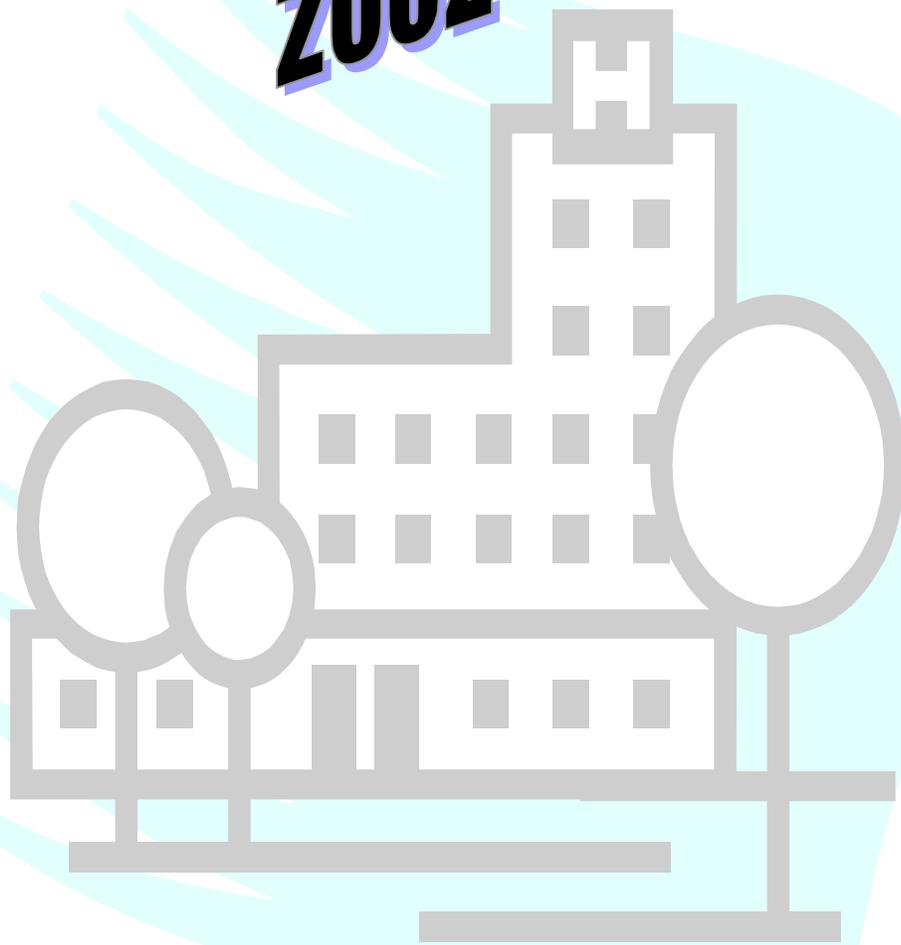


Michigan Injury Hospitalizations 2002



*Michigan Department
of Community Health*



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October 2004

State of Michigan

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Acknowledgments

The Michigan Health and Hospital Association is responsible for managing the Michigan Inpatient Database, the primary source of information for this report.

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This publication was supported by grants number U17/CCU519401-04 and U010H07306-04 from the U.S. Centers for Disease Control and Prevention. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the U.S. Centers for Disease Control and Prevention.

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Three hundred copies of this report were printed. The total cost of printing was \$1,728.47. The unit cost was \$5.81.

EXECUTIVE SUMMARY

This report examines Michigan resident injury hospitalizations for 2002. The age, sex, county of residence and the types of injuries sustained were analyzed. The cause of injury, which is a critical piece of information for injury prevention purposes, was also examined. In-depth cause of injury analyses were conducted for 30 counties and the City of Detroit. Each of these areas met the standard set by the Michigan Department of Community Health of providing cause of injury codes (E-codes) for at least 90% of injury inpatients. In 2001, only 23 counties and Detroit met this criterion.

This report utilized data from the Michigan Inpatient Database (MIDB). The Michigan Department of Community Health obtains annual MIDB data from the Michigan Health and Hospital Association, which is responsible for data aggregation and maintenance. The report utilized national recommendations that were released in 2003 for definitions and analysis format. Key findings of the report are as follows:

GENERAL

- In 2002, there were 56,213 Michigan resident hospitalizations for which the principal diagnosis was injury. This corresponds to an injury hospitalization rate of 559 per 100,000 residents.
- Injury hospitalizations comprised 4.4% of the 1,288,561 hospitalizations for any condition among Michigan residents in 2002.
- More than half of the patients (55%) had routine discharges; 2.3% died prior to discharge.

DEMOGRAPHIC CHARACTERISTICS

- The hospitalization rate for males was 3% greater than the hospitalization rate for females.
- The hospitalization rate for males was greater than that for females for each age group between birth and age 59. For every age group thereafter, females had higher rates.
- After age 69, hospitalization rates increased dramatically with age for both sexes. The hospitalization rate for those aged 85 and older was more than eight times the overall rate.

GEOGRAPHIC DISTRIBUTION

- Residents in the western Upper Peninsula and in the east central region of the Lower Peninsula had the highest rates of injury hospitalization.
- Of the ten most populous counties in the state, Genesee County had the highest rate of injury hospitalization. The rate for Genesee County exceeded the statewide rate by 34%.

TYPES OF INJURIES

- About one in six injury hospitalizations were for hip fracture making this the most common type of injury.
- Nearly ten percent of injury inpatients had traumatic brain injury as their principal diagnosis.

CAUSES OF INJURY

- An E-code indicating the cause of injury was provided for 48,344 of the 56,213 Michigan resident injury hospitalizations (E-coding rate: 86.0%).
- Of the hospitalizations for which an E-code was provided, unintentional injuries comprised 83%, assaults 5.8%, intentional self-harm/suicide attempts 9.1%, and 1.7% were of undetermined intent or otherwise classified.
- E-coding rates varied widely by county of residence, from 39% to 99%. The west central region of the Lower Peninsula generally coded at a lower rate than other regions.
- In each of the 31 areas for which a cause of injury analysis was performed, unintentional falls were the leading cause of injury. For most of these areas, falls caused about half of all injuries.
- Assaults caused nearly one-quarter of injury hospitalizations among Detroit residents. Among the other areas examined, assaults caused at most 10% of injury hospitalizations.
- Poisoning was by far the leading mechanism for those attempting suicide or otherwise intentionally harming themselves.

OCCUPATIONAL INJURIES

- Workers' compensation was the payment source for 3.4% of injury hospitalizations. Because workers' compensation is not utilized as a payment source by everyone who is injured at work, the number of occupational injuries requiring hospitalization was likely understated in this study.
- Males had an occupational injury hospitalization rate nearly four times that of females. Among those aged 65 and older, however, women had a higher rate than men.
- Of Michigan's ten most populous counties, Genesee County had the highest occupational injury hospitalization rate by a substantial margin. The rate for workers who lived in Genesee County was 51% greater than the statewide rate.
- Compared to all injury inpatients, those who were injured at work sustained a greater proportion of upper limb fractures, open wounds, sprains/strains, and burns, but a lower proportion of hip fractures and poisonings.

Questions or comments concerning this report or requests for additional copies should be directed to Linda Scarpetta, Michigan Department of Community Health, at (517) 335-8397 or e-mail at scarpettal@michigan.gov.

TABLE OF CONTENTS

INTRODUCTION	1
DATA SOURCES AND METHODS	1
Data Sources	1
Methods.....	1
RESULTS	4
Demographics of Injury Inpatients	5
Types of Injuries Sustained.....	7
Geographical Profile of Selected Injury Types.....	7
Traumatic Brain Injury	7
Hip Fractures, Ages 65 and Older.....	7
Causes of Injury	11
Michigan	13
Counties With At Least 90% Cause of Injury Coding.....	15
Alpena	16
Antrim.....	18
Benzie	20
Berrien.....	22
Cass	24
Crawford	26
Genesee	28
Gladwin	30
Grand Traverse	32
Kalamazoo	34
Kalkaska	36
Keweenaw.....	38
Leelanau	40
Livingston	42
Manistee.....	44
Marquette	46
Menominee	48
Midland	50
Missaukee	52
Montmorency	54
Oakland	56
Ogemaw	58
Presque Isle.....	60
Roscommon	62
Saginaw	64
St. Clair	66
St. Joseph	68
Van Buren	70
Washtenaw	72
Wayne Out-county.....	74
Detroit City	76

TABLE OF CONTENTS

Occupational Injuries	78
Demographics of Injury Inpatients	78
Types of Injuries Sustained.....	80
Causes of Injury	80
Temporal Analysis.....	82
APPENDICES	
A. Data Tables for Injury Hospitalizations to All Michigan Residents.....	83
B. Data Table for Occupational Injury Hospitalizations	89
C. Barell Injury Diagnosis Matrix	91
D. Cause and Manner/Intent of Injury and Corresponding E-codes.....	95
REFERENCES	98

INTRODUCTION

Injuries are a significant public health issue in Michigan. In 2002, 5,412 Michigan residents died from injuries (including unintentional injuries, suicides, and homicides)¹ making injury the fourth leading cause of death in the state.² Deaths are the most serious and prominent outcome of injuries, but most injuries are not fatal. In Michigan, for every death due to injury, there are approximately 10 hospitalizations and more than 200 emergency department visits.³

The Injury and Violence Prevention Program (IVPP) in the Michigan Department of Community Health has sponsored three statewide reports on injury mortality⁴⁻⁶ and two on injury hospitalization.^{3,7} This report utilizes cause of injury information in a manner similar to the 2001 report. Information on causes of injury (e.g., car crash, suicide attempt) is crucial to developing well-targeted prevention strategies. However, hospitalization data in Michigan have historically provided incomplete coding of injury causation. In an effort to maximize the use of this information while avoiding the presentation of data with a high level of missing values, cause of injury profiles were developed only for those counties with the most complete information. As cause of injury data become more complete, the IVPP anticipates analyses in subsequent reports to include more counties and eventually to perform an in-depth statewide analysis.

DATA SOURCES AND METHODS

Data Sources

The Michigan Inpatient Database (MIDB) was the source of data on injury hospitalizations. The MIDB is the aggregation of hospital discharge data voluntarily provided to the Michigan Health and Hospital Association (MHA) by virtually every acute care hospital in Michigan (one very small hospital does not provide data). In addition, hospitals in contiguous states (Indiana, Ohio, and Wisconsin) submit data on hospitalized Michigan residents to MHA.

Estimates for the 2002 Michigan population⁸ were used to calculate state and county-level population-based hospitalization rates. The Bureau of Labor Statistics, U.S. Department of Labor provided data on the number of employed residents at the state and county level for 2002.⁹ These data were used to calculate worker-based hospitalization rates for occupational injuries.

Methods

An “injury hospitalization” was defined as a Michigan resident hospitalized for an injury in a non-federal, acute care facility in Michigan or a contiguous state (Indiana, Ohio, and Wisconsin). Out-of-state residents hospitalized in Michigan were excluded. An “injury” was defined as a hospitalization for which the principal diagnosis was among the following ICD-9-CM¹⁰ codes: 800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.85. This range was based on the recommendations made by a panel of national injury surveillance experts.¹¹ Excluded are certain adverse effects (995.0-995.4, 995.6, 995.7, 995.89), and complications of surgical and medical care (996.0-999.9). Adverse effects of medical care are generally considered to be outside the scope of public health injury prevention programs.

Patients were limited to those discharged from a hospital between January 1, 2002 and December 31, 2002. Patients admitted to a hospital more than once for the same injury (i.e., readmissions) were not excluded (see discussion below). Patients who died during their hospitalization were included.

Injury diagnoses were categorized according to the Barell Matrix,¹² a two-dimensional array of ICD-9-CM codes grouped by body region and nature of injury. Use of this matrix was recommended by the national injury surveillance workgroup. The Barell Matrix and the ICD-9-CM codes defining each cell are presented in Table C-1 in Appendix C.

ICD-9-CM contains supplementary codes with which to specify the external cause of injury and poisoning. These “E-codes” indicate both the mechanism (e.g., struck by blunt object) and the intentionality (e.g., assault) of the injury cause. According to coding rules, an E-code should be assigned to every case involving an injury or poisoning (ICD-9-CM 800-999). In 1991, the rate at which injury hospitalizations were E-coded in Michigan was 51.9%.¹³ By 2002, this had increased to 86.0%. Analyzing the causes of injury is crucial to developing well-targeted prevention efforts. However, it is unknown if the characteristics of the cases for which information on injury cause is not provided are similar to the characteristics of cases for which this information is provided. Therefore, great care must be taken when presenting cause of injury information when E-coding is incomplete.

For this report, we limited cause of injury analyses to counties whose residents were E-coded at 90% or greater. This approach allows for important cause of injury information to be presented while minimizing errors associated with missing data. In addition, a cause of injury profile for the state was developed even though the rate was below 90% because high E-coding counties were geographically fairly well distributed throughout the state, minimizing the likelihood of an overall bias.

Some medical records contain more than one E-code. An algorithm for selecting the E-code to represent each record was provided by the national injury surveillance workgroup. That group also provided recommendations for calculating E-coding rates. For more detail on these methodologies, please see the reference paper.¹¹ Note that the national workgroup recommended excluding E-codes E869.4 (Accidental poisoning by secondhand tobacco smoke) and E967.0-E967.9 (Child and adult battering and other maltreatment) from the numerator in E-coding rate calculations. This study included these codes as they do provide information on injury cause. (Of the 48,344 total E-coded cases, two were coded E869.4 while 68 were coded E967.0-E967.9.)

A framework for presenting cause of injury information has been developed by the U.S. Centers for Disease Control and Prevention (CDC)¹⁴ (see Table D-1 in Appendix D for this framework). This matrix illustrates the cause and intent of each injury event and the E-codes that define each cell. Cells within this table that are shaded indicate that no ICD code exists for that category.

Hospitalization rates were calculated by dividing the number of hospital discharges by the appropriate population and multiplying by 100,000. For the analysis on occupational injuries, the population used was the number of people employed. Rates were calculated only when based on six or more discharges. Rates based on less than six discharges were considered unreliable because the relative standard error exceeded 40%. Asterisks identify these cases in the tables.

A geographical analysis was performed allowing for comparison of county injury rates. Age adjustment was utilized to eliminate differences in crude rates between the counties that may have been due to differing age distributions. A substantial number of counties had insufficient

numbers of cases to perform standard age-adjustment which requires parceling cases into eleven age groups. To increase the number of counties for which valid rates could be calculated, the number of years within each age group was increased. This reduced the number of age groups from eleven to three: ages 0-24, 25-64, 65 and older. Age adjusting with only three age groups seems reasonable given that a report¹⁵ by the National Center for Health Statistics on age-adjusting methods provides several examples using these same age groups.

Geographic analyses also were performed for two specific types of injury: hip fracture and traumatic brain injury. Since hip fracture incidence is strongly associated with age, varying age distributions across counties could account for differing hip fracture hospitalization rates. Thus, age-adjustment is warranted. However, due to small cell sizes in many counties, age-adjustment was not a valid strategy, even using three broad age groups as described above. As a next-best approach, the hip fracture analysis was limited to those over age 65.* Incidence of traumatic brain injury also varies by age and age adjustment would be appropriate here too. Again, due to small cell sizes, this was not feasible. Also, because rates were high among the very young and the elderly, it was felt that no one age group could be selected for use in the geographical analysis. Thus, the county-specific rates for TBI reflect crude rates for all ages.

Michigan county rates were mapped using ArcView (software designed by ESRI). With the exception of the map illustrating E-coding levels, rates were categorized into four groups using the “equal interval” classification method. In this method, the range of hospitalization rates was divided into four equal sub ranges. For example, if the lowest county rate was 26 per 100,000 and the highest county rate was 125 per 100,000, the four sub ranges would be: 26-50, 51-75, 76-100, and 101-125. In each geographical analysis, the quartile representing the highest rates contained the fewest counties. Thus, this methodology highlighted the relatively few counties with rates much higher than the state rate. Rates were not calculated for counties with less than six resident discharges due to the high statistical variability of these rates. These counties were marked by asterisks in the maps. Figure 5, which illustrates E-coding rates by county, utilized three categories reflecting “low”, “medium”, and “high” rates of E-coding.

Michigan residents who were hospitalized more than once for the same injury in 2002 were counted for each hospital discharge. Optimally, these cases would have been counted once to reflect injury incidence. However, there was no way to reliably sort out readmissions (due to missing values and different interpretations across hospitals for coding the Readmission field) or to identify patients treated in different hospitals for the same injury because the MIDB does not contain personal identifiers. There is some evidence that patients who are readmitted for the same injury differ from those who are admitted only once per injury. One study found that females were readmitted to a greater degree than males and that readmission rates varied by age, with readmission most likely for those over age 75.¹⁷ One injury researcher, who examined the Readmission variable in the MIDB for 1997,¹⁸ estimated the prevalence of readmissions at 5%.**

* The National Center for Health Statistics found a significant effect of age adjusting within the 65 and older age group.¹⁶ While performing this age adjustment would be beneficial, doing so for hip fractures would greatly limit the number of counties that could be included in the analysis.

** The researcher found that 5.2% of records had a value in the Readmission field indicating that the visit was a readmission. He assumed that cases for which this field contained missing values were not readmission visits. (Readmission data were missing for 83% of the records.) In other states, he estimated the prevalence of readmission between 3.8% (1997 Vermont) and 8.4% (1994 Missouri).

Because subsequent hospitalizations for the same injury incident could not be excluded, the frequencies and rates presented in this report represent frequencies and rates of injury hospitalization, not injury incidence.

Analyses involving patient race were not performed because information on race is typically unavailable for a large percentage of discharges in the MIDB. For the 2002 MIDB, race was unknown for 20% of the discharge records. In addition, citing the complexities regarding the collection of racial information, the national injury surveillance panel does not recommend performing this analysis.

The terms “hospitalization” and “discharge” are used interchangeably in the report and should be considered synonymous.

RESULTS

In 2002, there were 56,213 Michigan resident hospitalizations for which the principal diagnosis was injury. This corresponds to an injury hospitalization rate of 559.3 per 100,000 residents. Injury inpatients comprised 4.4% of the 1,288,561 Michigan residents hospitalized for any reason. Nearly all (98.0%) of the injury discharges were from Michigan hospitals. More than half (55.5%) of these patients had routine discharges (home with selfcare) and about one in forty (2.3%) died prior to discharge (Table 1).

TABLE 1
Number of Injury Hospitalizations
By Discharge Disposition
Michigan Residents, 2002

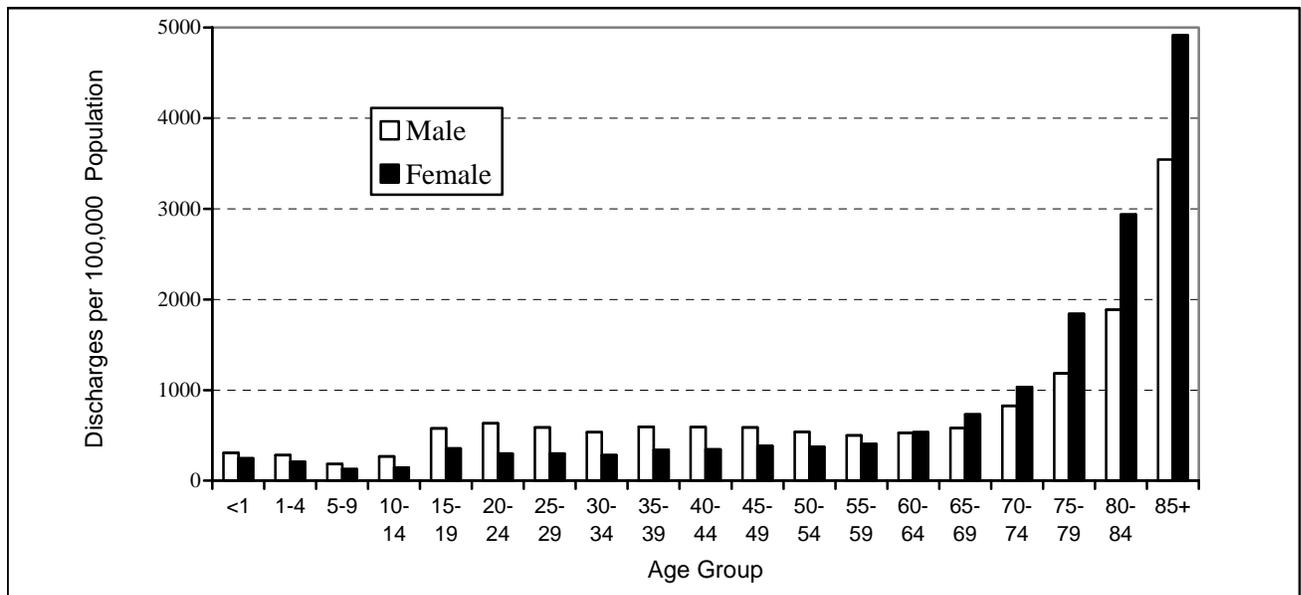
Discharge Disposition	Number	%
Home	35,405	63.0
<i>routine/self care</i>	31,189	55.5
<i>home health services</i>	4,182	7.4
<i>with IV</i>	23	0.0
<i>hospice care</i>	11	0.0
Skilled nursing facility	8,191	14.6
Inpatient rehabilitation center	2,495	4.4
Acute care hospital	1,265	2.3
Intermediate care facility	714	1.3
Left against medical advice	581	1.0
Long-term care facility	177	0.3
Hospice care at medical facility	53	0.1
Died	1,303	2.3
Other disposition	5,925	10.5
Invalid/missing data	104	0.2
Total	56,213	100.0

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

Demographics of Injury Inpatients

The hospitalization rate was higher for males than females up through the 55-59 year old age group (Figure 1). For every age group thereafter, the rate for females was greater. For both sexes, rates were lowest for those aged 5-9 years and highest for those aged 85 and older. Among those over age 69 injury rates increased dramatically with each subsequent five-year age interval. (See Table A-1 in Appendix A for age and sex specific rates.)

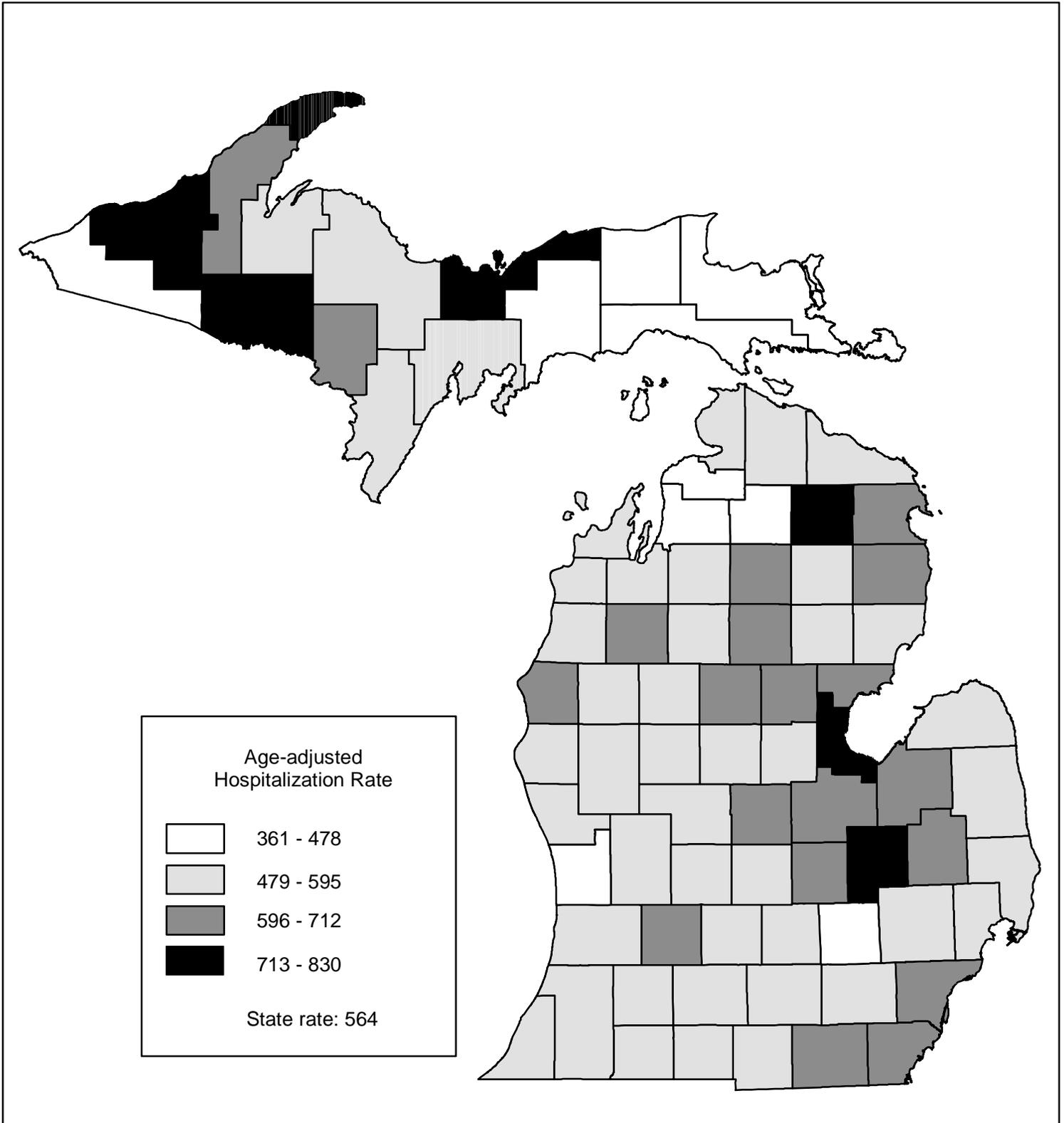
FIGURE 1
Rate of Injury Hospitalization
By Age and Sex
Michigan Residents, 2002



Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

The variation of injury hospitalization rates by county of residence is illustrated in Figure 2. Note that these rates have been age-adjusted, meaning that differences in injury rates cannot be explained by differences in county age distributions. Montmorency County had the highest age-adjusted injury rate, followed by Bay, Ontonagon, Alger, Genesee, Iron, and Keweenaw. These seven counties comprise the highest rate group and are illustrated in black in Figure 2. Among the state's ten most populous counties, Genesee had the highest age-adjusted rate followed by Saginaw and Wayne. (See Table A-2 in Appendix A for crude rates and age-adjusted rates for all counties.)

FIGURE 2
Age-adjusted Hospitalization Rates for All Injuries
By County of Residence, Michigan, 2002



Hospitalization rates are the number of hospital discharges per 100,000 population.

Injury hospitalizations are discharges with a principal diagnosis code in the following range per ICD-9-CM: 800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.85.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

Types of Injuries Sustained

Major types of injuries are illustrated by body region in the Barell Matrix (Table 2). Fractures were the leading type of injury, comprising 55% of the principal diagnoses. Nearly a third (31%) of the fractures were to the hip. Nearly ten percent of injury hospitalizations were for traumatic brain injury (TBI).^{*} Most of these (78%) were Type 1 TBI, the most severe injury group. Twenty-four cases were Shaken Infant Syndrome.

Geographic Profile of Selected Injury Types

Traumatic Brain Injuries

There were 5,431 hospitalizations of Michigan residents in which traumatic brain injury (TBI) was the principal diagnosis.^{**} This corresponds to a statewide rate of 54.0 per 100,000 residents. Rates varied from 25.7 per 100,000 Chippewa County residents to 155.8 per 100,000 Ontonagon County residents. (Rates were not calculated for twelve counties that had less than six discharges.) Ontonagon County was alone in the top quartile of rates (see Figure 3). It is worth noting that its rate was based on only twelve cases. Among the state's ten most populous counties, Genesee County had the highest rate (78.6 per 100,000). (See Table A-3 in Appendix A for all county-specific TBI hospitalization rates.)

Hip Fractures, Ages 65 and Older

There were 8,358 hospitalizations of Michigan residents aged 65 and older in which hip fracture was the principal diagnosis. This represented 88% of hip fractures among all ages. The corresponding hip fracture rate was 678.5 per 100,000 residents aged 65 and older. Rates varied from 234.7 per 100,000 Osceola County residents to 1,215.3 per 100,000 Alger County residents. (Rates were not calculated for two counties that had less than six discharges.) In addition to Alger County, Iron and Missaukee comprised the top quartile (Figure 4). (See Table A-4 in Appendix A for all county-specific hip fracture hospitalization rates.)

^{*} There are important differences as to how TBI is defined in this report and how it was defined in the 1999 Michigan injury hospitalization report.⁷ This report utilizes the Barell Injury Diagnosis Matrix (see Appendix C) to identify the ICD-9-CM codes defining TBI. This matrix includes ICD-9-CM codes 950.1-950.3 and 995.55 (not included in the 1999 definition) and excludes 959.01 (included in the 1999 definition).

^{**} It is likely that the number of true TBI hospitalizations was greater than 5,431 in 2002. Some hospitalizations that normally would be identified as TBI via ICD-9-CM code 854 ("Intracranial injury of other and unspecified nature") may have been coded as 959.01 ("Head injury, unspecified"), which was added to ICD-9-CM in 1997. The CDC notes that this type of misclassification has been occurring in a substantial number of cases.¹² In Michigan, the number of hospitalizations coded with 854 dropped noticeably starting in 1998 (by nearly 50%).

TABLE 2
Number of Injury Hospitalizations By Body Region and Injury Type, Principal Diagnoses, Michigan Residents, 2002

Body Region	Fracture	Dislocation	Sprain/ Strain	Internal	Open Wound	Amputation	Blood Vessels	Contusion/ Superficial	Crush	Burn	Nerves	Unspecified	TOTAL
Brain - Type 1 TBI ¹	961			3,286							0		4,247
Brain - Type 2 TBI ²	199			778									977
Brain - Type 3 TBI ³	207												207
Other Head					126					14	6	564	710
Face	1,098	6	0		327					67			1,498
Eye					193			71		6	1		271
Neck	3		0		90				1	16	5		115
Head, Face, Neck Unspecified							52	198	0	131	1	26	408
Cervical Spinal Cord (SCI)	139			113									252
Thoracic/Dorsal SCI	88			16									104
Lumbar SCI	35			12									47
Sacrum Coccyx SCI	4			0									4
Spine & Back Unspecified SCI	0			16									16
Cervical Vertebral Column (VCI)	547	100	133										780
Thoracic/Dorsal VCI	631	1	13										645
Lumbar VCI	1,027	37	113										1,177
Sacrum Coccyx VCI	151	2	1										154
Spine & Back Unspecified VCI	14	0											14
Chest	1,181	6	8	1,366	62		36	242	0	83	0		2,984
Abdomen				1,560	146		19	111		49	3		1,888
Pelvis & Urogenital	1,801	13	64	129	67		5	13	4	10	0		2,106
Trunk	2				10			25	1	23	0	162	223
Back & Buttock			8		32			73	1	70			184
Shoulder & Upper Arm	2,141	95	972		63	2		28	2	42		6	3,351
Forearm & Elbow	1,523	19	5		173	15		18	4	86			1,843
Wrist, Hand & Fingers	339	20	4		427	160		19	27	149		7	1,152
Other & Unspecified Upper Extremity	0				8	0	88	21	0	43	96	3	259
Hip	9,482	84	79					218	0				9,863
Upper Leg & Thigh	2,009	0				4		70	5	58			2,146
Knee	473	134	212					59	2	5			885
Lower Leg & Ankle	5,966	19	104			7		76	6	114			6,292
Foot & Toes	757	17	2		130	37		15	19	111			1,088
Other & Unspecified Lower Extremity	4		229		416	3	64	52	0	59		63	890
Other/Multiple	2						5			9	19		35
Unspecified	1	1	34	2	1		2	44	0	8	11	25	129
System-wide & Late Effects													9,269
TOTAL	30,785	554	1,981	7,278	2,271	228	271	1,353	72	1,153	142	856	56,213

1. Type 1 Traumatic Brain Injury: recorded evidence of an intracranial injury or a moderate or a prolonged loss of consciousness (LOC), shaken baby syndrome or injuries to the optic nerve pathways.

