THE BURDEN OF FALLS IN WISCONSIN

A SUPPLEMENT TO THE REPORT
THE BURDEN OF INJURY IN WISCONSIN

RELEASED AUGUST 2010

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A Letter from
Secretary Karen E. Timberlake
Wisconsin Department of Health Services

I am proud to present *The Burden of Falls in Wisconsin*. This document is a supplement to the report, *The Burden of Injury in Wisconsin*, a 2006 report summarizing surveillance efforts for all injuries in the state. By delving deeper into the data specific to falls, this report is an essential tool for both statewide and local planning efforts to address this cross-cutting health issue.

Fall-related injuries are a leading cause of death and disability for too many of Wisconsin's residents. Falls disproportionately affect Wisconsin's older adults. Because falls are not a normal part of aging and can be prevented, I have identified falls and their prevention as a key focus area for the Department.

The first step in the prevention of falls is to understand the problem, which is in part achieved through surveillance efforts such as this document. This report shows the extent of the problem that falling creates for our citizens, both through loss of independence and costs to the healthcare system. Importantly, we are providing this information to statewide stakeholders to assist in the development and implementation of interventions to reduce falls and their potentially devastating consequences to citizens of Wisconsin.

I would like to extend my thanks to our partners on this project, including the Injury Research Center at the Medical College of Wisconsin, the University of Wisconsin School of Medicine and Public Health, and the Greater Wisconsin Agency on Aging Resources. Additionally, I would like to thank all the dedicated professionals who make up the Fall Prevention Initiative, our statewide fall prevention coalition. Without these important academic and community partners, we would not be able to advance our efforts to prevent falls.

Through diverse partnerships and multi-faceted interventions, Wisconsin older adults can lead healthy, independent lives free of falls.

Sincerely,

Karen E. Timberlake
Secretary

THE BURDEN OF FALLS IN WISCONSIN

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PURPOSE OF THE REPORT

Unintentional falls are a significant public health problem in Wisconsin. They are the underlying cause of substantial numbers of emergency department visits, inpatient hospitalizations, nursing home admissions, and deaths each year. This report seeks to describe the large burden that these preventable injuries place on individuals, families, and communities throughout Wisconsin. In response to these findings, this report suggests resources and strategies that may reduce the burden, along with information on evidence-based prevention programs that exist in Wisconsin.

The bulk of the burden of injuries due to unintentional falls occurs in Wisconsin residents 65 years of age and older; therefore, much of this report will focus on that population. However, falls are the leading cause of injury-related emergency department visits for all ages, resulting in a large burden on the health care system. As a result, all ages are included in this report.

KEY FINDINGS

- Falls have surpassed motor vehicle crashes as the most common cause of injury-related death.
- A large majority of fall-related deaths (87%) and inpatient hospitalizations (70%) involve people age 65 or older.
- Hospitalizations and emergency department visits due to falls result in $800 million in hospital charges each year in Wisconsin.
- Over 70% of the costs for fall-related hospitalizations and emergency department visits are paid by government insurance programs such as Medicare and Medicaid.
- The majority of falls that result in death occur in the home.
- Approximately 40% of those admitted to a nursing home had a fall in the 30 days prior to admission.

Unintentional Fall-related Deaths in Wisconsin

The most severe outcome from a fall is death. As Figure 1 shows, falls are the leading cause of injury-related death in Wisconsin, resulting in 918 deaths in 2008. For county-specific information, please see Appendix C on pages 16-17.

As described in Table 1, the majority of falls that result in death occur in the home (55.2%). As the population ages, a larger share of falls occur in a residential institution, which includes nursing homes and assisted living facilities. Even though the majority of falls occur in the home, most of the deaths occur in a hospital (Table 2, 51.5%). Most who suffer a severe fall receive some treatment before dying. For example, of those who were hospitalized for a fall in 2008 and died in the hospital, the average length of stay was 6.5 days, resulting in over $26 million in charges. For ages 65 years and older, 25% of deaths occurred in a nursing home, and 15% of deaths occurred in a facility based hospice. This information does not account for time between fall and death, and does not indicate whether the individual who died was transferred between facilities prior to death.

Figure 1. Five leading causes of injury-related death in Wisconsin residents with corresponding counts, by age group, 2008.*

RANK	0-14	15-44	45-64	65+		ALL AGES
1	Suffocation 27	Suicide 340	Suicide 302	Falls 789		Falls 918
2	Motor Vehicle Crash 22	Motor Vehicle Crash 296	Poisoning 210	Motor Vehicle Crash 106		Suicide 737
3	Homicide 19	Poisoning 259	Motor Vehicle Crash 157	Suicide 93		Motor Vehicle Crash 581
4	Drowning 13	Homicide 97	Falls 105	Suffocation 48		Poisoning 481
5	Fire 9	Falls 23	Homicide 24	Poisoning 11	Homicide 11	Homicide 151

*All causes are unintentional unless categorized as suicide or homicide.

Table 1. Place of injury for fall-related deaths, by age, Wisconsin, 2008.

	Place of Injury (Percentage†)					
Age Group	**Home**	**Residential Institution**	**School, Institution, or Other Public Area**	**Street or Highway**	**Trade and Service Area**	**Other**
0-14	100.0%	–	–	–	–	–
15-44	56.5%	–	–	13.0%	4.3%	26.0%
45-64	57.1%	3.8%	4.8%	5.7%	7.6%	21.0%
65+	54.9%	29.3%	3.3%	1.3%	2.4%	8.7%
Total	55.2%	25.6%	3.4%	2.1%	3.1%	10.6%

†Due to rounding, percentages may not add to 100.

Table 2. Place of death for fall-related deaths, by age, Wisconsin, 2008.

