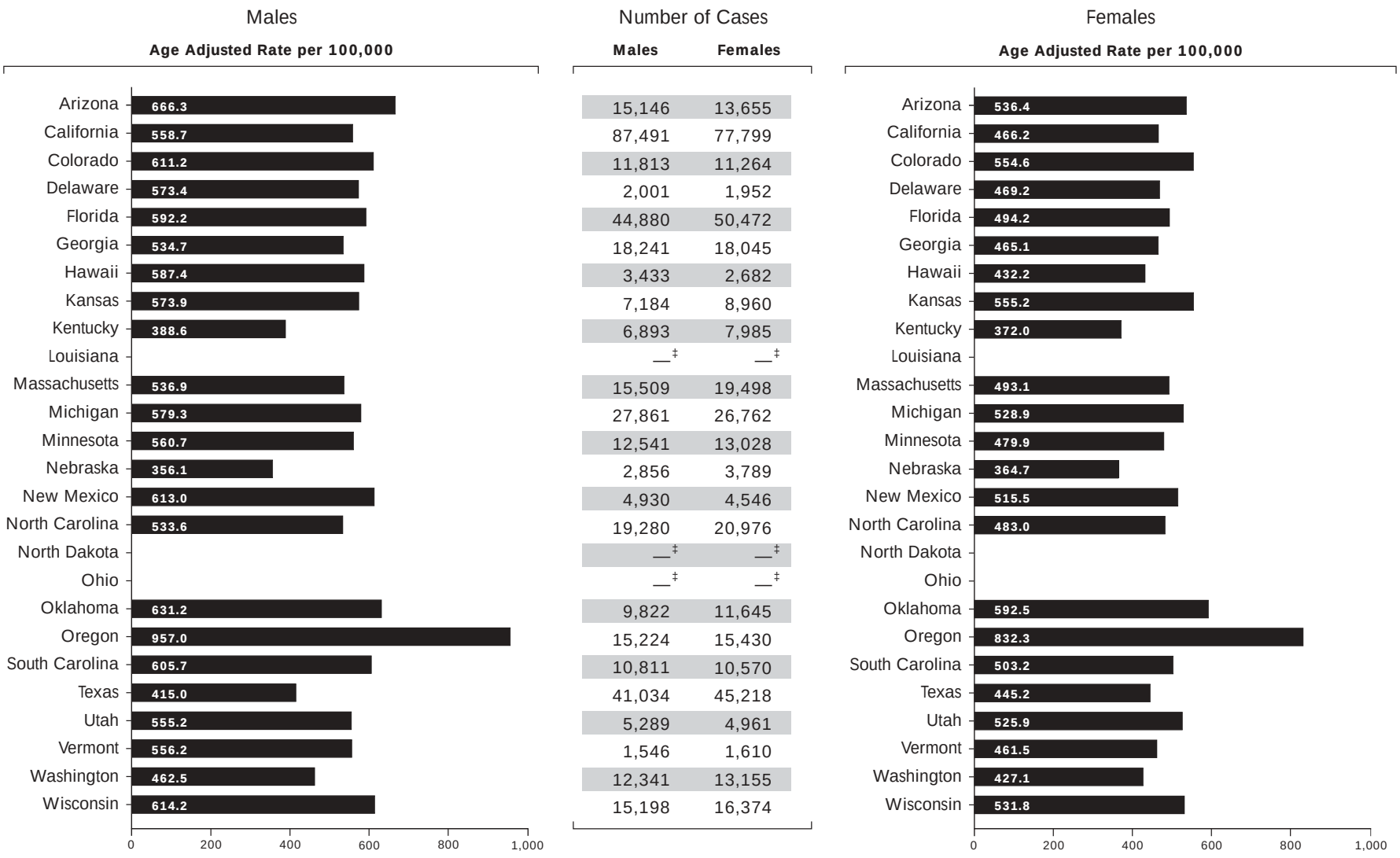
§ Rate=[(male rate*pop) + (female rate*pop)] / (male+female pop).

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 1b.

All Injury Indicator: Hospitalizations for All Injuries by Sex, 1999



‡ No data available.

ll Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 1C.

All Injury Indicator: Hospitalizations for All Injuries by Age**, 1999

State	<1		1-4		5-14		15-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	N	Rate††	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
AZ	294	383	925	299	1,715	232	3,924	587	3,579	569	3,811	518	2,721	463	1,884	468	2,522	740	4,299	1,939	3,127	4,745
CA	1,326	264	6,154	308	21,209	419	19,101	408	21,073	412	16,274	291	11,382	277	11,522	472	14,227	737	23,699	1,834	19,323	4,557
CO	127	211	417	178	1,165	192	3,176	528	2,853	432	3,308	458	2,565	436	1,628	491	1,863	832	3,157	2,285	2,821	6,016
DE	36	350	99	248	252	247	538	542	420	371	479	368	374	385	270	427	385	707	633	1,889	467	4,605
FL	561	283	1,983	263	4,207	214	9,089	492	9,084	460	11,199	482	8,563	426	6,537	437	10,112	699	18,256	1,725	15,779	4,910
GA	275	231	738	160	1,849	162	4,439	400	4,524	375	5,131	384	3,834	375	2,897	460	3,386	808	5,143	2,005	4,089	4,792
HI	26	155	249	391	418	258	875	525	790	538	715	361	589	356	413	398	499	567	847	1,497	694	4,013
KS	89	238	335	229	726	187	1,779	447	1,323	389	1,742	408	1,305	381	1,058	482	1,585	905	3,101	2,437	3,101	6,005
KY	116	220	642	311	1,257	235	1,537	266	1,423	262	1,755	274	1,311	242	1,096	294	1,510	564	2,440	1,452	1,792	3,120
LA	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
MA	186	233	559	175	1,469	182	3,272	370	3,087	307	3,814	374	3,030	370	2,410	486	3,718	841	7,036	2,349	6,426	5,333
MI	335	252	1,283	238	2,902	202	6,607	494	6,089	424	7,639	477	5,778	438	4,137	497	5,077	786	8,139	1,874	6,609	4,599
MN	147	230	519	201	1,376	191	3,219	471	2,528	402	3,238	398	2,449	390	1,788	454	2,290	788	4,094	1,946	3,922	4,644
NE	37	161	109	119	308	125	710	282	508	246	626	240	515	239	466	331	727	640	1,298	1,616	1,341	3,908
NM	110	409	207	198	620	224	1,330	505	1,091	517	1,241	446	906	395	635	424	854	768	1,373	2,047	1,109	5,130
NC	271	250	852	201	1,734	158	4,700	423	4,737	389	5,065	400	3,913	371	3,057	433	4,388	831	6,627	2,054	4,930	4,774
ND	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OH	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OK	208	434	643	348	1,183	242	2,472	490	1,982	475	2,424	477	1,864	425	1,505	471	2,147	901	3,652	2,383	3,509	6,134
OR	240	542	714	407	1,271	275	2,691	587	2,701	636	3,819	725	3,780	774	3,134	1,038	3,872	1,773	5,065	3,159	3,367	5,984
SC	161	318	574	283	1,148	214	2,613	469	2,689	480	2,938	467	2,242	427	1,741	499	2,098	783	3,042	1,917	2,136	4,571
TX	521	156	2,052	157	4,723	151	11,191	368	9,265	334	9,924	304	7,893	309	6,248	386	9,148	825	13,859	2,056	11,903	5,097
UT	97	212	330	194	698	184	1,761	434	1,075	326	1,164	373	919	400	677	497	879	889	1,459	2,274	1,188	5,719
VT	19	—‖	45	160	152	177	378	452	291	382	355	352	300	331	249	446	329	816	546	2,072	492	5,053
WA	197	248	514	161	1,283	149	2,696	336	2,547	301	3,152	323	2,700	334	1,857	387	2,307	672	4,403	1,882	3,840	4,700
WI	210	319	720	271	1,487	194	3,718	490	2,989	434	3,740	431	3,003	431	2,165	481	3,127	896	5,443	2,198	4,947	5,251

‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

** Age in years.

†† Rate per 100,000 population.

2. Traumatic Brain Injury Indicators (TBI)

Of all types of injury, TBI is among the most likely to cause death or permanent disability.[1] Each year in the United States, an estimated one million people are treated for TBI and released from hospital emergency departments;[2] 230,000 people are hospitalized for TBI and survive,[3] and 50,000 people die.[4] An estimated 5.3 million Americans live with a TBI-related disability.[5]

The risk of TBI is highest among adolescents, young adults, and people ages 75 years and older. Motor vehicle crashes, violence, and falls are the leading causes of TBI. Among people ages 65 years and older, falls are the leading cause of TBI. Motor vehicle crashes are the leading cause among persons ages 5 to 64 years. For persons of all ages, the risk of TBI among males is twice that among females. The outcome of these injuries varies greatly depending on the cause: 91% of firearm-related TBIs result in death, and 11% of fall-related TBIs are fatal.[6]

Nearly two-thirds of firearm-related TBIs are classified as suicidal intent.[5] In 1990, firearms surpassed motor vehicles as the largest single cause of death associated with TBI in the United States.[7] These data reflect the success of efforts to prevent TBI due to motor vehicle crashes and the failure to prevent such injuries due to firearms.[1] Continued surveillance of TBI is needed to monitor trends, identify high risk groups, prioritize prevention efforts, and to assess prevention programs.

Figures 2a, 2b, and 2c present TBI-related hospitalization rates in the 22 states in 1999; the range from lowest to highest rates was almost five-fold. Figures 2d, 2e, and 2f present the fatal TBI data in 21 states for the same year. Figure 2d illustrates a more than three-fold difference between the lowest and highest rates. The ratio of hospitalized cases to death certificate-identified cases ranges from 1.4:1 to 7.6:1. As noted previously, cases of injury resulting in hospitalization and subsequent death may be included in both HDD and death certificate data. Males have higher rates of death and hospitalization than females. The highest rates of TBI death and hospitalization are seen among persons ages 65 years and older. (Table 2c and 2f.)

Limitation: The case inclusion criteria for TBI hospitalization in this report requires that an *injury* be listed in the principal diagnostic field and a TBI diagnosis in any diagnostic field. In contrast, the hospital-based CDC TBI surveillance definition requires that a TBI be listed in *any* of the diagnostic fields. Hospitalization rates based on CDC's TBI surveillance definition will be higher than the TBI hospitalizations indicators shown here.[8,9] The TBI fatal indicator uses the same definition as the death file-based CDC TBI surveillance definition, so the death rates should be similar. Four states did not have access to state multiple cause-of-death files and so were not able to calculate the fatal TBI indicator.

References

1. CDC. Epidemiology of traumatic brain injury in the United States [Online]. 2000 May [accessed 2003 Jul 24]. Available from URL: www.cdc.gov/ncipc/factsheets/tbi.htm.
2. Guerrero J, Thurman DJ, Sniezek JE. Emergency department visits associated with traumatic brain injury: United States, 1995–1996. Brain Inj 2000; 14(2):181–6.
3. Thurman DJ, Guerrero J. Trends in hospitalization associated with traumatic brain injury. JAMA 1999; 282(10):954–7.
4. CDC. National Center for Health Statistics. Multiple Cause of Death Public Use Data, 1996 [unpublished]. 2003.
5. Thurman DJ, Alverson CA, Dunn KA, Guerrero J, Sniezek JE. Traumatic brain injury in the United States: a public health perspective. J Head Trauma Rehabil 1999;14(6):602–15.
6. CDC. National Center for Injury Prevention and Control. State health department traumatic brain injury data; Alaska, Arizona, California (reporting Sacramento County only), Colorado, Louisiana, Maryland, Missouri, New York, Oklahoma, Rhode Island, South Carolina, and Utah, 1997 [unpublished]. 2003.
7. Sosin DM, Sniezek JE, Waxweiler RJ. Trends in death associated with brain injury, 1979–1992. JAMA 1995; 273:1778–80.
8. Thurman DJ, Sniezek JE, Johnson D, Greenspan A, Smith SM. Guidelines for surveillance of central nervous system injury. Atlanta (GA): Centers for Disease Control and Prevention; 1995.
9. Langlois JA, Kegler SR, Butler JA, Gotsch KE, Johnson RL, Reichard AA, et al. Traumatic brain injury-related hospital discharges, results from a 14-state surveillance system, 1997. Atlanta (GA): CDC. MMWR Surveillance Summaries 2003;52 (SS-04):1–18.