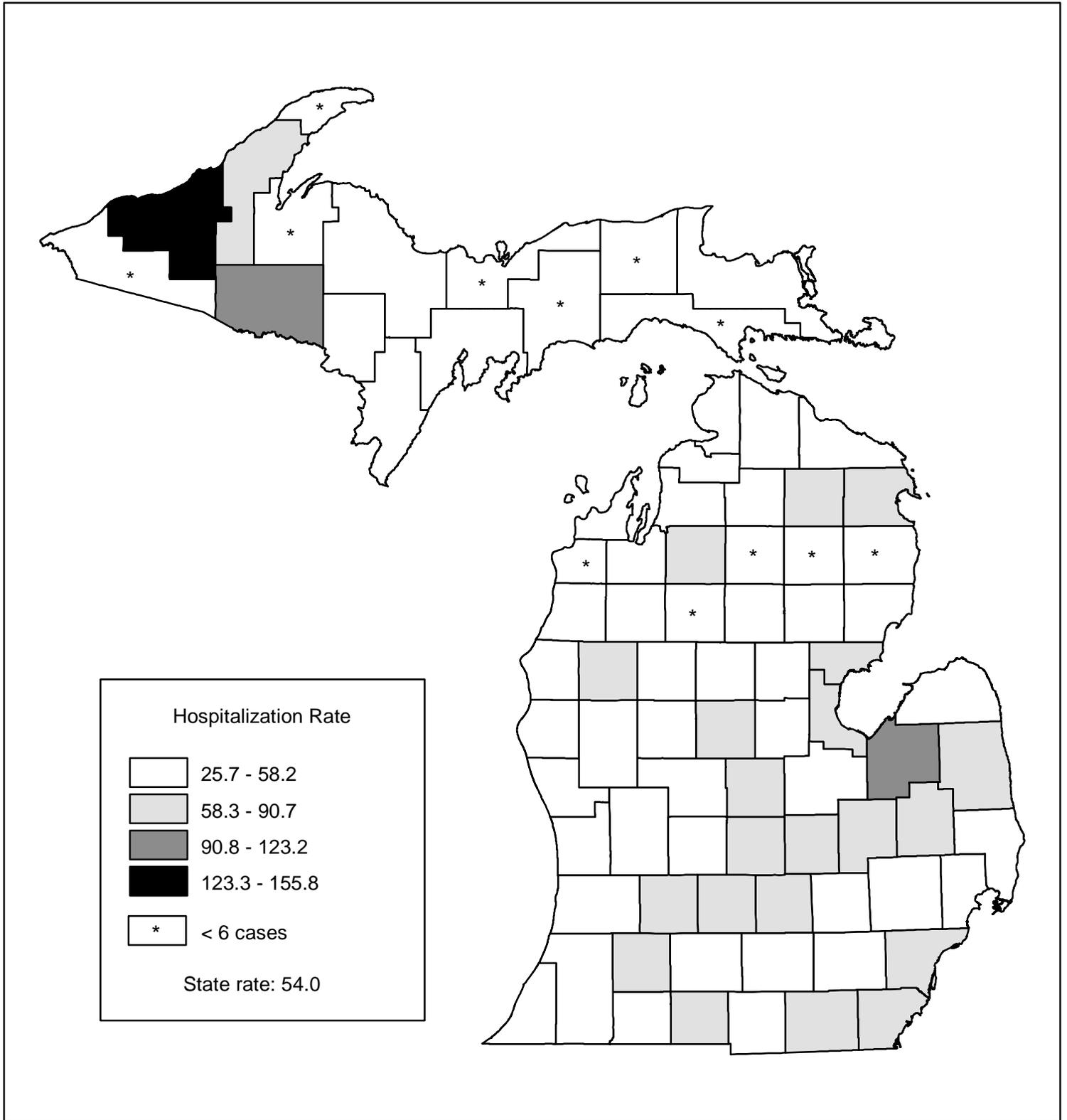
2. Type 2 Traumatic Brain Injury: injuries with no recorded evidence of intracranial injury, and LOC of less than one hour, or LOC of unknown duration, or unspecified LOC.

3. Type 3 Traumatic Brain Injury: Patients with no evidence of intracranial injury and no LOC.

See Table C-1 in Appendix C for ICD-9-CM codes defining cells in this matrix.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

FIGURE 3
Hospitalization Rates for Traumatic Brain Injuries
By County of Residence, Michigan, 2002

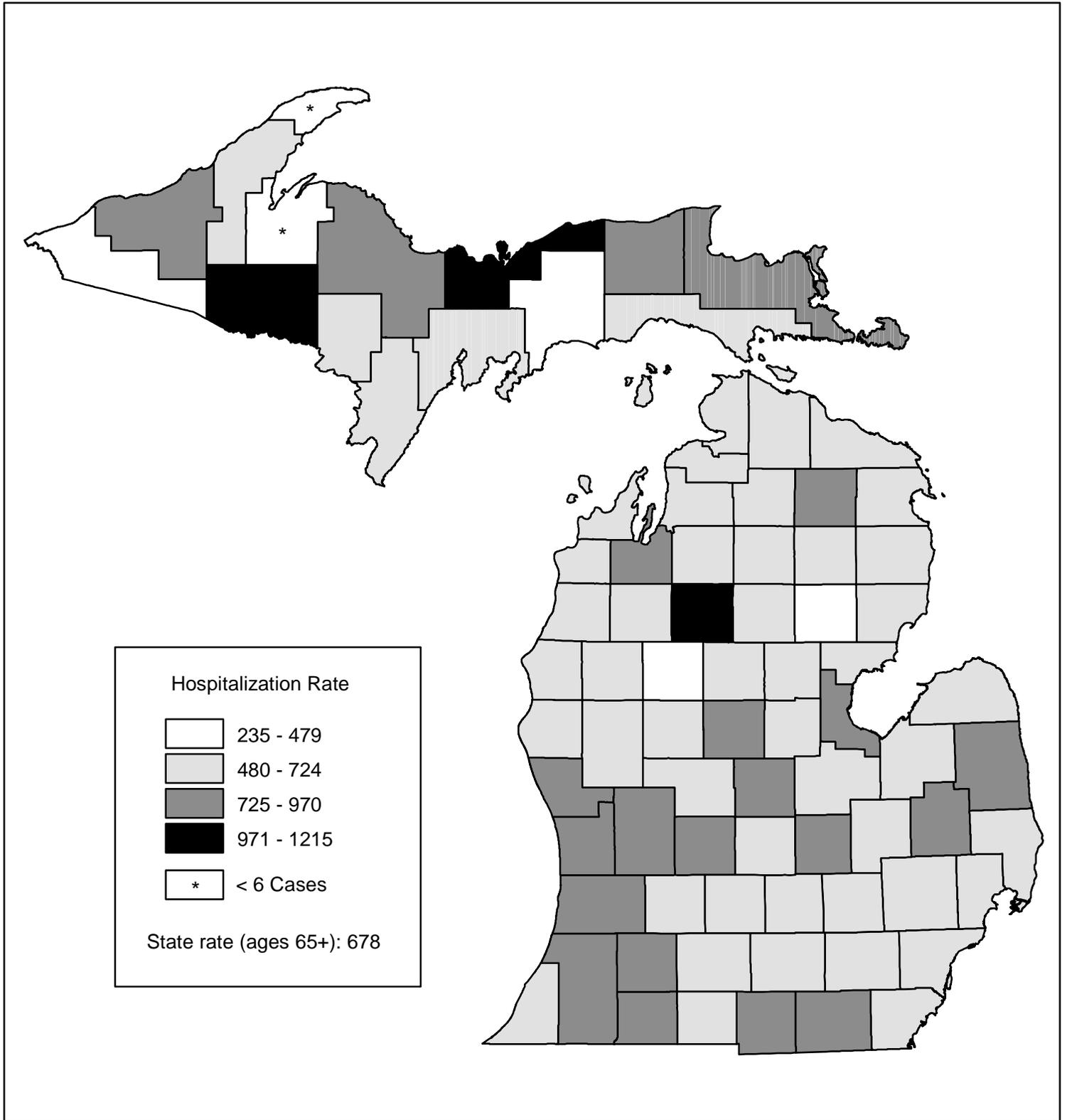


Hospitalization rates are the number of hospital discharges per 100,000 population.

Traumatic brain injuries are discharges with a principal diagnosis code in the following range per ICD-9-CM: 800, 801, 803, 804, 850-854, 950.1-950.3, 995.55.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 4
Hospitalization Rates for Hip Fractures, Ages 65 and Older
By County of Residence, Michigan, 2002



Hospitalization rates are the number of hospital discharges per 100,000 population.
 Hip fractures are discharges with a principal diagnosis in the following range per ICD-9-CM: 820.0 - 820.9.
 Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

Causes of Injury

An E-code indicating the external cause of injury was provided for 48,344 of the 56,213 Michigan resident hospital discharges in 2002. This 86.0% E-coding rate indicates that the rate continues to improve in Michigan (e.g., it was 83.5% and 85.0% in 1999 and 2001, respectively). The Michigan Department of Community Health has maintained that the statewide E-coding rate be at least 90% before in-depth analyses of injury causes are performed. MDCH is concerned about using incomplete data because cases that are coded may not be representative of all injury cases. Note that medical epidemiologists at the Centers for Disease Control and Prevention who were involved in developing national recommendations for injury surveillance using hospital discharge data¹¹ consider a 90% E-coding rate very high and strongly encourage examining those data.¹⁹

Figure 5 illustrates the variability of E-coding rates by county of residence. Rates ranged from 39% to 99%. Thirty counties and the City of Detroit had an E-coding rate of at least 90% (these are illustrated in black in Figure 5). Compared to 2001, this is an increase of seven counties with at least this level of E-coding. No geographic pattern is clearly apparent in Figure 5 – counties with low rates were distributed across the state as were counties with high rates with one exception: the west central counties of the Lower Peninsula (from Mason south to Allegan east to mid-state) had no high E-coding counties.

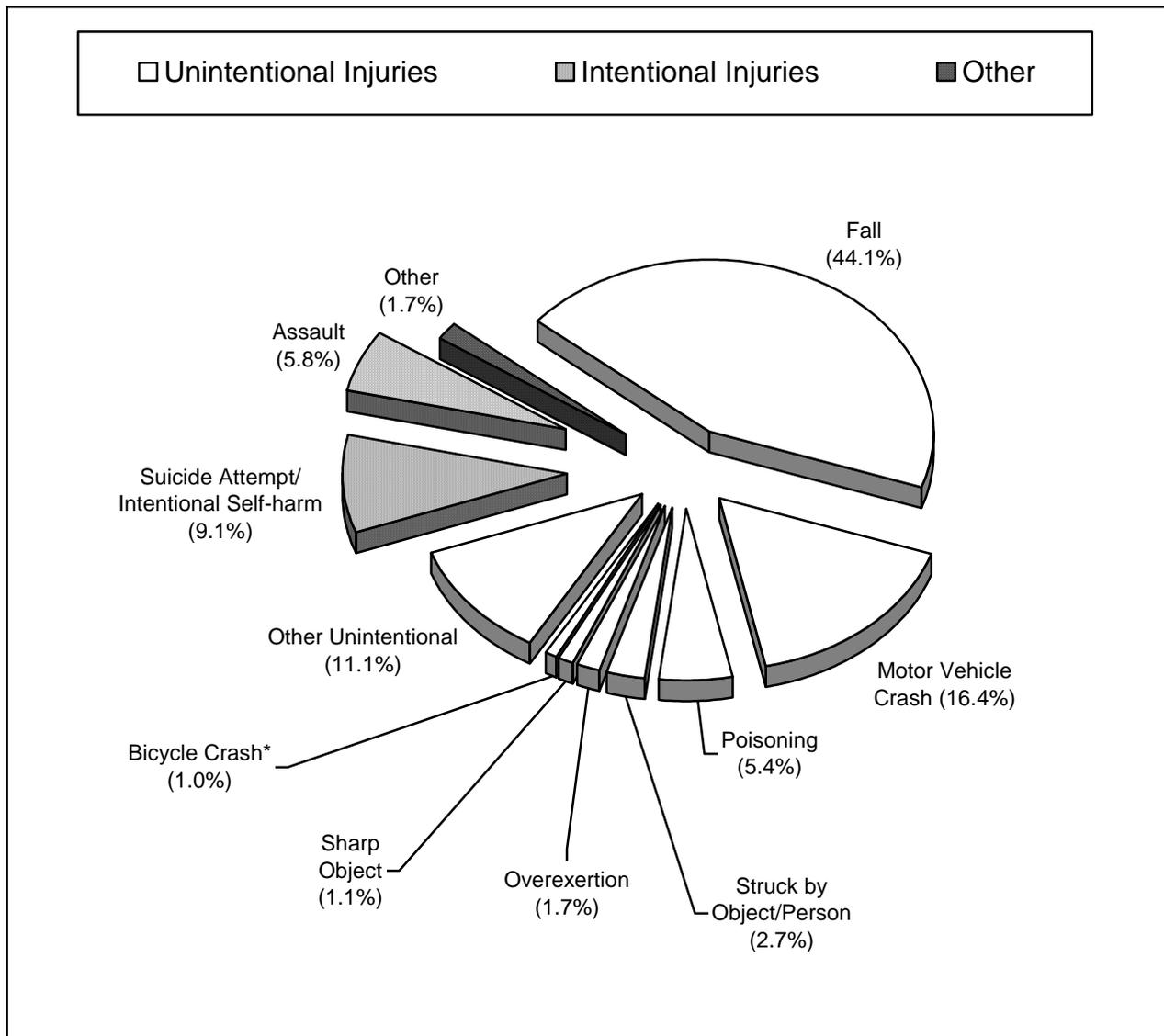
Michigan

An overall cause of injury profile for the state was developed (Figure 6) because no E-coding pattern was apparent that would clearly distort the overall profile. As noted previously, the west central Lower Peninsula had a lower E-coding rate relative to other regions. If certain causes of injury were more or less likely in this region than elsewhere in the state, the cause of injury profile for the state would be biased. Because MDCH requires 90% E-coding for in-depth analyses to be performed, the cause of injury profile represents the extent of the statewide analysis.

The following should be noted about Figure 6:

- Unintentional injuries comprised 83% of all E-coded injury hospitalizations.
- Unintentional falls were by far the leading cause of injury.
- There were more hospitalizations for suicide attempts/intentional self-harm injuries than for assaults.
- Among motor vehicle crashes, three quarters of those injured were vehicle occupants. Pedestrians and motorcyclists each comprised nearly 10%.
- Seventy percent (70%) of bicycling-related injuries did not involve a collision with a motor vehicle (bicyclists injured in motor vehicle crashes are included among the Motor Vehicle Crash category in Figure 6).

FIGURE 6
 Causes of Injury Hospitalization
 Michigan Residents, 2002
 (N = 48,344 E-coded cases)



* Excludes bicycle-motor vehicle crashes.

E-coding rate for Michigan: 86%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

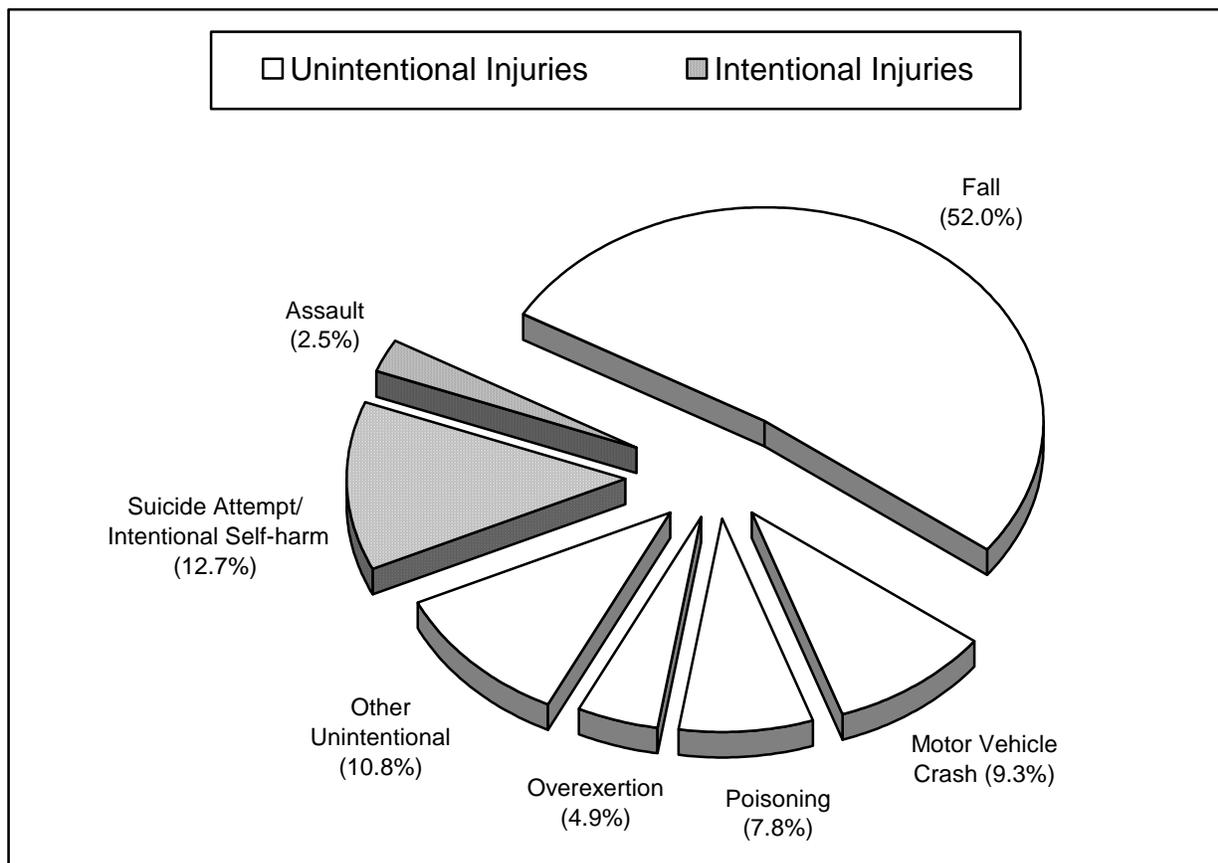
Counties With At Least 90% Cause of Injury Coding

Brief cause of injury analyses were performed for those counties that had E-coding rates of 90% or higher (29 counties, Wayne out-county, and the City of Detroit). These analyses consisted of an overall profile of all injury causes and a list of the leading causes of injury for the major age groups.

Salient findings of these 31 area-specific analyses:

- Unintentional falls were the leading cause of injury for each area. The proportion of all injuries caused by falls varied substantially by area (25.5% to 61.8%).
- The group most affected by falls were those aged 65 and older. Fall injury rates among this age group were at least 1,000 per 100,000 for most counties. These rates were several times greater than rates for any other cause in the other age groups.
- Assaults caused nearly one-quarter (22.7%) of the injury hospitalizations among Detroit residents. Assaults caused 10% or less of the cases in each of the other areas examined.
- Poisoning was by far the leading mechanism for suicide attempts/intentional self-harm.
- The cause of injury profile was often distinct between counties. This provides support for continuing to perform area-specific analyses.

FIGURE 7
Causes of Injury Hospitalization
Alpena County Residents, 2002
 (N = 204 E-coded cases)



E-coding rate for Alpena County: 94%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 3
Specific Causes of Injury Hospitalization
Alpena County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	106	Struck by Person/Object	4	Poisoning	26
Poisoning	16	Other	1		
MVC – Occupant	15				
Overexertion	10				
Sharp Object	3				
Struck by Object/Person	3				
Other	20				
Total	173	Total	5	Total	26

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 4
 Leading Causes of Injury Hospitalization, by Age Group
 Alpena County Residents, 2002
 Cause of Injury Coding Rate: 94% (204 of 218 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	2	100.0	*
5 – 14	1. Suicide Attempt/Intentional Self-harm	2	40.0	*
	All Causes	5	100.0	*
15 – 24	1. Suicide Attempt/Intentional Self-harm	10	33.3	239.2
	2. Unintentional Motor Vehicle Crash	6	20.0	143.5
	3. Unintentional Fall	3	10.0	*
	3. Unintentional Overexertion	3	10.0	*
	All Causes	30	100.0	717.7
25 – 44	1. Suicide Attempt/Intentional Self-harm	12	28.6	155.4
	2. Unintentional Fall	9	21.4	116.6
	3. Unintentional Poisoning	8	19.1	103.6
	4. Assault	3	7.1	*
	All Causes	42	100.0	544.0
45 – 64	1. Unintentional Fall	18	48.7	222.6
	2. Unintentional Poisoning	4	10.8	*
	3. Unintentional Overexertion	3	8.1	*
	3. Unintentional Motor Vehicle Crash	3	8.1	*
	All Causes	37	100.0	457.5
65+	1. Unintentional Fall	76	86.4	1,385.3
	2. Unintentional Motor Vehicle Crash	7	8.0	127.6
	3. Unintentional Overexertion	2	2.3	*
	All Causes	88	100.0	1,604.1

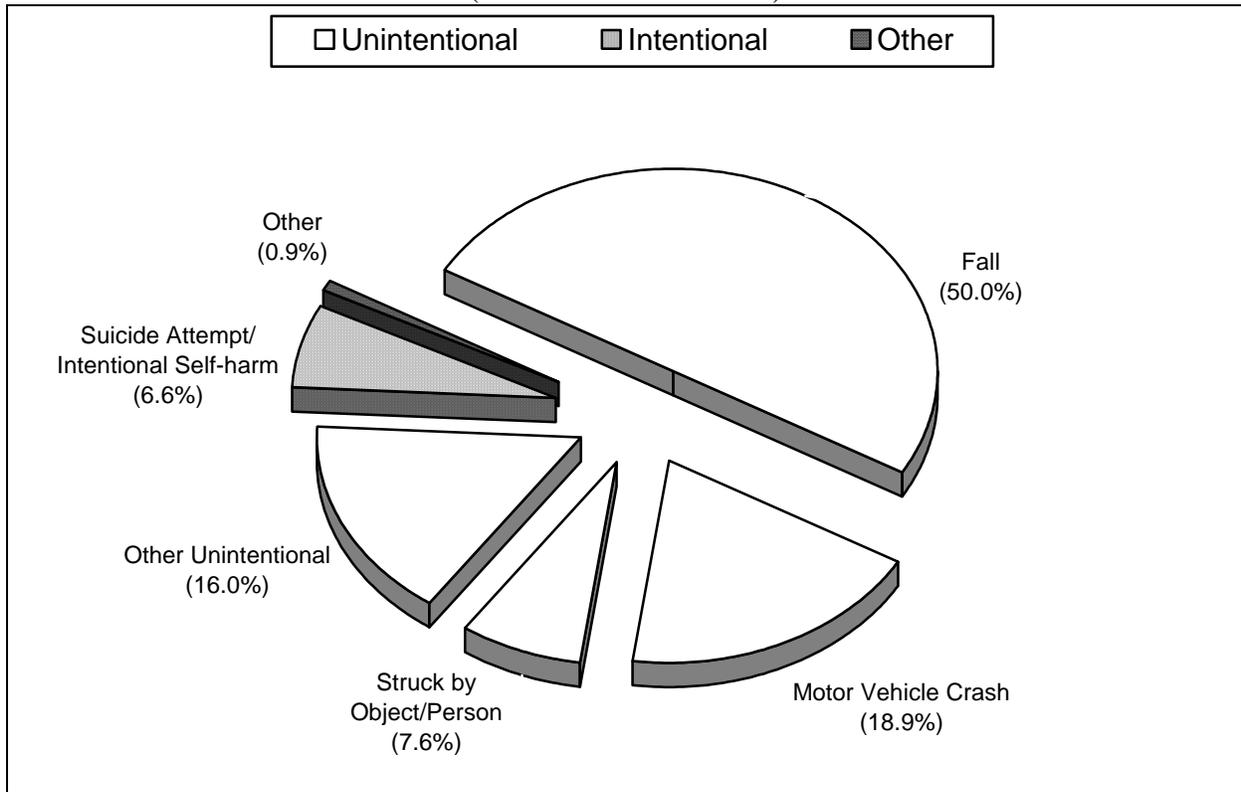
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 8
Causes of Injury Hospitalization
Antrim County Residents, 2002
(N = 106 E-coded cases)



E-coding rate for Antrim County: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 5
Specific Causes of Injury Hospitalization
Antrim County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	53			Poisoning	7
MVC – Occupant	13				
Struck by Object/Person	8				
MVC – Motorcyclist	4				
MVC – Pedestrian	3				
Other	17				
Total	98	Total	0	Total	7

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 6
 Leading Causes of Injury Hospitalization, by Age Group
 Antrim County Residents, 2002
 Cause of Injury Coding Rate: 91% (106 of 117 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	3	100.0	*
5 – 14	1. Unintentional Fall	2	40.0	*
	All Causes	5	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	6	37.5	199.4
	2. Suicide Attempt/Intentional Self-harm	4	25.0	*
	3. Struck by Object/Person	2	12.5	*
	All Causes	16	100.0	531.7
25 – 44	1. Unintentional Motor Vehicle Crash	6	40.0	100.2
	2. Unintentional Fall	3	20.0	*
	3. Suicide Attempt/Intentional Self-harm	2	13.3	*
	All Causes	15	100.0	250.4
45 – 64	1. Unintentional Fall	11	47.8	176.5
	2. Unintentional Motor Vehicle Crash	3	13.0	*
	2. Unintentional Struck by Object/Person	3	13.0	*
	All Causes	23	100.0	368.9
65+	1. Unintentional Fall	36	81.8	875.7
	2. Unintentional Motor Vehicle Crash	4	9.1	*
	All Causes	44	100.0	1,070.3

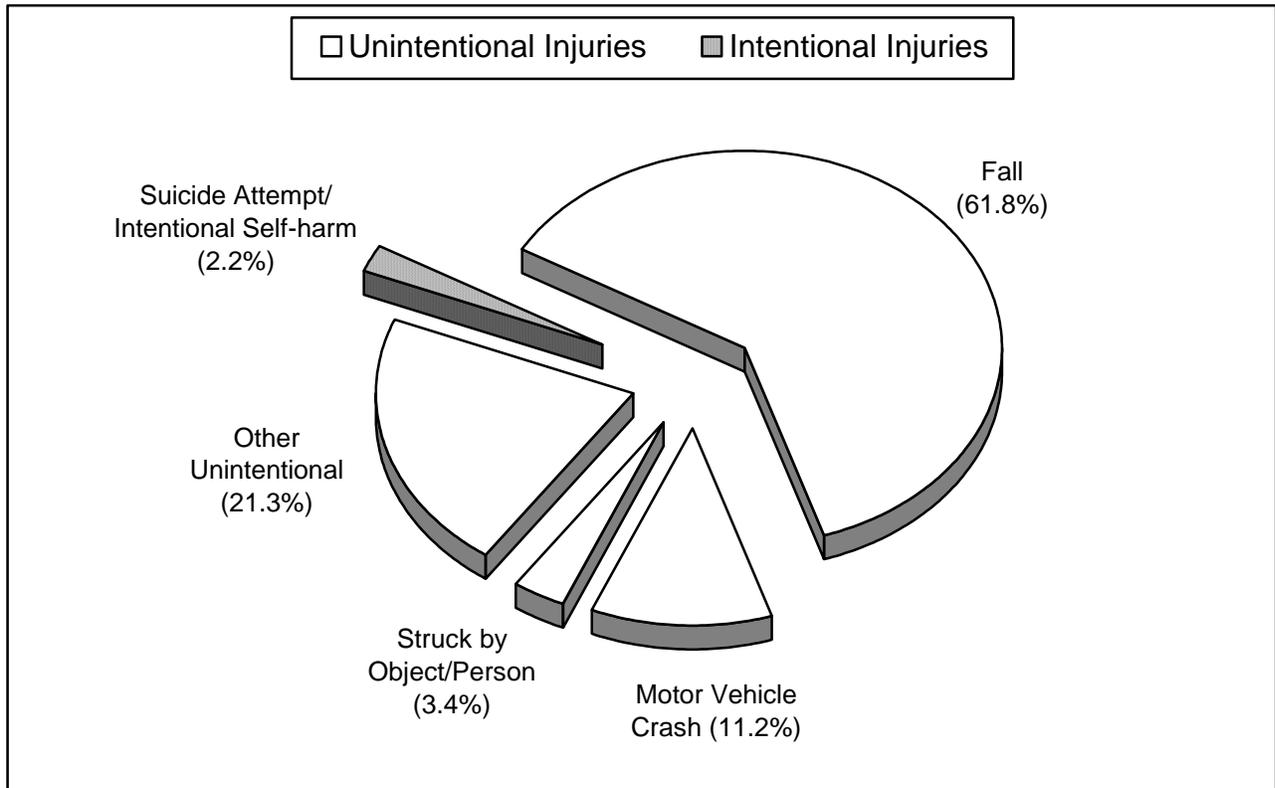
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 9
Causes of Injury Hospitalization
Benzie County Residents, 2002
(N = 89 E-coded cases)



E-coding rate for Benzie County: 97%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 7
Specific Causes of Injury Hospitalization
Benzie County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	55			Poisoning	2
MVC – Occupant	8				
Struck by Object/Person	3				
Overexertion	2				
Poisoning	2				
Snowmobile Crash	2				
Total	87	Total	0	Total	2

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 8
 Leading Causes of Injury Hospitalization, by Age Group
 Benzie County Residents, 2002
 Cause of Injury Coding Rate: 97% (89 of 92 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	3	100.0	*
5 – 14	All Causes	5	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	3	23.1	*
	2. Unintentional Struck by Object/Person	2	15.4	*
	All Causes	13	100.0	640.7
25 – 44	1. Unintentional Fall	11	57.9	247.7
	2. Unintentional Motor Vehicle Crash	3	15.8	*
	All Causes	19	100.0	427.8
45 – 64	1. Unintentional Fall	8	66.7	185.1
	2. Unintentional Motor Vehicle Crash	3	25.0	*
	All Causes	12	100.0	277.7
65+	1. Unintentional Fall	33	89.2	1,130.1
	All Causes	37	100.0	1,267.1