	Place of Death (Percentage†)					
Age Group	**Hospital**	**CBRF***	**Facility Based Hospice**	**Nursing Home**	**Home**	**Other**
0-14	100.0%	–	–	–	–	–
15-44	69.5%	–	–	–	17.4%	13.0%
45-64	56.2%	1.0%	7.6%	2.8%	23.8%	8.6%
65+	50.3%	2.5%	15.0%	25.0%	5.8%	1.9%
Total	51.5%	2.3%	13.7%	21.7%	8.2%	2.6%

*Community Based Residential Facility; includes assisted living facilities such as residential care apartment complexes and adult family homes.
†Due to rounding, percentages may not add to 100.

Older Wisconsinites: Who Falls? Who is Injured?

Falls and fall-related injuries are not distributed equally among all demographic groups in Wisconsin. The Behavioral Risk Factor Surveillance System (BRFSS), a national survey, asks people age 45 and older whether they had a fall in the past three months; and whether they have had a fall-related injury or a fall that required medical care in the past three months.

BRFSS survey data from Wisconsin for 2008 (Table 3) show that a smaller share of women than men report a fall, but women are more likely to report a fall-related injury. Unmarried people are more likely than those with a partner to fall and be injured. People in excellent or very good health are less likely than people who report good, fair, or poor health to have a fall or be injured.

Perhaps the most critical consideration when trying to understand target groups for fall prevention activities is to evaluate questions in the BRFSS survey that relate to socioeconomic status. Those with no insurance reported a higher percentage of falls in the past three months, and a higher percentage of injury from falls in the past three months. Income has an inverse relationship with percentage of falls and fall-related injury – those with higher incomes report fewer falls. This inverse relationship is also seen with education; those with lower education report higher percentages of falls and fall-related injury.

Table 3. Fall-related questions and characteristics, Behavioral Risk Factor Surveillance System, Wisconsin, 2008.

Characteristic	**Fell at least once, past 3 months** N=377,453	**Injured at least once (from a fall), past 3 months** N=116,835
Total (all persons 45 and older)	**17.0%**	**5.3%**
Sex		
Male (47.6%)	17.2%	4.6%
Female (52.4%)	17.0%	5.9%
Age Groups		
45-54 (37.9%)	18.7%	6.0%
55-64 (28.5%)	16.9%	5.8%
65+ (33.6%)	15.2%	4.0%
Race		
White (93.2%)	16.8%	5.0%
All other races (6.8%)	19.3%	9.1%
Marital Status		
Married or partnered (72.0%)	15.4%	4.6%
Not married (28.0%)	21.3%	7.0%
General Health Status		
Excellent/very good (51.3%)	13.6%	3.7%
Good (31.7%)	16.2%	4.4%
Fair/poor (16.9%)	29.0%	11.6%
Current Health Problem		
Physical health problem, past month (36.7%)	24.5%	9.9%
No physical health problem (63.3%)	12.6%	2.5%
Health Insurance Coverage		
Coverage (93.4%)	16.9%	5.1%
No coverage (6.6%)	18.6%	7.4%
Income Level		
Less than $25,000 (18.0%)	23.9%	9.4%
$25,000-$49,999 (32.2%)	15.9%	4.1%
$50,000 or more (38.1%)	16.2%	4.8%
Education Level		
Did not graduate high school (6.4%)	18.8%	4.5%
High school diploma/GED (36.6%)	16.3%	5.5%
Attended college/technical school (26.6%)	19.3%	6.7%
College/technical school degree (29.7%)	15.8%	4.0%

Notes:
Questions were asked only of persons age 45 and older. Survey data have been weighted to reflect population in each group. Weighted total was 2,220,053. Percentages in characteristic column indicate baseline demographics of those who answered the questions. In each set of demographic characteristics, group differences are significant at the $p<.001$ level (chi-square)

Source: Behavioral Risk Factor Surveillance System, Wisconsin, 2008

Hospital Treatment for Fall-related Injuries

Table 4 describes the rate of inpatient hospitalizations and emergency department visits due to falls by sex and age. Inpatient hospitalizations for falls increase greatly over the lifespan. While males have higher rates of hospitalization for most of the lifespan, this shifts at age 45. Emergency department visits have a different pattern. In all but the youngest age group (ages 0-14), women have a higher rate of emergency department visits than men. And while the emergency department visit rates are highest in those 65 years and older, they are also high in children 14 years and younger. For county-specific information on fall-related inpatient hospitalizations and emergency department visits, please see Appendices D and E on pages 18-21.

In 2008, over $798 million was spent in Wisconsin hospitals on inpatient and emergency department care for fall-related injuries. Emergency department visits accounted for $160 million, while inpatient hospitalizations accounted for $638 million. Overall, 62% of hospital charges were for patients age 65 years and older. These charges do not include physician fees, ambulance transport costs, and subsequent rehabilitation costs.

Table 5 describes the discharge location for patients hospitalized for fall-related injuries. Younger patients are primarily discharged to their homes, but older patients are most often discharged to a nursing home for post-acute care, or require other rehabilitative care or home health services upon discharge. Nearly 60% of those ages 65 years and older are discharged to a nursing home following a fall.

Table 4. Fall-related inpatient hospitalization and emergency department visit rates (per 100,000 population), by age and sex, Wisconsin, 2008.

	Inpatient Hospitalization			Emergency Department Visit		
Age Group	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
0-14	41.6	71.5	56.9	2,476.1	3,183.9	2,837.5
15-44	85.4	110.8	98.4	1,915.7	1,714.1	1,812.7
45-64	326.3	321.1	323.7	1,847.8	1,429.2	1,638.5
65+	2,856.2	1,874.8	2,436.6	4,677.4	3,118.8	4,011.1
Total	562.5	362.7	463.2	2,421.0	2,087.1	2,255.1

Table 5. Discharge status of fall-related inpatient hospitalizations, by age, 2008.