Traumatic Brain Injury Indicators Figures

2a. TBI Hospitalizations (Overall), 1999

2b. TBI Hospitalizations by Sex, 1999

2c. TBI Hospitalizations by Age, 1999

2d. TBI Fatalities (Overall), 1999

2e. TBI Fatalities by Sex, 1999

2f. TBI Fatalities by Age, 1999

FIGURE 2a.

TBI Indicator: TBI Hospitalizations (Overall), 1999

	Number	Rate	Factors Affecting Representativeness of State Hospital Discharge Data Sets for Injury Surveillance				
State			State	Percentage of HDD Injury Records with External Cause Coding*	Inclusion of Readmission and Transfers?	Cross-Border Hospitalization†	Incomplete Hospital Participation
Arizona	4,498	94.5	AZ	84.0%	Yes	No	No
California	23,499	72.2	CA	100.0%	Yes	No	No
Colorado	3,392	82.9	CO	98.8%	Yes	No	No
Delaware	931	124.6	DE	76.0%	Yes	No	No
Florida	11,956	73.8	FL	74.0%	Yes	No	No
Georgia	4,409	59.1	GA	91.8%	Yes	Unknown	No
Hawaii	999	84.6	HI	52.9%	Yes	No	No
Kansas	1,978	72.3	KS	58.0%	Yes	Unknown	No
Kentucky	1,711	44.4	KY	68.0%	Yes	**Yes**	**Yes**
Louisiana	—‡	—‡	LA	‡	‡	‡	‡
Massachusetts	3,674	56.8	MA	95.3%	Yes	No	No
Michigan	7,344	75.8	MI	82.3%	Yes	No	No
Minnesota	3,518	73.4	MN	78.4%	Yes	No	**Yes**
Nebraska	538	30.4	NE	100.0%	**No**	**Yes**	No
New Mexico	1,050	61.8	NM	48.3%	Yes	Unknown	No
North Carolina	4,487	57.1	NC	89.1%	Yes	No	No
North Dakota	—‡	—‡	ND	‡	‡	‡	‡
Ohio	—‡	—‡	OH	‡	‡	‡	‡
Oklahoma	2,540	74.3	OK	65.9%	Yes	No	No
Oregon	2,421	72.3	OR	67.5%	Yes	No	No
South Carolina	—‡	—‡	SC	94.1%	‡	**Yes**	No
Texas	5,165	25.7	TX	62.7%	Yes	**Yes**	**Yes**
Utah	1,620	75.6	UT	89.2%	Yes	No	No
Vermont	339	57.2	VT	85.0%	Yes	**Yes**	No
Washington	2,787	49.0	WA	98.9%	Yes	No	No
Wisconsin	3,593	67.4	WI	97.3%	Yes	No	No

* Incompleteness can lead to bias.

† Subjective assessment by health department staff that a substantial proportion of state residents injured in-state who require hospitalization are hospitalized in a neighboring state.

‡ No data available.

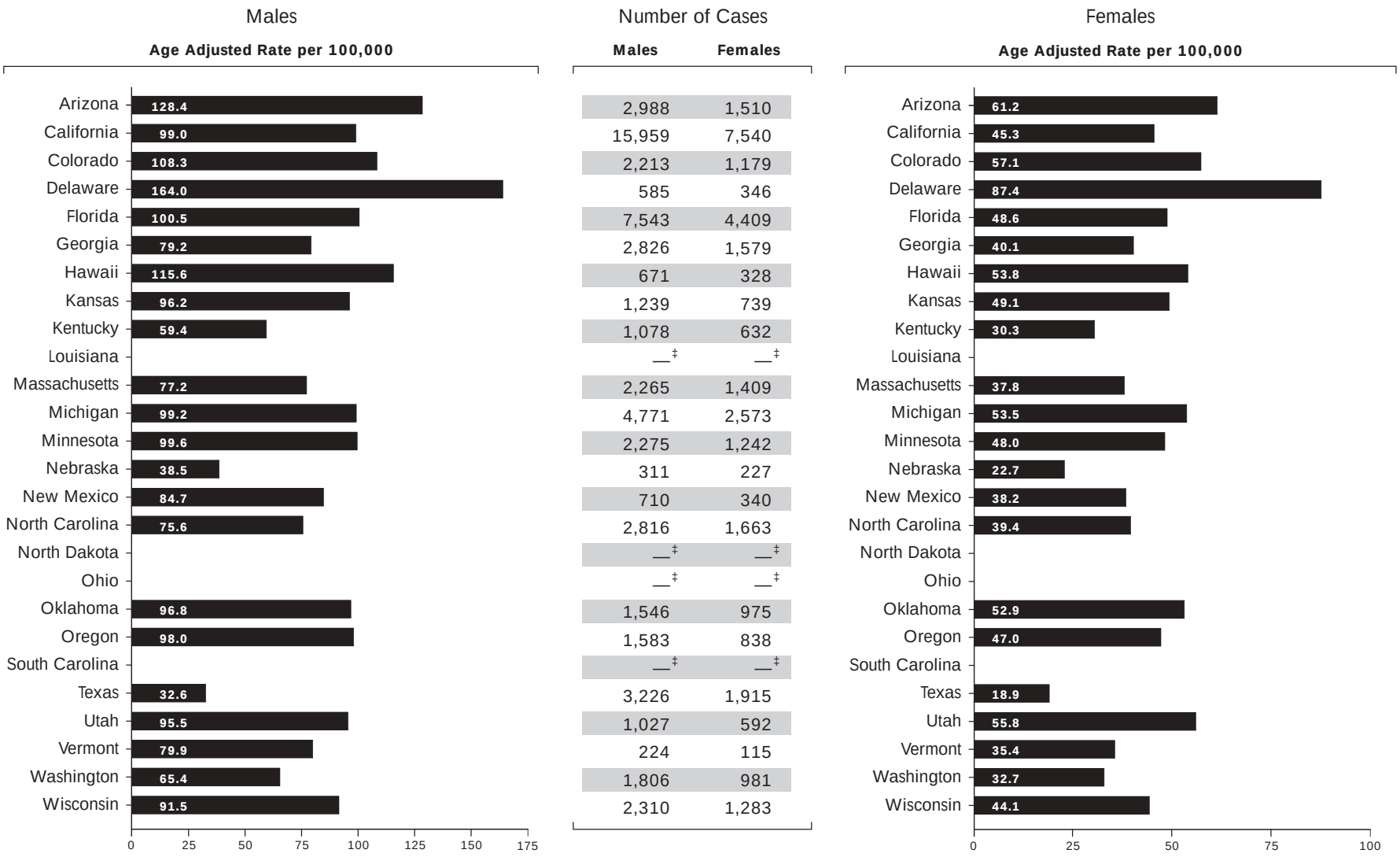
§ Rate=[(male rate*pop) + (female rate*pop)] / (male+female pop).

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 2b.

TBI Indicator: TBI Hospitalizations by Sex, 1999



‡ No data available.

ll Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 2C.

TBI Indicator: TBI Hospitalizations by Age**, 1999

State	<1		1-4		5-14		15-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	N	Rate††	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
AZ	143	186.5	212	68.5	433	58.6	899	134.4	642	102.1	650	88.3	424	72.1	260	64.6	281	82.4	361	162.8	193	292.8
CA	622	123.6	1,187	59.5	4,379	86.6	3,045	65.0	3,054	59.7	2,337	41.8	2,418	58.9	1,463	59.9	1,573	81.5	2,121	164.1	1,300	306.5
CO	65	108.0	108	46.1	298	49.0	733	121.9	476	72.1	523	72.4	380	64.5	198	59.7	184	82.2	257	186.0	170	362.6
DE	27	262.2	28	70.2	60	58.7	187	188.3	123	108.6	147	112.9	99	102.0	55	87.0	65	119.3	92	274.5	48	473.3
FL	261	131.5	328	43.5	902	45.9	1,857	100.5	1,380	69.9	1,507	64.8	1,096	54.6	808	54.0	951	65.7	1,640	155.0	1,226	381.5
GA	127	106.7	156	33.8	396	34.7	880	79.3	586	48.6	667	49.9	433	42.3	273	43.3	277	66.1	368	143.4	246	288.3
HI	15	—ll	53	83.3	98	60.4	146	87.7	121	82.4	101	51.0	98	59.2	59	56.8	67	76.1	144	245.5	97	560.9
KS	40	107.0	67	45.7	163	42.0	419	105.2	194	57.0	243	56.9	155	45.2	105	47.8	150	85.6	247	194.1	195	377.6
KY	37	70.3	80	38.7	139	26.0	328	56.9	228	42.0	215	33.6	138	25.5	116	31.1	137	51.2	189	112.5	104	181.1
LA	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
MA	104	130.2	97	30.3	231	28.6	539	61.0	395	39.3	443	43.5	308	37.6	244	49.2	357	80.8	551	184.0	405	336.1
MI	148	111.6	206	38.1	592	41.1	1,416	105.9	925	64.5	1,131	70.6	731	55.4	466	56.0	542	84.0	720	165.8	463	322.2
MN	69	107.9	116	45.0	322	44.7	637	93.2	422	67.0	498	61.2	338	53.9	200	50.7	244	84.0	399	189.6	273	323.3
NE	6	—ll	10	—ll	48	19.4	114	45.3	55	26.7	49	18.8	38	17.6	29	20.6	39	34.3	83	103.3	67	195.3
NM	38	141.2	32	30.6	124	44.7	222	84.3	147	69.7	118	42.4	94	41.0	70	46.7	67	60.2	85	126.7	53	245.1
NC	119	109.8	137	32.4	355	32.3	880	79.3	623	51.2	563	44.4	347	32.9	278	39.3	358	67.8	496	153.8	331	320.5
ND	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OH	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OK	75	156.3	107	58.0	275	56.3	508	100.8	273	65.4	268	52.7	196	44.6	145	45.4	181	76.0	297	193.8	215	375.8
OR	42	94.9	101	57.6	225	48.7	443	96.7	296	69.7	328	62.2	249	51.0	145	48.0	182	83.3	237	147.8	173	307.5
SC	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
TX	161	48.2	295	22.6	595	19.0	1,192	39.2	716	25.8	637	19.5	449	17.6	253	15.6	290	26.2	319	47.3	258	110.5
UT	53	115.6	93	54.8	208	54.7	434	106.9	164	49.7	174	55.8	131	56.9	87	63.8	83	83.9	116	180.8	76	365.8
VT	9	—ll	9	—ll	28	32.6	60	71.7	26	34.1	40	39.6	32	35.3	36	64.4	34	84.3	35	132.8	30	307.0
WA	83	104.3	105	32.9	258	29.9	546	68.0	297	35.1	327	33.5	266	32.9	183	38.1	193	56.2	313	133.8	216	264.4
WI	88	133.6	102	38.4	298	38.9	740	97.6	390	56.7	435	50.1	298	42.8	204	45.3	304	87.1	430	173.7	304	321.2

‡ No data available.

ll Rates are suppressed if fewer than 20 cases were reported.