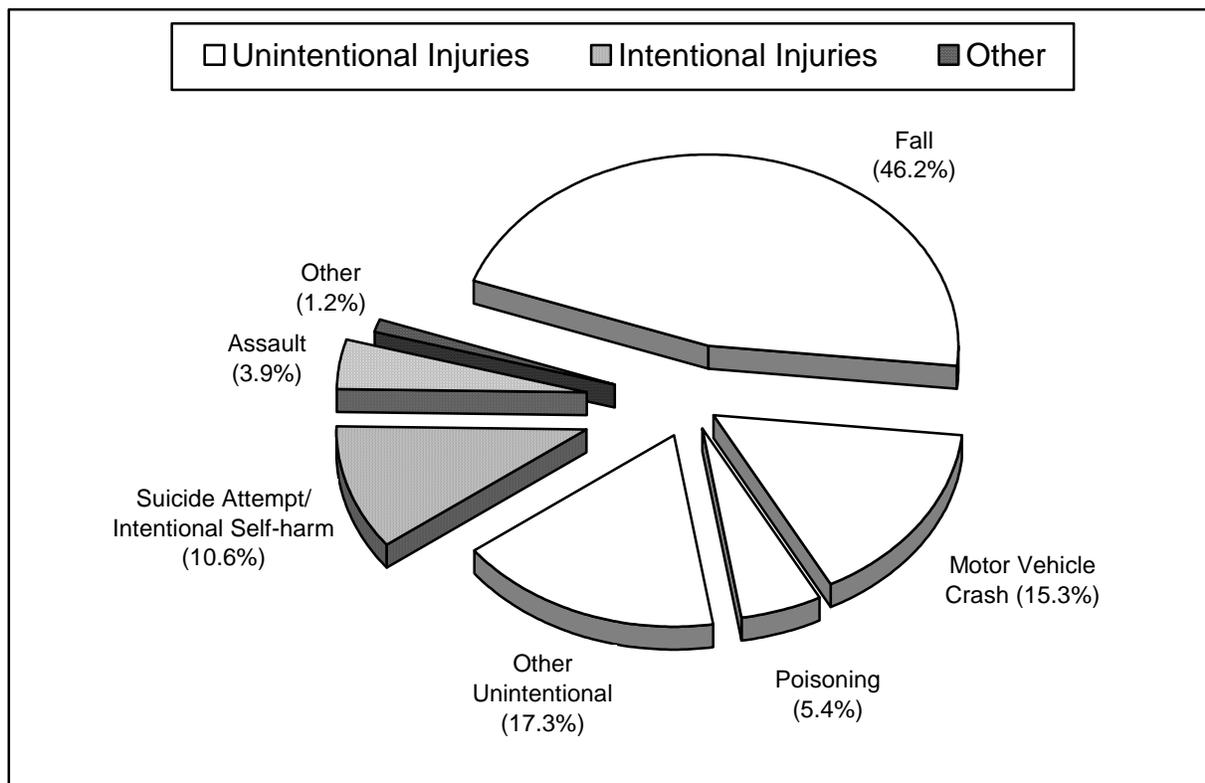
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 10
Causes of Injury Hospitalization
Berrien County Residents, 2002
(N = 889 E-coded cases)



E-coding rate for Berrien County: 92%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 9
Specific Causes of Injury Hospitalization
Berrien County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	411	Struck by Object/Person	14	Poisoning	85
MVC – Occupant	113	Firearm	11	Sharp Object	3
Poisoning	48	Sharp Object	8	Jump	2
Struck by Object/Person	18	Other	2	Other	4
Overexertion	16				
Machinery	12				
MVC – Motorcyclist	10				
Fire/Flames	9				
Hot Object	9				
MVC – Pedestrian	8				
Sharp Object	8				
Other	87				
Total	749	Total	35	Total	94

Causes not classifiable above comprised eleven cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 10
 Leading Causes of Injury Hospitalization, by Age Group
 Berrien County Residents, 2002
 Cause of Injury Coding Rate: 92% (889 of 963 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Poisoning	6	24.0	57.8
	2. Unintentional Hot Object	5	20.0	*
	3. Unintentional Fall	4	16.0	*
	All Causes ¹	25	100.0	240.8
5 – 14	1. Unintentional Fall	10	25.6	42.6
	2. Unintentional Motor Vehicle Crash	8	20.5	34.1
	3. Bicycle Crash – non MVC	4	10.3	*
	3. Suicide Attempt/Intentional Self-harm	4	10.3	*
	All Causes	39	100.0	166.1
15 – 24	1. Unintentional Motor Vehicle Crash	30	31.6	137.1
	2. Suicide Attempt/Intentional Self-harm	25	26.3	114.3
	3. Unintentional Poisoning	10	10.5	45.7
	4. Unintentional Fall	8	8.4	36.6
	5. Assault	6	6.3	27.4
	All Causes	95	100.0	434.2
25 – 44	1. Unintentional Motor Vehicle Crash	50	23.4	116.8
	2. Suicide Attempt/Intentional Self-harm	43	20.1	100.4
	3. Unintentional Fall	30	14.0	70.1
	4. Assault	23	10.8	53.7
	5. Unintentional Poisoning	10	4.7	23.4
	All Causes	214	100.0	499.8
45 – 64	1. Unintentional Fall	57	35.9	141.2
	2. Unintentional Motor Vehicle Crash	34	21.4	84.2
	3. Suicide Attempt/Intentional Self-harm	21	13.2	52.0
	4. Unintentional Poisoning	7	4.4	17.3
	All Causes	159	100.0	393.7
65+	1. Unintentional Fall	302	84.6	1,293.6
	2. Unintentional Poisoning	14	3.9	60.0
	2. Unintentional Motor Vehicle Crash	14	3.9	60.0
	All Causes	357	100.0	1,529.2

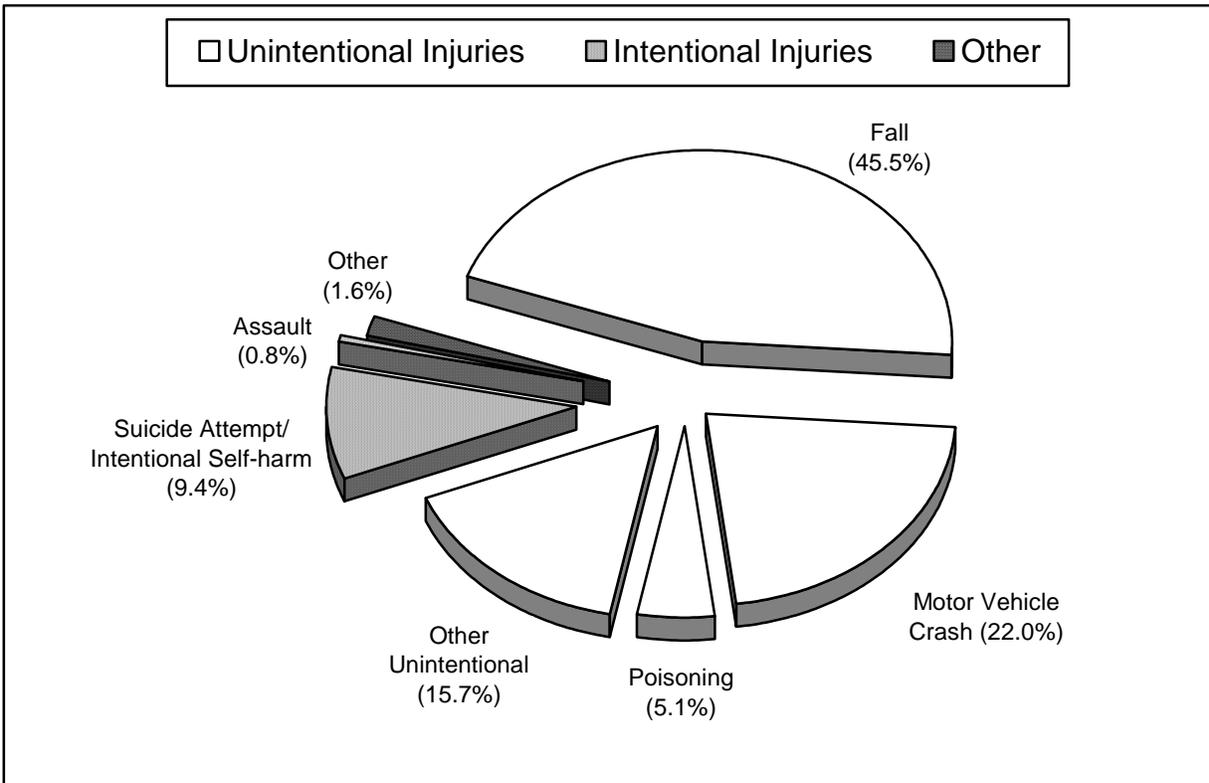
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 11
Causes of Injury Hospitalization
Cass County Residents, 2002
(N = 255 E-coded cases)



E-coding rate for Cass County: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 11
Specific Causes of Injury Hospitalization
Cass County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	116	Sharp Object	1	Poisoning	24
MVC – Occupant	47	Struck by Object/Person	1		
Poisoning	13				
Struck by Object/Person	9				
MVC – Motorcyclist	6				
Sharp Object	4				
Bicyclist – non MVC	3				
Other	27				
Total	225	Total	2	Total	24

Causes not classifiable above comprised four cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 12
 Leading Causes of Injury Hospitalization, by Age Group
 Cass County Residents, 2002
 Cause of Injury Coding Rate: 91% (255 of 280 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	3	100.0	*
5 – 14	1. Unintentional Fall	4	33.3	*
	2. Unintentional Motor Vehicle Crash	3	25.0	*
	3. Unintentional Bicycle Crash – non-MVC	2	16.7	*
	All Causes	12	100.0	166.8
15 – 24	1. Unintentional Motor Vehicle Crash	14	43.8	202.5
	2. Suicide Attempt/Intentional Self-harm	8	25.0	115.7
	3. Unintentional Poisoning	3	9.4	*
	3. Unintentional Struck by Object/Person	3	9.4	*
	All Causes	32	100.0	462.8
25 – 44	1. Unintentional Motor Vehicle Crash	17	30.4	126.1
	2. Unintentional Fall	11	19.6	81.6
	3. Suicide Attempt/Intentional Self-harm	10	17.9	74.2
	4. Unintentional Sharp Object	4	7.1	*
	5. Unintentional Poisoning	3	5.4	*
	All Causes	56	100.0	415.5
45 – 64	1. Unintentional Fall	14	32.6	100.9
	2. Unintentional Motor Vehicle Crash	10	23.3	72.1
	3. Unintentional Poisoning	4	9.3	*
	3. Suicide Attempt/Intentional Self-harm	4	9.3	*
	All Causes	43	100.0	310.0
65+	1. Unintentional Fall	84	77.1	1,204.8
	2. Unintentional Motor Vehicle Crash	12	11.0	172.1
	All Causes	109	100.0	1,563.4

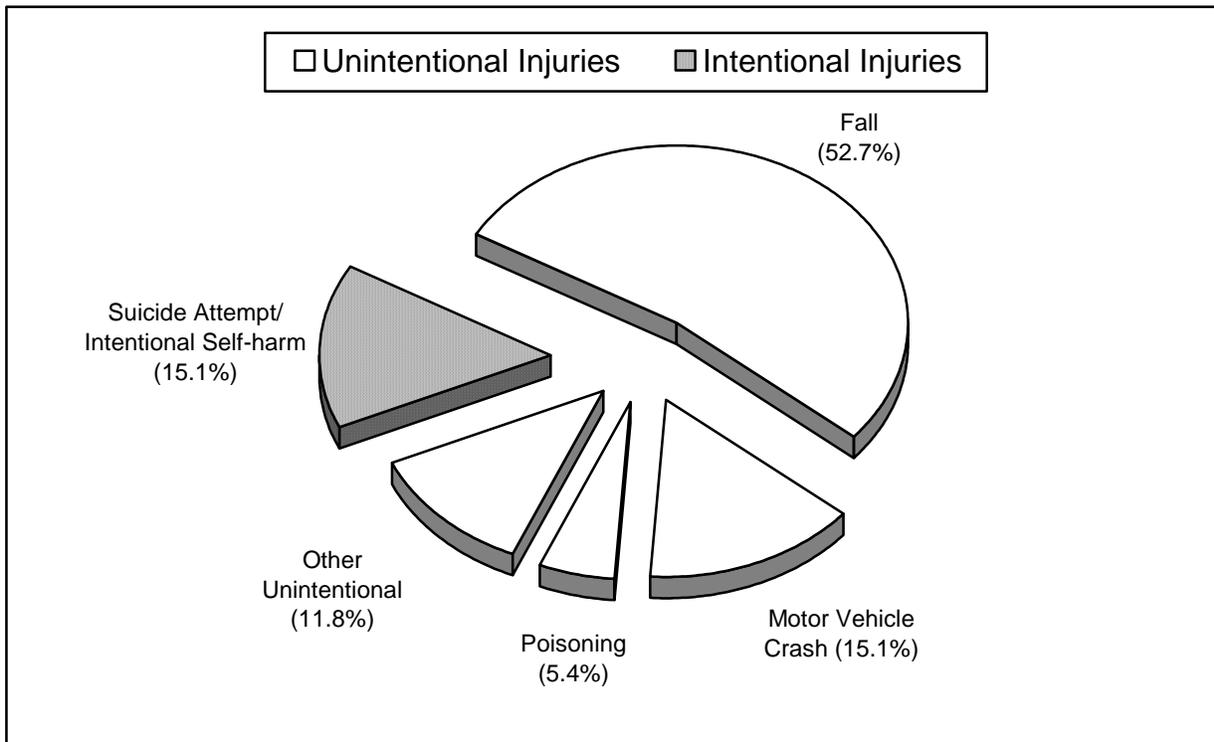
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 12
 Causes of Injury Hospitalization
 Crawford County Residents, 2002
 (N = 93 E-coded cases)



E-coding rate for Crawford County: 95%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 13
 Specific Causes of Injury Hospitalization
 Crawford County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	49			Poisoning	12
MVC – Occupant	13			Other	2
Poisoning	5				
Struck by Object/Person	2				
Other	10				
Total	79	Total	0	Total	14

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 14
 Leading Causes of Injury Hospitalization, by Age Group
 Crawford County Residents, 2002
 Cause of Injury Coding Rate: 95% (93 of 98 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5		0	0.0	-
5 – 14	1. Unintentional Fall	3	60.0	*
	All Causes ¹	5	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	4	44.4	*
	2. Suicide Attempt/Intentional Self-harm	3	33.3	*
	All Causes	9	100.0	467.0
25 – 44	1. Suicide Attempt/Intentional Self-harm	7	35.0	183.2
	2. Unintentional Fall	5	25.0	*
	3. Unintentional Motor Vehicle Crash	4	20.0	*
	All Causes	20	100.0	523.6
45 – 64	1. Unintentional Fall	11	47.8	290.8
	2. Unintentional Motor Vehicle Crash	4	17.4	*
	All Causes	23	100.0	608.0
65+	1. Unintentional Fall	29	80.6	1,152.6
	2. Suicide Attempt/Intentional Self-harm	2	5.6	*
	All Causes	36	100.0	1,430.8

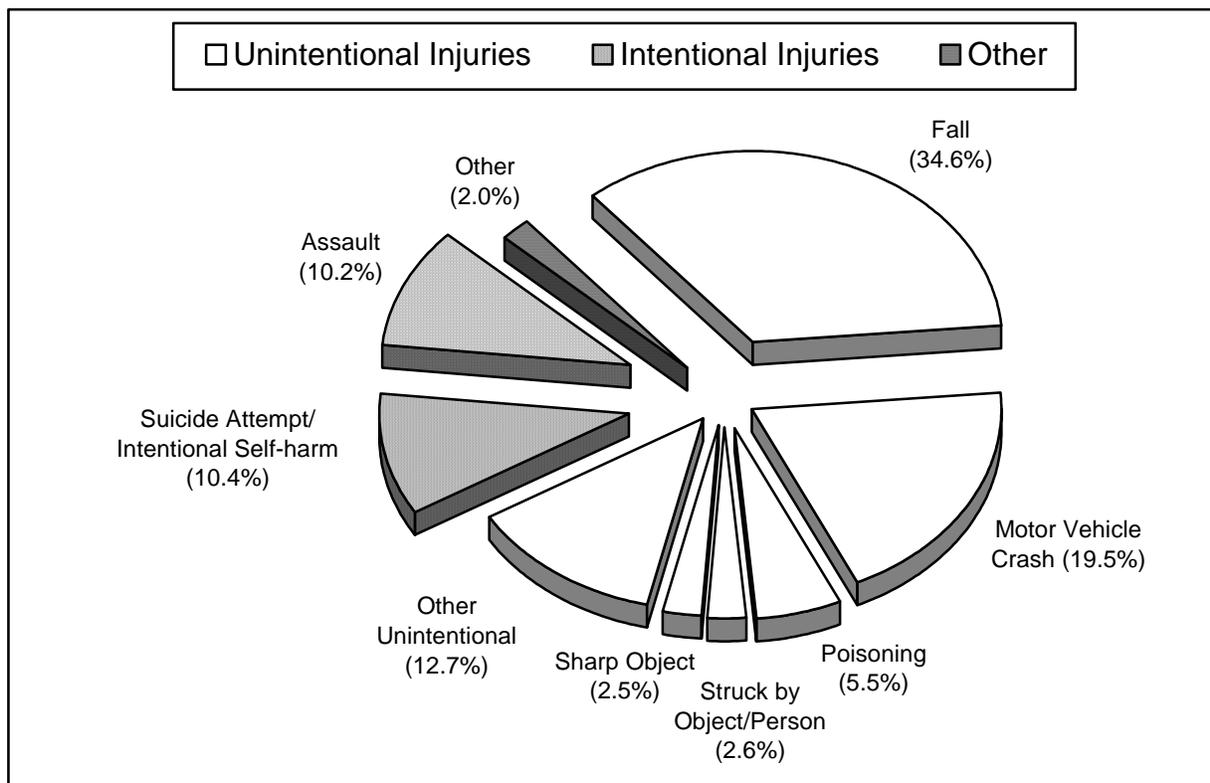
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 13
Causes of Injury Hospitalization
Genesee County Residents, 2002
(N = 2,993 E-coded cases)



E-coding rate for Genesee County: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 15
Specific Causes of Injury Hospitalization
Genesee County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	1,037	Struck by Object/Person	102	Poisoning	281
MVC – Occupant	451	Sharp Object	73	Sharp Object	15
Poisoning	165	Firearm	68	Firearm	6
Struck by Object/Person	79	Motor Vehicle	6	Hanging	4
Sharp Object	75	Fire/Flames	4	Other	5
MVC – Pedestrian	58	Other	51		
MVC – Motorcyclist	49				
Overexertion	38				
Fire/Flames	34				
Hot Object	33				
Bite/Sting	30				
Machinery	22				
Bicyclist, non-MVC	16				
Other	231				
Total	2,318	Total	304	Total	311

Causes not classifiable above comprised 60 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 16
 Leading Causes of Injury Hospitalization, by Age Group
 Genesee County Residents, 2002
 Cause of Injury Coding Rate: 91% (2,993 of 3,288 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Poisoning	34	26.2	107.8
	2. Unintentional Fall	22	16.9	69.8
	3. Unintentional Hot Object	14	10.8	44.4
	4. Unintentional Motor Vehicle Crash	13	10.0	41.2
	5. Unintentional Fire/Flames	8	6.2	25.4
	All Causes ¹	130	100.0	412.3
5 – 14	1. Unintentional Motor Vehicle Crash	49	27.7	71.7
	2. Unintentional Fall	42	23.7	61.5
	3. Suicide Attempt/Intentional Self-harm	14	7.9	20.5
	4. Unintentional Struck by Object/Person	13	7.3	19.0
	5. Bicycle Crash – Non-MVC	9	5.1	13.2
	All Causes	177	100.0	259.0
15 – 24	1. Unintentional Motor Vehicle Crash	136	30.2	227.4
	2. Assault	90	20.0	150.5
	3. Suicide Attempt/Intentional Self-harm	77	17.1	128.7
	4. Unintentional Fall	40	8.9	66.9
	5. Unintentional Sharp Object	20	4.4	33.4
	All Causes	451	100.0	754.0
25 – 44	1. Unintentional Motor Vehicle Crash	201	22.8	160.5
	2. Suicide Attempt/Intentional Self-harm	156	17.7	124.6
	3. Assault	150	17.0	119.8
	4. Unintentional Fall	132	15.0	105.4
	5. Unintentional Poisoning	41	4.6	32.7
	All Causes	883	100.0	705.1
45 – 64	1. Unintentional Fall	192	33.3	184.3
	2. Unintentional Motor Vehicle Crash	130	22.5	124.8
	3. Suicide Attempt/Intentional Self-harm	58	10.1	55.7
	4. Assault	49	8.5	47.0
	5. Unintentional Poisoning	40	6.9	38.4
	All Causes	577	100.0	553.7
65+	1. Unintentional Fall	609	78.6	1,164.3
	2. Unintentional Motor Vehicle Crash	54	7.0	103.2
	3. Unintentional Poisoning	26	3.4	49.7
	4. Unintentional Overexertion	12	1.6	22.9
	5. Unintentional Struck by Object/Person	11	1.4	21.0
	All Causes	775	100.0	1,481.7

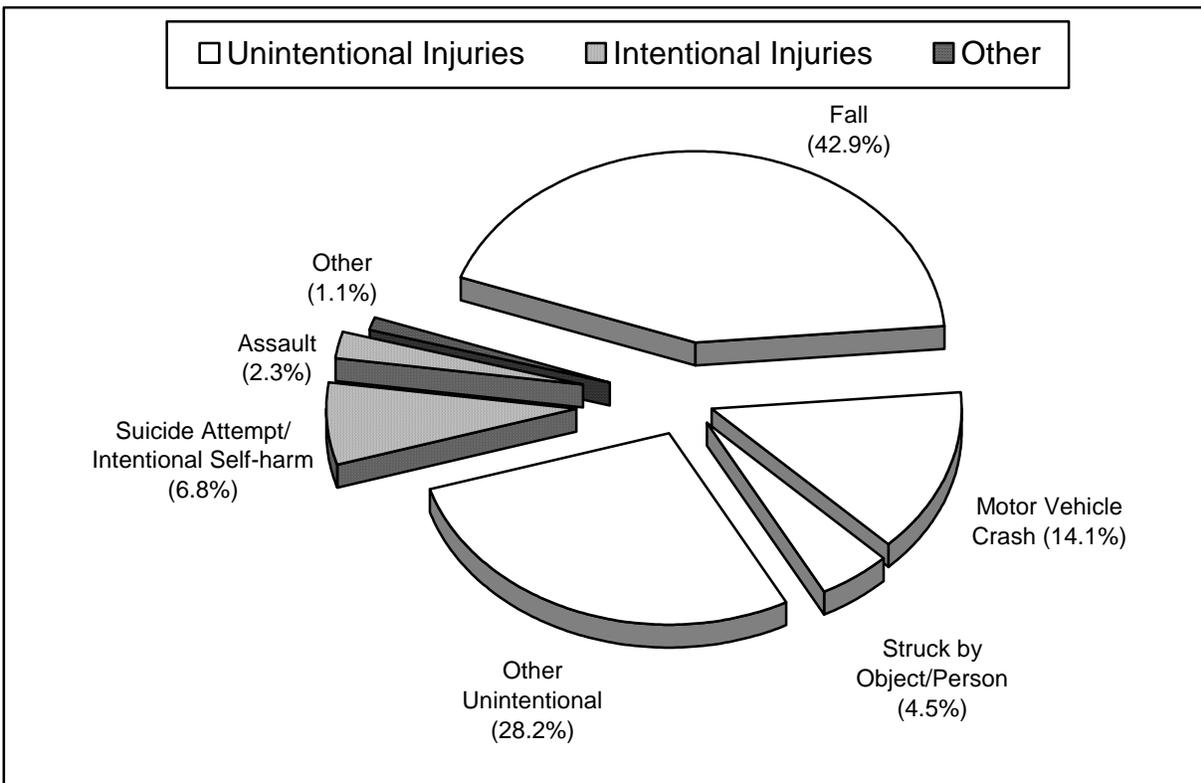
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 14
Causes of Injury Hospitalization
Gladwin County Residents, 2002
(N = 177 E-coded cases)



E-coding rate for Gladwin County: 93%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 17
Specific Causes of Injury Hospitalization
Gladwin County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	76	Other & Unspecified	4	Poisoning	11
MVC – Occupant	20			Other	1
Struck by Object/Person	8				
Overexertion	5				
Poisoning	5				
Sharp Object	4				
MVC – Motorcyclist	4				
Pedestrian, non-MVC	3				
Snowmobile	3				
Hot Object	2				
Machinery	2				
Other	27				
Total	159	Total	4	Total	12

Causes not classifiable above comprised two cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 18
 Leading Causes of Injury Hospitalization, by Age Group
 Gladwin County Residents, 2002
 Cause of Injury Coding Rate: 93% (177 of 191 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	2	50.0	*
	All Causes ¹	4	100.0	*
5 – 14	1. Unintentional Fall	2	22.2	*
	All Causes	9	100.0	263.6
15 – 24	1. Unintentional Motor Vehicle Crash	4	19.0	*
	2. Suicide Attempt/Intentional Self-harm	3	14.3	*
	3. Unintentional Fall	2	9.5	*
	3. Unintentional Struck by Object/Person	2	9.5	*
	3. Unintentional Snowmobile Crash	2	9.5	*
	All Causes	21	100.0	644.2
25 – 44	1. Unintentional Motor Vehicle Crash	6	26.1	94.5
	2. Suicide Attempt/Intentional Self-harm	3	13.0	*
	3. Unintentional Fall	2	8.7	*
	3. Unintentional Hot Object	2	8.7	*
	All Causes	23	100.0	362.1
45 – 64	1. Unintentional Motor Vehicle Crash	9	26.5	124.4
	2. Suicide Attempt/Intentional Self-harm	5	14.7	*
	3. Unintentional Fall	4	11.8	*
	4. Unintentional Sharp Object	2	5.9	*
	All Causes	34	100.0	469.9
65+	1. Unintentional Fall	64	74.4	1,279.7
	2. Unintentional Motor Vehicle Crash	5	5.8	*
	3. Unintentional Overexertion	3	3.5	*
	3. Unintentional Poisoning	3	3.5	*
	3. Unintentional Struck by Object/Person	3	3.5	*
	All Causes	86	100.0	1,719.7

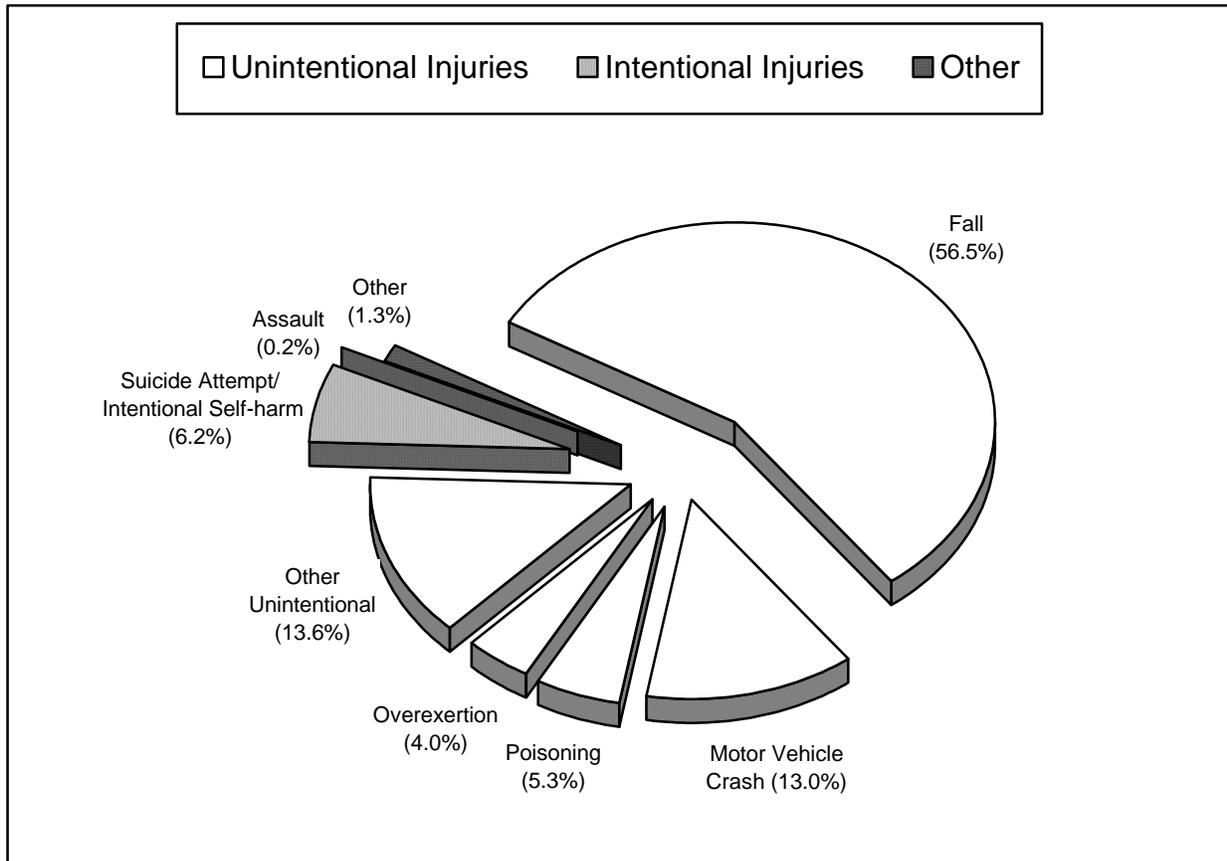
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 15
Causes of Injury Hospitalization
Grand Traverse County Residents, 2002
(N = 471 E-coded cases)



E-coding rate for Grand Traverse County: 98%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 19
Specific Causes of Injury Hospitalization
Grand Traverse County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	266	Struck by Object/Person	1	Poisoning	28
MVC – Occupant	46			Other	1
Poisoning	25				
Overexertion	19				
Struck by Object/Person	16				
MVC – Motorcyclist	6				
Bicycle, non-MVC	6				
MVC – Bicyclist	4				
Bite/Sting	3				
Sharp Object	3				
Other	41				
Total	435	Total	1	Total	29

Causes not classifiable above comprised six cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 20
 Leading Causes of Injury Hospitalization, by Age Group
 Grand Traverse County Residents, 2002
 Cause of Injury Coding Rate: 98% (471 of 479 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	4	33.3	*
	2. Unintentional Bite/Sting	2	16.7	*
	2. Unintentional Hot Object	2	16.7	*
	All Causes ¹	12	100.0	248.3
5 – 14	1. Unintentional Fall	11	61.1	100.3
	2. Unintentional Motor Vehicle Crash	4	22.2	*
	3. Unintentional Struck by Object/Person	2	11.1	*
	All Causes	18	100.0	164.1
15 – 24	1. Unintentional Motor Vehicle Crash	17	34.0	151.8
	2. Suicide Attempt/Intentional Self-harm	7	14.0	62.5
	3. Unintentional Fall	6	12.0	53.6
	4. Unintentional Overexertion	4	8.0	*
	4. Unintentional Struck by Object/Person	4	8.0	*
	All Causes	50	100.0	446.4
25 – 44	1. Unintentional Fall	26	27.7	112.4
	2. Unintentional Motor Vehicle Crash	18	19.1	77.8
	3. Suicide Attempt/Intentional Self-harm	12	12.8	51.9
	4. Unintentional Poisoning	9	9.6	38.9
	5. Unintentional Overexertion	6	6.4	25.9
	All Causes	94	100.0	406.5
45 – 64	1. Unintentional Fall	49	51.6	240.1
	2. Unintentional Motor Vehicle Crash	12	12.6	58.8
	3. Suicide Attempt/Intentional Self-harm	9	9.5	44.1
	4. Unintentional Overexertion	7	7.4	34.3
	5. Unintentional Poisoning	4	4.2	*
	All Causes	95	100.0	465.6
65+	1. Unintentional Fall	170	84.2	1,584.2
	2. Unintentional Poisoning	9	4.5	83.9
	2. Unintentional Motor Vehicle Crash	9	4.5	83.9
	All Causes	202	100.0	1,882.4