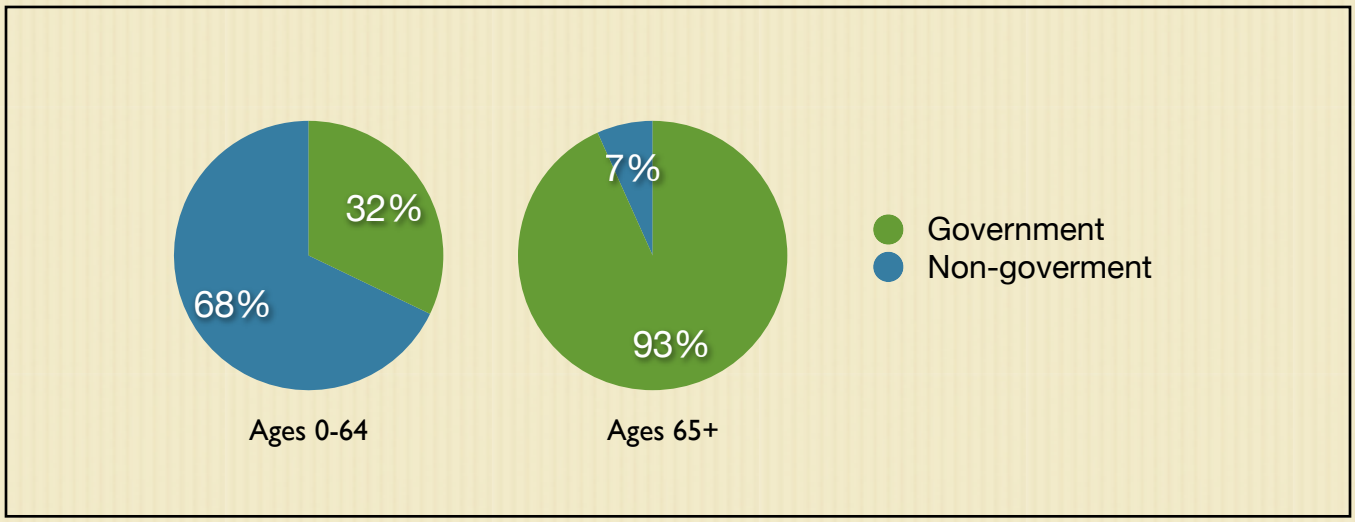
	Age Group				
Discharge Location	**0-14**	**15-44**	**45-64**	**65+**	**Total**
All discharges (number)	*618*	*2,258*	*4,967*	*18,432*	*26,275*
Home	98.0%	88.0%	65.8%	22.6%	38.1%
Home with home health service	2.0%	3.3%	7.0%	6.9%	6.5%
Transferred to another hospital	–	1.3%	2.6%	2.5%	2.4%
Transferred to nursing home	–	2.5%	16.0%	58.0%	43.9%
Transferred to rehab or outpatient services	–	2.8%	4.6%	4.4%	4.2%
Left against medical advice	–	1.6%	1.6%	0.2%	0.6%
Expired	–	0.5%	1.8%	3.2%	2.6%
Discharged to hospice	–	–	0.7%	2.1%	1.6%

Hospital Treatment for Fall-related Injuries

Of the nearly $800 million spent each year on hospital treatment for fall-related injuries, a large portion is paid by government insurance programs. Since the majority of falls occur in those 65 years and older, most of the costs are covered by Medicare (93%, Figure 2).

However, falls in those under age 65 still incur high costs for government insurance programs, including Medicaid. The 2008 Wisconsin Family Health Survey estimated that 12% of the Wisconsin population 0-64 years were covered by Medicaid and other government insurance programs. Therefore, expected government payment for fall-related inpatient hospitalizations and emergency department visits in this age group should be approximately 12%. Figure 2 shows that 32% of the treatment for fall-related injury among those under age 65 years was paid by government insurance programs. This indicates that those with government insurance, generally a proxy for low socioeconomic status, made up a disproportionate percentage of the hospital charges for falls.

Figure 2. Government versus private insurance payments for fall-related inpatient hospitalizations and emergency department visits.



Of all those admitted to a nursing home in 2007, 41.5% reported having fallen in the 30 days before admission (Table 6). Of those admitted with a recent fall on record, 73.3% ended up with nursing home stays of less than 100 days, indicating that their stays were for post-acute rehabilitative care. The remaining 27% of fall-related admissions, totaling 4,401 in all, were considered long-term admissions because they exceeded the Medicare limit of 100 days for post-acute care. In all, more than one out of every ten admissions to nursing homes in 2007 involved a fall and resulted in a long-term stay.

Fractures

This table also provides information about individuals who experienced a fracture in the months prior to nursing home admission. Approximately 8% of nursing home admissions in 2007 involved someone who had fractured a hip in the previous 180 days.

Eleven percent involved a person who had some other kind of fracture in the past six months. About eight in ten people admitted in the six months after a fracture ended up having a short-term nursing home stay (less than 100 days), but about 20% ended up staying more than 100 days, with approximately 14% staying six months or longer.

Table 6. Fall-related injury or fracture prior to nursing home admission, by length of stay, Wisconsin, 2007.

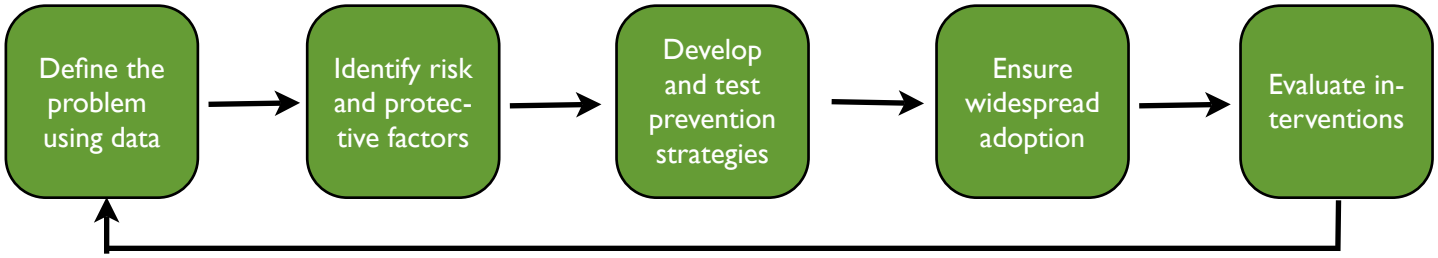
		Fell in Past 30 Days		**Fell in Past 31-180 Days**		**Hip Fracture in Past 180 Days**		**Other Fracture in Past 180 Days**	
Length of Stay	Total Admissions	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than 100 days	29,556	12,074	40.9%	2,442	8.3%	2,551	8.6%	3513	11.9%
100-179 days	2,493	1,112	44.6%	296	11.9%	205	8.2%	313	12.6%
180 days or more	7,665	3,289	42.9%	1,053	13.7%	464	6.1%	607	7.9%
Total	39,714	16,475	41.5%	3,791	9.5%	3,220	8.1%	4,433	11.2%

Source: Minimum Data Set Admissions, 2007. Extract produced by Anthony Reeves, DHS DQA 3/2009.