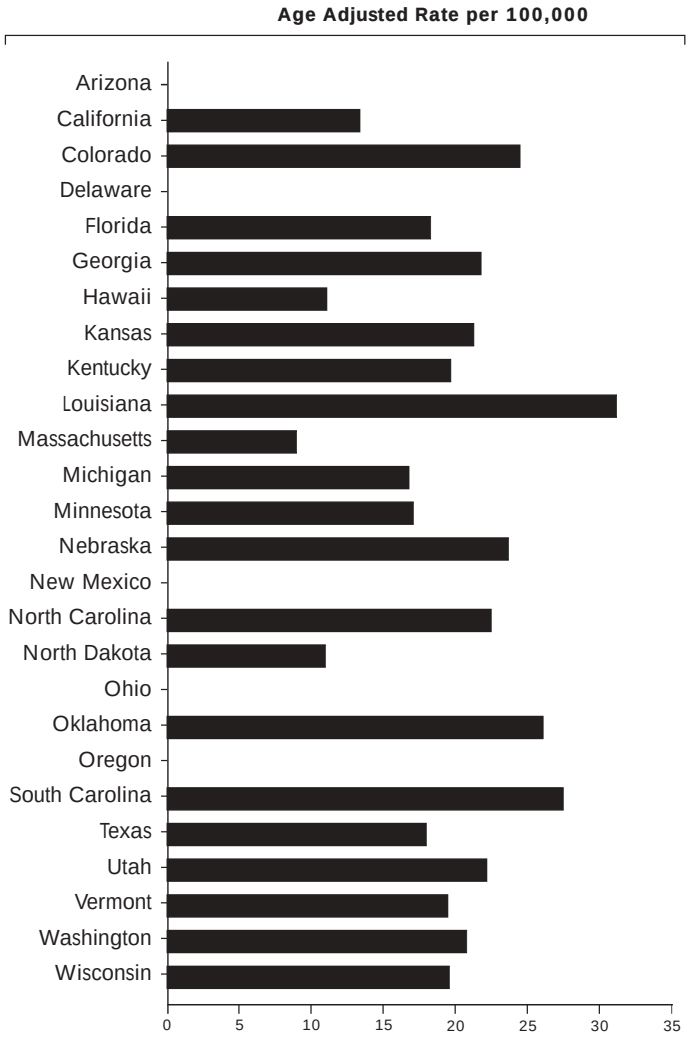
¶ Case counts are suppressed if fewer than 5 cases were reported.

** Age in years.

†† Rate per 100,000 population.

FIGURE 2d.

TBI Indicator: TBI Fatalities (Overall), 1999



	Number	Rate
Arizona	—‡	—‡
California	4,139	13.4
Colorado	938	24.5
Delaware	—‡	—‡
Florida	2,933	18.3
Georgia	1,616	21.8
Hawaii	130	11.1
Kansas	569	21.3
Kentucky	739	19.7
Louisiana	1,163	31.2
Massachusetts	562	9.0
Michigan	1,585	16.8
Minnesota	795	17.1
Nebraska	404	23.7
New Mexico	—‡	—‡
North Carolina	1,729	22.5
North Dakota	71	11.0
Ohio	—‡	—‡
Oklahoma	865	26.1
Oregon	—‡	—‡
South Carolina	1,045	27.5
Texas	3,620	18.0
Utah	429	22.2
Vermont	114	19.5
Washington	1,151	20.8
Wisconsin	1,030	19.6

* Incompleteness can lead to bias.

† Subjective assessment by health department staff that a substantial proportion of state residents injured in-state who require hospitalization are hospitalized in a neighboring state.

‡ No data available.

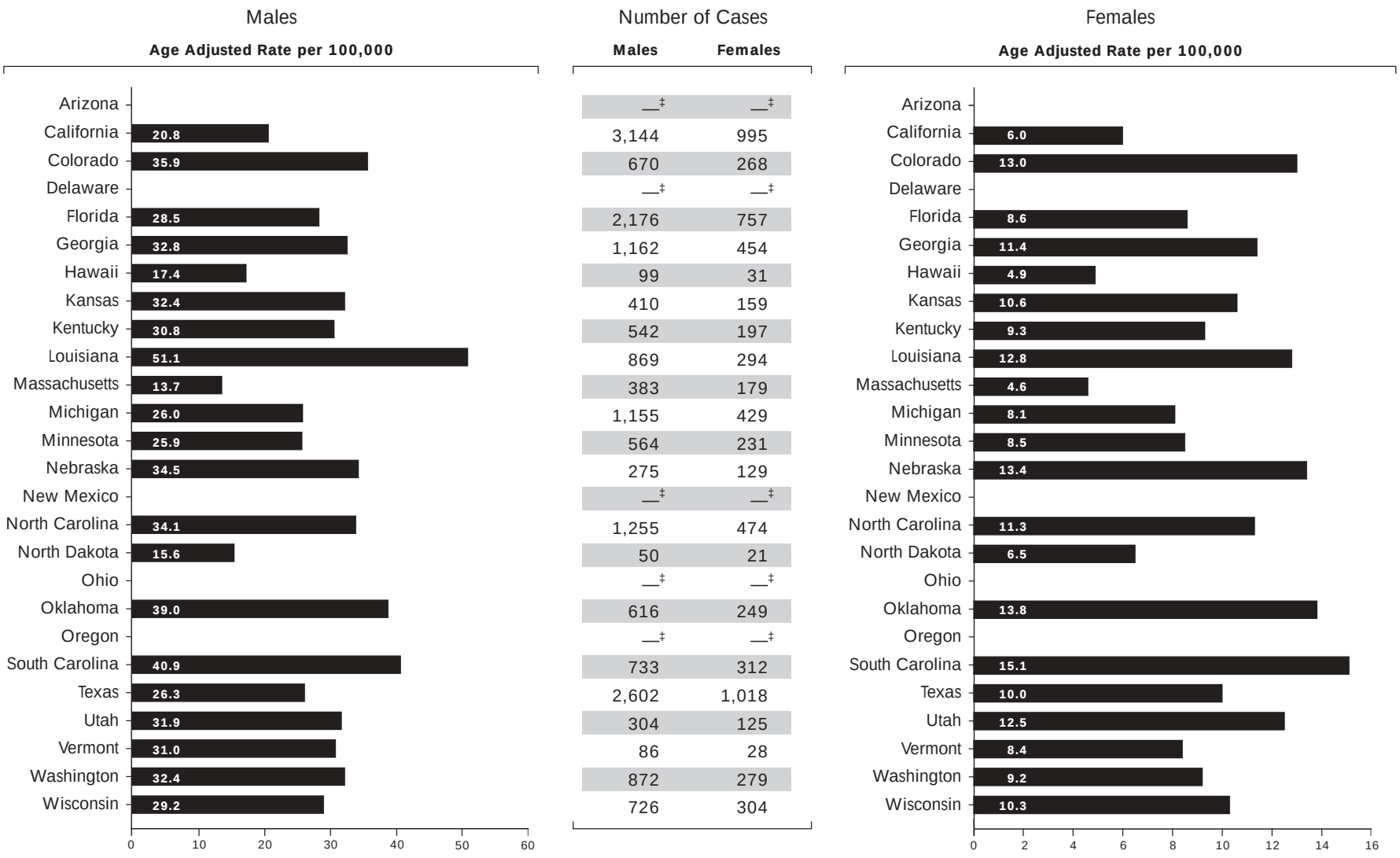
§ Rate=[(male rate*pop) + (female rate*pop)] / (male+female pop).

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 2e.

TBI Indicator: TBI Fatalities by Sex, 1999



‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 2f.

TBI Indicator: TBI Fatalities by Age**, 1999

State	<1		1-4		5-14		15-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	N	Rate††	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
AZ	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
CA	24	4.8	67	3.4	116	2.3	740	15.8	550	10.8	574	10.3	509	12.4	358	14.7	398	20.6	459	35.5	344	81.1
CO	—¶	—ǁ	8	—ǁ	34	5.6	164	27.3	148	22.4	138	19.1	114	19.4	74	22.3	74	33.1	102	73.9	78	166.5
DE	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
FL	17	—ǁ	35	4.6	80	4.1	409	22.1	396	20.1	456	19.6	414	20.6	229	15.3	300	20.7	353	33.4	241	75.0
GA	12	—ǁ	30	6.5	68	6.0	330	29.7	299	24.8	264	19.7	188	18.4	137	21.8	105	25.0	128	49.9	55	64.4
HI	—¶	—ǁ	—¶	—ǁ	—¶	—ǁ	9	—ǁ	22	15.0	15	—ǁ	11	—ǁ	7	—ǁ	15	—ǁ	22	38.9	23	133.0
KS	—¶	—ǁ	9	—ǁ	18	—ǁ	114	28.6	73	21.4	68	15.9	60	17.5	49	22.3	52	29.7	73	57.4	49	94.9
KY	—¶	—ǁ	5	—ǁ	25	4.7	135	23.4	115	21.2	110	17.2	81	15.0	45	12.1	70	26.2	82	48.8	67	116.6
LA	12	—ǁ	24	9.6	43	6.5	258	37.0	200	35.0	197	29.2	130	22.9	83	21.6	88	31.7	82	48.7	46	82.3
MA	5	—ǁ	—¶	—ǁ	8	—ǁ	63	7.1	55	5.5	65	6.4	49	6.0	57	11.5	48	10.9	122	40.7	86	71.4
MI	16	—ǁ	27	5.0	47	3.3	273	20.4	240	16.7	220	13.7	177	13.4	121	14.5	141	21.8	195	44.9	128	89.1
MN	5	—ǁ	5	—ǁ	20	2.8	145	21.2	82	13.0	115	14.1	76	12.1	60	15.2	63	21.7	104	49.4	120	142.1
NE	—¶	—ǁ	5	—ǁ	10	—ǁ	80	31.8	53	25.7	58	22.2	47	21.8	36	25.5	32	28.2	45	56.0	37	107.8
NM	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
NC	14	—ǁ	21	5.0	46	4.2	334	30.1	268	22.0	272	21.5	197	18.7	135	19.1	187	35.4	154	47.7	101	97.8
ND	—¶	—ǁ	—¶	—ǁ	—¶	—ǁ	18	—ǁ	11	—ǁ	6	—ǁ	5	—ǁ	8	—ǁ	6	—ǁ	9	—ǁ	7	—ǁ
OH	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OK	13	—ǁ	16	—ǁ	23	4.7	177	35.1	122	29.2	116	22.8	94	21.4	74	23.2	77	32.3	94	61.3	59	103.1
OR	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
SC	7	—ǁ	19	—ǁ	33	6.1	200	35.9	160	28.6	173	27.5	127	24.2	84	24.1	91	34.0	90	56.7	61	130.6
TX	40	12.0	79	6.0	142	4.5	737	24.2	497	17.9	583	17.9	411	16.1	311	19.2	276	24.9	324	48.1	220	94.2
UT	—¶	—ǁ	—¶	—ǁ	17	—ǁ	98	24.1	62	18.8	69	22.1	51	22.2	32	23.5	32	32.4	34	53.0	27	130.0
VT	—¶	—ǁ	—¶	—ǁ	5	—ǁ	21	25.1	15	—ǁ	21	20.8	12	—ǁ	6	—ǁ	8	—ǁ	14	—ǁ	11	—ǁ
WA	5	—ǁ	9	—ǁ	30	3.5	228	28.4	147	17.4	165	16.9	154	19.1	84	17.5	104	30.3	132	56.4	93	113.8
WI	—¶	—ǁ	11	—ǁ	24	3.2	207	27.3	125	8.2	133	15.3	129	18.5	76	16.9	91	26.1	133	53.7	97	102.5

‡ No data available.