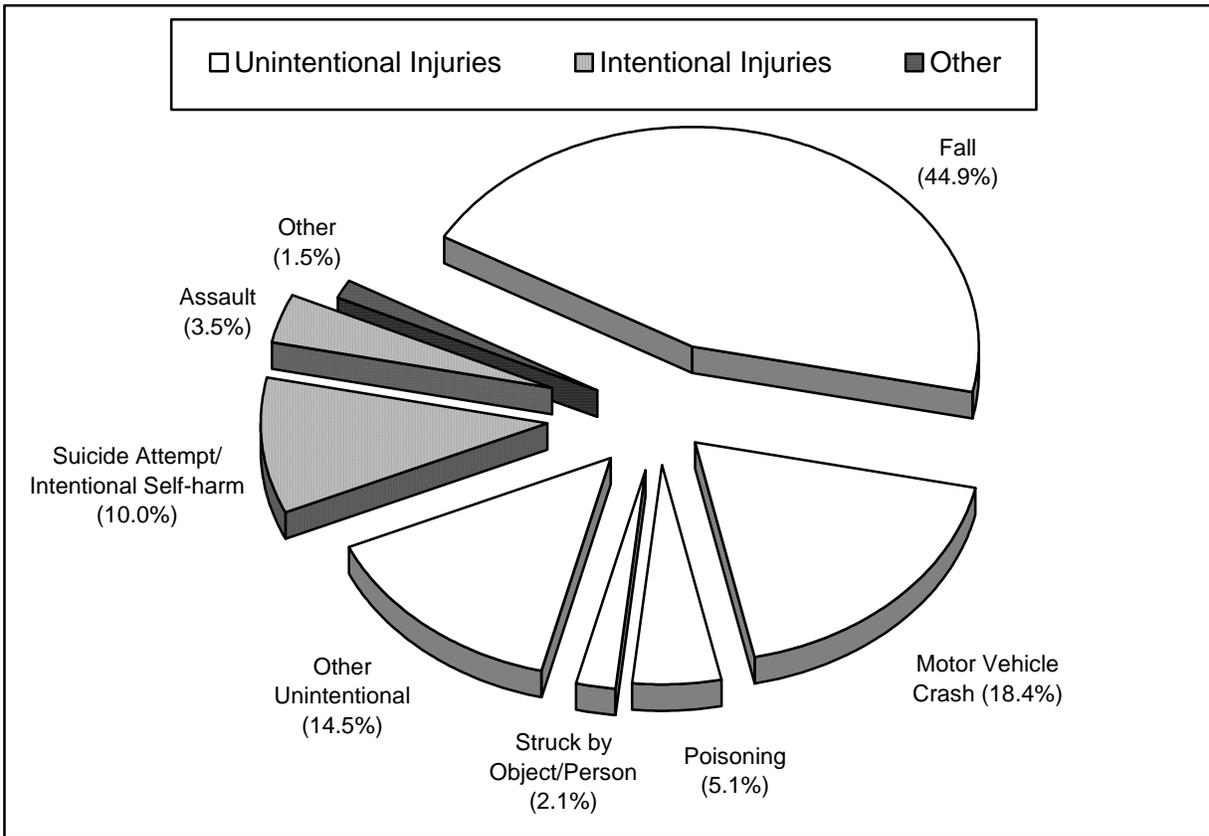
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 16
Causes of Injury Hospitalization
Kalamazoo County Residents, 2002
(N = 1,124 E-coded cases)



E-coding rate for Kalamazoo County: 92%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 21
Specific Causes of Injury Hospitalization
Kalamazoo County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	505	Struck by Object/Person	12	Poisoning	102
MVC – Occupant	163	Sharp Object	10	Sharp Object	5
Poisoning	57	Firearm	6	Firearm	3
Struck by Object/Person	24	Other	11	Other	2
MVC – Motorcyclist	23				
Bicycle, non-MVC	21				
MVC – Pedestrian	13				
Overexertion	12				
Sharp Object	12				
Bite/Sting	11				
Hot Object	10				
Other	105				
Total	956	Total	39	Total	112

Causes not classifiable above comprised 17 cases.
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 22
 Leading Causes of Injury Hospitalization, by Age Group
 Kalamazoo County Residents, 2002
 Cause of Injury Coding Rate: 92% (1,124 of 1,221 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	4	19.1	*
	2. Unintentional Motor Vehicle Crash	3	14.3	*
	2. Assault	3	14.3	*
	4. Unintentional Hot Object	2	9.5	*
	All Causes ¹	21	100.0	134.3
5 – 14	1. Unintentional Motor Vehicle Crash	11	26.2	34.0
	2. Unintentional Fall	10	23.8	30.9
	3. Unintentional Bicycle Crash, non-MVC	6	14.3	18.5
	All Causes	42	100.0	129.7
15 – 24	1. Unintentional Motor Vehicle Crash	51	35.9	115.2
	2. Suicide Attempt/Intentional Self-harm	26	18.3	58.7
	3. Unintentional Fall	13	9.2	29.4
	4. Assault	10	7.0	22.6
	5. Unintentional Struck by Object/Person	6	4.2	13.6
	All Causes	142	100.0	320.7
25 – 44	1. Unintentional Motor Vehicle Crash	60	22.8	88.8
	2. Suicide Attempt/Intentional Self-harm	48	18.3	71.1
	3. Unintentional Fall	43	16.4	63.7
	4. Unintentional Poisoning	22	8.4	32.6
	5. Assault	17	6.5	25.2
	All Causes	263	100.0	389.4
45 – 64	1. Unintentional Fall	75	33.6	139.1
	2. Unintentional Motor Vehicle Crash	53	23.8	98.3
	3. Suicide Attempt/Intentional Self-harm	28	12.6	51.9
	4. Unintentional Poisoning	19	8.5	35.2
	5. Assault	8	3.6	14.8
	All Causes	223	100.0	413.5
65+	1. Unintentional Fall	360	83.1	1,298.7
	2. Unintentional Motor Vehicle Crash	29	6.7	104.6
	3. Unintentional Poisoning	10	2.3	36.1
	4. Suicide Attempt/Intentional Self-harm	8	1.9	28.9
	5. Unintentional Struck by Object/Person	5	1.2	*
	All Causes	433	100.0	1,562.1

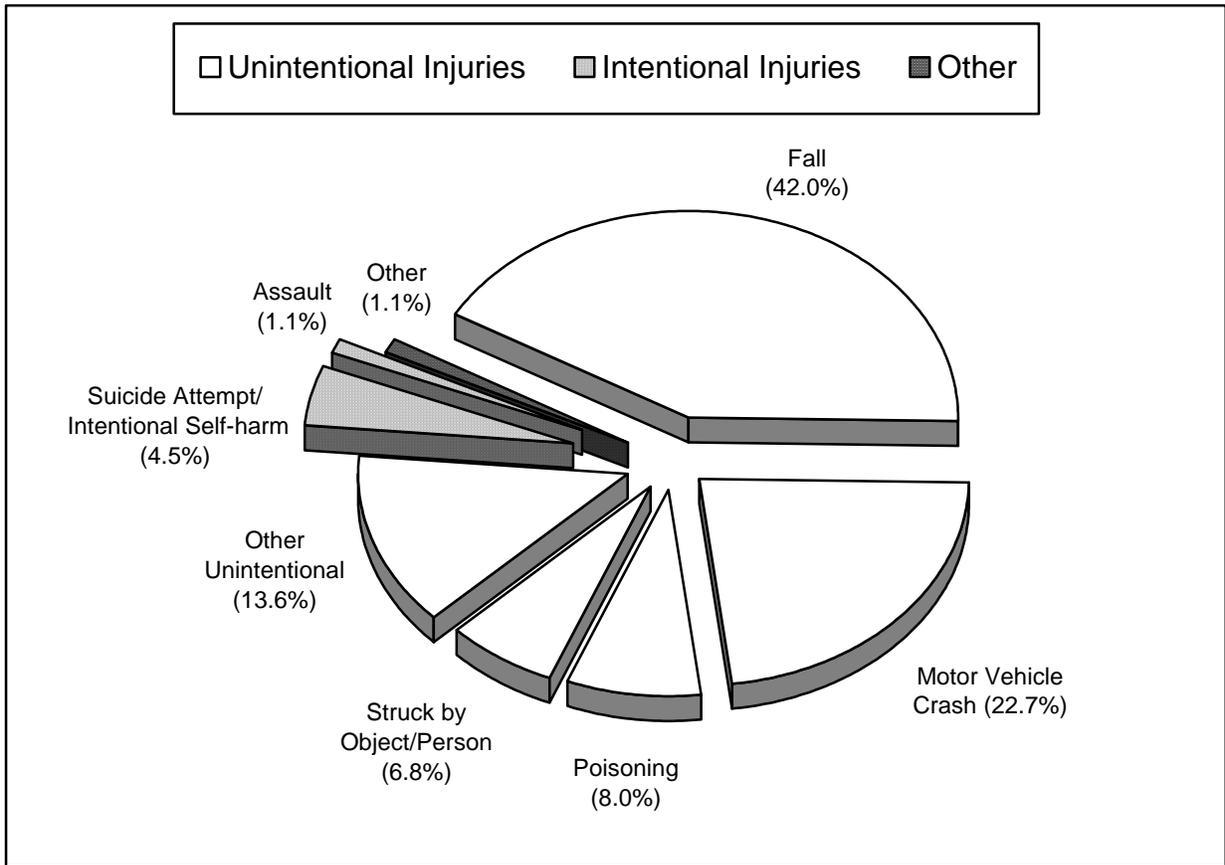
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 17
Causes of Injury Hospitalization
Kalkaska County Residents, 2002
(N = 88 E-coded cases)



E-coding rate for Kalkaska County: 96%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 23
Specific Causes of Injury Hospitalization
Kalkaska County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	37	Unspecified	1	Poisoning	3
MVC – Occupant	19			Firearm	1
Poisoning	7				
Struck by Object/Person	6				
Overexertion	3				
Bite/Sting	2				
Other	8				
Total	82	Total	1	Total	4

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 24
 Leading Causes of Injury Hospitalization, by Age Group
 Kalkaska County Residents, 2002
 Cause of Injury Coding Rate: 96% (88 of 92 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	2	100.0	*
5 – 14	All Causes	3	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	8	53.3	365.5
	2. Suicide Attempt/Intentional Self-harm	2	13.3	*
	All Causes	15	100.0	685.2
25 – 44	1. Unintentional Poisoning	5	25.0	*
	2. Unintentional Fall	4	20.0	*
	2. Unintentional Motor Vehicle Crash	4	20.0	*
	All Causes	20	100.0	424.0
45 – 64	1. Unintentional Fall	6	42.9	140.4
	2. Unintentional Motor Vehicle Crash	4	28.6	*
	All Causes	14	100.0	327.5
65+	1. Unintentional Fall	24	70.6	1,014.8
	2. Unintentional Motor Vehicle Crash	4	11.8	*
	3. Unintentional Overexertion	2	5.9	*
	3. Unintentional Struck by Object/Person	2	5.9	*
	All Causes	34	100.0	1,437.6

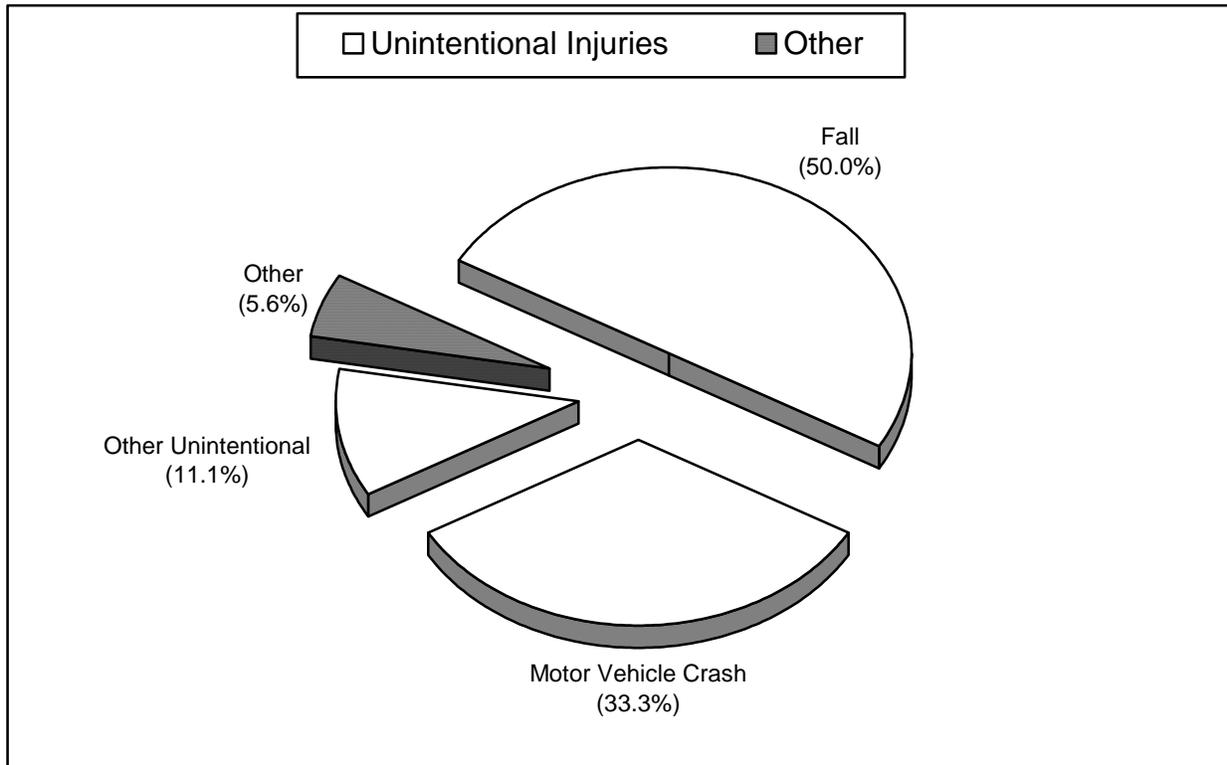
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 18
 Causes of Injury Hospitalization
 Keweenaw County Residents, 2002
 (N = 18 E-coded cases)



E-coding rate for Keweenaw County: 95%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 25
 Specific Causes of Injury Hospitalization
 Keweenaw County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	9				
MVC – Occupant	6				
Other	2				
Total	17	Total	0	Total	0

Causes not classifiable above comprised one case.
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 26
 Leading Causes of Injury Hospitalization, by Age Group
 Keweenaw County Residents, 2002
 Cause of Injury Coding Rate: 95% (18 of 19 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	0	0.0	-
5 – 14	All Causes	0	0.0	-
15 – 24	1. Unintentional Fall	1	100.0	*
	All Causes	1	100.0	*
25 – 44	1. Unintentional Motor Vehicle Crash	2	66.7	*
	All Causes	3	100.0	*
45 – 64	1. Unintentional Motor Vehicle Crash	2	40.0	*
	All Causes	5	100.0	*
65+	1. Unintentional Fall	7	77.8	1,566.0
	2. Unintentional Motor Vehicle Crash	2	22.2	*
	All Causes	9	100.0	2,013.4

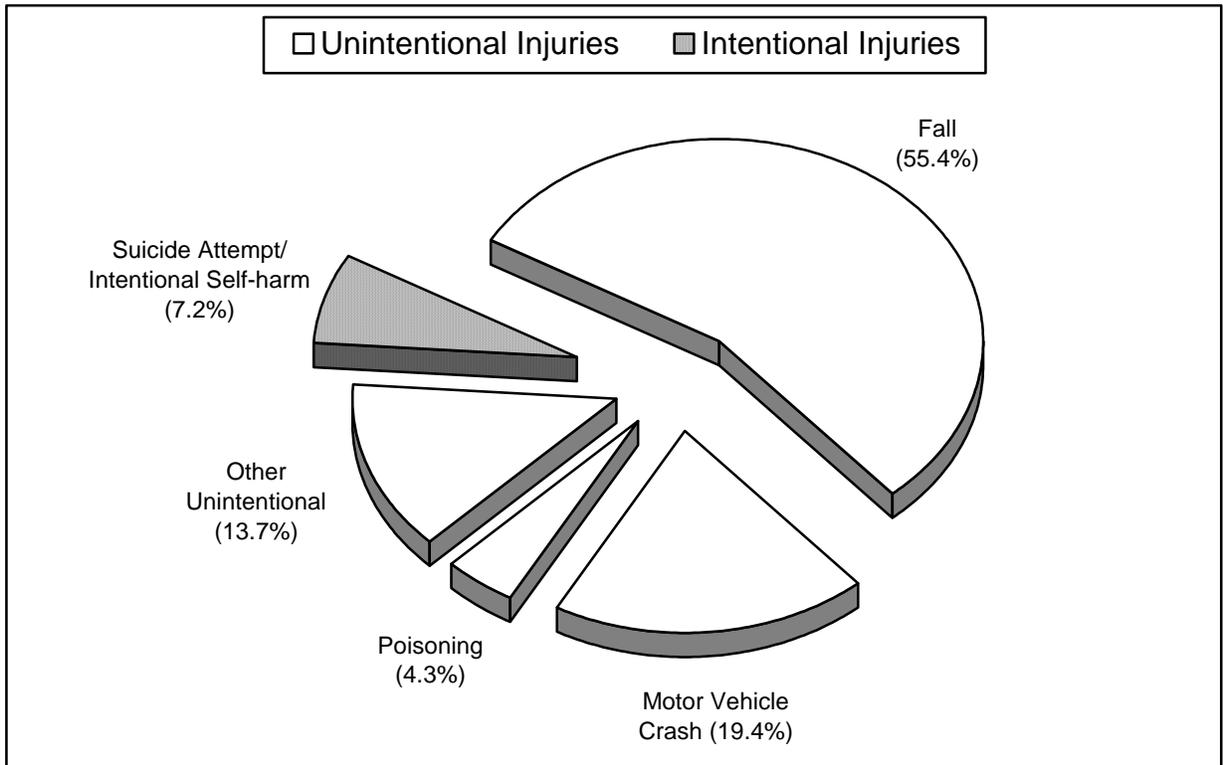
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 19
Causes of Injury Hospitalization
Leelanau County Residents, 2002
(N = 139 E-coded cases)



E-coding rate for Leelanau County: 99%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 27
Specific Causes of Injury Hospitalization
Leelanau County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	77			Poisoning	10
MVC – Occupant	21				
Poisoning	6				
Struck by Object/Person	4				
Bicycle, non-MVC	3				
Machinery	2				
MVC – Motorcyclist	2				
Overexertion	2				
Snowmobile Crash	2				
Other	10				
Total	129	Total	0	Total	10

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 28
 Leading Causes of Injury Hospitalization, by Age Group
 Leelanau County Residents, 2002
 Cause of Injury Coding Rate: 99% (139 of 141 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	2	40.0	*
	All Causes ¹	5	100.0	*
5 – 14	1. Unintentional Fall	5	55.5	*
	2. Unintentional Struck by Object/Person	2	22.2	*
	All Causes	9	100.0	313.4
15 – 24	1. Unintentional Motor Vehicle Crash	2	28.57	*
	All Causes	7	100.0	263.7
25 – 44	1. Unintentional Fall	7	28.0	144.2
	2. Unintentional Motor Vehicle Crash	6	24.0	123.6
	3. Suicide Attempt/Intentional Self-harm	5	20.0	*
	4. Unintentional Poisoning	2	8.0	*
	5. Unintentional Snowmobile Crash	2	8.0	*
	All Causes	25	100.0	514.8
45 – 64	1. Unintentional Fall	13	43.3	204.5
	2. Unintentional Motor Vehicle Crash	8	26.7	125.8
	3. Suicide Attempt/Intentional Self-harm	4	13.3	*
	4. Unintentional Poisoning	2	6.7	*
	All Causes	30	100.0	471.8
65+	1. Unintentional Fall	49	77.8	1,251.0
	2. Unintentional Motor Vehicle Crash	9	14.3	229.8
	All Causes	63	100.0	1,608.4

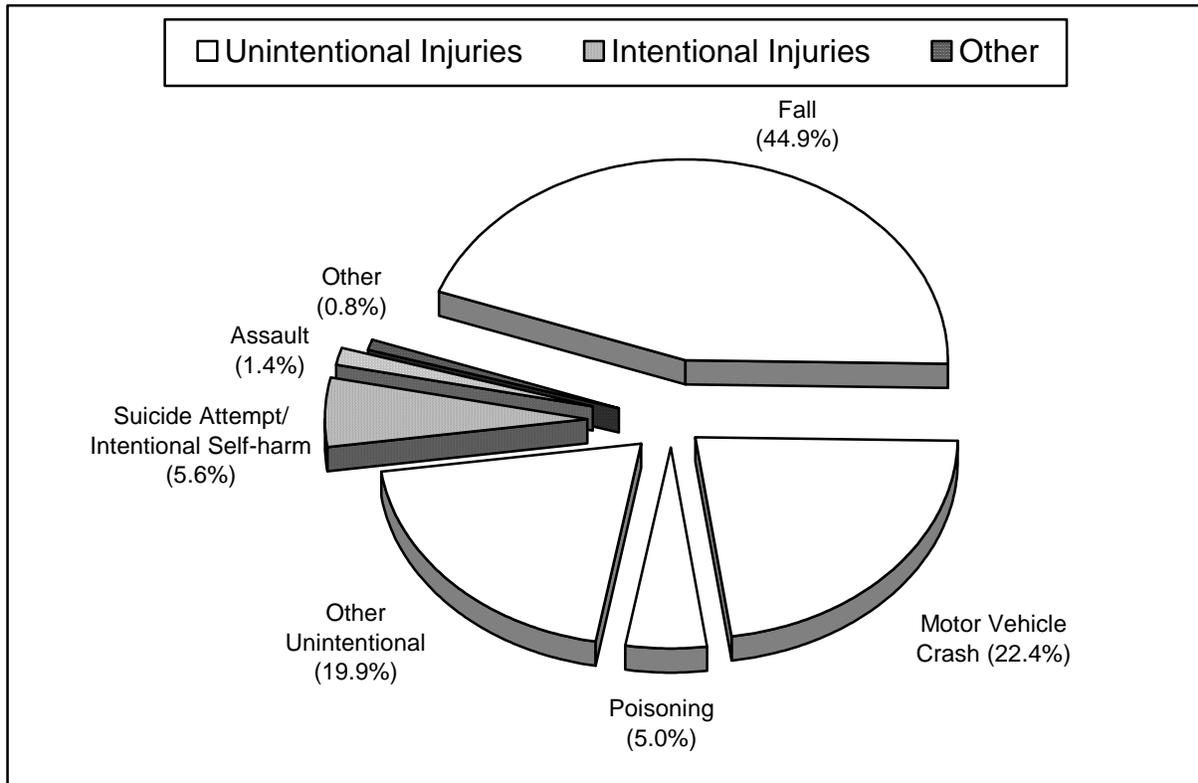
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 20
Causes of Injury Hospitalization
Livingston County Residents, 2002
(N = 642 E-coded cases)



E-coding rate for Livingston County: 91%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 29
Specific Causes of Injury Hospitalization
Livingston County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	288	Sharp Object	3	Poisoning	35
MVC – Occupant	96	Struck by Object/Person	2	Sharp Object	1
Poisoning	32	Firearm	1		
MVC – Motorcyclist	29	Hot Object	1		
Struck by Object/Person	22	Poisoning	1		
Machinery	11	Other	1		
Overexertion	10				
MVC – Pedestrian	7				
Fire/Flames	5				
Bite/Sting	4				
Sharp Object	4				
Other	84				
Total	592	Total	9	Total	36

Causes not classifiable above comprised five cases.
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 30
 Leading Causes of Injury Hospitalization, by Age Group
 Livingston County Residents, 2002
 Cause of Injury Coding Rate: 91% (642 of 704 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	8	50.0	73.6
	2. Unintentional Poisoning	2	12.5	*
	All Causes ¹	16	100.0	147.2
5 – 14	1. Unintentional Fall	20	60.6	75.7
	2. Unintentional Motor Vehicle Crash	5	15.2	*
	3. Unintentional Struck by Object/Person	4	12.1	*
	All Causes	33	100.0	124.8
15 – 24	1. Unintentional Motor Vehicle Crash	21	29.6	92.1
	2. Suicide Attempt/Intentional Self-harm	10	14.1	43.9
	3. Unintentional Fall	5	7.0	*
	4. Unintentional Poisoning	4	5.6	*
	All Causes	71	100.0	311.3
25 – 44	1. Unintentional Motor Vehicle Crash	61	34.5	120.1
	2. Unintentional Fall	39	22.0	76.8
	3. Suicide Attempt/Intentional Self-harm	14	7.9	27.6
	4. Unintentional Poisoning	13	7.3	25.6
	5. Unintentional Struck by Object/Person	9	5.1	17.7
	All Causes	177	100.0	348.5
45 – 64	1. Unintentional Fall	54	38.0	123.4
	2. Unintentional Motor Vehicle Crash	45	31.7	102.8
	3. Suicide Attempt/Intentional Self-harm	11	7.7	25.1
	4. Unintentional Poisoning	5	3.5	*
	5. Unintentional Struck by Object/Person	4	2.8	*
	All Causes	142	100.0	324.5
65+	1. Unintentional Fall	162	79.8	1,140.2
	2. Unintentional Motor Vehicle Crash	12	5.9	84.5
	3. Unintentional Poisoning	7	3.4	49.3
	4. Unintentional Overexertion	3	1.5	*
	All Causes	203	100.0	1,428.8

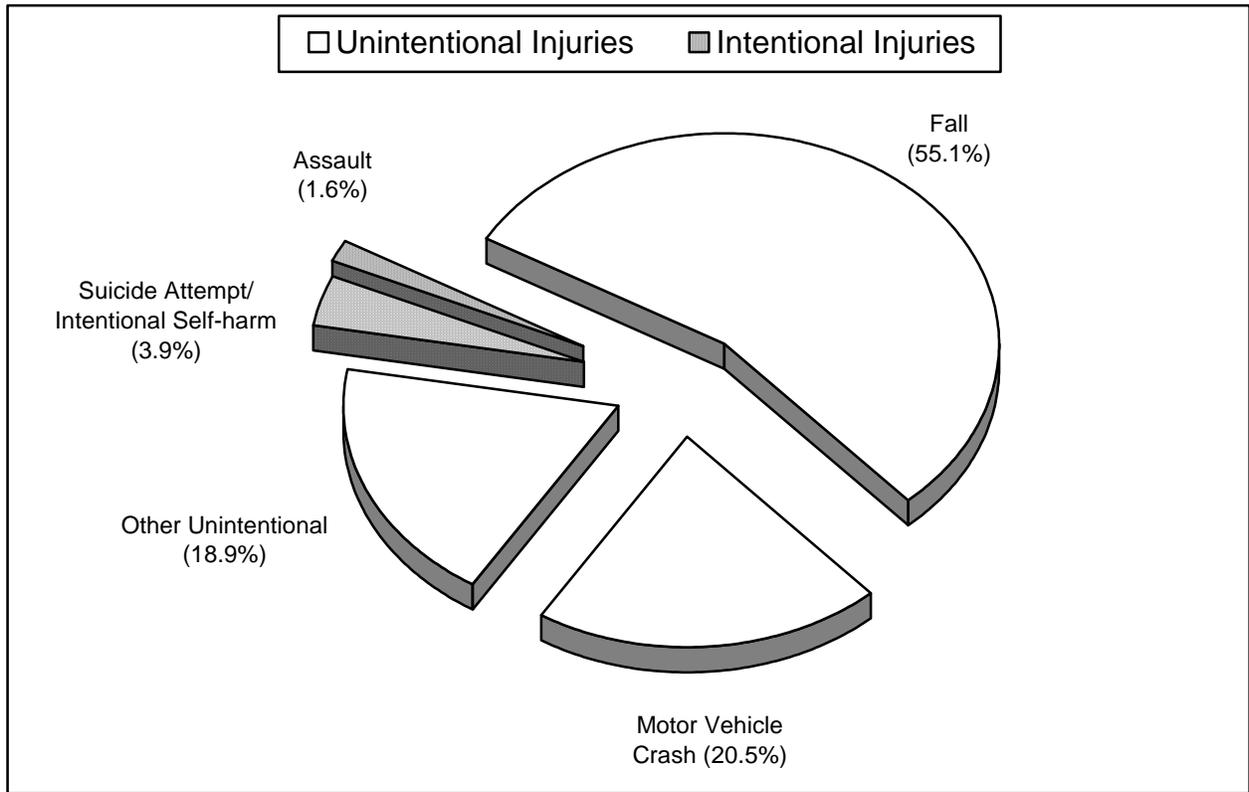
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 21
Causes of Injury Hospitalization
Manistee County Residents, 2002
(N = 127 E-coded cases)



E-coding rate for Manistee County: 94%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 31
Specific Causes of Injury Hospitalization
Manistee County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	70	Sharp Object	2	Poisoning	4
MVC – Occupant	19			Firearm	1
Machinery	3				
Bite/Sting	2				
Hot Object	2				
MVC – Motorcyclist	2				
Overexertion	2				
Sharp Object	2				
Struck by Object	2				
Other	16				
Total	120	Total	2	Total	5

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 32
 Leading Causes of Injury Hospitalization, by Age Group
 Manistee County Residents, 2002
 Cause of Injury Coding Rate: 94% (127 of 135 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	3	100.0	*
5 – 14	1. Unintentional Fall	2	28.6	*
	1. Unintentional Struck by Object/Person	2	28.6	*
	All Causes	7	100.0	230.2
15 – 24	1. Unintentional Motor Vehicle Crash	13	61.9	412.7
	2. Unintentional Fall	3	14.3	*
	All Causes	21	100.0	666.7
25 – 44	1. Unintentional Fall	6	37.5	93.6
	1. Unintentional Motor Vehicle Crash	6	37.5	93.6
	3. Suicide Attempt/Intentional Self-harm	2	12.5	*
	All Causes	16	100.0	249.5
45 – 64	1. Unintentional Fall	11	44.0	164.7
	2. Suicide Attempt/Intentional Self-harm	2	8.0	*
	2. Unintentional Motor Vehicle Crash	2	8.0	*
	All Causes	25	100.0	374.4
65+	1. Unintentional Fall	47	85.5	1,041.0
	2. Unintentional Motor Vehicle Crash	4	7.3	*
	All Causes	55	100.0	1,218.2