Prevention Strategies

Falls are preventable and are not a normal part of aging. The public health approach (Figure 3) is an ideal method to address fall prevention. The first two steps of the public health approach, define the problem using data and identify risk and protective factors, have been accomplished throughout this report. Wisconsin is a national leader in applying the next steps to the prevention of falls--developing, implementing and evaluating prevention strategies that are informed by data,. A sample list of programs used in Wisconsin to prevent falls can be found in Appendix A on page 13. Further, the Centers for Disease Control and Prevention (CDC) has created a compendium of evidence-based practices for fall prevention as well as a toolkit for developing older adult fall prevention programs. The links to these documents is provided on page 11.

Figure 3. Public health approach to fall prevention.



Wisconsin has embarked on multi-faceted efforts to prevent falls in older adults. Research indicates that there are many things that make an older adult more likely to fall but also strategies that may reduce an individual's likelihood of falling. The Minnesota Falls Prevention Program developed a chart (Appendix B, pages 14 and 15) which matches specific interventions to each risk factor. Wisconsin emphasizes a collaborative approach to implement these strategies. Partnerships between aging services, public health, research institutions, healthcare systems and community organizations have been developing for many years. One example of this is the Wisconsin Fall Prevention Initiative (FPI). The FPI is a virtual coalition of professionals with representatives from across Wisconsin all dedicated to preventing falls and moving fall prevention programming forward. The FPI meets via conference call on a quarterly basis and are engaged in the development and implementation of a collaborative statewide fall prevention strategic plan. For more information about the FPI or to join the listserv for free, please call (608) 266-3008. Additionally, many local communities have established similar coalitions with multi-disciplinary membership to address the specific needs in their area.

The importance of fall prevention for Wisconsin's older adults is evident by the many stakeholders supporting the efforts to address this very preventable issue. For instance, Governor Doyle has, since

2008, declared September Fall Prevention Awareness Month in Wisconsin. Further, the Secretary of the Wisconsin Department of Health Services (DHS) has identified falls and their prevention as one of 10 key focus areas for the department. Most recently, Healthy Wisconsin 2020, the state's health plan, identified falls as one of five injury priority areas needing to be addressed over the next ten years.

To coordinate the state's approach to address the burden of falls on our residents, the Injury and Violence Prevention Program within the Wisconsin Department of Health Services is leading these many stakeholders and partners, including the FPI, in a comprehensive strategic planning process. The plan will set the direction for the state and assure a comprehensive approach to this significant problem.

ADDITIONAL RESOURCES

Wisconsin Department of Health Services
www.dhs.wisconsin.gov/health/InjuryPrevention/FallPrevention

Fall Prevention Center of Excellence
www.stopfalls.org

Minnesota Falls Prevention Program
www.mnfallsprevention.org

Falls Free Coalition
www.healthyagingprograms.com

Center for Disease Control and Prevention
www.cdc.gov/HomeandRecreationalSafety/Falls/index.html

Key Publications
"Preventing Falls: What Works; A CDC Compendium of Effective Community-based Interventions from Around the World"

"Preventing Falls: How to Develop Community-based Fall Prevention Programs for Older Adults"
www.cdc.gov/HomeandRecreationalSafety/Falls/index-pr.html

APPENDICES

Appendix A:
Examples of Current Evidence-based Programs in Wisconsin

Stepping On

Stepping On is a program that empowers older adults to carry out health behaviors that reduce the risk of falls, improve self management, and increase quality of life. It has been shown to reduce falls by 31%. It is a community-based workshop offered once a week for seven weeks using adult education and self efficacy principles. Older adults develop specific knowledge and skills to prevent falls in community settings. Participants include those who are at risk of falling, have a fear of falling, or have fallen one or more times. Workshops are facilitated by two trained leaders, one health professional and one peer leader. To learn more about Stepping On or to get involved with the Stepping On program please visit the Health Promotion section at www.gwaar.org.

Otago Exercise Program

The Otago Exercise Program (OEP) is an individually tailored exercise program that is delivered in the home by a trained nurse or physical therapist. It has been shown to reduce falls by 35%. The OEP was designed by the Falls Prevention Research Group at the University of Otago Medical School. It consists of a series of leg-strengthening and balance-retraining exercises that become progressively more difficult as the participant gets stronger. For more information, please visit:
www.acc.co.nz/preventing-injuries/at-home/older-people/information-for-older-people/otago-exercise-programme/index.htm

Sure Step

Sure Step is a multi-factorial, one-on-one intervention conducted by a physical therapist, occupational therapist, or registered nurse. It is the result of research conducted by Jane Mahoney, MD, and Terry Shea, PT, in a randomized trial in Kenosha County, and was found to be effective in reducing falls in a subset of high risk older adults. Results to date show a 68% reduction in falls in the six months after the start of the intervention compared to the six months prior.