ǁ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

** Age in years.

†† Rate per 100,000 population.

3. Drowning Indicators

Drowning is the second leading cause of injury death among U.S. children ages 1 to 14 years. It is also in the top 10 causes of injury death for all ages. In 2000, 4,073 drownings occurred in the United States, the majority of which were unintentional (85.5%); 8.8% were intentional; 5.7% were undetermined.[1] Men are at higher risk than women (4:1), and blacks are at a higher risk than whites (1.4:1).[2]

Nationally, drowning rates are highest for two age groups: children under five years of age, and persons 15 to 19 years of age. In one California study, for every child who drowned another 4 were hospitalized, and 16 received emergency department care for near drowning.[3] Near drowning can be costly and can result in lifelong disability.

Among adolescents and adults, risk factors for drowning include drinking alcohol, swimming alone, and not wearing a personal flotation device while engaged in water sports or recreation. For children under five, unexpected access to water or brief lapses in adult supervision are implicated in most drowning incidents.[4]

Infants commonly drown in bathtubs. As these young children become more mobile, small water containers such as buckets and toilets also pose drowning risks. Most toddlers and preschoolers drown in residential backyard pools. The percentage of drowning in open water such as lakes, rivers, and the ocean increases with age.[5]

Despite technological advancements in medical care, hospital treatment often does little to change the outcome of a submersion injury. Prevention is key, since the window of opportunity to prevent brain damage or death is so small. Strategies to prevent drownings among infants and children focus on environmental changes:

- proper fencing of home pools,
- drainage of buckets,
- close supervision of children in bathtubs,
- public education and training in CPR.

Figures 3a, 3b, and 3c, which present the near drowning hospitalization data for 22 states in 1999, illustrate an eight-and-a-half fold difference between the lowest and highest hospitalization rates. In four states, the number of drowning hospitalizations was too low to calculate a stable rate. Figures 3d, 3e, and 3f present the drowning death data for 25 states in 1999. This figure shows over a four-fold difference between the lowest and highest rates. In three states, the number of drowning deaths in 1999 was too low to calculate a stable rate. Exposure to aquatic environments also varies by state and should be considered along with these rate differences.

In states where data are available by sex, males have higher rates of death and hospitalization than females. The highest death rates by age group are among 1 to 4 year olds, but events are infrequent and only states with large populations (California, Florida, and Texas) were able to calculate stable rates for this age group. Nine states showed relatively high death rates for 15 to 24 year olds. The highest hospitalization rates were among 1 to 4 year olds, followed by 5 to 14 year olds, consistent with the 1990 study cited earlier.[3]

The ratio of death versus hospitalizations for near-drowning ranges from 1:0.4 to 1:1.7. Similar ratios were reported in the previous *State Injury Indicators Report* using 1997 and 1998 data. Hospitalization for submersion injuries appears to be a more common outcome among children 14 years old and under than it is for adults.

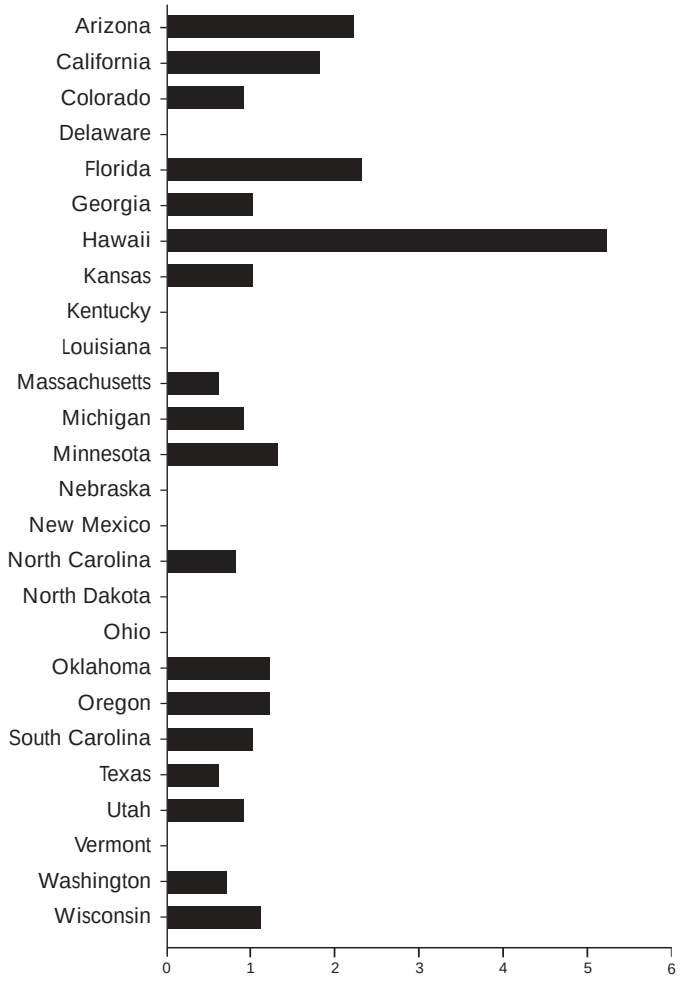
References

1. CDC. Web-based Injury Statistics Query and Reporting System (WISQARS) [Online]. 2002. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (producer). [accessed 2003 Jul 28]. Available from URL: www.cdc.gov/ncipc/wisqars.
2. Division of Unintentional Injury Prevention downing fact sheet [accessed 2003 Jul 28]. Available from: URL: www.cdc.gov/ncipc/factsheets/drown.htm.
3. Wintemute GJ. Childhood drowning and near-drowning in the U.S. Am J Dis Child 1990;144.
4. Fletemeyer JR, Freas SJ, editors. Drowning: new perspectives on intervention and prevention. Boca Raton: CRC Press; 1998.
5. Brenner RA, Trumble AC, Smith GS, et al. Where children drown, U.S., 1995. Pediatrics 2001;10(1):85–9.

Drowning Indicators Figures

FIGURE 3a.

Drowning Indicator: Near Drowning Hospitalizations (Overall), 1999



	Number	Rate
Arizona	116	2.2
California	605	1.8
Colorado	37	0.9 §
Delaware	— ¶	— ‖
Florida	332	2.3
Georgia	78	1.0
Hawaii	60	5.2
Kansas	26	1.0 §
Kentucky	16	— ‖
Louisiana	— ‡	— ‡
Massachusetts	35	0.6 §
Michigan	94	0.9
Minnesota	63	1.3 §
Nebraska	7	— ‖
New Mexico	— ‡	— ‡
North Carolina	66	0.8
North Dakota	— ‡	— ‡
Ohio	— ‡	— ‡
Oklahoma	39	1.2 §
Oregon	39	1.2 §
South Carolina	40	1.0 §
Texas	125	0.6
Utah	26	0.9 §
Vermont	— ¶	— ‖
Washington	41	0.7 §
Wisconsin	54	1.1 §

Factors Affecting Representativeness of State Hospital Discharge Data Sets for Injury Surveillance

State	Percentage of HDD Injury Records with External Cause Coding*	Inclusion of Readmission and Transfers?	Cross-Border Hospitalization†	Incomplete Hospital Participation
AZ	84.0%	Yes	No	No
CA	100.0%	Yes	No	No
CO	98.8%	Yes	No	No
DE	76.0%	Yes	No	No
FL	74.0%	Yes	No	No
GA	91.8%	Yes	Unknown	No
HI	52.9%	Yes	No	No
KS	58.0%	Yes	Unknown	No
KY	68.0%	Yes	**Yes**	**Yes**
LA	‡	‡	‡	‡
MA	95.3%	Yes	No	No
MI	82.3%	Yes	No	No
MN	78.4%	Yes	No	**Yes**
NE	100.0%	**No**	**Yes**	No
NM	48.3%	Yes	Unknown	No
NC	89.1%	Yes	No	No
ND	‡	‡	‡	‡
OH	‡	‡	‡	‡
OK	65.9%	Yes	No	No
OR	67.5%	Yes	No	No
SC	94.1%	‡	**Yes**	No
TX	62.7%	Yes	**Yes**	**Yes**
UT	89.2%	Yes	No	No
VT	85.0%	Yes	**Yes**	No
WA	98.9%	Yes	No	No
WI	97.3%	Yes	No	No

* Incompleteness can lead to bias.

† Subjective assessment by health department staff that a substantial proportion of state residents injured in-state who require hospitalization are hospitalized in a neighboring state.

‡ No data available.

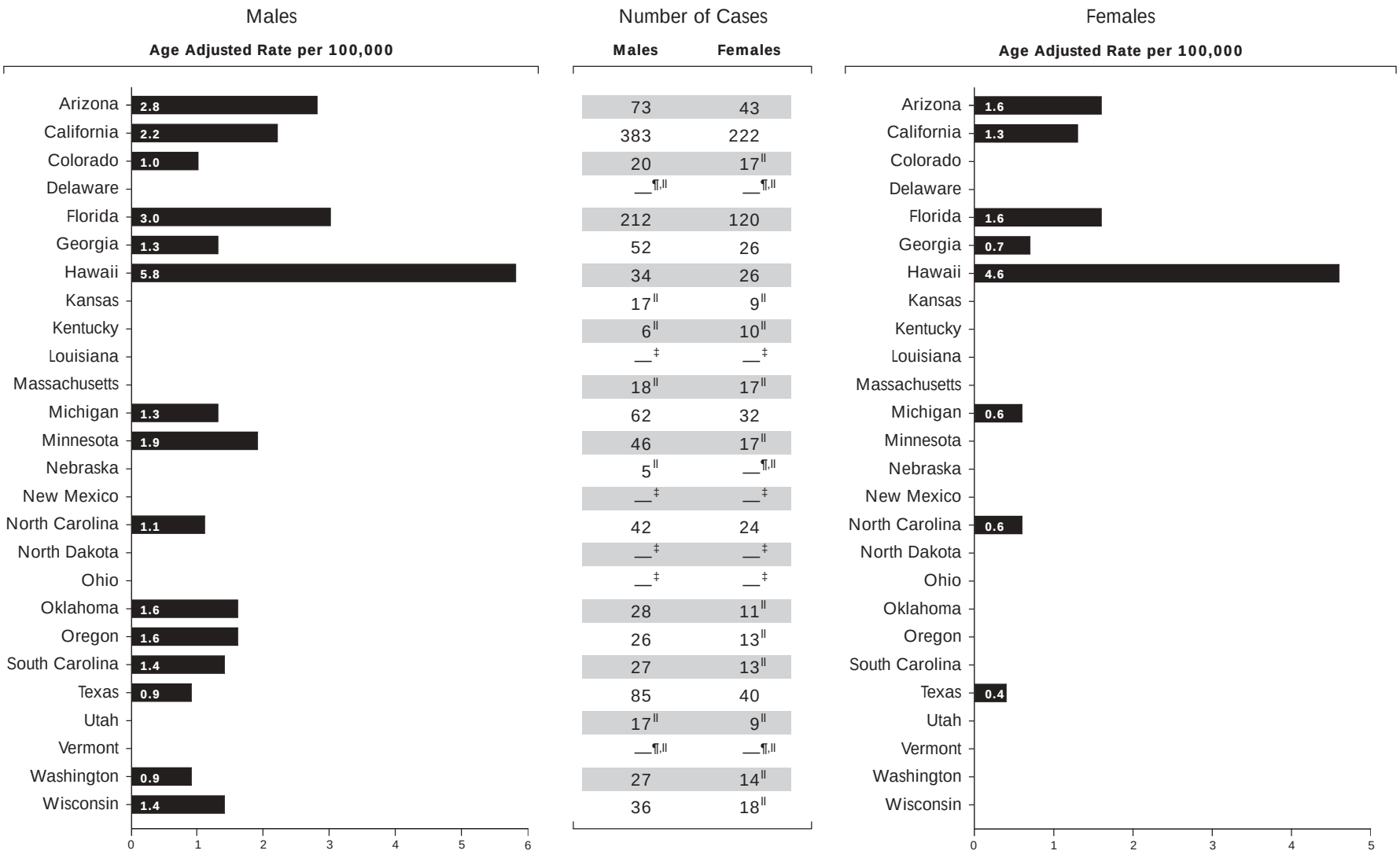
§ Rate=[(male rate*pop) + (female rate*pop)] / (male+female pop).