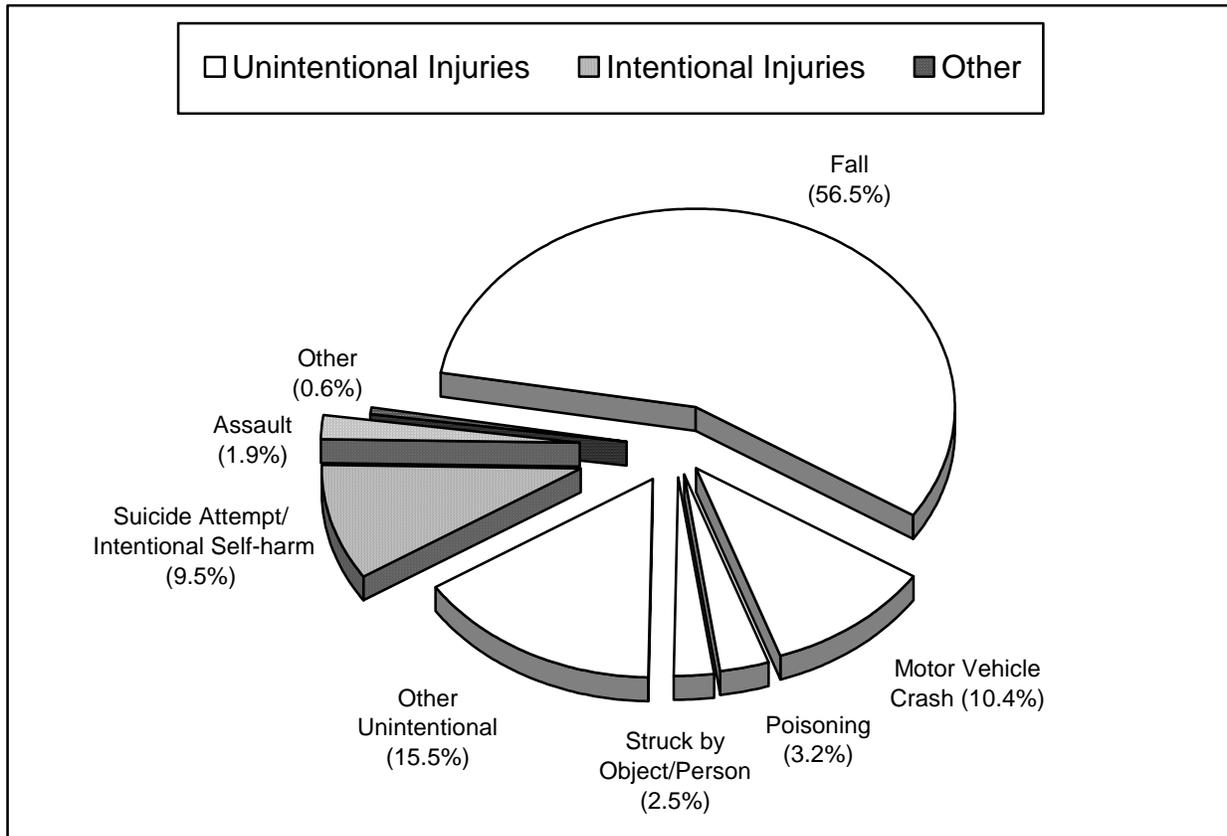
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 22
Causes of Injury Hospitalization
Marquette County Residents, 2002
(N = 317 E-coded cases)



E-coding rate for Marquette County: 91%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 33
Specific Causes of Injury Hospitalization
Marquette County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	179	Struck by Object/Person	3	Poisoning	27
MVC – Occupant	21	Other	3	Sharp Object	3
Poisoning	10				
Struck by Object/Person	8				
Overexertion	7				
Fire/Flames	3				
MVC – Bicyclist	3				
MVC – Motorcyclist	3				
MVC – Pedestrian	3				
Sharp Object	3				
Other	39				
Total	279	Total	6	Total	30

Causes not classifiable above comprised two cases.
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 34
 Leading Causes of Injury Hospitalization, by Age Group
 Marquette County Residents, 2002
 Cause of Injury Coding Rate: 91% (317 of 349 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	2	22.2	*
	1. Assault	2	22.2	*
	All Causes ¹	9	100.0	306.0
5 – 14	1. Unintentional Fall	6	35.3	81.2
	2. Unintentional Motor Vehicle Crash	5	29.4	*
	All Causes	17	100.0	230.0
15 – 24	1. Suicide Attempt/Intentional Self-harm	13	31.0	113.5
	1. Unintentional Motor Vehicle Crash	13	31.0	113.5
	3. Unintentional Fall	6	14.3	52.4
	4. Unintentional Poisoning	3	7.1	*
	All Causes	42	100.0	366.6
25 – 44	1. Unintentional Fall	16	29.6	94.2
	2. Suicide Attempt/Intentional Self-harm	13	24.1	76.5
	3. Unintentional Motor Vehicle Crash	4	7.4	*
	4. Unintentional Overexertion	3	5.6	*
	All Causes	54	100.0	317.8
45 – 64	1. Unintentional Fall	31	50.8	185.2
	2. Unintentional Motor Vehicle Crash	8	13.1	47.8
	3. Unintentional Poisoning	4	6.6	*
	4. Suicide Attempt/Intentional Self-harm	3	4.9	*
	All Causes	61	100.0	364.4
65+	1. Unintentional Fall	118	88.1	1,338.0
	2. Unintentional Motor Vehicle Crash	3	2.2	*
	3. Unintentional Struck by Object/Person	2	1.5	*
	All Causes	134	100.0	1,519.4

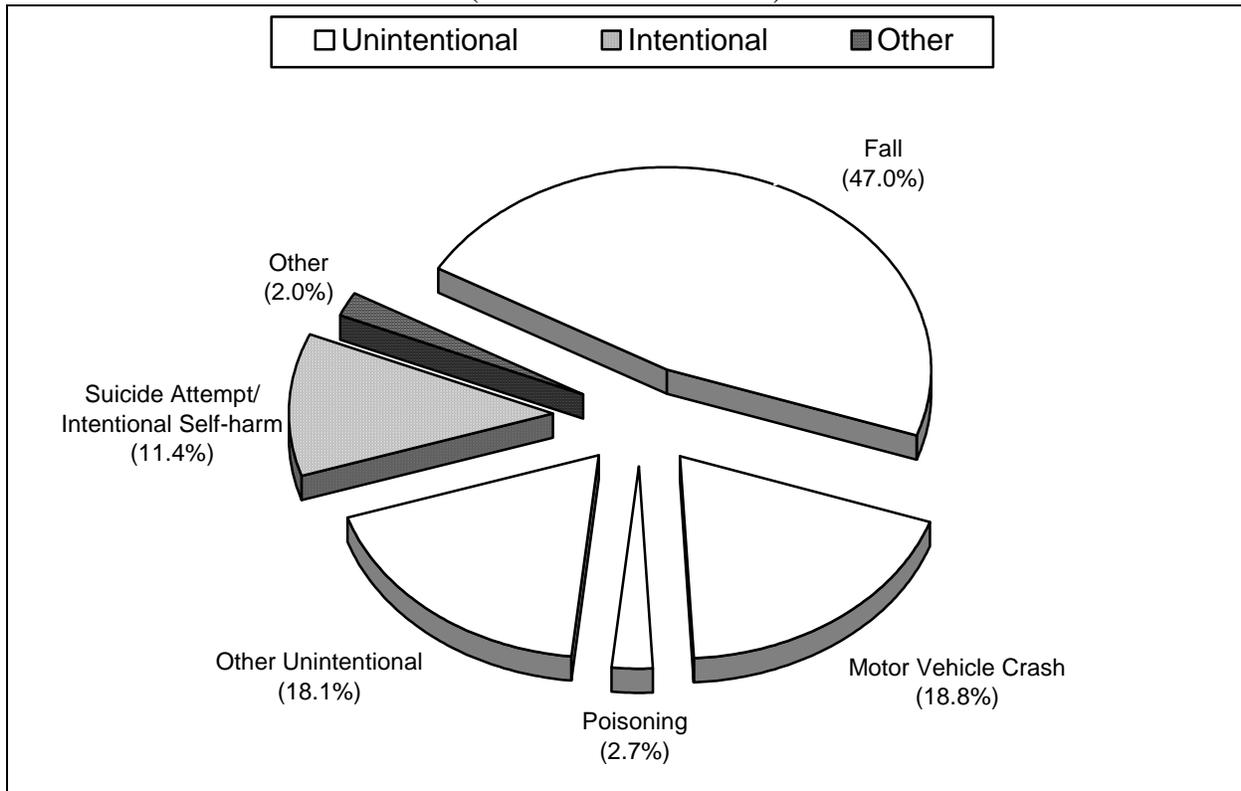
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 23
Causes of Injury Hospitalization
Menominee County Residents, 2002
(N = 149 E-coded cases)



E-coding rate for Menominee County: 93%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 35
Specific Causes of Injury Hospitalization
Menominee County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	70			Poisoning	17
MVC – Occupant	22				
Poisoning	4				
Bite/Sting	2				
MVC – Motorcyclist	2				
MVC – Pedestrian	2				
Overexertion	2				
Struck by Object/Person	2				
Other	23				
Total	129	Total	0	Total	17

Causes not classifiable above comprised three cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 36
 Leading Causes of Injury Hospitalization, by Age Group
 Menominee County Residents, 2002
 Cause of Injury Coding Rate: 93% (149 of 161 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	3	100.0	*
5 – 14	1. Unintentional Fall	4	44.4	*
	2. Unintentional Motor Vehicle Crash	2	22.2	*
	All Causes	9	100.0	281.0
15 – 24	1. Suicide Attempt/Intentional Self-harm	7	46.7	210.3
	2. Unintentional Motor Vehicle Crash	2	13.3	*
	All Causes	15	100.0	450.6
25 – 44	1. Unintentional Fall	9	24.3	143.0
	1. Unintentional Motor Vehicle Crash	9	24.3	143.0
	3. Suicide Attempt/Intentional Self-harm	8	21.6	127.1
	4. Unintentional Poisoning	2	5.4	*
	4. Unintentional Struck by Object/Person	2	5.4	*
	All Causes	37	100.0	588.0
45 – 64	1. Unintentional Fall	10	35.7	150.8
	2. Unintentional Motor Vehicle Crash	8	28.6	120.6
	All Causes	28	100.0	422.3
65+	1. Unintentional Fall	45	78.9	1,040.5
	2. Unintentional Motor Vehicle Crash	6	10.5	138.7
	All Causes	57	100.0	1,317.9

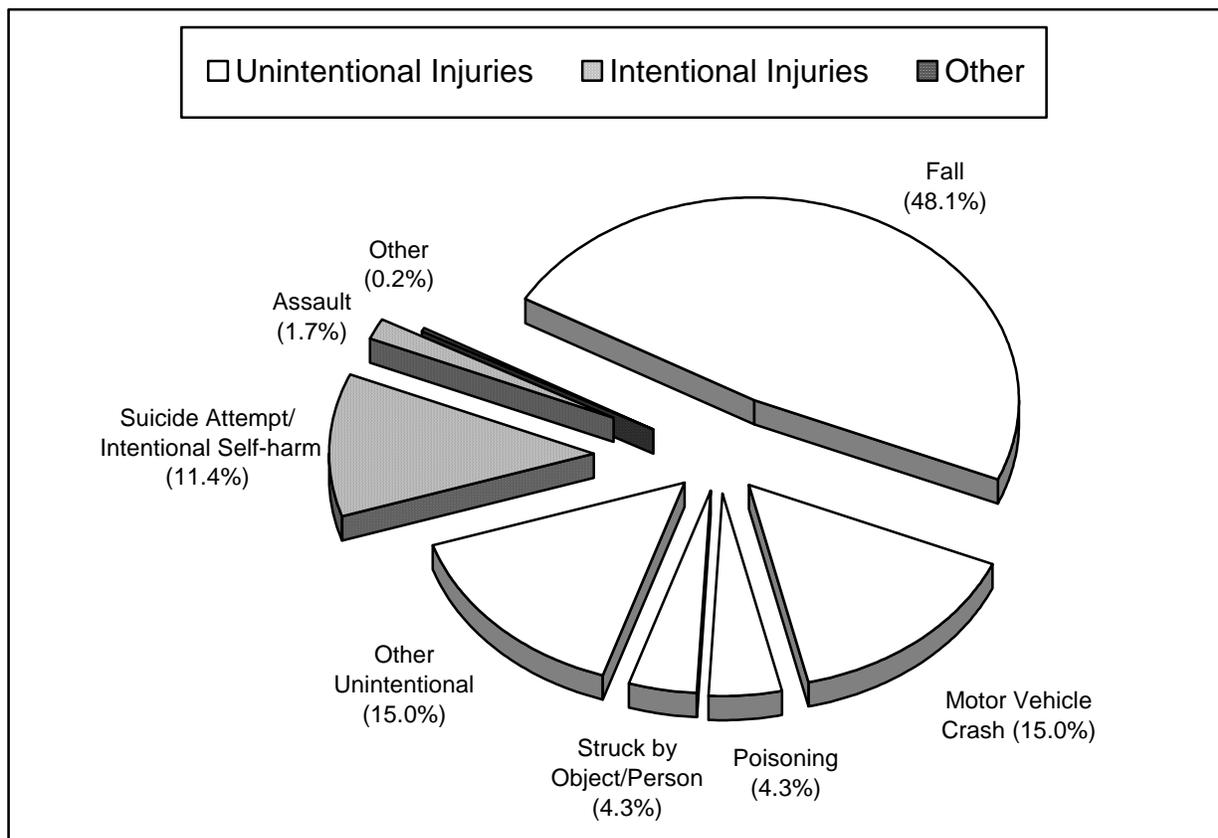
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 24
Causes of Injury Hospitalization
Midland County Residents, 2002
(N = 414 E-coded cases)



E-coding rate for Midland County: 97%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 37
Specific Causes of Injury Hospitalization
Midland County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	199	Struck by Object/Person	5	Poisoning	45
MVC – Occupant	52	Other	2	Other	2
Poisoning	18				
Struck by Object/Person	18				
Overexertion	14				
MVC – Motorcyclist	6				
Bicyclist, non-MVC	5				
Sharp Object	5				
Fire/Flames	3				
Machinery	3				
Snowmobile Crash	3				
Other	33				
Total	359	Total	7	Total	47

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 38
 Leading Causes of Injury Hospitalization, by Age Group
 Midland County Residents, 2002
 Cause of Injury Coding Rate: 97% (414 of 429 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	2	20.0	*
	All Causes ¹	10	100.0	188.9
5 – 14	1. Unintentional Fall	5	31.3	*
	2. Suicide Attempt/Intentional Self-harm	2	12.5	*
	2. Unintentional Fire/Flames	2	12.5	*
	2. Unintentional Motor Vehicle Crash	2	12.5	*
	All Causes	16	100.0	127.6
15 – 24	1. Unintentional Motor Vehicle Crash	21	37.5	175.9
	2. Suicide Attempt/Intentional Self-harm	17	30.4	142.4
	3. Unintentional Fall	5	8.9	*
	4. Unintentional Struck by Object/Person	4	7.1	*
	All Causes	56	100.0	469.0
25 – 44	1. Unintentional Fall	23	27.4	98.5
	2. Unintentional Motor Vehicle Crash	17	20.2	72.8
	3. Suicide Attempt/Intentional Self-harm	16	19.0	68.5
	4. Unintentional Poisoning	6	7.1	25.7
	5. Unintentional Struck by Object/Person	5	6.0	*
	All Causes	84	100.0	359.7
45 – 64	1. Unintentional Fall	32	39.5	155.2
	2. Unintentional Motor Vehicle Crash	17	21.0	82.4
	3. Suicide Attempt/Intentional Self-harm	10	12.3	48.5
	4. Unintentional Overexertion	4	4.9	*
	All Causes	81	100.0	392.7
65+	1. Unintentional Fall	132	79.0	1,273.3
	2. Unintentional Overexertion	7	4.2	67.5
	2. Unintentional Struck by Object/Person	7	4.2	67.5
	4. Unintentional Poisoning	6	3.6	57.9
	5. Unintentional Motor Vehicle Crash	5	3.0	*
	All Causes	167	100.0	1,610.9

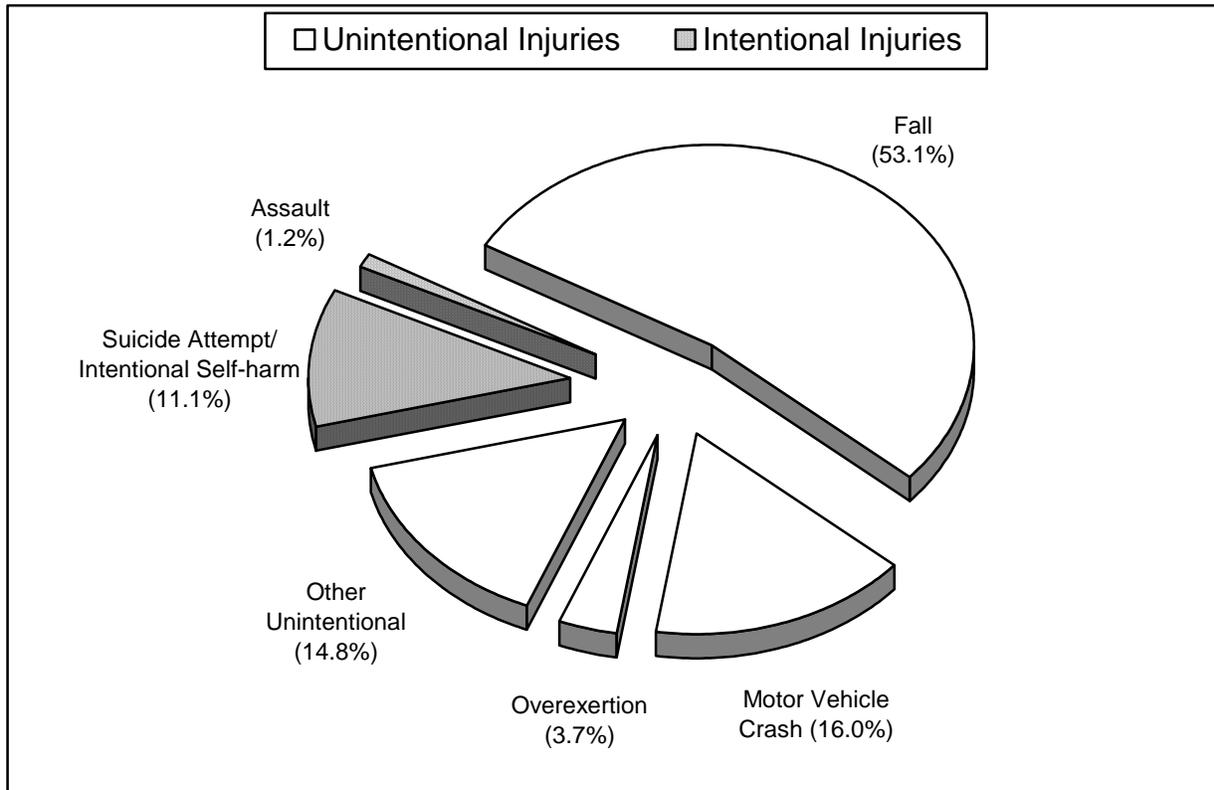
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 25
Causes of Injury Hospitalization
Missaukee County Residents, 2002
(N = 81 E-coded cases)



E-coding rate for Missaukee County: 95%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 39
Specific Causes of Injury Hospitalization
Missaukee County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	43	Struck by Object/Person	1	Poisoning	9
MVC – Occupant	10				
Overexertion	3				
Poisoning	2				
Struck by Object/Person	2				
Other	11				
Total	71	Total	1	Total	9

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 40
 Leading Causes of Injury Hospitalization, by Age Group
 Missaukee County Residents, 2002
 Cause of Injury Coding Rate: 95% (81 of 85 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	1	100.0	*
5 – 14	1. Unintentional Fall	2	33.3	*
	All Causes	6	100.0	277.8
15 – 24	1. Unintentional Motor Vehicle Crash	2	33.3	*
	All Causes	6	100.0	282.2
25 – 44	1. Suicide Attempt/Intentional Self-harm	6	31.6	151.2
	2. Unintentional Fall	5	26.3	*
	3. Unintentional Motor Vehicle Crash	2	10.5	*
	3. Unintentional Overexertion	2	10.5	*
	All Causes	19	100.0	478.8
45 – 64	1. Unintentional Motor Vehicle Crash	4	44.4	*
	2. Unintentional Fall	3	33.3	*
	All Causes	9	100.0	249.0
65+	1. Unintentional Fall	32	80.0	1,477.4
	2. Unintentional Motor Vehicle Crash	5	12.5	*
	All Causes	40	100.0	1,846.7

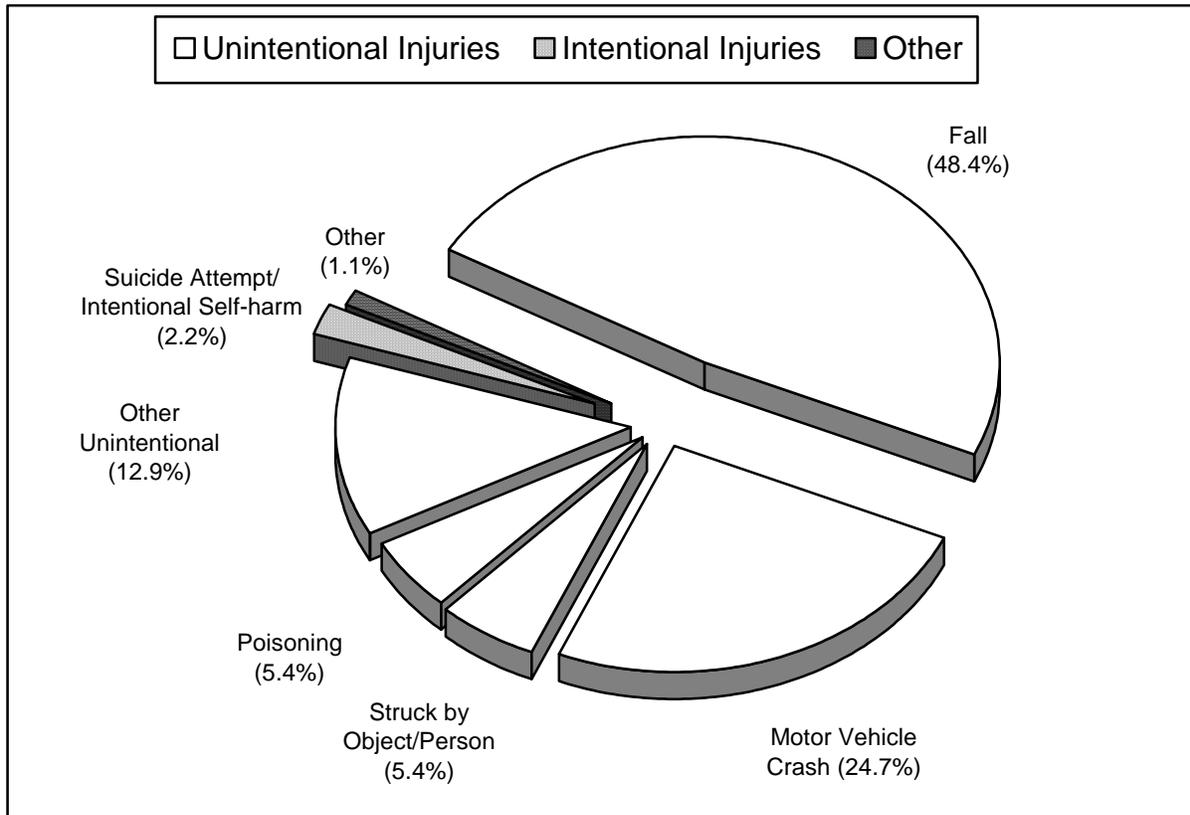
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 26
Causes of Injury Hospitalization
Montmorency County Residents, 2002
(N = 93 E-coded cases)



E-coding rate for Montmorency County: 93%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 41
Specific Causes of Injury Hospitalization
Montmorency County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	45			Poisoning	2
MVC – Occupant	21				
Poisoning	5				
Struck by Object/Person	5				
Overexertion	3				
Snowmobile Crash	2				
Other	9				
Total	90	Total	0	Total	2

Causes not classifiable above comprised one case.
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 42
 Leading Causes of Injury Hospitalization, by Age Group
 Montmorency County Residents, 2002
 Cause of Injury Coding Rate: 93% (93 of 100 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	1	100.0	*
5 – 14	All Causes	1	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	12	75.0	966.2
	All Causes	16	100.0	1,288.2
25 – 44	1. Unintentional Fall	4	28.6	*
	1. Unintentional Motor Vehicle Crash	4	28.6	*
	3. Unintentional Struck by Object/Person	2	14.3	*
	All Causes	14	100.0	643.7
45 – 64	1. Unintentional Fall	9	42.9	299.2
	2. Unintentional Motor Vehicle Crash	4	19.0	*
	3. Suicide Attempt/Intentional Self-harm	2	9.5	*
	3. Unintentional Struck by Object/Person	2	9.5	*
	All Causes	21	100.0	698.1
65+	1. Unintentional Fall	32	80.0	1,271.4
	2. Unintentional Poisoning	3	7.5	*
	All Causes	40	100.0	1,589.2

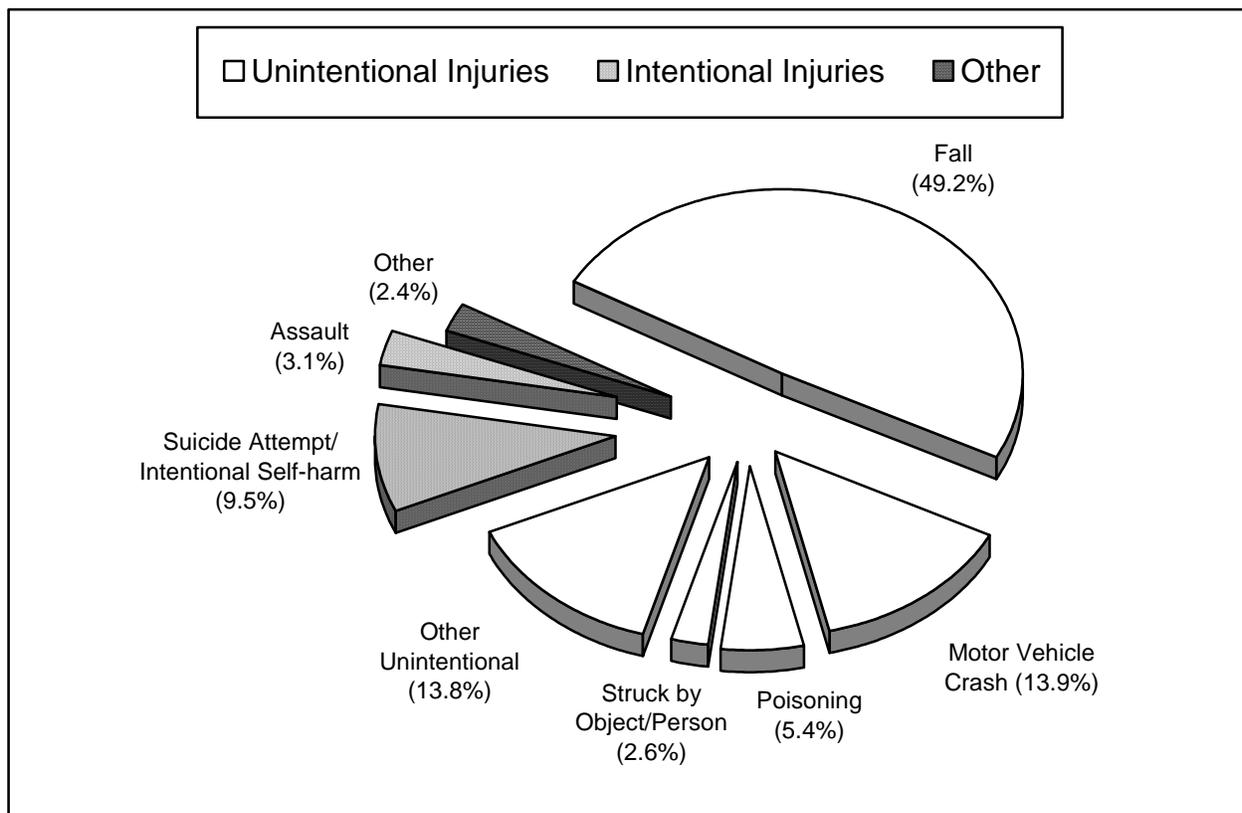
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 27
Causes of Injury Hospitalization
Oakland County Residents, 2002
(N = 5,417 E-coded cases)



E-coding rate for Oakland County: 92%
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 43
Specific Causes of Injury Hospitalization
Oakland County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	2,663	Struck by Object/Person	67	Poisoning	478
MVC – Occupant	539	Firearm	39	Sharp Object	22
Poisoning	295	Sharp Object	17	Firearm	5
Struck by Object/Person	142	MVC	2	Hanging	4
MVC – Pedestrian	93	Other	42	Fire/Flames	2
Overexertion	81			MVC	2
Bicyclist, non-MVC	73			Other	3
MVC – Motorcyclist	65				
Hot Object	55				
Sharp Object	39				
Fire/Flames	34				
Machinery	33				
Other	490				
Total	4,602	Total	167	Total	516

Causes not classifiable above comprised 132 case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 44
 Leading Causes of Injury Hospitalization, by Age Group
 Oakland County Residents, 2002
 Cause of Injury Coding Rate: 92% (5,417 of 5,902 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	50	35.5	63.3
	2. Unintentional Poisoning	25	17.7	31.7
	3. Unintentional Hot Object	20	14.2	25.3
	4. Unintentional Struck by Object/Person	10	7.1	12.7
	5. Unintentional Motor Vehicle Crash	7	5.0	8.9
	All Causes ¹	141	100.0	178.6
5 – 14	1. Unintentional Fall	101	35.6	59.4
	2. Unintentional Motor Vehicle Crash	40	14.1	23.5
	3. Unintentional Bicycle Crash, non-MVC	33	11.6	19.4
	4. Unintentional Struck by Object/Person	27	9.5	15.9
	5. Suicide Attempt/Intentional Self-harm	14	4.9	8.2
	All Causes	284	100.0	166.9
15 – 24	1. Unintentional Motor Vehicle Crash	180	31.6	130.4
	2. Suicide Attempt/Intentional Self-harm	119	20.9	86.2
	3. Unintentional Fall	84	14.8	60.9
	4. Assault	44	7.7	31.9
	5. Unintentional Struck by Object/Person	28	4.9	20.3
	All Causes	569	100.0	412.2
25 – 44	1. Suicide Attempt/Intentional Self-harm	237	20.1	64.0
	2. Unintentional Fall	228	19.4	61.6
	3. Unintentional Motor Vehicle Crash	225	19.1	60.8
	4. Unintentional Poisoning	101	8.6	27.3
	5. Assault	82	7.0	22.2
	All Causes	1,178	100.0	318.2
45 – 64	1. Unintentional Fall	420	39.0	136.1
	2. Unintentional Motor Vehicle Crash	180	16.7	58.3
	3. Suicide Attempt/Intentional Self-harm	124	11.5	40.2
	4. Unintentional Poisoning	82	7.6	26.6
	5. Assault	28	2.6	9.1
	All Causes	1,077	100.0	349.0
65+	1. Unintentional Fall	1,780	82.1	1,301.0
	2. Unintentional Motor Vehicle Crash	122	5.6	89.2
	3. Unintentional Poisoning	55	2.5	40.2
	4. Unintentional Overexertion	27	1.2	19.7
	5. Suicide Attempt/Intentional Self-harm	22	1.0	16.1
	All Causes	2,168	100.0	1,584.6