Appendix B:
Risk Factors for Falls

Risk Factor	Intervention Strategy
Muscle weakness	Evaluate and assess. Refer as needed to physical therapy and/or occupational therapy for assessment and treatment. Treatment may include an exercise program that includes gait, balance, and lower body strengthening exercises.
Gait, balance, or both	Evaluate and assess. Refer as needed to physical therapy, occupational therapy, home care, and/or medical equipment suppliers. Treatment may include an exercise program that includes gait, balance, and lower body strengthening exercises. Recommend professionally delivered home safety evaluation to reduce environmental hazards and identify home modifications to maximize safety. Encourage adult to have cane, walker or gait device fitted properly to ensure correct form.
Medication	Review prescribed and over-the-counter medications. Evaluate for proper dose, route, compliance, interactions and side effects that may increase the adult's risk of falling. Taper medications to the lowest effective dose. Reduce the total number of medications when possible. Educate the adult about their medications, possible side effects, and when those side effects should be reported. Encourage adult to bring list of all prescribed and over-the-counter medications to each visit and to keep list current. Learn the prescription medications that increase the risk of falls for patients 65 and older.
Postural hypotension	Evaluate and assess. Review medications. Encourage good hydration habits. Educate adult on how to rise slowly from a seated or supine position.

Risk Factor	Intervention Strategy
Hazards inside and outside the home	Educate adult about environmental hazards. Recommend professionally delivered home safety evaluation to reduce environmental hazards and identify home modifications to maximize safety.
Cardiovascular disorder	Treat medical condition as needed. Learn the prescription medications that increase the risk of falls for patients 65 and older.
Foot problems or inappropriate footwear	Recommend self-examination of the feet and regular foot care. Educate adult about foot problems and proper footwear. Suggest supportive shoes with non-slip soles and wide low heels.
Cognitive impairment	Evaluate and assess to determine whether or not there is cognitive impairment. Recommend home health care services if needed.
Visual impairment	Visual acuity testing. Recommend visit to eye doctor to test vision and make sure eye glasses prescription is up-to-date. Eye doctor may also test for conditions of the eye that may impair vision.
Limitations in activities of daily living (ADLs) and instrumental activities of daily living (IADLs)	Evaluate and assess to determine whether or not functional impairment exists. Recommend visit to physical therapy for evaluation of gait and possible need for assistive devices. Recommend home health care services.
Fear of falling	Screen adults perceptions of their abilities to perform their ADLs and IADLs, as well as their fear of falling. Encourage adult to be physically active.
Osteoporosis	Screen and treat as indicated.

Adapted from materials developed by the Minnesota Falls Prevention Program
www.mnfallsprevention.org/professional/interventions.htm

Appendix C: Fall-related Deaths, By County, 2008

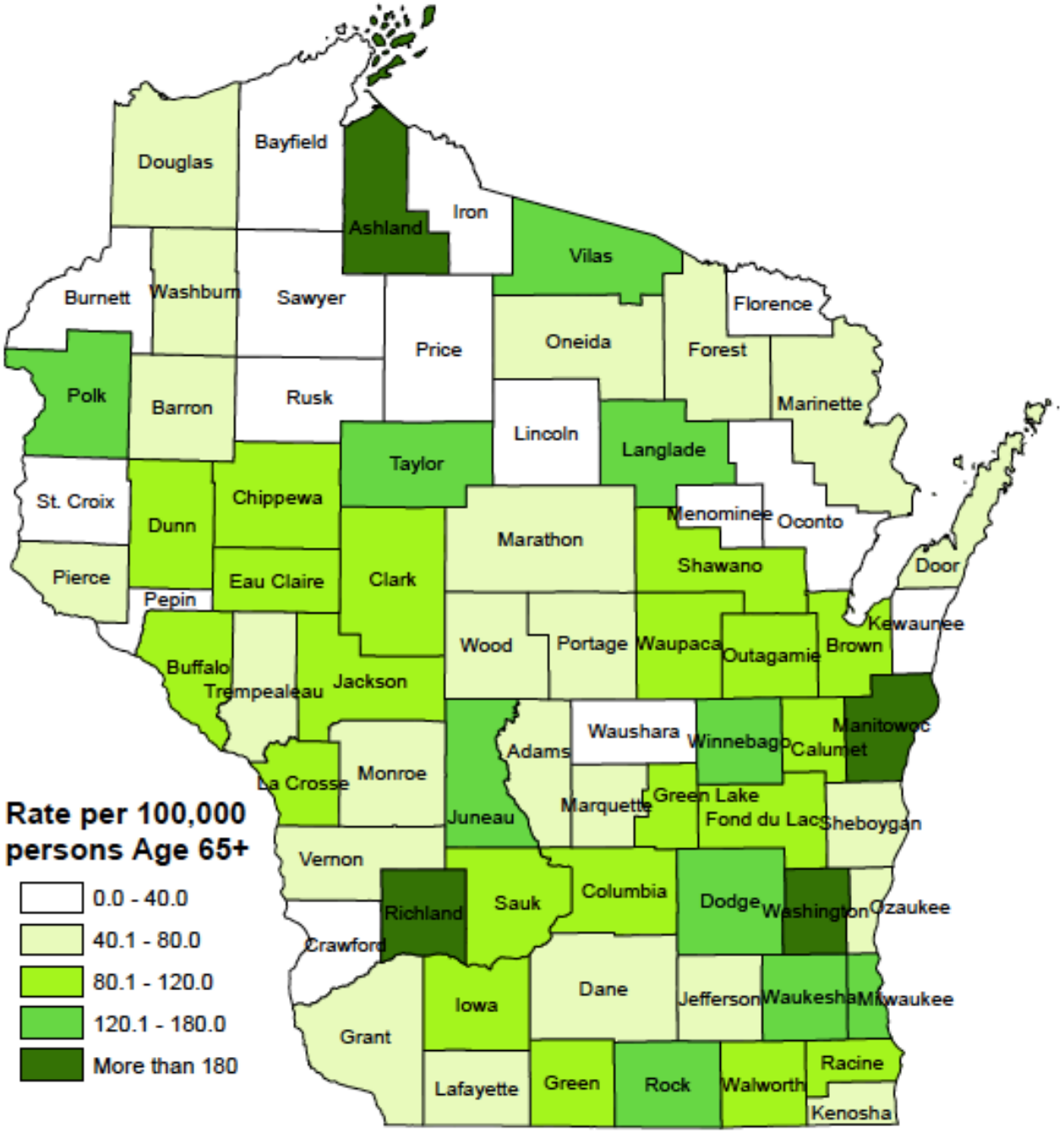


Table 7. Count and rate of fall-related deaths, by county, ages 65 years and older, Wisconsin, 2008.