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 3b.

Drowning Indicator: Near Drowning Hospitalizations by Sex, 1999



‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 3C.

Drowning Indicator: Near Drowning Hospitalizations by Age**, 1999

State	<1		1-4		5-14		15-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	N	Rate††	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
AZ	10	—‖	67	21.7	11	—‖	5	—‖	6	—‖	8	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
CA	56	11.1	249	12.5	49	1.0	41	0.9	39	0.8	26	0.5	111	2.7	7	—‖	9	—‖	14	—‖	—¶	—‖
CO	—¶	—‖	12	—‖	7	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
DE	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
FL	11	—‖	153	20.3	47	2.4	25	1.4	15	—‖	17	—‖	18	—‖	6	—‖	11	—‖	18	—‖	11	—‖
GA	—¶	—‖	23	5.0	21	1.8	9	—‖	7	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
HI	—¶	—‖	16	—‖	12	—‖	6	—‖	9	—‖	—¶	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
KS	—¶	—‖	7	—‖	11	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
KY	—¶	—‖	5	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
LA	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
MA	—¶	—‖	7	—‖	7	—‖	9	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
MI	—¶	—‖	36	6.7	29	2.0	7	—‖	—¶	—‖	—¶	—‖	9	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
MN	6	—‖	16	—‖	19	—‖	—¶	—‖	7	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
NE	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
NM	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
NC	7	—‖	20	4.7	12	—‖	—¶	—‖	6	—‖	8	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
ND	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OH	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OK	5	—‖	15	—‖	7	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
OR	5	—‖	14	—‖	—¶	—‖	5	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
SC	—¶	—‖	13	—‖	5	—‖	8	—‖	—¶	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
TX	7	—‖	66	5.1	23	0.7	7	—‖	6	—‖	6	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
UT	—¶	—‖	11	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
VT	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
WA	7	—‖	8	—‖	13	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
WI	—¶	—‖	13	—‖	20	2.6	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖

‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

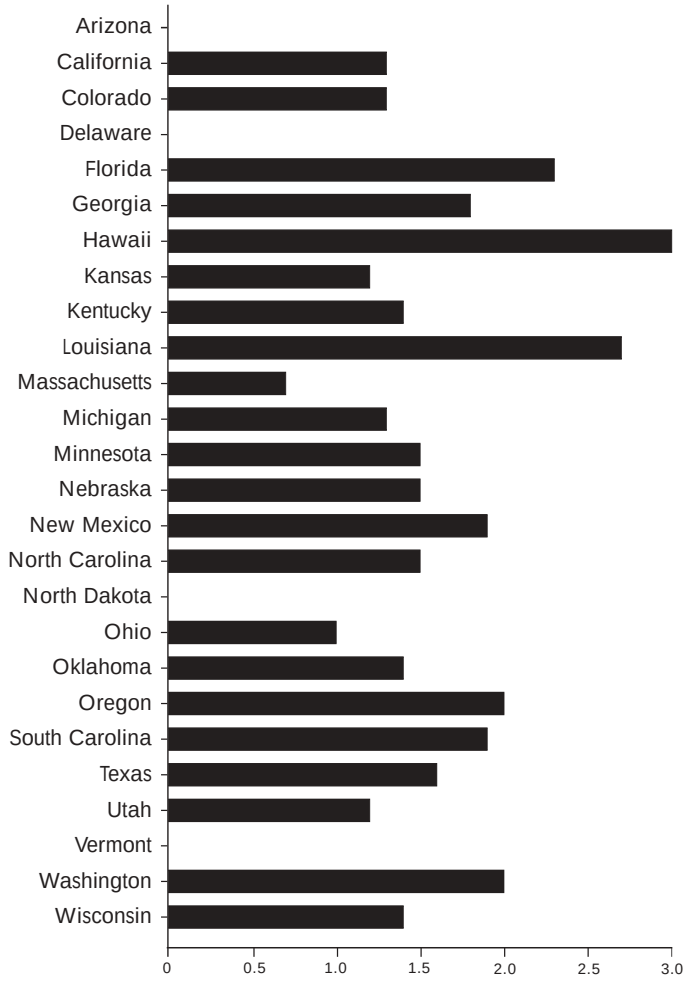
¶ Case counts are suppressed if fewer than 5 cases were reported.

** Age in years.

†† Rate per 100,000 population.

FIGURE 3d.

Drowning Indicator: Drowning Fatalities (Overall), 1999



	Number	Rate
Arizona	—‡	—‡
California	416	1.3
Colorado	55	1.3§
Delaware	10	—‖
Florida	360	2.3
Georgia	147	1.8
Hawaii	36	3.0§
Kansas	31	1.2§
Kentucky	56	1.4§
Louisiana	120	2.7§
Massachusetts	43	0.7§
Michigan	132	1.3
Minnesota	72	1.5§
Nebraska	25	1.5§
New Mexico	32	1.9§
North Carolina	123	1.5§
North Dakota	13	—‖
Ohio	112	1.0
Oklahoma	49	1.4§
Oregon	66	2.0§
South Carolina	74	1.9§
Texas	314	1.6
Utah	27	1.2§
Vermont	8	—‖
Washington	118	2.0§
Wisconsin	74	1.4§

* Incompleteness can lead to bias.

† Subjective assessment by health department staff that a substantial proportion of state residents injured in-state who require hospitalization are hospitalized in a neighboring state.

‡ No data available.

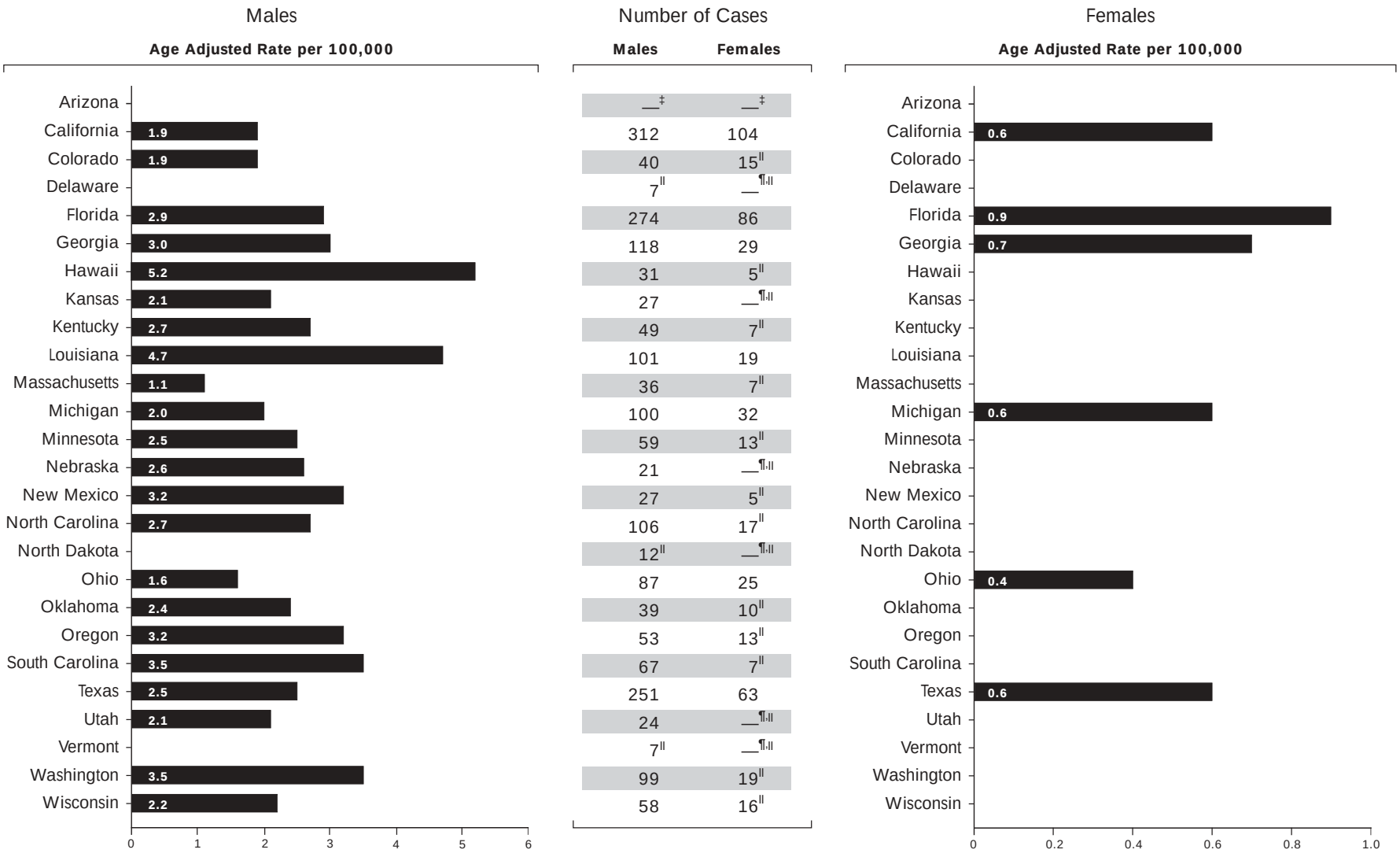
§ Rate=[(male rate*pop) + (female rate*pop)] / (male+female pop).

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 3e.

Drowning Indicator: Drowning Fatalities by Sex, 1999



‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 3f.