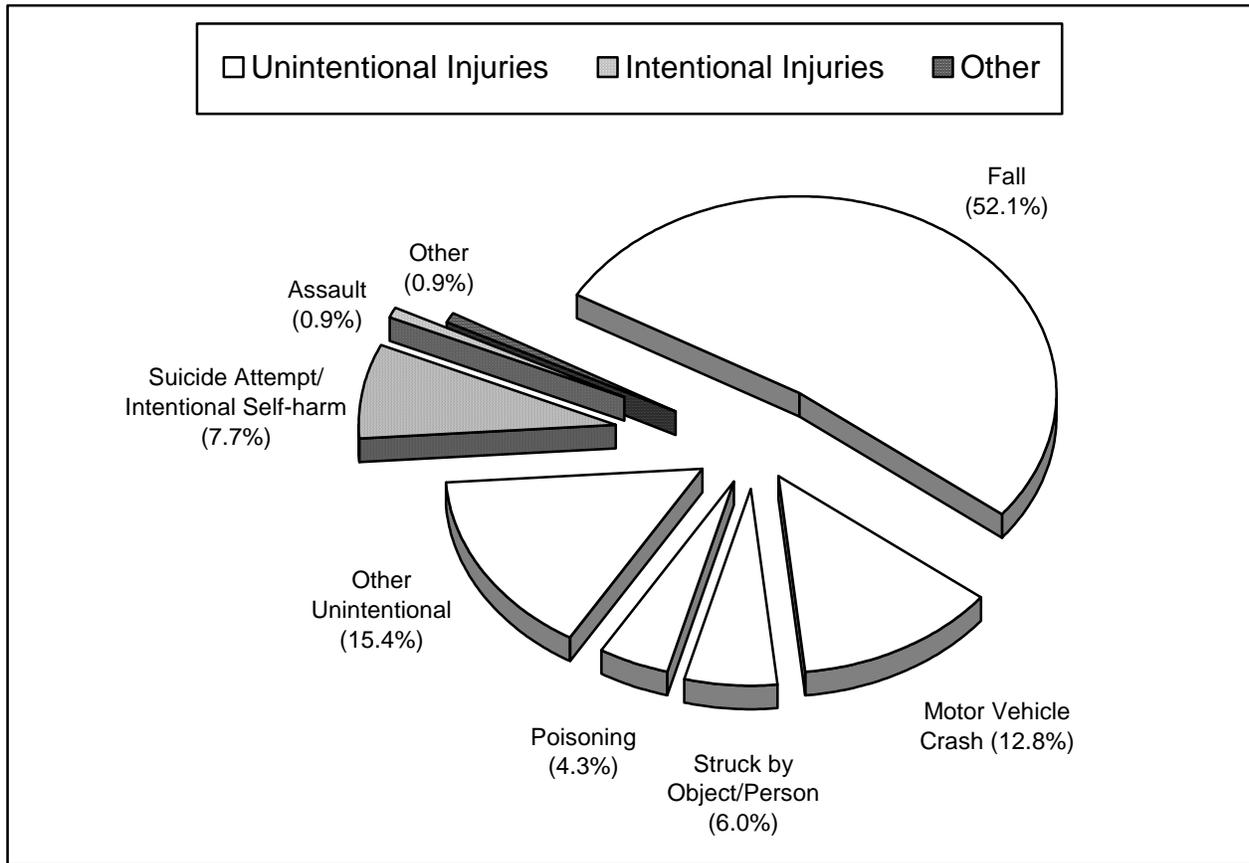
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 28
Causes of Injury Hospitalization
Ogemaw County Residents, 2002
 (N = 117 E-coded cases)



E-coding rate for Ogemaw County: 95%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 45
Specific Causes of Injury Hospitalization
Ogemaw County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	61	Firearm	1	Poisoning	7
MVC – Occupant	12			Hanging	1
Struck by Object/Person	7			Sharp Object	1
Poisoning	5				
MVC – Pedestrian	3				
Overexertion	3				
Machinery	2				
Other	13				
Total	106	Total	1	Total	9

Causes not classifiable above comprised one case.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 46
 Leading Causes of Injury Hospitalization, by Age Group
 Ogemaw County Residents, 2002
 Cause of Injury Coding Rate: 95% (117 of 123 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	4	100.0	*
5 – 14	1. Unintentional Motor Vehicle Crash	3	75.0	*
	All Causes	4	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	5	33.3	*
	2. Suicide Attempt/Intentional Self-harm	2	13.3	*
	2. Unintentional Fall	2	13.3	*
	2. Unintentional Poisoning	2	13.3	*
	All Causes	15	100.0	553.5
25 – 44	1. Suicide Attempt/Intentional Self-harm	4	25.0	*
	2. Unintentional Fall	3	18.8	*
	3. Unintentional Motor Vehicle Crash	2	12.5	*
	3. Unintentional Struck by Object/Person	2	12.5	*
	All Causes	16	100.0	316.8
45 – 64	1. Unintentional Fall	18	52.9	307.3
	2. Unintentional Motor Vehicle Crash	2	5.9	*
	2. Unintentional Overexertion	2	5.9	*
	2. Unintentional Struck by Object/Person	2	5.9	*
	All Causes	34	100.0	580.5
65+	1. Unintentional Fall	36	81.8	851.9
	2. Unintentional Motor Vehicle Crash	3	6.8	*
	3. Suicide Attempt/Intentional Self-harm	2	4.5	*
	All Causes	44	100.0	1,041.2

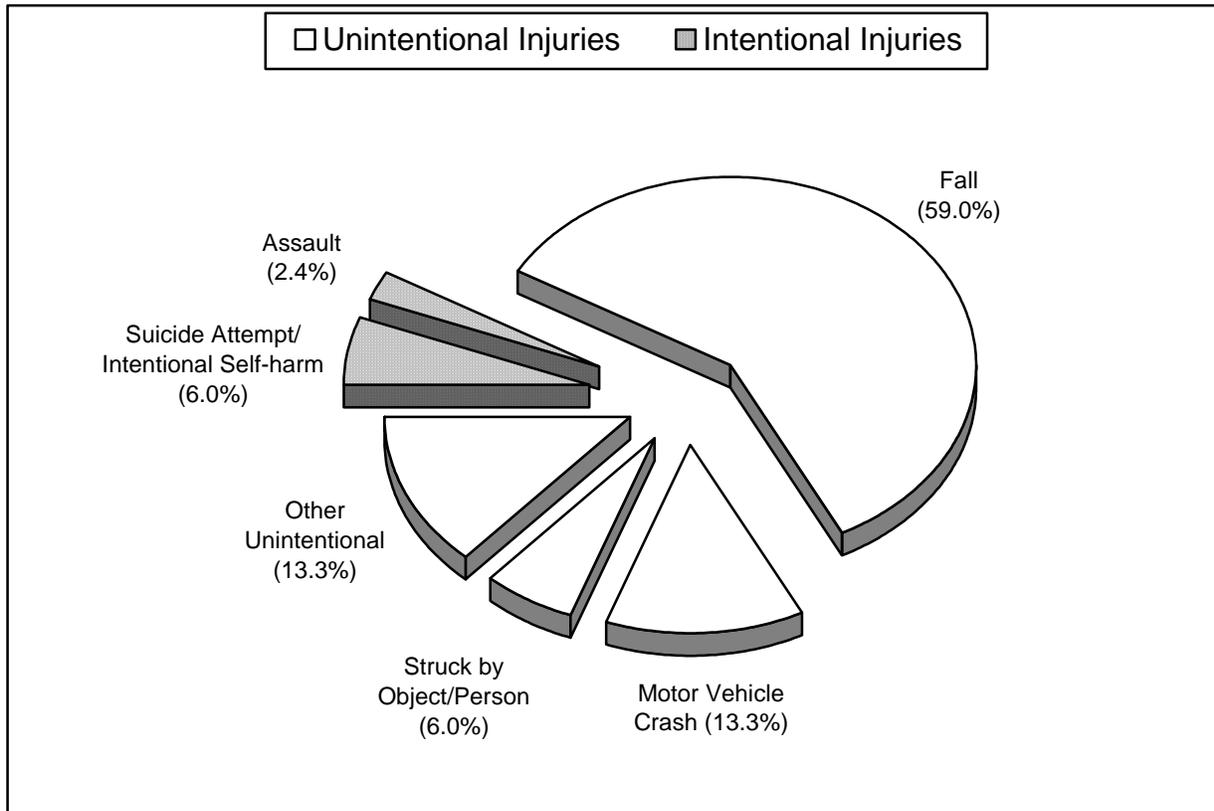
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 29
Causes of Injury Hospitalization
Presque Isle County Residents, 2002
(N = 83 E-coded cases)



E-coding rate for Presque Isle County: 93%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 47
Specific Causes of Injury Hospitalization
Presque Isle County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	49	Struck by Object/Person	2	Poisoning	3
MVC – Occupant	7			Firearm	1
Struck by Object/Person	5			Hanging	1
Machinery	2				
MVC – Pedestrian	2				
Overexertion	2				
Other	9				
Total	76	Total	2	Total	5

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 48
 Leading Causes of Injury Hospitalization, by Age Group
 Presque Isle County Residents, 2002
 Cause of Injury Coding Rate: 93% (83 of 89 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	1	100.0	*
5 – 14	All Causes	2	100.0	*
15 – 24	1. Unintentional Motor Vehicle Crash	4	40.0	*
	2. Suicide Attempt/Intentional Self-harm	3	30.0	*
	All Causes	10	100.0	579.7
25 – 44	1. Unintentional Fall	2	18.2	*
	1. Unintentional Motor Vehicle Crash	2	18.2	*
	All Causes	11	100.0	354.7
45 – 64	1. Unintentional Fall	11	64.7	276.2
	2. Unintentional Machinery	2	11.8	*
	2. Unintentional Motor Vehicle Crash	2	11.8	*
	All Causes	17	100.0	426.9
65+	1. Unintentional Fall	35	83.3	1,072.0
	2. Unintentional Motor Vehicle Crash	3	7.1	*
	All Causes	42	100.0	1,286.4

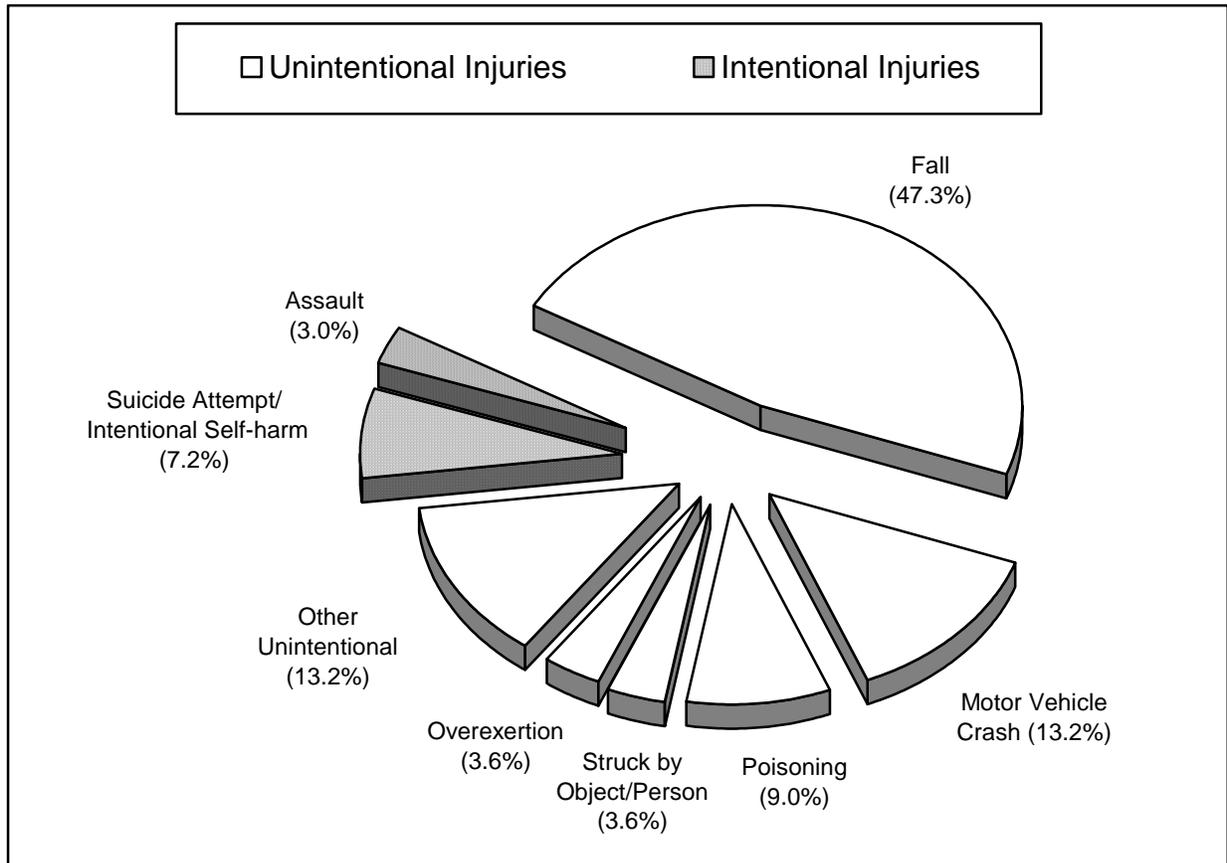
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 30
Causes of Injury Hospitalization
Roscommon County Residents, 2002
(N = 167 E-coded cases)



E-coding rate for Roscommon County: 90%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 49
Specific Causes of Injury Hospitalization
Roscommon County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	79	Struck by Object/Person	3	Poisoning	10
MVC – Occupant	19	Other	2	Sharp Object	2
Poisoning	15				
Overexertion	6				
Struck by Object/Person	6				
Snowmobile Crash	5				
Bicyclist, non-MVC	3				
Fire/Flames	2				
Hot Object	2				
Other	13				
Total	150	Total	5	Total	12

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 50
 Leading Causes of Injury Hospitalization, by Age Group
 Roscommon County Residents, 2002
 Cause of Injury Coding Rate: 90% (167 of 185 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	All Causes ¹	1	100.0	*
5 – 14	1. Unintentional Motor Vehicle Crash	2	33.3	*
	All Causes	6	100.0	206.8
15 – 24	1. Suicide Attempt/Intentional Self-harm	3	27.3	*
	2. Unintentional Poisoning	2	18.2	*
	2. Unintentional Struck by Object/Person	2	18.2	*
	All Causes	11	100.0	386.4
25 – 44	1. Unintentional Poisoning	7	21.9	131.3
	2. Suicide Attempt/Intentional Self-harm	5	15.6	*
	3. Unintentional Motor Vehicle Crash	4	12.5	*
	4. Assault	3	9.4	*
	4. Unintentional Snowmobile Crash	3	9.4	*
	All Causes	32	100.0	600.4
45 – 64	1. Unintentional Fall	15	37.5	201.4
	2. Unintentional Motor Vehicle Crash	10	25.0	134.3
	3. Unintentional Poisoning	4	10.0	*
	4. Unintentional Overexertion	3	7.5	*
	All Causes	40	100.0	537.1
65+	1. Unintentional Fall	62	80.5	991.8
	2. Unintentional Motor Vehicle Crash	5	6.5	*
	3. Unintentional Overexertion	3	3.9	*
	4. Unintentional Poisoning	2	2.6	*
	All Causes	77	100.0	1,231.8

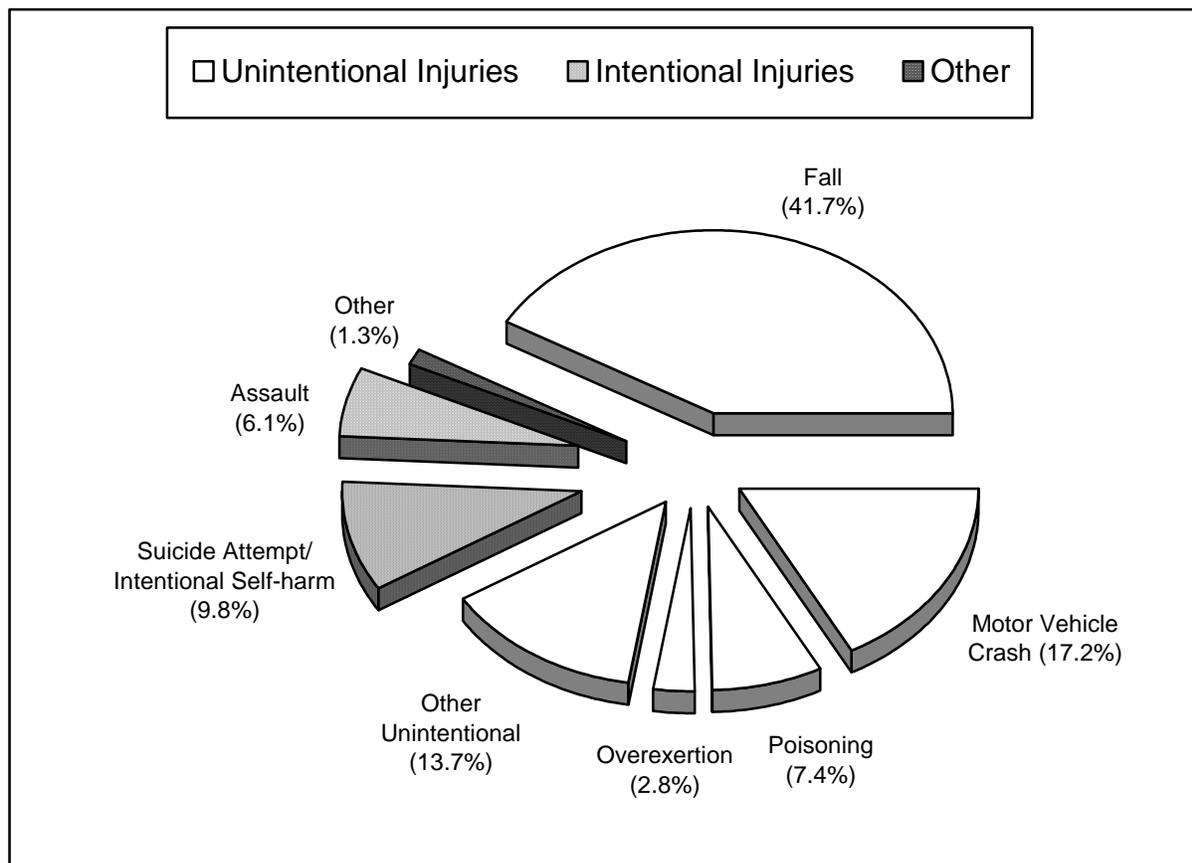
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 31
Causes of Injury Hospitalization
Saginaw County Residents, 2002
(N = 1,417 E-coded cases)



E-coding rate for Saginaw County: 94%
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 51
Specific Causes of Injury Hospitalization
Saginaw County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	591	Firearm	30	Poisoning	133
MVC – Occupant	189	Struck by Object/Person	29	Firearm	2
Poisoning	105	Sharp Object	15	Sharp Object	2
Overexertion	39	Hot Object	2	Jump	1
Struck by Object/Person	34	Poisoning	1	Other	1
MVC – Pedestrian	23	Other	10		
Firearm	15				
MVC – Motorcyclist	13				
Sharp Object	13				
Machinery	12				
Other	139				
Total	1,173	Total	87	Total	139

Causes not classifiable above comprised 18 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 52
 Leading Causes of Injury Hospitalization, by Age Group
 Saginaw County Residents, 2002
 Cause of Injury Coding Rate: 94% (1,417 of 1,505 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Poisoning	16	30.8	114.8
	2. Unintentional Fall	9	17.3	64.6
	3. Assault	7	13.5	50.2
	3. Unintentional Motor Vehicle Crash	7	13.5	50.2
	5. Unintentional Suffocation	4	7.7	*
	All Causes ¹	52	100.0	373.2
5 – 14	1. Unintentional Fall	24	35.3	76.7
	2. Unintentional Motor Vehicle Crash	14	20.6	44.8
	3. Unintentional Struck by Object/Person	6	8.8	19.2
	4. Suicide Attempt/Intentional Self-harm	5	7.4	*
	5. Unintentional Bicycle Crash, non-MVC	3	4.4	*
	5. Unintentional Firearm	3	4.4	*
	All Causes	68	100.0	217.4
15 – 24	1. Unintentional Motor Vehicle Crash	61	33.7	206.7
	2. Assault	29	16.0	98.3
	3. Suicide Attempt/Intentional Self-harm	26	14.4	88.1
	4. Unintentional Fall	20	11.0	67.8
	5. Unintentional Poisoning	7	3.9	23.7
	All Causes	181	100.0	613.3
25 – 44	1. Unintentional Motor Vehicle Crash	78	23.1	141.1
	2. Suicide Attempt/Intentional Self-harm	76	22.6	137.4
	3. Unintentional Fall	49	14.5	88.6
	4. Assault	37	11.0	66.9
	5. Unintentional Poisoning	30	8.9	54.3
	All Causes	337	100.0	609.4
45 – 64	1. Unintentional Fall	90	35.6	175.2
	2. Unintentional Motor Vehicle Crash	47	18.6	91.5
	3. Unintentional Poisoning	28	11.1	54.5
	4. Suicide Attempt/Intentional Self-harm	24	9.5	46.7
	5. Unintentional Overexertion	12	4.7	23.4
	All Causes	253	100.0	492.4
65+	1. Unintentional Fall	399	75.9	1,390.7
	2. Unintentional Motor Vehicle Crash	37	7.0	129.0
	3. Unintentional Poisoning	24	4.6	83.7
	4. Unintentional Overexertion	12	2.3	41.8
	5. Unintentional Struck by Object/Person	8	1.5	27.9
	All Causes	526	100.0	1,833.4

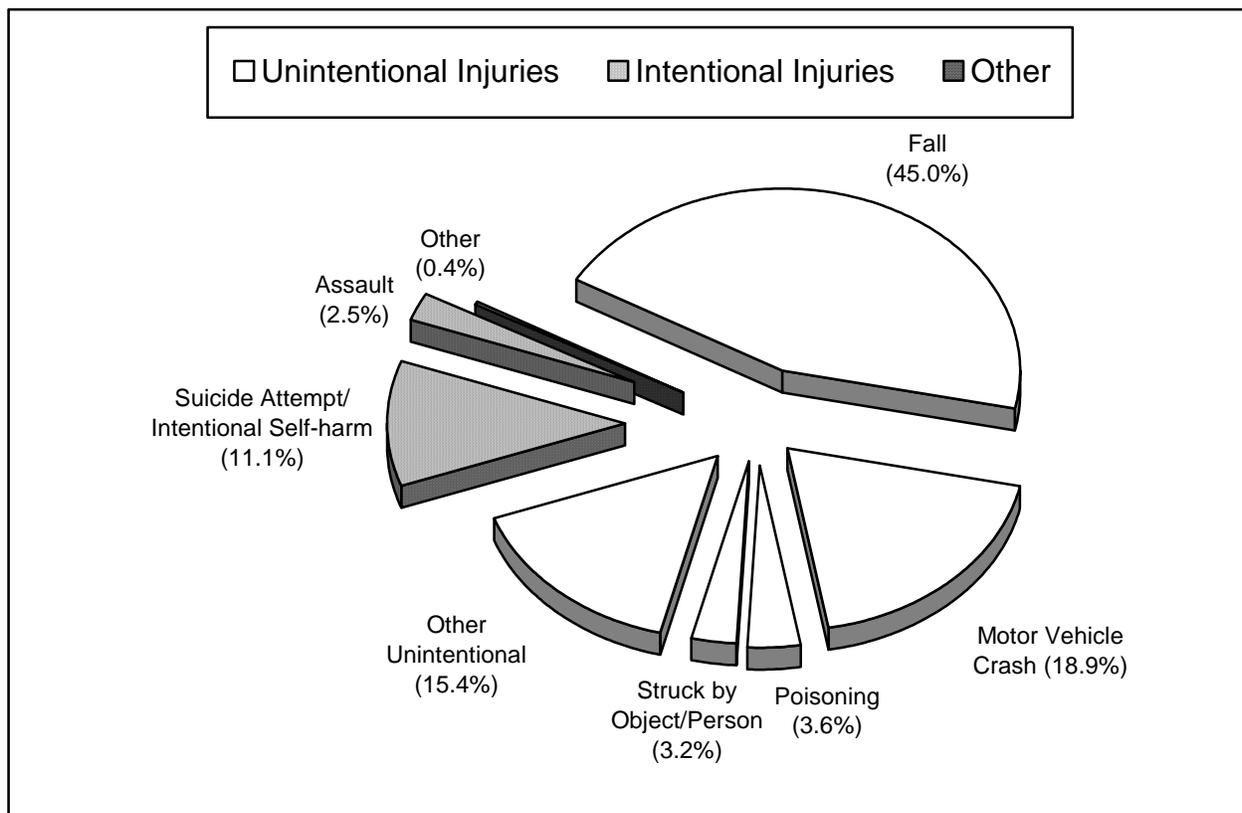
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 32
Causes of Injury Hospitalization
St. Clair County Residents, 2002
(N = 729 E-coded cases)



E-coding rate for St. Clair County: 90%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 53
Specific Causes of Injury Hospitalization
St. Clair County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	328	Struck by Object/Person	10	Poisoning	72
MVC – Occupant	106	Sharp Object	3	Sharp Object	4
Poisoning	26	Firearm	2	Firearm	2
Struck by Object/Person	23	Other	3	Other	3
MVC – Motorcyclist	17				
Sharp Object	14				
Machinery	8				
Fire/Flames	7				
Bicyclist, non-MVC	6				
Snowmobile Crash	6				
Bite/Sting	5				
Overexertion	5				
Other	76				
Total	627	Total	18	Total	81

Causes not classifiable above comprised three cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 54
 Leading Causes of Injury Hospitalization, by Age Group
 St. Clair County Residents, 2002
 Cause of Injury Coding Rate: 90% (729 of 811 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	2	22.2	*
	1. Unintentional Poisoning	2	22.2	*
	All Causes ¹	9	100.0	84.3
5 – 14	1. Unintentional Motor Vehicle Crash	5	17.2	*
	2. Suicide Attempt/Intentional Self-harm	4	13.8	*
	2. Unintentional Struck by Object/Person	4	13.8	*
	4. Unintentional Fall	3	10.3	*
	All Causes	29	100.0	116.9
15 – 24	1. Unintentional Motor Vehicle Crash	47	44.8	207.4
	2. Suicide Attempt/Intentional Self-harm	16	15.2	70.6
	3. Assault	7	6.7	30.9
	3. Unintentional Fall	7	6.7	30.9
	5. Unintentional Struck by Object/Person	6	5.7	26.5
	All Causes	105	100.0	463.2
25 – 44	1. Suicide Attempt/Intentional Self-harm	39	24.7	81.1
	2. Unintentional Motor Vehicle Crash	35	22.2	72.8
	3. Unintentional Fall	33	20.9	68.6
	4. Assault	8	5.1	16.6
	5. Unintentional Poisoning	6	3.8	12.5
	All Causes	158	100.0	328.5
45 – 64	1. Unintentional Fall	51	36.4	124.7
	2. Unintentional Motor Vehicle Crash	33	23.6	80.7
	3. Suicide Attempt/Intentional Self-harm	14	10.0	34.2
	4. Unintentional Poisoning	10	7.1	24.5
	5. Unintentional Struck by Object/Person	6	4.3	14.7
	All Causes	140	100.0	342.3
65+	1. Unintentional Fall	232	80.6	1,127.1
	2. Unintentional Motor Vehicle Crash	18	6.3	87.4
	3. Unintentional Poisoning	8	2.8	38.9
	3. Suicide Attempt/Intentional Self-harm	8	2.8	38.9
	5. Unintentional Struck by Object/Person	5	1.7	*
	All Causes	288	100.0	1,399.1

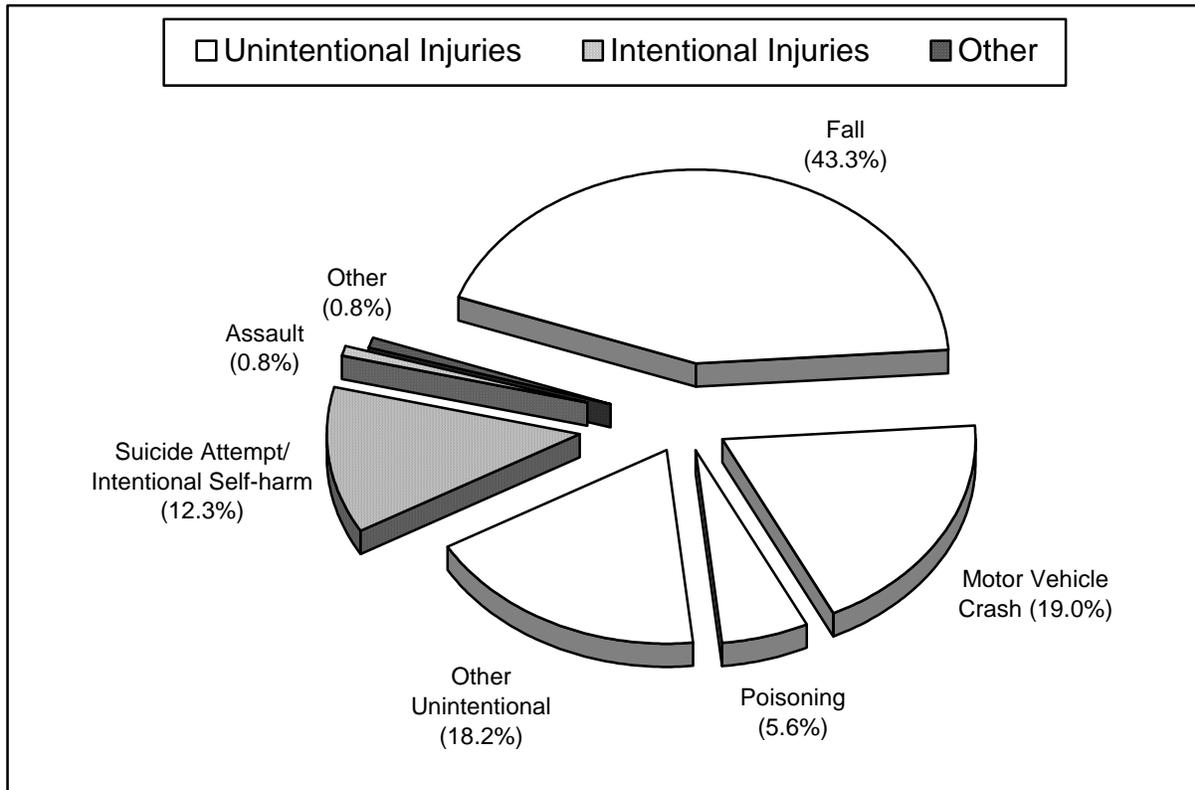
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 33
Causes of Injury Hospitalization
St. Joseph County Residents, 2002
(N = 358 E-coded cases)



E-coding rate for St. Joseph County: 96%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 55
Specific Causes of Injury Hospitalization
St. Joseph County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	155	Sharp Object	1	Poisoning	43
MVC – Occupant	59	Struck by Object/Person	1	Sharp Object	1
Poisoning	20	Other	1		
Struck by Object/Person	9				
Overexertion	8				
Fire/Flames	5				
Bicyclist, non-MVC	5				
Bite/Sting	4				
Machinery	3				
MVC – Motorcyclist	3				
Other	37				
Total	308	Total	3	Total	44

Causes not classifiable above comprised three cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 56
 Leading Causes of Injury Hospitalization, by Age Group
 St. Joseph County Residents, 2002
 Cause of Injury Coding Rate: 96% (358 of 372 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	2	50.0	*
	All Causes ¹	4	100.0	*
5 – 14	1. Unintentional Fall	5	22.7	*
	2. Unintentional Motor Vehicle Crash	4	18.2	*
	3. Suicide Attempt/Intentional Self-harm	3	13.6	*
	4. Unintentional Poisoning	2	9.1	*
	4. Unintentional Struck by Object/Person	2	9.1	*
	All Causes	22	100.0	233.3
15 – 24	1. Unintentional Motor Vehicle Crash	15	35.7	170.2
	2. Suicide Attempt/Intentional Self-harm	9	21.4	102.1
	3. Unintentional Fall	6	14.3	68.1
	4. Unintentional Struck by Object/Person	3	7.1	*
	5. Unintentional Bicyclist, non-MVC	2	4.8	*
	All Causes	42	100.0	476.6
25 – 44	1. Unintentional Motor Vehicle Crash	24	34.3	141.9
	2. Suicide Attempt/Intentional Self-harm	17	24.3	100.5
	3. Unintentional Fall	4	5.7	*
	4. Unintentional Fire/Flames	3	4.3	*
	4. Unintentional Poisoning	3	4.3	*
	All Causes	70	100.0	413.9
45 – 64	1. Unintentional Fall	21	31.8	142.2
	2. Unintentional Motor Vehicle Crash	15	22.7	101.6
	3. Suicide Attempt/Intentional Self-harm	11	16.7	74.5
	4. Unintentional Poisoning	7	10.6	47.4
	5. Unintentional Overexertion	3	4.5	*
	All Causes	66	100.0	447.0
65+	1. Unintentional Fall	117	76.0	1,454.9
	2. Unintentional Motor Vehicle Crash	9	5.8	111.9
	3. Unintentional Poisoning	7	4.5	87.0
	4. Suicide Attempt/Intentional Self-harm	4	2.6	*
	All Causes	154	100.0	1,914.9