County	Count Ages 65+	Rate (per 100,000) Ages 65+	County	Count Ages 65+	Rate (per 100,000) Ages 65+
Adams	<5	45.4	Marathon	11	60.3
Ashland	5	192.5	Marinette	6	71.6
Barron	5	61.6	Marquette	<5	67.7
Bayfield	<5	36.2	Menominee	0	NA
Brown	29	106.6	Milwaukee	179	154.4
Buffalo	<5	83.7	Monroe	<5	65.1
Burnett	0	NA	Oconto	<5	16.8
Calumet	<5	80.4	Oneida	<5	52.5
Chippewa	10	110.7	Outagamie	20	103.4
Clark	6	118.3	Ozaukee	7	57.7
Columbia	7	88.2	Pepin	0	NA
Crawford	<5	35.6	Pierce	<5	70.6
Dane	25	52.4	Polk	11	151.4
Dodge	18	144.1	Portage	6	71.8
Door	<5	63.2	Price	<5	33.5
Douglas	<5	63.3	Racine	24	97.2
Dunn	6	119.5	Richland	6	191.8
Eau Claire	12	96.8	Rock	29	138.5
Florence	0	NA	Rusk	<5	34.2
Fond du Lac	15	102.1	St. Croix	<5	36.3
Forest	<5	47.3	Sauk	9	103.7
Grant	5	60.7	Sawyer	<5	30.8
Green	5	94.3	Shawano	7	98.5
Green Lake	<5	83.8	Sheboygan	8	49.8
Iowa	<5	97.6	Taylor	<5	128.6
Iron	0	NA	Trempealeau	<5	66.0
Jackson	<5	102.5	Vernon	<5	62.2
Jefferson	5	48.5	Vilas	7	128.4
Juneau	6	129.5	Walworth	14	101.0
Kenosha	14	78.2	Washburn	<5	59.2
Kewaunee	<5	31.5	Washington	34	207.2
La Crosse	13	88.5	Waukesha	85	164.0
Lafayette	<5	77.6	Waupaca	9	99.3
Langlade	5	121.0	Waushara	<5	21.0
Lincoln	<5	39.1	Winnebago	27	128.7
Manitowoc	24	183.5	Wood	9	71.7
			Wisconsin (total)	789	104.3

Note: Rates based on counts of less than 20 are considered unstable and should be interpreted with caution.

Appendix D:
Fall-related Inpatient Hospitalizations, By County, 2008

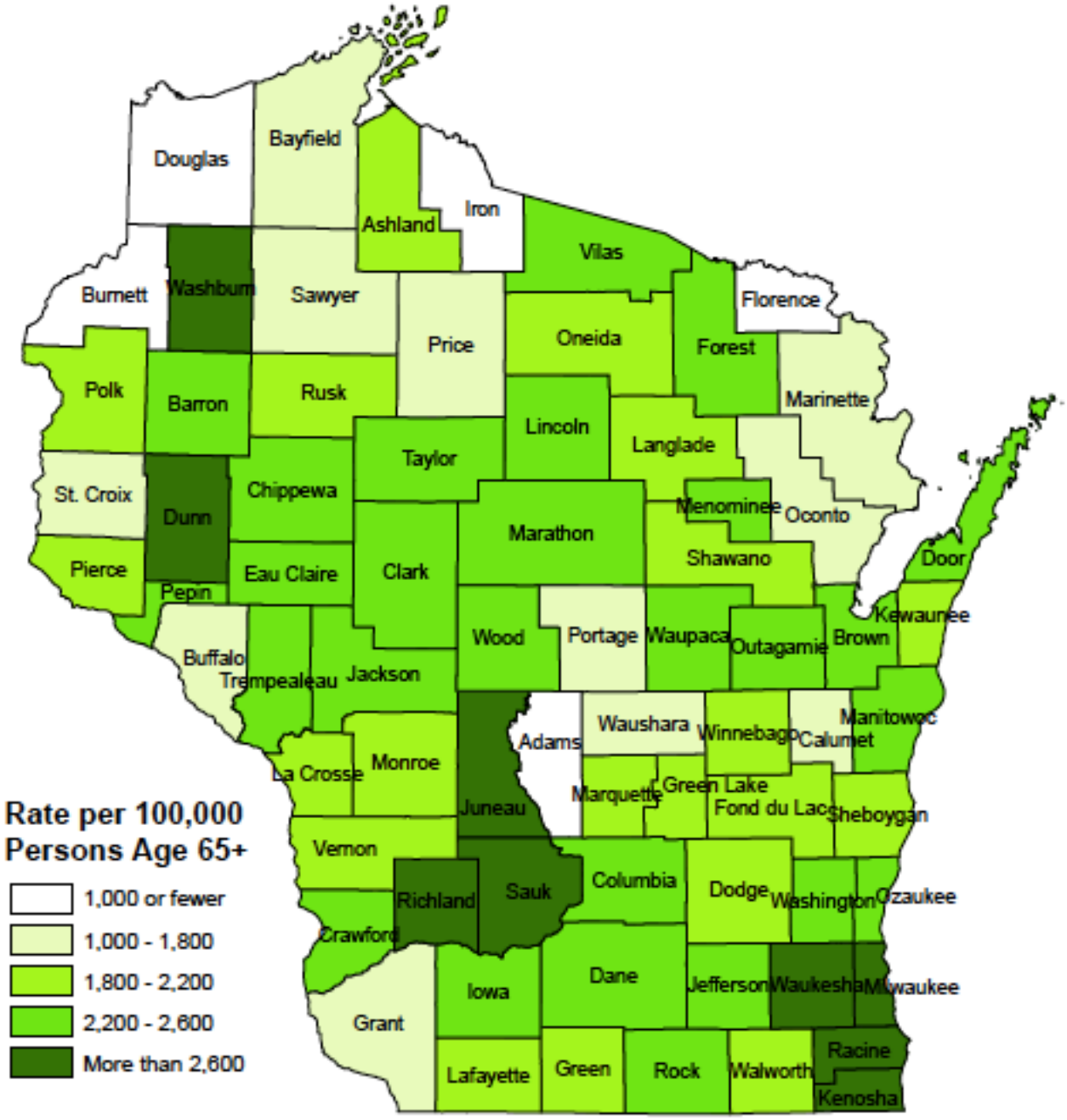


Table 8. Count and rate of fall-related inpatient hospitalizations by county, ages 65 years and older, Wisconsin, 2008.