Drowning Indicator: Drowning Fatalities by Age**, 1999

State	<1		1-4		5-14		15-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	N	Rate††	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
AZ	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
CA	8	—‖	72	3.6	29	0.6	71	1.5	49	0.9	49	0.8	53	1.0	22	0.8	28	1.2	25	1.9	10	—‖
CO	—¶	—‖	8	—‖	6	—‖	3	—‖	8	—‖	12	—‖	8	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
DE	—¶	—‖	—¶	—‖	—¶	—‖	3	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
FL	6	—‖	71	9.4	20	1.0	36	1.9	33	1.7	47	2.0	36	1.8	34	2.3	25	1.7	30	2.8	14	—‖
GA	—¶	—‖	18	—‖	24	2.0	29	2.6	16	—‖	17	—‖	16	—‖	11	—‖	12	—‖	—¶	—‖	—¶	—‖
HI	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
KS	—¶	—‖	5	—‖	—¶	—‖	6	—‖	5	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
KY	—¶	—‖	7	—‖	—¶	—‖	7	—‖	7	—‖	14	—‖	13	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
LA	—¶	—‖	13	—‖	17	—‖	26	3.7	14	—‖	30	4.4	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
MA	—¶	—‖	—¶	—‖	—¶	—‖	7	—‖	7	—‖	8	—‖	—¶	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖
MI	—¶	—‖	18	—‖	20	1.4	21	1.6	25	1.7	14	—‖	15	—‖	6	—‖	—¶	—‖	7	—‖	—¶	—‖
MN	—¶	—‖	8	—‖	10	—‖	11	—‖	—¶	—‖	11	—‖	10	—‖	—¶	—‖	6	—‖	5	—‖	—¶	—‖
NE	—¶	—‖	—¶	—‖	—¶	—‖	8	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
NM	—¶	—‖	—¶	—‖	—¶	—‖	7	—‖	6	—‖	9	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
NC	—¶	—‖	12	—‖	16	—‖	20	1.8	16	—‖	23	1.8	18	—‖	12	—‖	5	—‖	—¶	—‖	—¶	—‖
ND	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
OH	—¶	—‖	14	—‖	13	—‖	21	1.3	11	—‖	17	—‖	14	—‖	11	—‖	6	—‖	—¶	—‖	—¶	—‖
OK	—¶	—‖	6	—‖	—¶	—‖	12	—‖	5	—‖	—¶	—‖	5	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖
OR	—¶	—‖	6	—‖	5	—‖	11	—‖	9	—‖	13	—‖	12	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖
SC	—¶	—‖	8	—‖	14	—‖	8	—‖	16	—‖	10	—‖	11	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
TX	12	—‖	49	3.8	39	1.2	70	2.3	32	1.2	37	1.1	33	1.3	14	—‖	14	—‖	8	—‖	6	—‖
UT	—¶	—‖	5	—‖	—¶	—‖	7	—‖	6	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
VT	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
WA	—¶	—‖	—¶	—‖	7	—‖	24	3.0	18	—‖	22	2.3	17	—‖	9	—‖	8	—‖	7	—‖	—¶	—‖
WI	—¶	—‖	10	—‖	9	—‖	11	—‖	8	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	6	—‖	—¶	—‖

‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

** Age in years.

†† Rate per 100,000 population.

4. Fire-Related Indicators

The United States has the fourth highest overall fire death rate of all industrialized countries.[1] Residential fires cause about 85% of all civilian fire-related deaths.[2] In 2000, 379,500 residential fires in the United States claimed the lives of 3,445 people and injured another 17,400.[2] Cooking is the leading cause of home fires,[2] while smoking-related fires are the leading cause of home fire deaths.[3]

Residential fires disproportionately affect young children, older adults, African-Americans, and Native Americans. The southern region of the United States has the highest fire death rate. Contributing factors may include rural poverty, a lower prevalence of functional smoke alarms, and a greater use of portable heating equipment.[4]

Working smoke alarms reduce the chance of dying in a house fire by 40% to 50%.[5] One large-scale smoke alarm giveaway program reduced the incidence of fire-related injury rates by 80% in its target area.[4] However, about 25% of U.S. households lack working smoke alarms.[6]

Figures 4a, 4b, and 4c represent the 1999 combined residential and non-residential fire-related hospitalization data for 22 states. There were too few hospitalizations in three states to calculate stable rates and four states did not provide hospitalization data. Reported fire-related hospitalization rates ranged from 2.2 per 100,000 population to 7.4 per 100,000 population.

Figures 4d, 4e, and 4f represent the 1999 combined residential and non-residential fire-related fatality data for 25 states. For seven states, there were too few deaths to calculate stable rates and one state did not provide data on fatalities. The reported fire-related fatality rates ranged from 0.7 per 100,000 population to 2.4 per 100,000 population.

Fire-related hospitalization rates were 1.3 to 6.6 times higher than the death rate among the states reporting both rates. Males had higher rates than females for both deaths and hospitalizations. Age-specific rates of fire-related fatalities and hospitalizations could not be calculated for many of the age categories because of small numbers. When rates could be calculated, they tended to be highest among adults 75 years of age and older and among children ages one to four years.

Figure 4g represents the percentage of homes in which all the smoke alarms had been tested within the past month, as is currently recommended,[5] for 25 states. The proportion of these homes ranged from 21.7% (Minnesota) to 42.4% (Oklahoma). In 1999, 33.5% of U.S. homeowners reported that they tested all their smoke alarms within the past month.[7] Only nine of the 25 states had a proportion higher than the national average.

Figure 4h presents the percentage of homes without smoke alarms in 25 states. The proportion of homes lacking any smoke alarms ranged from 1.3% (Oregon) to 13.0% (Hawaii). Nationally, 3.9% of U.S. homes had no smoke alarms in 1999.[7] Of the 25 states, 13 had a higher percentage of homes without a smoke alarm than the national average.

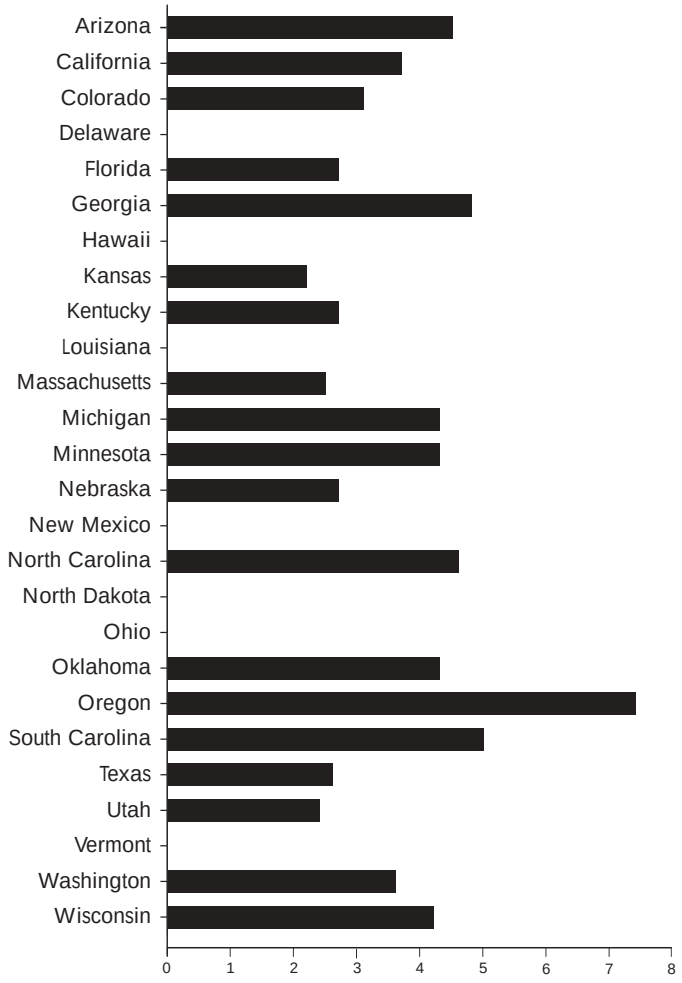
References

1. World Fire Statistics Center. U.N. fire statistics study. Prepared for the U.N. Committee on Human Settlements. 2001 Sep.
2. Ahrens M. The U.S. fire problem overview report: leading causes and other patterns and trends. Quincy (MA): National Fire Protection Association; 2001 June.
3. Karter MJ. Fire loss in the United States during 2000. Quincy (MA): National Fire Protection Association; 2001.
4. Mallonee S, Istre G, Rosenberg M, Reddish-Douglas M, Jordan F, Silverstein P, et al. Surveillance and prevention of residential-fire injuries. N Eng J Med 1996;335:27–31.
5. Ahrens M. U.S. experience with smoke alarms and other fire alarms. Quincy (MA): National Fire Protection Association; 2001 Sep.
6. Smith CL. Smoke detector operability survey–report on findings. Bethesda (MD): U.S. Consumer Product Safety Commission; 1993 Nov.
7. Centers for Disease Control and Prevention, Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion, Behavioral risk factor surveillance system online prevalence data [online] 1999. [accessed 2003 Nov 28]. Available from URL: apps.nccd.cdc.gov/brfss.

Fire-Related Indicators Figures

FIGURE 4a.

Fire-Related Indicator: Fire-Related Hospitalizations (Overall), 1999



	Number	Rate
Arizona	214	4.5
California	1,195	3.7
Colorado	130	3.1
Delaware	6	—‖
Florida	407	2.7
Georgia	363	4.8
Hawaii	19	—‖
Kansas	60	2.2§
Kentucky	105	2.7
Louisiana	—‡	—‡
Massachusetts	157	2.5
Michigan	424	4.3
Minnesota	202	4.3
Nebraska	45	2.7§
New Mexico	—‡	—‡
North Carolina	358	4.6
North Dakota	—‡	—‡
Ohio	—‡	—‡
Oklahoma	144	4.3
Oregon	243	7.4
South Carolina	194	5.0
Texas	512	2.6
Utah	50	2.4§
Vermont	12	—‖
Washington	209	3.6
Wisconsin	219	4.2

Factors Affecting Representativeness of State Hospital Discharge Data Sets for Injury Surveillance

State	Percentage of HDD Injury Records with External Cause Coding*	Inclusion of Readmission and Transfers?	Cross-Border Hospitalization†	Incomplete Hospital Participation
AZ	84.0%	Yes	No	No
CA	100.0%	Yes	No	No
CO	98.8%	Yes	No	No
DE	76.0%	Yes	No	No
FL	74.0%	Yes	No	No
GA	91.8%	Yes	Unknown	No
HI	52.9%	Yes	No	No
KS	58.0%	Yes	Unknown	No
KY	68.0%	Yes	**Yes**	**Yes**
LA	‡	‡	‡	‡
MA	95.3%	Yes	No	No
MI	82.3%	Yes	No	No
MN	78.4%	Yes	No	**Yes**
NE	100.0%	**No**	**Yes**	No
NM	48.3%	Yes	Unknown	No
NC	89.1%	Yes	No	No
ND	‡	‡	‡	‡
OH	‡	‡	‡	‡
OK	65.9%	Yes	No	No
OR	67.5%	Yes	No	No
SC	94.1%	‡	**Yes**	No
TX	62.7%	Yes	**Yes**	**Yes**
UT	89.2%	Yes	No	No
VT	85.0%	Yes	**Yes**	No
WA	98.9%	Yes	No	No
WI	97.3%	Yes	No	No

* Incompleteness can lead to bias.

† Subjective assessment by health department staff that a substantial proportion of state residents injured in-state who require hospitalization are hospitalized in a neighboring state.

‡ No data available.