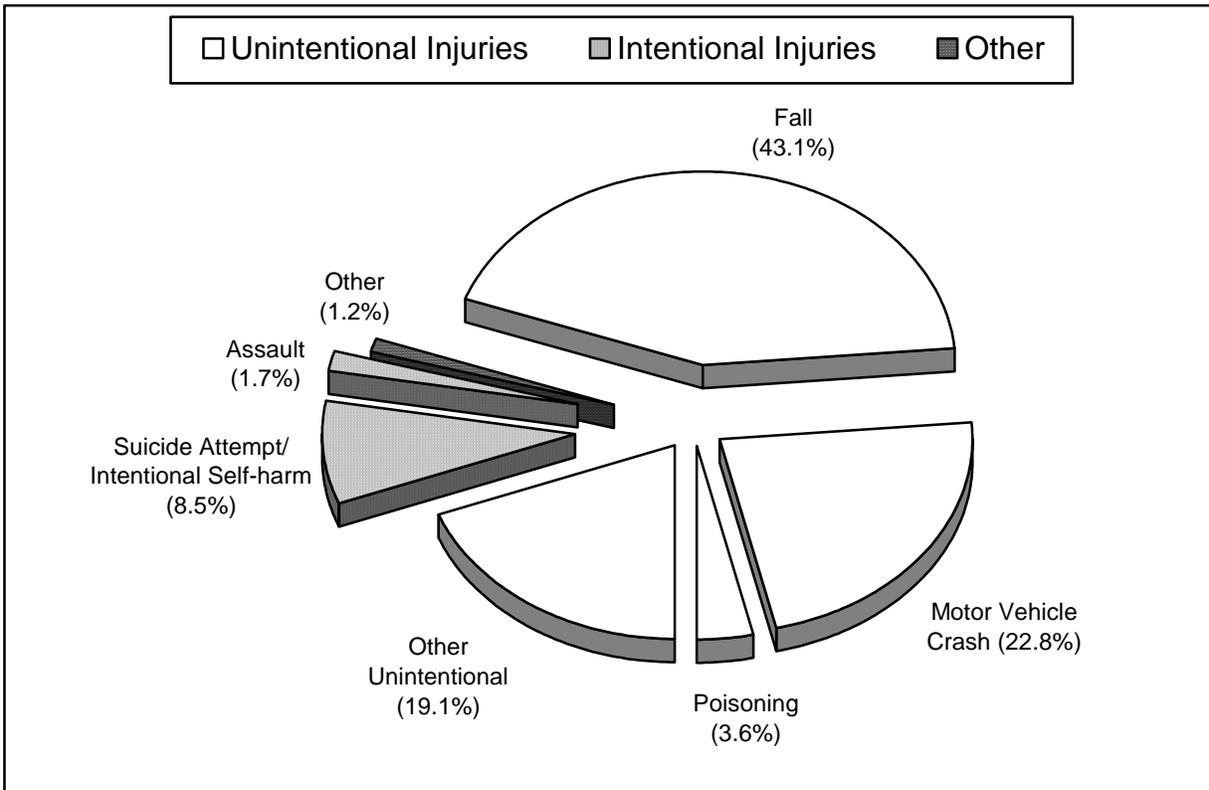
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 34
Causes of Injury Hospitalization
Van Buren County Residents, 2002
(N = 413 E-coded cases)



E-coding rate for Van Buren County: 94%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 57
Specific Causes of Injury Hospitalization
Van Buren County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	178	Struck by Object/Person	5	Poisoning	31
MVC – Occupant	76	Other	2	Hanging	2
Poisoning	15			MVC	1
Fire/Flames	9			Sharp Object	1
MVC – Motorcyclist	8				
MVC – Pedestrian	6				
Machinery	5				
Overexertion	5				
Sharp Object	5				
Snowmobile Crash	5				
Struck by Object/Person	5				
Suffocation	4				
Other	45				
Total	366	Total	7	Total	35

Causes not classifiable above comprised five cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 58
 Leading Causes of Injury Hospitalization, by Age Group
 Van Buren County Residents, 2001
 Cause of Injury Coding Rate: 94% (413 of 440 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	3	30.0	*
	1. Unintentional Motor Vehicle Crash	3	30.0	*
	All Causes ¹	10	100.0	194.3
5 – 14	1. Unintentional Fall	5	21.7	*
	2. Unintentional Fire/Flames	4	17.4	*
	2. Unintentional Motor Vehicle Crash	4	17.4	*
	4. Unintentional Hot Object	2	8.7	*
	4. Suicide Attempt/Intentional Self-harm	2	8.7	*
	All Causes	23	100.0	192.9
15 – 24	1. Unintentional Motor Vehicle Crash	26	46.4	238.3
	2. Suicide Attempt/Intentional Self-harm	11	19.6	100.8
	3. Unintentional Fall	5	8.9	*
	4. Assault	2	3.6	*
	All Causes	56	100.0	513.3
25 – 44	1. Unintentional Motor Vehicle Crash	37	32.7	179.3
	2. Suicide Attempt/Intentional Self-harm	17	15.0	82.4
	3. Unintentional Fall	14	12.4	67.8
	4. Unintentional Poisoning	8	7.1	38.8
	All Causes	113	100.0	547.5
45 – 64	1. Unintentional Fall	26	41.9	135.4
	2. Unintentional Motor Vehicle Crash	17	27.4	88.5
	3. Suicide Attempt/Intentional Self-harm	4	6.5	*
	3. Unintentional Poisoning	4	6.5	*
	5. Assault	3	4.8	*
	All Causes	62	100.0	322.9
65+	1. Unintentional Fall	125	83.9	1,326.8
	2. Unintentional Motor Vehicle Crash	7	4.7	74.3
	3. Unintentional Poisoning	3	2.0	*
	4. Unintentional Bite/Sting	2	1.3	*
	4. Unintentional Overexertion	2	1.3	*
	All Causes	149	100.0	1,581.6

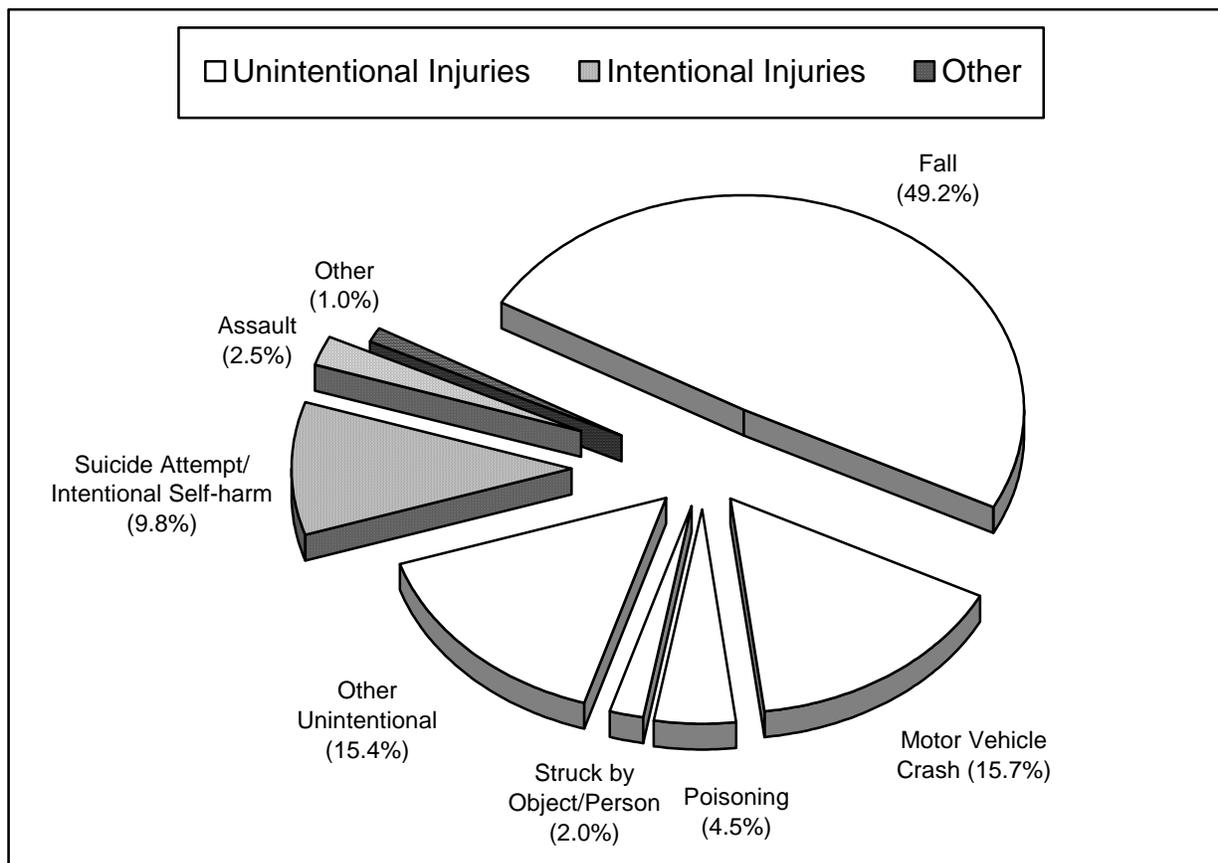
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 35
Causes of Injury Hospitalization
Washtenaw County Residents, 2002
(N = 1,302 E-coded cases)



E-coding rate for Washtenaw County: 93%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 59
Specific Causes of Injury Hospitalization
Washtenaw County Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	640	Struck by Object/Person	10	Poisoning	114
MVC – Occupant	157	Firearm	7	Sharp Object	8
Poisoning	59	Sharp Object	6	Other	6
Overexertion	26	Other	9		
Bicyclist, non-MVC	19				
MVC – Motorcyclist	19				
Struck by Object/Person	19				
MVC – Pedestrian	17				
Hot Object	14				
Sharp Object	14				
Other	145				
Total	1,129	Total	32	Total	128

Causes not classifiable above comprised 13 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 60
 Leading Causes of Injury Hospitalization, by Age Group
 Washtenaw County Residents, 2002
 Cause of Injury Coding Rate: 93% (1,302 of 1,401 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	20	43.5	95.7
	2. Unintentional Poisoning	9	19.6	43.1
	3. Unintentional Hot Object	5	10.9	*
	4. Unintentional Motor Vehicle Crash	3	6.5	*
	All Causes ¹	46	100.0	220.2
5 – 14	1. Unintentional Fall	26	44.8	63.6
	2. Suicide Attempt/Intentional Self-harm	5	8.6	*
	2. Unintentional Motor Vehicle Crash	5	8.6	*
	2. Unintentional Struck by Object/Person	5	8.6	*
	All Causes	58	100.0	141.9
15 – 24	1. Unintentional Motor Vehicle Crash	42	29.0	65.3
	2. Suicide Attempt/Intentional Self-harm	32	22.1	49.7
	3. Unintentional Fall	25	17.2	38.8
	4. Assault	12	8.3	18.6
	All Causes	145	100.0	225.3
25 – 44	1. Unintentional Fall	73	24.8	67.9
	2. Unintentional Motor Vehicle Crash	70	23.8	65.1
	3. Suicide Attempt/Intentional Self-harm	50	17.0	46.5
	4. Unintentional Poisoning	16	5.4	14.9
	5. Assault	14	4.8	13.0
	All Causes	294	100.0	273.3
45 – 64	1. Unintentional Fall	94	36.7	128.8
	2. Unintentional Motor Vehicle Crash	48	18.8	65.8
	3. Suicide Attempt/Intentional Self-harm	36	14.1	49.3
	4. Unintentional Poisoning	14	5.5	19.2
	All Causes	256	100.0	350.8
65+	1. Unintentional Fall	402	79.9	1,453.8
	2. Unintentional Motor Vehicle Crash	36	7.2	130.2
	3. Unintentional Poisoning	16	3.2	57.9
	4. Suicide Attempt/Intentional Self-harm	5	1.0	*
	All Causes	503	100.0	1,819.1

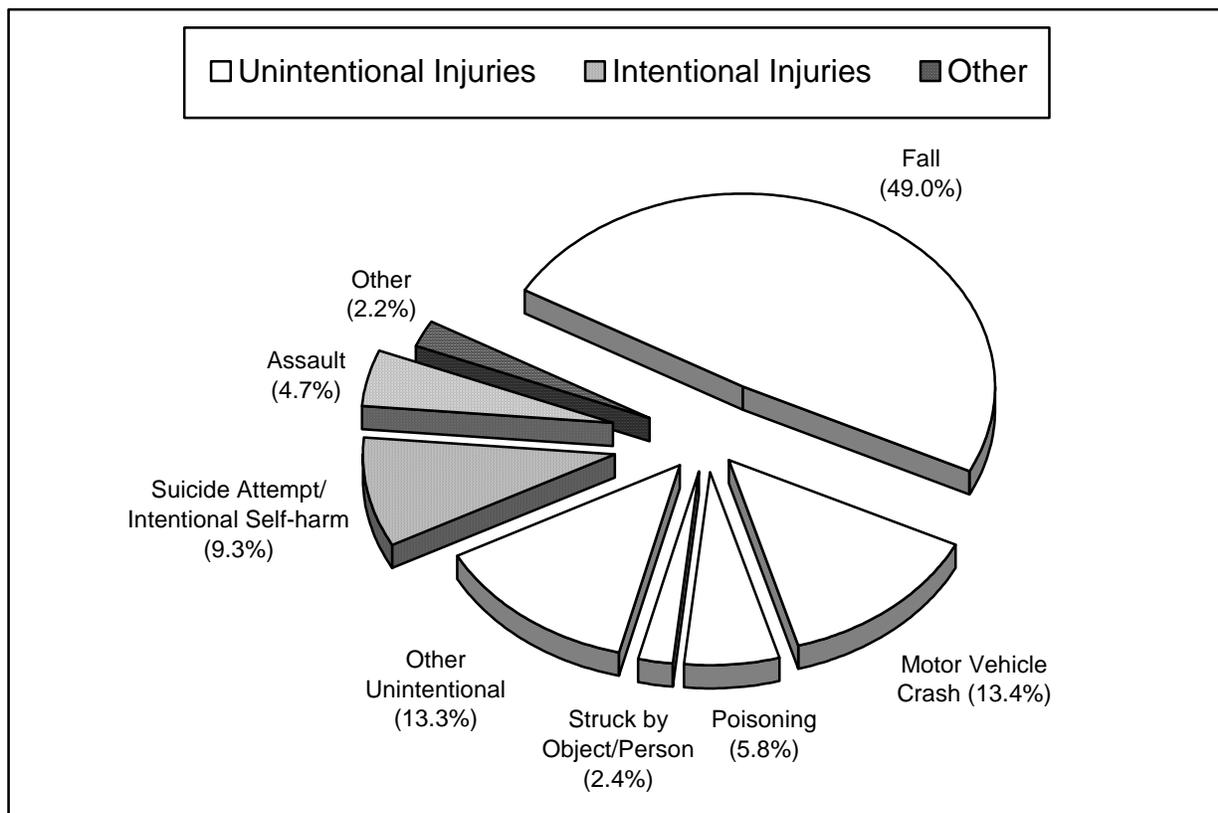
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 36
Causes of Injury Hospitalization
Wayne Out-county Residents, 2002
(N = 5,595 E-coded cases)



E-coding rate for Wayne Out-county: 91%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 61
Specific Causes of Injury Hospitalization
Wayne Out-county Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	2,739	Struck by Object/Person	106	Poisoning	482
MVC – Occupant	525	Firearm	55	Sharp Object	19
Poisoning	327	Sharp Object	34	Firearm	5
Struck by Object/Person	135	MVC	7	Hanging	5
MVC – Pedestrian	88	Hot Object	3	Other	7
MVC – Motorcyclist	79	Other	56		
Overexertion	70				
Hot Object	64				
Sharp Object	57				
Fire/Flames	56				
Machinery	53				
Bicyclist, non-MVC	51				
Other	449				
Total	4,693	Total	261	Total	518

Causes not classifiable above comprised 123 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 62
 Leading Causes of Injury Hospitalization, by Age Group
 Wayne Out-county Residents, 2002
 Cause of Injury Coding Rate: 91% (5,595 of 6,117 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Fall	39	29.5	50.2
	2. Unintentional Hot Object	27	20.5	34.8
	3. Unintentional Poisoning	18	13.6	23.2
	4. Assault	9	6.8	11.6
	5. Unintentional Motor Vehicle Crash	8	6.1	10.3
	All Causes ¹	132	100.0	169.9
5 – 14	1. Unintentional Fall	75	31.1	44.2
	2. Unintentional Motor Vehicle Crash	53	22.0	31.2
	3. Unintentional Struck by Object/Person	25	10.4	14.7
	4. Bicyclist, non-Motor Vehicle Crash	18	7.5	10.6
	5. Suicide Attempt/Intentional Self-harm	10	4.1	5.9
	All Causes	241	100.0	142.0
15 – 24	1. Unintentional Motor Vehicle Crash	154	26.2	110.1
	2. Suicide Attempt/Intentional Self-harm	136	23.1	97.3
	3. Assault	66	11.2	47.2
	4. Unintentional Fall	59	10.0	42.2
	5. Unintentional Poisoning	43	7.3	30.8
	All Causes	588	100.0	420.5
25 – 44	1. Unintentional Fall	261	20.9	74.6
	2. Suicide Attempt/Intentional Self-harm	230	18.4	65.7
	3. Unintentional Motor Vehicle Crash	213	17.0	60.9
	4. Assault	125	10.0	35.7
	5. Unintentional Poisoning	108	8.6	30.9
	All Causes	1,250	100.0	357.2
45 – 64	1. Unintentional Fall	420	39.5	157.5
	2. Unintentional Motor Vehicle Crash	175	16.5	65.6
	3. Suicide Attempt/Intentional Self-harm	125	11.8	46.9
	4. Unintentional Poisoning	88	8.3	33.0
	5. Assault	48	4.5	18.0
	All Causes	1,063	100.0	398.7
65+	1. Unintentional Fall	1,885	81.2	1,241.1
	2. Unintentional Motor Vehicle Crash	147	6.3	96.8
	3. Unintentional Poisoning	66	2.8	43.5
	4. Unintentional Overexertion	28	1.2	18.4
	5. Suicide Attempt/Intentional Self-harm	17	0.7	11.2
	All Causes	2,321	100.0	1,528.21

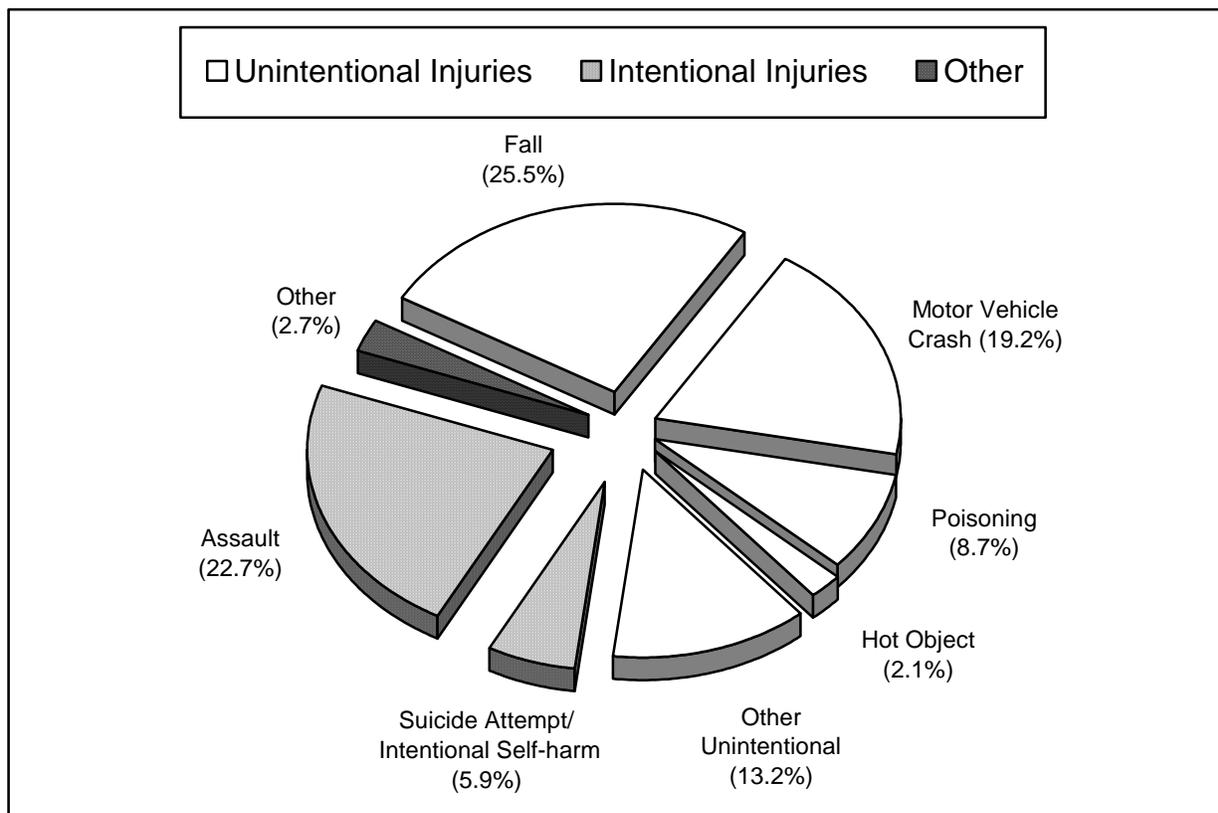
1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

FIGURE 37
Causes of Injury Hospitalization
Detroit City Residents, 2002
(N = 5,867 E-coded cases)



E-coding rate for Detroit City: 94%
 Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 63
Specific Causes of Injury Hospitalization
Detroit City Residents, 2002

Unintentional		Assault		Suicide Attempt/ Intentional Self-harm	
Cause	No.	Cause	No.	Cause	No.
Fall	1,496	Struck by Object/Person	507	Poisoning	312
MVC – Occupant	734	Firearm	435	Sharp Object	13
Poisoning	508	Sharp Object	188	Firearm	10
MVC – Pedestrian	247	MVC	10	Jump	3
Hot Object	123	Hot Object	9	Hanging	3
Struck by Object/Person	101	Fire/Flames	4	Other	8
Fire/Flames	91	Other	178		
Sharp Object	79				
Firearm	68				
MVC – Motorcyclist	63				
Overexertion	51				
Machinery	41				
Other	424				
Total	4,026	Total	1,331	Total	349

Causes not classifiable above comprised 161 cases.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 64
 Leading Causes of Injury Hospitalization, by Age Group
 Detroit City Residents, 2002
 Cause of Injury Coding Rate: 94% (5,867 of 6,232 discharges)

Age Group	Cause of Injury	No.	%	Rate
<5	1. Unintentional Poisoning	92	29.6	125.5
	2. Unintentional Hot Object	61	19.6	83.2
	3. Unintentional Fall	52	16.7	70.9
	4. Assault	27	8.7	36.8
	5. Unintentional Motor Vehicle Crash	25	8.0	34.1
	All Causes ¹	311	100.0	424.1
5 – 14	1. Unintentional Motor Vehicle Crash	95	30.4	58.6
	2. Unintentional Fall	53	16.9	32.7
	3. Unintentional Struck by Object/Person	21	6.7	13.0
	4. Assault	19	6.1	11.7
	4. Unintentional Poisoning	19	6.1	11.7
	All Causes	313	100.0	193.2
15 – 24	1. Assault	320	39.0	258.5
	2. Unintentional Motor Vehicle Crash	210	25.6	169.7
	3. Suicide Attempt/Intentional Self-harm	62	7.6	50.1
	4. Unintentional Fall	54	6.6	43.6
	5. Unintentional Firearm	32	3.9	25.9
	All Causes	821	100.0	663.3
25 – 44	1. Assault	619	32.3	248.7
	2. Unintentional Motor Vehicle Crash	420	21.9	168.7
	3. Unintentional Fall	232	12.1	93.2
	4. Suicide Attempt/Intentional Self-harm	183	9.5	73.5
	5. Unintentional Poisoning	139	7.3	55.8
	All Causes	1,917	100.0	770.1
45 – 64	1. Unintentional Fall	358	25.0	187.3
	2. Assault	321	22.4	168.0
	3. Unintentional Motor Vehicle Crash	265	18.5	138.7
	4. Unintentional Poisoning	167	11.7	87.4
	5. Suicide Attempt/Intentional Self-harm	82	5.7	42.9
	All Causes	1,433	100.0	749.8
65+	1. Unintentional Fall	747	69.7	823.1
	2. Unintentional Motor Vehicle Crash	110	10.3	121.2
	3. Unintentional Poisoning	62	5.8	68.3
	4. Assault	25	2.3	27.5
	5. Unintentional Fire/Flames	18	1.7	19.8
	All Causes	1,072	100.0	1,181.2

1. Represents the total number of E-coded cases, not the total number of injury hospitalizations, in the age group.

* Reliable rate could not be calculated. See Methods.

Rates are number of hospitalizations per 100,000 population.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

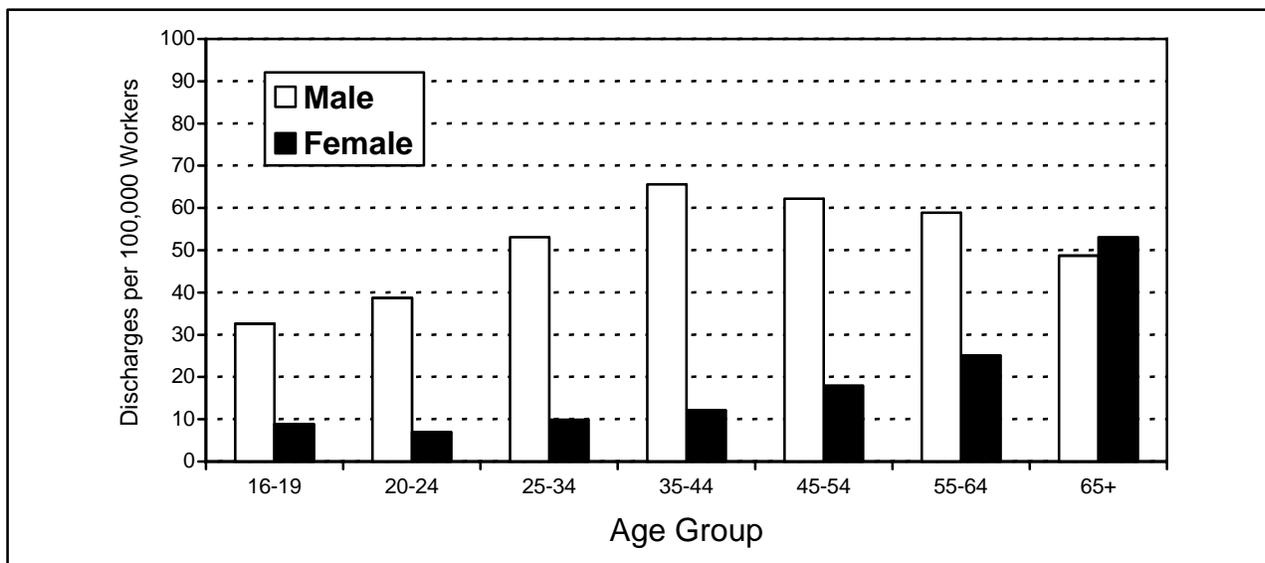
Occupational Injuries

Workers' compensation was listed as the primary payer for 1,725 (3.4%) of the 51,247 injury hospitalizations to Michigan residents aged 16 and older. This was slightly lower than the proportions found in the 1999 and 2001 injury hospitalization studies (3.8% and 3.7%, respectively). Forty (2.3%) of the 1,725 cases were out-of-state hospitalizations.

Demographics of Injury Inpatients

Rates of work-related injury hospitalization by age and sex are illustrated in Figure 38. (The corresponding data can be found in Table B-1 in Appendix B.) Rates were substantially higher for males than females for ages 16-64. While rates for males peaked in the 35-44 year age group then decreased, the rates for females increased with age after age 19 and surpassed the rate for males for those aged 65 and older. This was similar to the pattern found in the 2001 Michigan injury hospitalization study.

FIGURE 38
Rate of Occupational Injury Hospitalizations
By Age and Sex
Michigan Residents Aged 16 and Older, 2002



Occupational injury discharges were defined as those for which the primary payment source was workers' compensation.
Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
Bureau of Labor Statistics, U.S. Department of Labor, Local Area Unemployment Statistics

Table 65 illustrates hospitalization rates for occupational injury by county of worker residence. Rates ranged from 12.7 per 100,000 workers in Washtenaw County to 124.8 per 100,000 workers in Presque Isle County. Among Michigan's ten most populous counties, Genesee had the highest rate (55.5). Rates were not calculated for 31 counties that had less than six discharges. Due to this level of missing information, a map illustrating county-specific hospitalization rates was not developed.

TABLE 65
Number and Rate of Occupational Injury Hospitalizations
By County of Residence
Michigan Residents Aged 16 and Older, 2002

County	Number of Hospitalizations	Rate	County	Number of Hospitalizations	Rate
Alcona	3	*	Lapeer	28	67.7
Alger	2	*	Leelanau	1	*
Allegan	22	41.2	Lenawee	28	65.1
Alpena	9	63.2	Livingston	22	26.6
Antrim	5	*	Luce	0	-
Arenac	4	*	Mackinac	0	-
Baraga	1	*	Macomb	135	32.5
Barry	11	36.3	Manistee	4	*
Bay	31	62.0	Marquette	15	49.9
Benzie	3	*	Mason	7	51.6
Berrien	32	43.1	Mecosta	10	58.9
Branch	14	64.5	Menominee	5	*
Calhoun	13	21.4	Midland	19	46.7
Cass	10	41.0	Missaukee	2	*
Charlevoix	5	*	Monroe	35	49.7
Cheboygan	9	84.2	Montcalm	11	46.7
Chippewa	8	50.2	Montmorency	5	*
Clare	8	82.5	Muskegon	33	44.3
Clinton	16	45.9	Newaygo	13	67.4
Crawford	1	*	Oakland	138	21.6
Delta	8	45.1	Oceana	10	76.8
Dickinson	5	*	Ogemaw	3	*
Eaton	18	31.8	Ontonagon	0	-
Emmet	9	52.0	Osceola	4	*
Genesee	95	55.5	Oscoda	1	*
Gladwin	5	*	Otsego	7	55.3
Gogebic	3	*	Ottawa	38	28.6
Grand Traverse	23	53.8	Presque Isle	7	124.8
Gratiot	9	48.6	Roscommon	5	*
Hillsdale	9	41.3	Saginaw	27	29.4
Houghton	7	44.2	St. Clair	27	35.3
Huron	6	38.2	St. Joseph	12	41.0
Ingham	47	32.2	Sanilac	4	*
Ionia	12	46.9	Schoolcraft	0	-
Iosco	4	*	Shiawassee	15	48.7
Iron	1	*	Tuscola	17	67.3
Isabella	15	46.6	Van Buren	23	68.2
Jackson	17	23.2	Washtenaw	22	12.7
Kalamazoo	42	34.3	Wayne	334	39.5
Kalkaska	5	*	Wexford	4	*
Kent	106	34.5			
Keweenaw	0	-			
Lake	1	*	Michigan	1,725	36.8

* Reliable rate could not be calculated. See Methods.