County	Count Ages 65+	Rate (per 100,000) Ages 65+	County	Count Ages 65+	Rate (per 100,000) Ages 65+
Adams	43	975.3	Marathon	407	2,230.1
Ashland	53	2,040.0	Marinette	149	1,777.0
Barron	184	2,268.5	Marquette	55	1,862.5
Bayfield	35	1,267.2	Menominee	12	2,547.8
Brown	618	2,272.4	Milwaukee	3,264	2,815.9
Buffalo	24	1,004.2	Monroe	133	2,165.4
Burnett	35	959.7	Oconto	84	1,413.0
Calumet	73	1,467.6	Oneida	165	2,166.8
Chippewa	204	2,258.6	Outagamie	458	2,368.3
Clark	118	2,327.0	Ozaukee	290	2,388.6
Columbia	201	2,533.1	Pepin	31	2,472.1
Crawford	70	2,488.5	Pierce	85	1,999.5
Dane	1,205	2,524.9	Polk	149	2,021.2
Dodge	273	2,186.1	Portage	144	1,722.7
Door	142	2,243.6	Price	52	1,743.2
Douglas	18	284.9	Racine	729	2,951.9
Dunn	131	2,609.0	Richland	99	3,165.0
Eau Claire	318	2,566.4	Rock	473	2,259.1
Florence	<5	97.4	Rusk	55	1,882.9
Fond du Lac	294	2,000.5	St. Croix	133	1,610.8
Forest	54	2,555.6	Sauk	250	2,881.2
Grant	120	1,456.7	Sawyer	58	1,784.1
Green	109	2,056.2	Shawano	137	1,928.5
Green Lake	77	2,151.4	Sheboygan	309	1,922.2
Iowa	71	2,308.9	Taylor	70	2,250.8
Iron	8	500.6	Trempealeau	112	2,465.3
Jackson	70	2,392.3	Vernon	99	2,051.4
Jefferson	231	2,239.9	Vilas	127	2,328.6
Juneau	122	2,633.3	Walworth	299	2,157.6
Kenosha	582	3,252.7	Washburn	88	2,605.9
Kewaunee	63	1,986.1	Washington	400	2,438.0
La Crosse	266	1,811.7	Waukesha	1,489	2,872.1
Lafayette	51	1,979.8	Waupaca	204	2,250.9
Langlade	86	2,081.3	Waushara	59	1,237.2
Lincoln	128	2,499.5	Winnebago	429	2,045.0
Manitowoc	314	2,401.0	Wood	308	2,454.2
			Wisconsin (total)	18,432	2,436.6

Note: Rates based on counts of less than 20 are considered unstable and should be interpreted with caution.