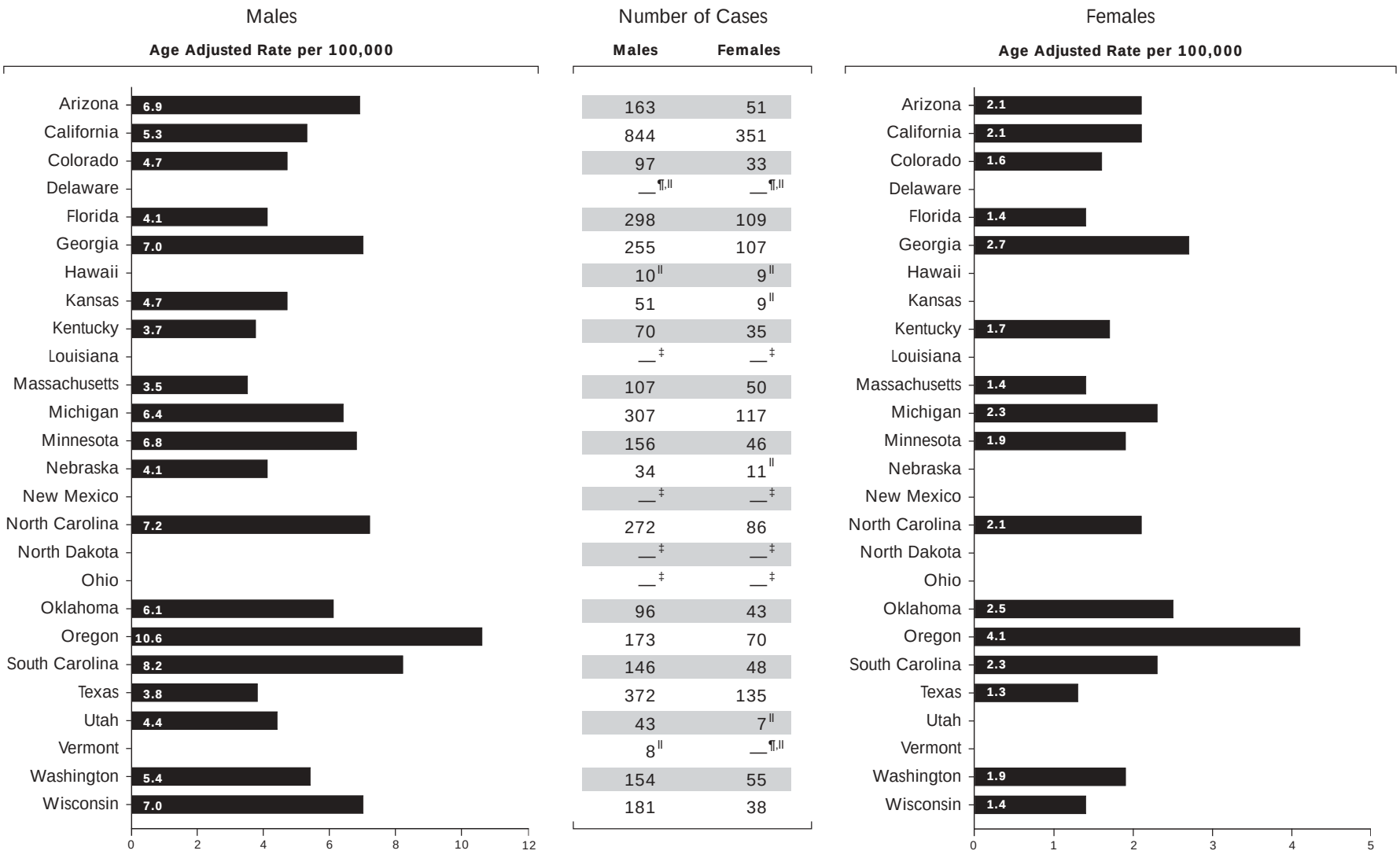
§ Rate=[(male rate*pop) + (female rate*pop)] / (male+female pop).

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 4b.

Fire-Related Indicator: Fire-Related Hospitalizations by Sex, 1999



‡ No data available.

II Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 4C.

Fire-Related Indicator: Fire-Related Hospitalizations by Age**, 1999

State	<1		1-4		5-14		15-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	N	Rate††	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
AZ	—¶	—‖	9	—‖	22	3.0	33	4.9	30	4.8	42	5.7	18	3.1	30	7.5	17	—‖	7	—‖	—¶	—‖
CA	8	—‖	66	3.3	123	2.4	164	3.5	222	4.3	188	3.4	105	2.6	97	4.0	107	5.5	76	5.9	39	9.2
CO	—¶	—‖	—¶	—‖	—¶	—‖	21	3.5	13	—‖	30	4.2	28	4.8	17	—‖	5	—‖	9	—‖	—¶	—‖
DE	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
FL	—¶	—‖	32	4.2	42	2.1	62	3.4	77	3.9	72	3.1	36	1.8	37	2.5	17	—‖	22	2.1	10	—‖
GA	—¶	—‖	18	—‖	52	4.6	46	4.1	49	4.1	54	4.0	50	4.9	34	5.4	25	6.0	19	—‖	16	—‖
HI	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
KS	—¶	—‖	—¶	—‖	9	—‖	13	—‖	6	—‖	13	—‖	—¶	—‖	6	—‖	—¶	—‖	—¶	—‖	—¶	—‖
KY	—¶	—‖	—¶	—‖	23	4.3	13	—‖	10	—‖	18	—‖	10	—‖	13	—‖	8	—‖	6	—‖	—¶	—‖
LA	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
MA	—¶	—‖	—¶	—‖	9	—‖	13	—‖	21	2.1	40	3.9	25	3.1	18	—‖	14	—‖	10	—‖	5	—‖
MI	—¶	—‖	32	5.9	48	3.3	57	4.3	60	4.2	69	4.3	57	4.3	33	4.0	22	3.4	26	6.0	16	—‖
MN	—¶	—‖	—¶	—‖	20	2.8	42	6.1	29	4.6	33	4.1	15	—‖	22	5.6	20	6.9	14	—‖	—¶	—‖
NE	—¶	—‖	—¶	—‖	9	—‖	6	—‖	—¶	—‖	5	—‖	—¶	—‖	6	—‖	9	—‖	—¶	—‖	—¶	—‖
NM	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
NC	—¶	—‖	16	—‖	34	3.1	44	4.0	65	5.3	61	4.8	44	4.2	36	5.1	20	3.8	23	7.1	13	—‖
ND	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OH	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
OK	—¶	—‖	7	—‖	16	—‖	20	4.0	26	6.2	24	4.7	10	—‖	13	—‖	9	—‖	9	—‖	8	—‖
OR	6	—‖	40	1.3	23	0.7	24	0.7	22	0.7	41	1.3	24	0.7	22	0.6	19	—‖	10	—‖	12	—‖
SC	—¶	—‖	8	—‖	18	—‖	20	3.6	29	5.2	25	4.0	35	6.7	19	—‖	16	—‖	17	—‖	7	—‖
TX	—¶	—‖	23	1.8	54	1.7	83	2.7	74	2.7	79	2.4	54	2.1	47	2.9	46	4.1	30	4.5	18	—‖
UT	—¶	—‖	—¶	—‖	9	—‖	7	—‖	6	—‖	6	—‖	6	—‖	4	—‖	—¶	—‖	—¶	—‖	—¶	—‖
VT	—¶	—‖	—¶	—‖	—¶	—‖	3	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
WA	—¶	—‖	9	—‖	27	3.1	31	3.9	31	3.7	33	3.4	24	3.0	16	—‖	16	—‖	17	—‖	—¶	—‖
WI	—¶	—‖	11	—‖	26	3.4	32	4.2	31	4.5	39	4.5	34	4.9	18	—‖	16	—‖	7	—‖	—¶	—‖

‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

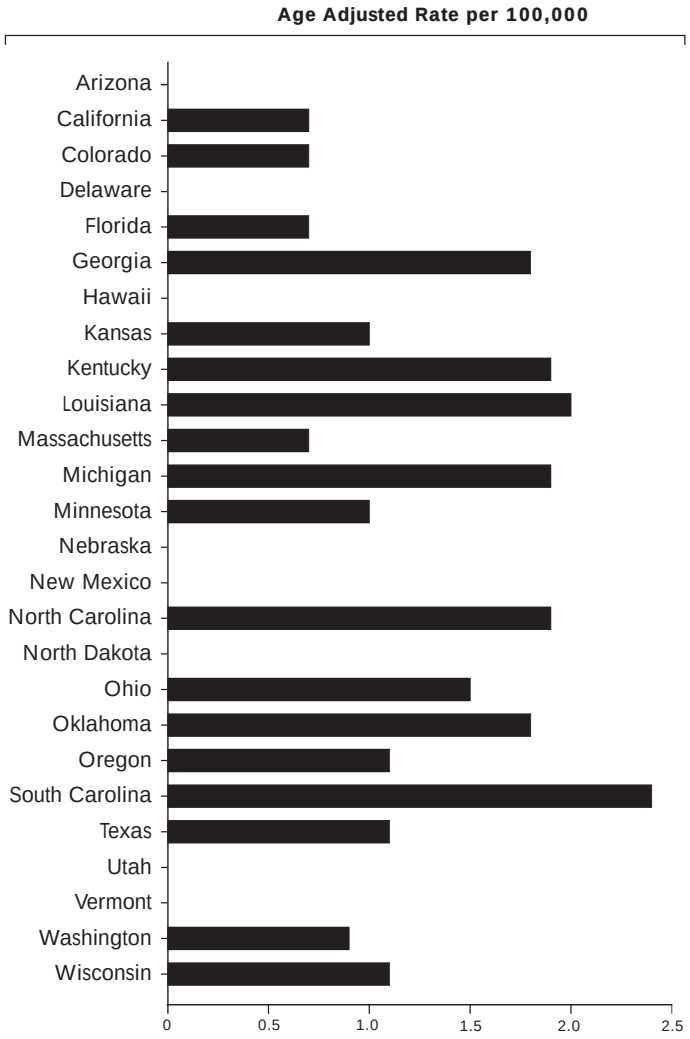
¶ Case counts are suppressed if fewer than 5 cases were reported.

** Age in years.

†† Rate per 100,000 population.

FIGURE 4d.

Fire-Related Indicator: Fire-Related Fatalities (Overall), 1999



	Number	Rate
Arizona	—‡	—‡
California	213	0.7
Colorado	26	0.7§
Delaware	12	—‖
Florida	117	0.7
Georgia	120	1.8
Hawaii	—¶	—‖
Kansas	27	1.0§
Kentucky	73	1.9
Louisiana	84	2.0
Massachusetts	48	0.7§
Michigan	181	1.9
Minnesota	46	1.0§
Nebraska	14	—‖
New Mexico	11	—‖
North Carolina	143	1.9
North Dakota	8	—‖
Ohio	165	1.5
Oklahoma	61	1.8
Oregon	36	1.1§
South Carolina	92	2.4
Texas	218	1.1
Utah	—¶	—‖
Vermont	5	—‖
Washington	51	0.9
Wisconsin	55	1.1

* Incompleteness can lead to bias.

† Subjective assessment by health department staff that a substantial proportion of state residents injured in-state who require hospitalization are hospitalized in a neighboring state.

‡ No data available.