Appendix E:
Fall-related Emergency Department Visits, By County, 2008

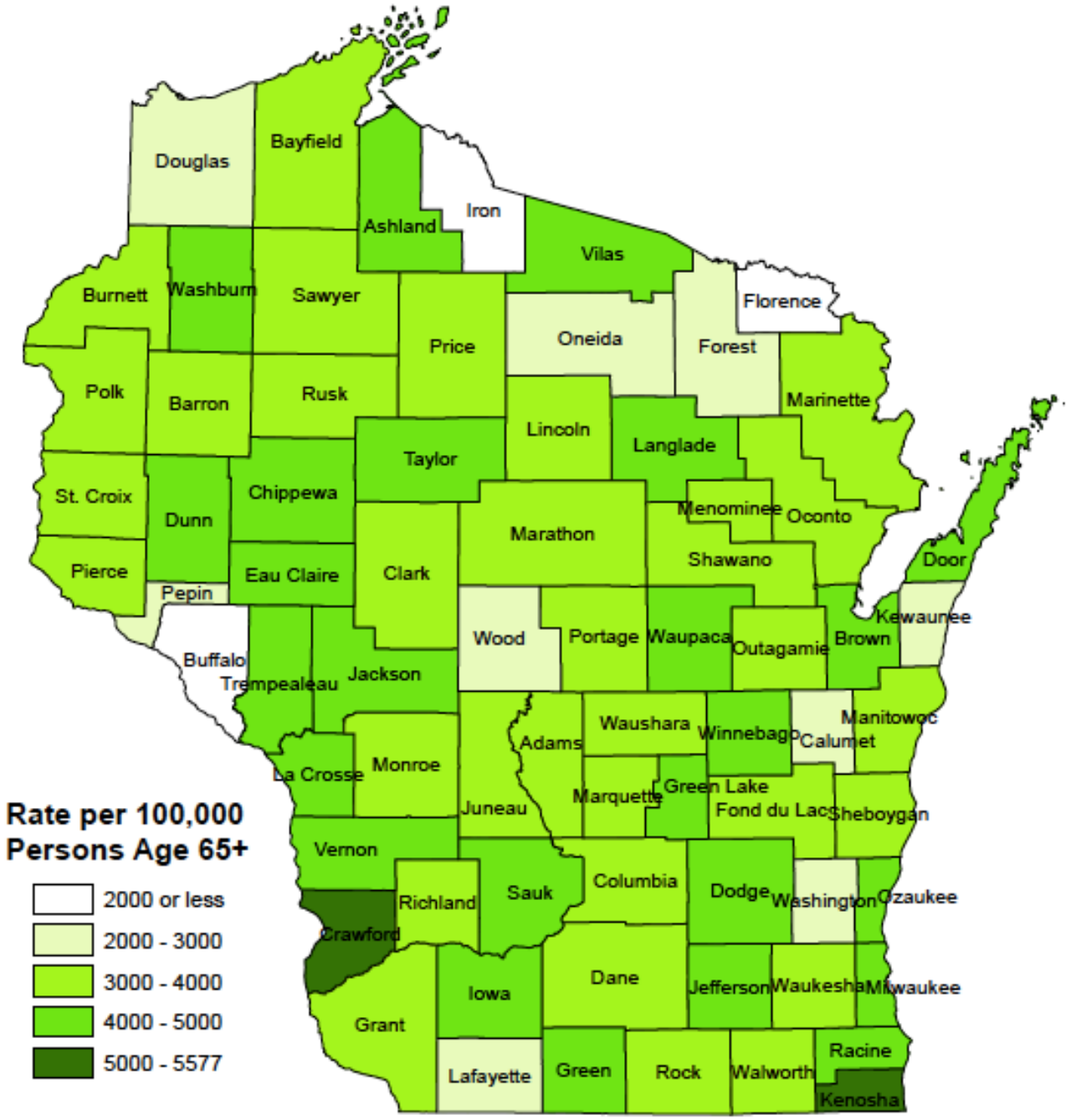


Table 9. Count and rate of fall-related emergency department visits, by county, ages 65 years and older, Wisconsin, 2008.

County	Count Ages 65+	Rate (per 100,000) Ages 65+	County	Count Ages 65+	Rate (per 100,000) Ages 65+
Adams	137	3,107.3	Marathon	549	3,008.2
Ashland	115	4,426.5	Marinette	302	3,601.7
Barron	311	3,834.3	Marquette	98	3,318.7
Bayfield	102	3,693.0	Menominee	18	3,821.7
Brown	1,298	4,772.8	Milwaukee	4,779	4,122.9
Buffalo	44	1,841.0	Monroe	226	3,679.6
Burnett	114	3,125.9	Oconto	195	3,280.1
Calumet	146	2,935.3	Oneida	223	2,928.4
Chippewa	378	4,185.1	Outagamie	772	3,991.9
Clark	166	3,273.5	Ozaukee	516	4,250.1
Columbia	288	3,629.5	Pepin	33	2,631.6
Crawford	152	5,403.5	Pierce	132	3,105.2
Dane	1,439	3,015.2	Polk	267	3,675.7
Dodge	540	4,324.2	Portage	267	3,194.2
Door	312	4,929.7	Price	99	3,318.8
Douglas	159	2,516.2	Racine	1,001	4,053.3
Dunn	213	4,242.2	Richland	125	3,996.2
Eau Claire	528	4,261.2	Rock	732	3,496.0
Florence	not available	not available	Rusk	92	3,149.6
Fond du Lac	515	3,504.4	St. Croix	306	3,706.0
Forest	50	2,366.3	Sauk	368	4,241.1
Grant	282	3,423.2	Sawyer	128	3,937.3
Green	217	4,093.6	Shawano	246	3,462.8
Green Lake	164	4,582.3	Sheboygan	591	3,676.5
Iowa	142	4,617.9	Taylor	147	4,726.7
Iron	10	625.8	Trempealeau	198	4,358.4
Jackson	119	4,067.0	Vernon	217	4,496.5
Jefferson	477	4,625.2	Vilas	229	4,198.8
Juneau	150	3,237.6	Walworth	547	3,947.2
Kenosha	998	5,577.6	Washburn	155	4,589.9
Kewaunee	77	2,427.5	Washington	473	2,882.9
La Crosse	599	4,079.8	Waukesha	1,962	3,784.4
Lafayette	75	2,911.5	Waupaca	428	4,722.5
Langlade	204	4,937.1	Waushara	188	3,942.1
Lincoln	200	3,905.5	Winnebago	857	4,085.2
Manitowoc	504	3853.8	Wood	365	2,908.4
			Wisconsin (total)	30,342	4,011.1

Note: Rates based on counts of less than 20 are considered unstable and should be interpreted with caution.

Appendix F:
Technical Notes

Fall-related Death Data

Data on fall-related deaths were obtained from Wisconsin resident death certificates. Cases were included if they had an International Classification of Diseases - 10th Revision (ICD-10) code of W00-W19, which indicates an external cause of injury due to a fall. These data may be accessed from the Wisconsin Interactive Statistics on Health (WISH) data query system, www.dhs.wisconsin.gov/wish/, Injury Mortality Module.

Fall-related Hospitalization Data

Data on fall-related inpatient hospitalizations were obtained from the Inpatient Hospitalization Discharge file, prepared by the Wisconsin Hospital Association Information Center. Cases were included if they had an International Classification of Diseases - 9th Revision (ICD-9) E code of E880.0-E886.9 or E888, which indicates an external cause of injury due to a fall. These data may be accessed from the Wisconsin Interactive Statistics on Health (WISH) data query system, www.dhs.wisconsin.gov/wish/, Injury Inpatient Hospitalizations.

Fall-related Emergency Department Data

Data on fall-related emergency department visits were obtained from the Emergency Department visit file, prepared by the Wisconsin Hospital Association Information Center. Cases were included if they had an International Classification of Diseases - 9th Revision (ICD-9) E code of E880.0-E886.9 or E888, which indicates an external cause of injury due to a fall. These data may be accessed from the Wisconsin Interactive Statistics on Health (WISH) data query system, www.dhs.wisconsin.gov/wish/, Injury Emergency Department Visits.

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) is a national survey that collects health-related information. It is conducted annually by state health departments. In Wisconsin, the survey is completed by the Bureau of Health Information and Policy, Division of Public Health, Wisconsin Department of Health Services. Data are collected via telephone survey of randomly selected Wisconsin residents.