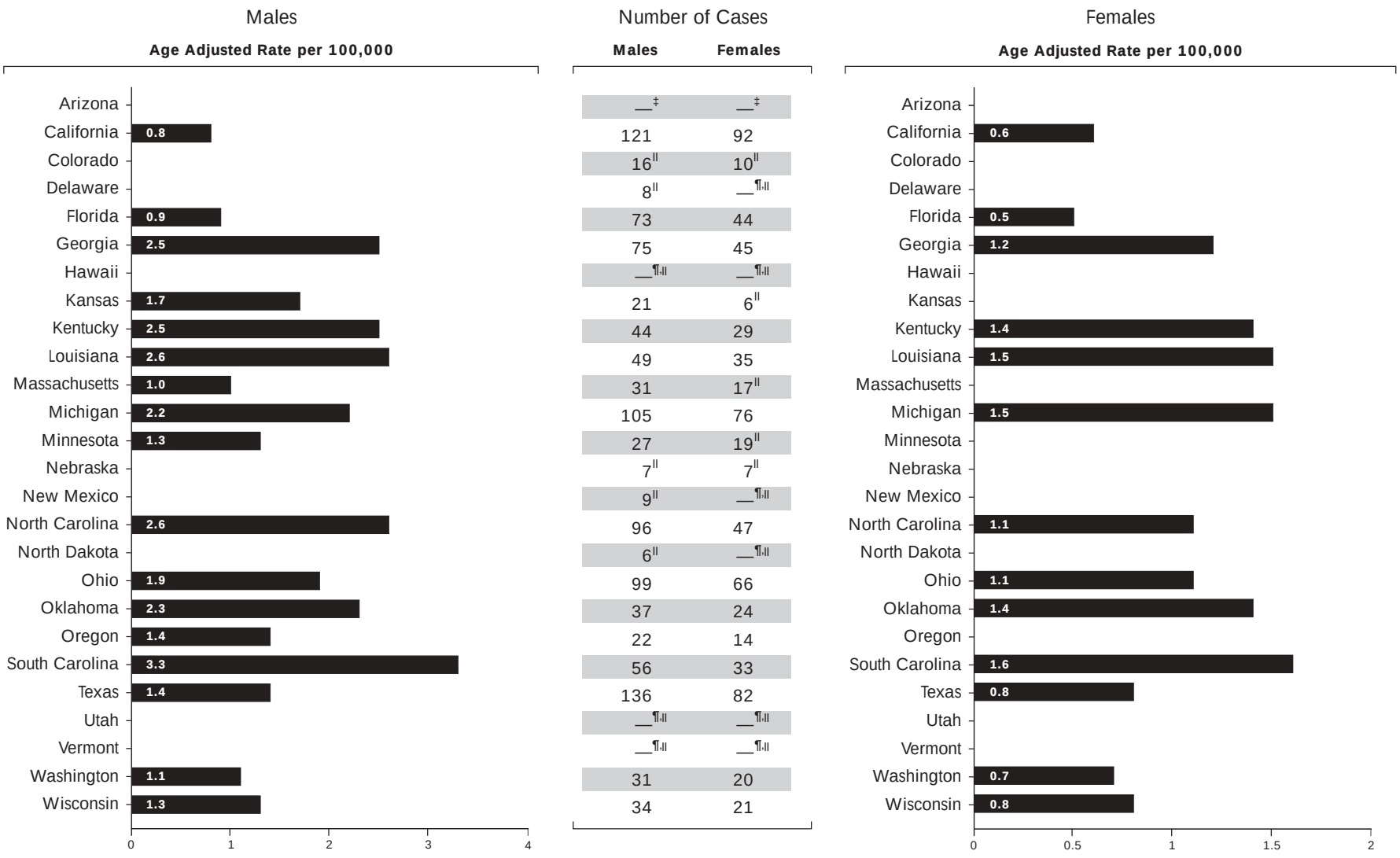
§ Rate=[(male rate*pop) + (female rate*pop)] / (male+female pop).

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 4e.

Fire-Related Indicator: Fire-Related Fatalities by Sex, 1999



‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

FIGURE 4f.

Fire-Related Indicator: Fire-Related Fatalities by Age**, 1999

State	<1		1-4		5-14		15-24		25-34		35-44		45-54		55-64		65-74		75-84		85+	
	N	Rate††	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
AZ	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡	—‡
CA	—¶	—‖	15	—‖	11	—‖	12	—‖	15	—‖	25	0.4	21	0.5	21	0.9	32	1.7	38	2.9	22	5.2
CO	—¶	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	5	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
DE	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
FL	—¶	—‖	12	—‖	9	—‖	7	—‖	7	—‖	13	—‖	17	—‖	13	—‖	12	—‖	17	—‖	7	—‖
GA	—¶	—‖	—¶	—‖	—¶	—‖	6	—‖	—¶	—‖	16	—‖	20	2.0	17	—‖	16	—‖	19	—‖	16	—‖
HI	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	13	—‖	7	—‖	7	—‖	—¶	—‖	—¶	—‖	—¶	—‖
KS	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	5	—‖	5	—‖	—¶	—‖	—¶	—‖
KY	—¶	—‖	5	—‖	11	—‖	—¶	—‖	9	—‖	7	—‖	5	—‖	11	—‖	6	—‖	12	—‖	—¶	—‖
LA	—¶	—‖	7	—‖	12	—‖	—¶	—‖	—¶	—‖	16	—‖	7	—‖	5	—‖	11	—‖	14	—‖	5	—‖
MA	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	7	—‖	9	—‖	—¶	—‖	6	—‖	—¶	—‖	10	—‖	—¶	—‖
MI	—¶	—‖	22	4.1	18	—‖	25	1.9	15	—‖	19	—‖	22	1.7	18	—‖	16	—‖	13	—‖	9	—‖
MN	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	6	—‖	8	—‖	9	—‖	—¶	—‖
NE	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
NM	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
NC	—¶	—‖	6	—‖	—¶	—‖	7	—‖	18	—‖	23	1.8	26	2.5	12	—‖	22	4.2	21	6.5	—¶	—‖
ND	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
OH	—¶	—‖	19	—‖	15	—‖	13	—‖	17	—‖	20	1.1	16	—‖	15	—‖	17	—‖	18	—‖	11	—‖
OK	—¶	—‖	6	—‖	—¶	—‖	7	—‖	6	—‖	10	—‖	10	—‖	—¶	—‖	7	—‖	7	—‖	—¶	—‖
OR	—¶	—‖	—¶	—‖	5	—‖	—¶	—‖	—¶	—‖	8	—‖	—¶	—‖	—¶	—‖	—¶	—‖	6	—‖	—¶	—‖
SC	—¶	—‖	5	—‖	5	—‖	—¶	—‖	5	—‖	14	—‖	12	—‖	13	—‖	10	—‖	16	—‖	8	—‖
TX	—¶	—‖	27	2.1	22	0.7	14	—‖	9	—‖	24	0.7	16	—‖	21	1.3	24	2.2	35	5.2	25	10.7
UT	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
VT	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖	—¶	—‖
WA	—¶	—‖	5	—‖	—¶	—‖	5	—‖	6	—‖	6	—‖	5	—‖	—¶	—‖	6	—‖	8	—‖	5	—‖
WI	—¶	—‖	—¶	—‖	5	—‖	—¶	—‖	9	—‖	7	—‖	8	—‖	—¶	—‖	9	—‖	—¶	—‖	—¶	—‖

‡ No data available.

‖ Rates are suppressed if fewer than 20 cases were reported.

¶ Case counts are suppressed if fewer than 5 cases were reported.

** Age in years.

†† Rate per 100,000 population.

FIGURE 4g.

Fire-Related Indicator: Percentage of Homes with Smoke Alarms Tested in the Last Month, 1999 Behavioral Risk Factor Surveillance System

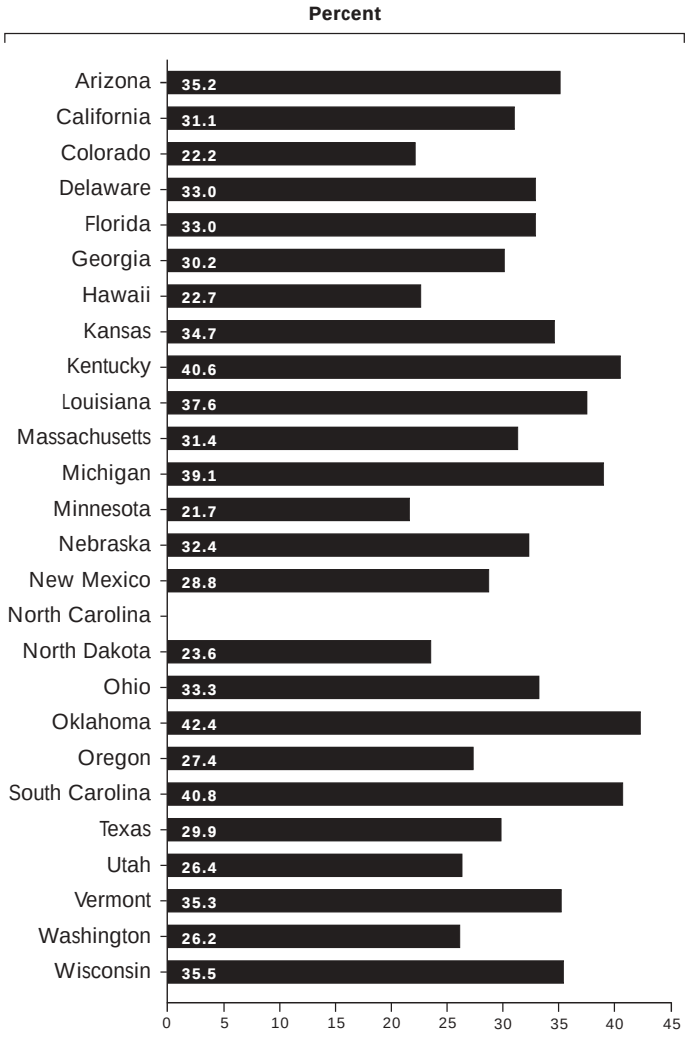
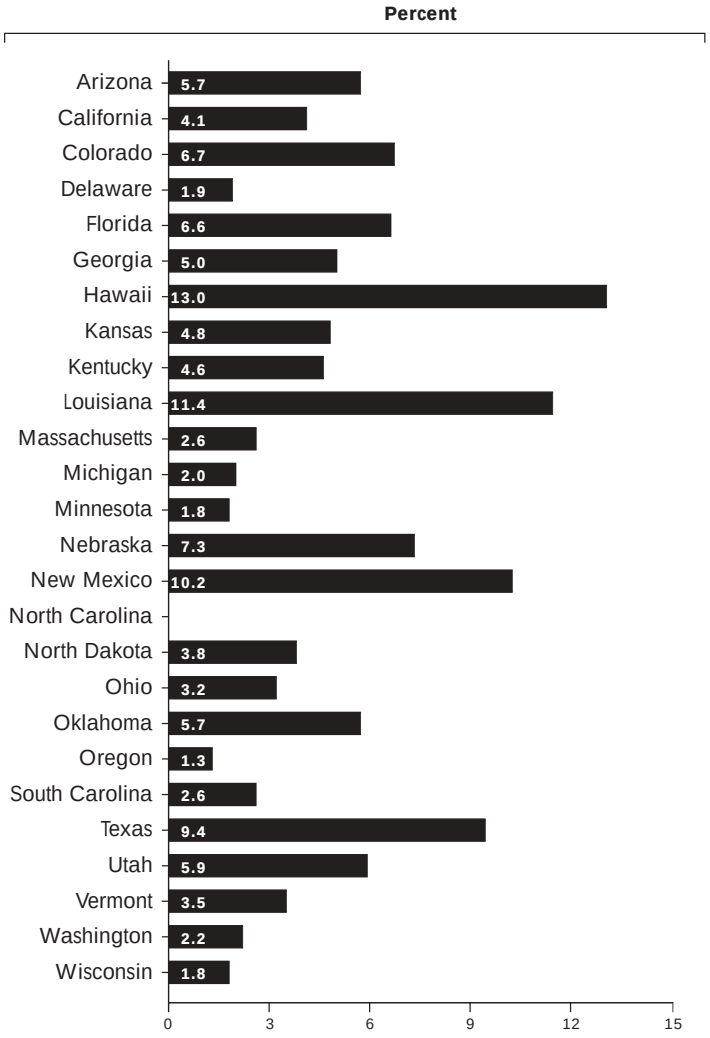


FIGURE 4h.

Fire-Related Indicator: Percentage of Homes without Smoke Alarms, 1999, Behavioral Risk Factor Surveillance System



Note: No data available for North Carolina.