Occupational injury discharges were defined as those for which payment source was workers' compensation. Hospitalization rate is the number of hospitalizations per 100,000 workers.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
Bureau of Labor Statistics, U.S. Department of Labor, Local Area Unemployment Statistics

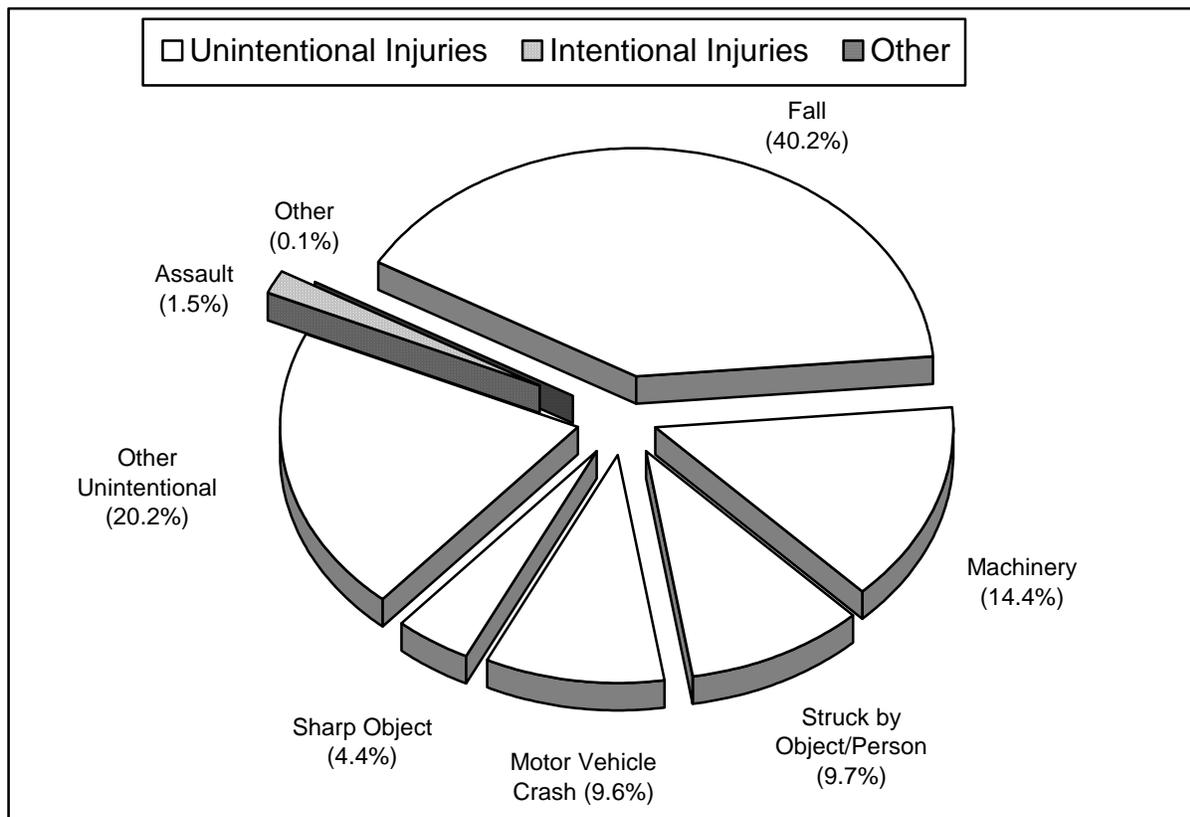
Types of Injuries Sustained

The types of occupational injuries requiring hospitalization are illustrated in Table 66. The table is a modified version of the more detailed Barell Matrix (Table 2) (body region categories have been collapsed into more general categories). The predominant type of injury was a fracture: it was the principal diagnosis in 51.7% of all work-related injury hospitalizations. More than half of all fractures were to the lower extremities. Certain types of injuries were much more common among occupational injury inpatients than among all injury inpatients aged 16 and older: upper limb fractures (11.2% vs. 6.5%); sprains and strains (11.9% vs. 3.8%); open wounds (7.2% vs. 3.8%); and burns (5.1% vs. 1.5%). Conversely, hip fractures (4.1% vs. 18.3%) and poisonings (0.9% vs. 14.3%) were much less prevalent among occupational injuries.

Causes of Injury

An external cause of injury code (E-code) was provided for 1,448 of the 1,725 work-related injury hospitalizations (E-coding rate: 84%). The leading causes of injury are illustrated in Figure 39. Falls were the leading cause of occupational injuries. Injuries caused by machinery were much more prevalent than they were among all injuries while motor vehicle crashes were slightly less prevalent (compare to Figure 6).

FIGURE 39
Causes of Occupational Injury Hospitalization
Michigan Residents Aged 16 and Older, 2002
(N = 1,448 E-coded cases)



E-coding rate for occupational injuries: 84%

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

TABLE 66
 Number of Occupational Injury Hospitalizations
 By Injury Type and Body Region
 Michigan Residents Aged 16 and Older, 2002

Body Region	Fracture	Dislocation	Sprain/ Strain	Internal	Open Wound	Amputation	Blood Vessels	Contusion/ Superficial	Crush	Burn	Nerves	Unspecified	TOTAL
Brain/Skull	41			95							0		136
Other Head, Face, Neck	21	0	0		32		3	4	0	18	1	7	86
Spinal Cord	14			2									16
Vertebral Column	74	14	19										107
Torso	55	1	2	83	4		4	12	1	12	0	6	180
Upper Extremity	193	0	148		52	49	7	2	17	39	11	2	520
Lower Extremity	494	13	36		37	7	2	10	11	18		1	629
Other & Unspecified	0	0	0	0	0	0	0	0	0	1	1	0	2
System-wide & Late Effects													49
TOTAL	892	28	205	180	125	56	16	28	29	88	13	16	1,725

Injury categories were based on principal diagnosis.

The Barell Matrix illustrated in Table 2 utilized more specific body regions. Table C-2 in Appendix C illustrates the composition of the broader body regions listed above.

Occupational injury discharges were defined as those for which payment source was workers' compensation.

Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

Temporal Analysis

Table 67 and Table 68 illustrate the day of week and the month in which patients were admitted to the hospital with a work-related injury. Day of admission is not necessarily equivalent to day of injury incident, but in most cases it is probably a good marker for day of incident. Most admissions occurred on Tuesdays, while the least occurred on the weekend. The greatest number of admissions occurred in January. These same results were found in the 2001 Michigan injury hospitalization report.

TABLE 67
Number of Occupational Injury Hospitalizations
By Day of Hospital Admission
Michigan Residents Aged 16 and Older, 2002

Day of Week	Number	%
Monday	300	17.4
Tuesday	329	19.1
Wednesday	305	17.7
Thursday	316	18.3
Friday	274	15.9
Saturday	132	7.7
Sunday	69	4.0
Total	1,725	100.0

TABLE 68
Number of Occupational Injury Hospitalizations
By Month of Hospital Admission
Michigan Residents Aged 16 and Older, 2002

Month of Admission	Number	%
January	184	10.7
February	157	9.1
March	144	8.3
April	127	7.4
May	140	8.1
June	143	8.3
July	158	9.2
August	134	7.8
September	129	7.5
October	144	8.3
November	120	7.0
December	145	8.4
Total	1,725	100.0

Occupational injury discharges were defined as those for which payment source was workers' compensation.
Source: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH

APPENDIX A

Data Tables for Injury Hospitalizations to All Michigan Residents

TABLE A-1
 Number and Rate of Injury Hospitalizations
 By Age and Sex
 Michigan Residents, 2002

Age	Male		Female		Total	
	Number	Rate	Number	Rate	Number	Rate
<1	212	308.2	162	247.8	374	278.8
1-4	768	283.4	538	208.2	1,307	246.9
5-9	668	185.8	437	127.7	1,105	157.5
10-14	1,058	269.8	539	144.6	1,597	208.8
15-19	2,140	577.2	1,257	356.8	3,398	469.9
20-24	2,198	633.5	1,022	300.2	3,221	468.6
25-29	1,827	588.6	913	298.3	2,742	444.8
30-34	1,918	536.6	1,001	281.8	2,920	409.7
35-39	2,245	596.4	1,285	339.9	3,530	467.9
40-44	2,365	589.8	1,405	344.5	3,771	466.2
45-49	2,231	586.3	1,507	385.6	3,738	484.6
50-54	1,802	539.9	1,292	375.3	3,094	456.3
55-59	1,297	499.2	1,100	406.2	2,397	451.7
60-64	1,032	528.0	1,126	536.6	2,159	532.7
65-69	873	580.3	1,275	732.2	2,148	661.8
70-74	1,123	826.2	1,746	1,034.0	2,869	941.3
75-79	1,288	1,184.1	2,810	1,839.9	4,099	1,567.5
80-84	1,294	1,886.7	3,427	2,940.0	4,721	2,549.9
85+	1,650	3,541.0	5,372	4,915.2	7,023	4,505.1
Total	27,989	567.2	28,214	551.5	56,213	559.3

Sex was not specified for ten cases; age was not specified for one case. These cases are included in the totals.

Hospitalization rate is the number of hospitalizations per 100,000 population.

An injury discharge was defined as one with a principal diagnosis in the following range per ICD-9-CM¹⁰:
 800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.89.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

TABLE A-2
 Number, Crude Rate and Age-Adjusted Rate of Hospitalizations for All Injury Types
 By County of Residence
 Michigan Residents, 2002

County	Number	Crude Rate	Age Adjusted Rate	County	Number	Crude Rate	Age Adjusted Rate
Alcona	80	698.4	612.8	Lapeer	511	562.9	601.8
Alger	85	867.7	774.1	Leelanau	141	649.1	581.0
Allegan	533	487.5	509.4	Lenawee	620	619.1	618.6
Alpena	218	702.6	636.9	Livingston	704	416.9	470.1
Antrim	117	491.4	451.6	Luce	28	398.5	366.9
Arenac	122	709.9	658.3	Mackinac	50	434.6	361.4
Baraga	50	575.1	564.2	Macomb	4,155	513.9	497.7
Barry	375	647.2	660.5	Manistee	135	538.2	490.5
Bay	950	866.2	820.5	Marquette	349	542.4	527.5
Benzie	92	547.0	504.9	Mason	194	671.8	614.7
Berrien	963	593.4	570.1	Mecosta	222	535.4	538.2
Branch	228	493.6	481.5	Menominee	161	641.2	589.6
Calhoun	757	547.1	534.0	Midland	429	510.0	514.0
Cass	280	546.0	531.2	Missaukee	85	568.6	538.1
Charlevoix	123	466.2	441.2	Monroe	952	637.8	657.0
Cheboygan	167	616.9	556.8	Montcalm	330	528.7	534.4
Chippewa	182	467.9	465.9	Montmorency	100	947.0	829.8
Clare	210	662.8	609.8	Muskegon	982	571.7	573.3
Clinton	344	516.0	536.1	Newaygo	254	518.2	517.1
Crawford	98	665.1	611.8	Oakland	5,902	490.7	505.7
Delta	248	646.9	590.9	Oceana	160	578.7	566.0
Dickinson	216	790.5	694.1	Ogemaw	123	565.3	517.7
Eaton	570	539.8	553.1	Ontonagon	77	999.6	778.1
Emmet	183	566.1	540.1	Osceola	134	570.2	558.9
Genesee	3,288	744.9	754.5	Oscoda	52	550.3	526.9
Gladwin	191	714.2	628.4	Otsego	108	447.1	434.5
Gogebic	85	488.3	429.6	Ottawa	1,065	433.1	469.8
Gd. Traverse	479	589.4	578.0	Presque Isle	89	621.5	526.0
Gratiot	263	620.8	606.0	Roscommon	185	716.6	598.5
Hillsdale	262	557.7	549.1	Saginaw	1,505	716.4	703.2
Houghton	233	649.3	631.3	St. Clair	811	483.6	487.2
Huron	209	590.0	506.3	St. Joseph	372	596.5	593.8
Ingham	1,469	522.1	578.5	Sanilac	259	581.6	539.7
Ionia	335	532.2	570.9	Schoolcraft	37	421.5	379.1
Iosco	171	633.8	519.6	Shiawassee	469	650.3	654.9
Iron	124	973.6	751.1	Tuscola	403	691.9	684.5
Isabella	288	446.4	506.8	Van Buren	440	569.7	576.3
Jackson	831	516.2	512.7	Washtenaw	1,401	419.0	493.4
Kalamazoo	1,221	505.7	526.5	Wayne	12,349	603.7	614.1
Kalkaska	92	539.8	525.0	Wexford	189	614.1	597.5
Kent	2,828	481.0	515.8	Unknown	36		
Keweenaw	19	862.1	720.6				
Lake	66	567.8	526.4	Michigan	56,213	559.3	563.8

Rates are the number of hospitalizations per 100,000 population.

An injury discharge was defined as one with a principal diagnosis in the following range per ICD-9-CM¹⁰:

800.0-909.2, 909.4, 909.9, 910.0-994.9, 995.50-995.59, 995.80-995.85.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 U.S. Census Bureau, Population Estimates Branch

TABLE A-3
Number and Rate of Hospitalizations for Traumatic Brain Injuries
By County of Residence
Michigan Residents, 2002

County	Number of Discharges	Discharge Rate	County	Number of Discharges	Discharge Rate
Alcona	1	*	Lapeer	53	58.4
Alger	5	*	Leelanau	12	55.2
Allegan	54	49.4	Lenawee	60	59.9
Alpena	28	90.2	Livingston	70	41.5
Antrim	8	33.6	Luce	2	*
Arenac	11	64.0	Mackinac	3	*
Baraga	4	*	Macomb	386	47.7
Barry	35	60.4	Manistee	13	51.8
Bay	76	69.3	Marquette	32	49.7
Benzie	5	*	Mason	15	51.9
Berrien	77	47.4	Mecosta	17	41.0
Branch	32	69.3	Menominee	10	39.8
Calhoun	58	41.9	Midland	42	49.9
Cass	18	35.1	Missaukee	5	*
Charlevoix	10	37.9	Monroe	88	59.0
Cheboygan	14	51.7	Montcalm	29	46.5
Chippewa	10	25.7	Montmorency	9	85.2
Clare	14	44.2	Muskegon	90	52.4
Clinton	40	60.0	Newaygo	22	44.9
Crawford	4	*	Oakland	611	50.8
Delta	21	54.8	Oceana	9	32.5
Dickinson	12	43.9	Ogemaw	10	46.0
Eaton	78	73.9	Ontonagon	12	155.8
Emmet	12	37.1	Osceola	12	51.1
Genesee	347	78.6	Oscoda	1	*
Gladwin	13	48.6	Otsego	10	41.4
Gogebic	5	*	Ottawa	101	41.1
Gd. Traverse	32	39.4	Presque Isle	7	48.9
Gratiot	27	63.7	Roscommon	15	58.1
Hillsdale	17	36.2	Saginaw	121	57.6
Houghton	24	66.9	St. Clair	70	41.7
Huron	19	53.6	St. Joseph	31	49.7
Ingham	186	66.1	Sanilac	27	60.6
Ionia	34	54.0	Schoolcraft	5	*
Iosco	12	44.5	Shiawassee	54	74.9
Iron	13	102.1	Tuscola	54	92.7
Isabella	40	62.0	Van Buren	44	57.0
Jackson	88	54.7	Washtenaw	132	39.5
Kalamazoo	148	61.3	Wayne	1,244	60.8
Kalkaska	11	64.5	Wexford	16	52.0
Kent	227	38.6	Unknown	6	
Keweenaw	3	*			
Lake	8	68.8	Michigan	5,431	54.0

* Reliable rate could not be calculated. See Methods.

Discharge rate is the number of discharges per 100,000 population.

Traumatic brain injuries were defined as discharges with a principal diagnosis in the following range per ICD-9-CM¹⁰: 800, 801, 803, 804, 850-854, 950(1-3), 995.55.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

TABLE A-4
Number and Rate of Hospitalizations for Hip Fractures, Ages 65 and Older
By County of Residence
Michigan Residents, 2002

County	Number of Discharges	Discharge Rate	County	Number of Discharges	Discharge Rate
Alcona	17	602.8	Lapeer	80	892.6
Alger	21	1,215.3	Leelanau	25	638.2
Allegan	95	790.2	Lenawee	110	869.3
Alpena	34	619.8	Livingston	95	668.6
Antrim	27	656.8	Luce	9	840.3
Arenac	19	652.7	Mackinac	16	720.4
Baraga	2	*	Macomb	750	683.5
Barry	43	632.9	Manistee	25	553.7
Bay	139	855.4	Marquette	65	737.0
Benzie	18	616.4	Mason	27	567.8
Berrien	165	706.8	Mecosta	28	512.1
Branch	44	718.1	Menominee	29	670.5
Calhoun	118	623.8	Midland	73	704.2
Cass	43	616.8	Missaukee	22	1,015.7
Charlevoix	28	702.5	Monroe	118	705.0
Cheboygan	32	664.6	Montcalm	48	628.0
Chippewa	40	810.0	Montmorency	21	834.3
Clare	36	655.6	Muskegon	163	751.3
Clinton	38	520.5	Newaygo	39	617.0
Crawford	13	516.7	Oakland	964	704.6
Delta	46	697.7	Oceana	22	574.4
Dickinson	33	671.6	Ogemaw	19	449.6
Eaton	71	578.5	Ontonagon	14	807.8
Emmet	31	666.7	Osceola	8	234.7
Genesee	344	657.7	Oscoda	10	515.7
Gladwin	28	559.9	Otsego	21	617.5
Gogebic	14	368.4	Ottawa	193	767.8
Gd. Traverse	81	754.8	Presque Isle	20	612.6
Gratiot	43	743.6	Roscommon	36	575.9
Hillsdale	57	898.5	Saginaw	204	711.0
Houghton	35	663.8	St. Clair	140	680.1
Huron	46	659.2	St. Joseph	72	895.3
Ingham	192	716.9	Sanilac	58	845.1
Ionia	57	906.6	Schoolcraft	6	361.2
Iosco	38	633.4	Shiawassee	68	772.4
Iron	31	972.1	Tuscola	50	651.6
Isabella	44	739.9	Van Buren	69	732.4
Jackson	142	691.3	Washtenaw	193	698.0
Kalamazoo	225	811.7	Wayne	1,408	580.3
Kalkaska	14	592.0	Wexford	25	559.8
Kent	452	748.7	Unknown	5	
Keweenaw	2	*			
Lake	12	537.9	Michigan	8,358	678.5

Discharge rate is the number of discharges per 100,000 population.
Hip fractures were defined as discharges with the principal diagnosis code 820 per ICD-9-CM.¹⁰
Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
U.S. Census Bureau, Population Estimates Branch

APPENDIX B

Data Table for Occupational Injury Hospitalizations

TABLE B-1
 Number and Rate of Occupational Injury Hospitalizations
 By Age and Sex
 Michigan Residents Aged 16 and Older, 2002

Age	Male		Female		Total	
	Number	Rate	Number	Rate	Number	Rate
16-19	43	32.6	11	8.8	54	21.0
20-24	99	38.7	16	6.9	115	23.6
25-34	296	53.1	43	9.9	339	34.1
35-44	437	65.6	69	12.1	506	40.8
45-54	338	62.2	99	17.9	437	39.8
55-64	152	58.9	59	25.1	211	42.8
65+	37	48.7	26	53.1	63	50.4
Total	1,402	56.3	323	14.7	1,725	36.8

* Reliable rate could not be calculated. See Methods.

Occupational injury discharges were defined as those for which payment source was workers' compensation.

Rates are the number of hospitalizations per 100,000 workers.

Sources: MI Resident Inpatient Files, Division for Vital Records and Health Statistics, MDCH
 Bureau of Labor Statistics, U.S. Department of Labor, Local Area Unemployment Statistics

APPENDIX C

Barell Injury Diagnosis Matrix



The Barell Injury Diagnosis Matrix, Classification by Body Region and Nature of the Injury

based on 5 digit icd-9 CM codes

		A	B	C	D	E	F	G	H	I	J	K	L					
		ICD-9-CM codes	FRACTURE	DISLOCATION	SPRAINS & STRAINS	INTERNAL	OPEN WOUND	AMPUTATIONS	BLOOD VESSELS	CONTUSION / SUPERFICIAL	CRUSH	BURNS	NERVES	UNSPECIFIED				
			800-829	830-839	840-848	850-854,860-869 952, 995.55	870-884, 890-894	885-887, 895-897	900-904	910-924	925-929	940-949	950-951 953-957	959				
37	Traumatic Brain Injury	1 Type 1 TBI	800,801,803,804(.1-.4,.6-.9), (.03-.05,.53-.55) 850(.2-.4), 851-854, 950(.1-.3), 995.55	800,801,803,804(.1-.4,.6-.9) 800,801,803,804(.03-.05,.53-.55)	/	/	850(.2-.4) 851-854*, 995.55	/	/	/	/	/	950.1-3	/				
		2 Type 2 TBI	800,801,803,804(.00,.02,.06,.09) (.50,.52,.56,.59) , 850(.0,.1,.5,.9)	800,801,803,804(.00,.02,.06,.09), 800,801,803,804(.50,.52,.56,.59)	/	/	850(.0,.1,.5,.9)	/	/	/	/	/	/	/	/			
		3 Type 3 TBI	800,801,803,804(.01, .51)	800,801,803,804(.01,.51)	/	/	/	/	/	/	/	/	/	/	/			
	38	Other head, face and neck	4 Other Head	873(.0-.1,.8-.9), 941.x6, 951, 959.01	/	/	/	873.0-.1,.8-.9	/	/	/	/	941.x6	951	959.01*			
			5 Face	802, 830, 848.0-1, 872, 873.2-7, 941(.x1,.x3-.x5,.x7)	802	830	848.0-1	/	872, 873.2-7	/	/	/	941.x1,.x3-.x5,.x7	/	/			
			6 Eye	870-871, 918, 921, 940, 941.x2, 950(.0,.9)	/	/	/	/	870-871	/	/	918, 921	/	940, 941.x2	950(.0,.9)	/		
			7 Neck	807.5-6, 848.2, 874, 925.2, 941.x8, 953.0, 954.0	807.5-6	/	848.2	/	874	/	/	/	925.2	941.x8	953.0, 954.0	/		
			8 Head, Face and Neck Unspecified	900, 910, 920, 925.1, 941.x0, .x9, 947.0, 957.0, 959.09	/	/	/	/	/	/	900	910, 920	925.1	941.x0,.x9, 947.0	957.0	959.09		
40	Spinal Cord (SCI)	9 Cervical SCI	806(.0-.1), 952.0	806.0-1	/	/	952.0	/	/	/	/	/	/	/				
		10 Thoracic/ Dorsal SCI	806(.2-.3), 952.1	806.2-3	/	/	952.1	/	/	/	/	/	/	/				
		11 Lumbar SCI	806(.4-.5), 952.2	806.4-5	/	/	952.2	/	/	/	/	/	/	/				
		12 Sacrum Coccyx SCI	806(.6-.7), 952(.3-.4)	806.6-7	/	/	952.3-4	/	/	/	/	/	/	/	/			
		13 Spine+ Back unspecified SCI	806(.8-.9), 952(.8-.9)	806.8-9	/	/	952.8-9	/	/	/	/	/	/	/	/			
		41	Vertebral Column (VCI)	14 Cervical VCI	805(.0-.1), 839(.0-.1), 847.0	805.0-1	839.0-1	847.0	/	/	/	/	/	/	/	/		
				15 Thoracic /Dorsal VCI	805(.2-.3), 839(.21,.31), 847.1	805.2-3	839.21,.31	847.1	/	/	/	/	/	/	/	/		
				16 Lumbar VCI	805(.4-.5), 839(.20,.30), 847.2	805.4-5	839.20,.30	847.2	/	/	/	/	/	/	/	/		
				17 Sacrum Coccyx VCI	805(.6-.7), 839(.41-.42), 839(.51-.52), 847.3-4	805.6-7	839(.41-.42, .51-.52)	847.3-4	/	/	/	/	/	/	/	/	/	
	18 Spine+ Back unspecified VCI			805(.8-.9), 839(.40,.49), 839(.50,.59)	805.8-9	839(.40,.49,.50,.59)	/	/	/	/	/	/	/	/	/	/		
	42			Torso	19 Chest (Thorax)	807(.0-.4), 839(.61,.71), 848(.3-.4), 860-862, 875, 879(.0-.1), 901, 922(.0-.1,.33), 926.19, 942.x1-.x2 953.1	807.0-4	839.61,.71	848.3-4	860-862	875, 879.0-.1	/	901	922(.0,.1,.33)	926.19	942.x1-x2	953.1	/
					20 Abdomen	863-866, 868, 879(.2-.5), 902(.0-.4), 922.2,942.x3, 947.3, 953(.2,.5)	/	/	/	863-866, 868	879.2-5	/	902.0-4	922.2	/	942.x3, 947.3	953.2, 953.5	/
					21 Pelvis & Urogenital	808, 839(.69,.79), 846, 848.5, 867,877-878 902(.5,.81-.82), 922.4, 926(.0,.12), 942.x5,947.4, 953.3	808	839.69,.79	846, 848.5	867	877-878	/	902(.5, .81-.82)	922.4	926(.0, .12)	942.x5, 947.4	953.3	/
					22 Trunk	809, 879(.6-.7), 911, 922(.8-.9), 926(.8-.9), 942(.x0,.x9), 954(.1,.8-.9), 959.1	809	/	/	/	879.6-7	/	/	911, 922.8-9	926.8-9	942.x0, 942.x9	954.1, .8-.9	959.1
		23 Back and Buttock	847.9, 876, 922(.31-.32), 926.11, 942.x4		/	/	847.9	/	876	/	/	922.31-.32	926.11	942.x4	/	/		
		43	Upper		24 Shoulder & upper arm	810-812, 831, 840, 880, 887(.2-.3), 912,923.0, 927.0, 943(.x3-.x6) ,959.2	810-812	831	840	/	880	887.2-.3	/	912, 923.0	927.0	943.x3-.x6	/	959.2
	25 Forearm & elbow			813, 832, 841, 881(.x0-.x1), 887(.0-.1), 923.1, 927.1, 943(.x1-x2)	813	832	841	/	881.x0-x1	887.0-1	/	923.1	927.1	943.x1-x2	/	/		
	26 Wrist, hand & fingers			814-817, 833-834, 842,881.x2, 882, 883, 885-886, 914-915, 923(.2-.3) ,927(.2-.3), 944, 959(.4-5)	814-817	833, 834	842	/	881.x2,882, 883	/	/	914-915, 923.2-3	927.2-3	944	/	959.4-5		
27 Other & unspecified	818, 884, 887(.4-.7), 903, 913, 923(.8-.9), 927(.8-.9), 943(.x0,.x9), 953.4, 955, 959.3			818	/	/	/	884	887.4-7	903	913,923.8,.9	927.8-9	943.x0,.x9	953.4, 955	959.3			
28 Hip	820, 835, 843, 924.01, 928.01			820	835	843	/	/	/	/	924.01	928.01	/	/	/			
29 Upper leg & thigh	821, 897(.2-.3), 924.00, 928.00, 945.x6			821	/	/	/	/	897.2-.3	/	924.00	928.00	945.x6	/	/			
30 Knee	822, 836, 844.0-3, 924.11, 928.11, 945.x5			822	836	844.0-3	/	/	/	/	924.11	928.11	945.x5	/	/			
31 Lower leg & ankle	823-824, 837, 845.0, 897(.0-.1), 924(.10,.21), 928(.10,.21), 945(.x3-x4)			823-824	837	845.0	/	/	897.0-1	/	924.10,.21	928.10,.21	945.x3-x4	/	/			
32 Foot & toes	825-826, 838, 845.1, 892-893, 895-896, 917, 924(.3,.20), 928 (.3,.20), 945 (.x1-x2)			825-826	838	845.1	/	/	892-893	895-896	/	917, 924.3,.20	928.3,.20	945.x1-x2	/	/		
33 Other & unspecified	827,844(.8-.9), 890-891, 894, 897(.4-.7), 904(.0-.8), 916, 924(.4-5), 928(.8-.9), 945(.x0,.x9), 959.6-7	827	/	844.8,.9	/	/	890-891,894	897.4-7	904.0-8	916, 924.4-5	928.8,.9	945.x0-.x9	/	959.6-7				
44	Lower	34 Other/ multiple	819, 828, 902(.87,.89), 947(.1-2), 953.8, 956	819, 828	/	/	/	/	/	902.87,.89	/	947.1-2	953.8, 956	/				
		35 Unspecified site	829, 839(.8-.9), 848(.8-.9), 869, 879(.8-.9), 902.9, 904.9, 919, 924(.8,.9), 928(.8,.9), 946, 947(.8,.9), 948, 949, 953.9, 957(.1,.8,.9), 959(.8,.9)	829	839.8-.9	848.8-.9	869	879(.8-.9)	/	902.9, 904.9	919, 924.8,.9	929	946, 947.8,.9	953.9, 957.1,.8,.9	959.8,.9			
		36 System-wide & late effects	905-908, 909 (.0,.1,.2,.4,.9), 930-939,958, 960-994, 995.50-.54,.59, 995(.80-.85)	Foreign body (930-939), Early complications of trauma (958), Poisoning (960-979), Toxic Effects (980-989), Other and unspecified effects of external cause (990-994) Child and adult maltreatment (995.50-.54,.59, 995.80-.85) Late effects of injuries, poisonings, toxic effects and other external causes (905-909) excluding 909(.3, .5)														

Special diagnostic codes for trauma: Flail Chest (807.4) Pneumothorax (860)

For purposes of classification, head injuries are labeled as Type 1 TBI if there is recorded evidence of an intracranial injury or a moderate or a prolonged loss of consciousness (LOC), Shaken Infant Syndrome (SIS), or injuries to the optic nerve pathways.

Type 2 TBI includes injuries with no recorded evidence of intracranial injury, and LOC of less than one hour, or LOC of unknown duration, or unspecified level of consciousness. Type 3 TBI includes patients with no evidence of intracranial injury and no LOC.

* Note from CDC: 959.01 (added to ICD-9-CM in 1997) is not intended to be assigned to TBI cases; however, in the USA it has been assigned incorrectly to a substantial proportion of cases previously coded 854.

The Matrix is available on the net at www.cdc.gov/nchs/about/otheract/ice/barellmatrix.htm

Table C-2
 Specific Injury Types Comprising
 Barell Injury Diagnosis Matrix Categories Used in Table 66

Body Region	Injury Types Comprising Category
Brain/Skull	<ul style="list-style-type: none"> • Type 1¹ Traumatic Brain Injury • Type 2² Traumatic Brain Injury • Type 3³ Traumatic Brain Injury
Other Head, Face, Neck	<ul style="list-style-type: none"> • Other Head • Face, Eye, Neck • Head, Face and Neck, Unspecified
Spinal Cord	<ul style="list-style-type: none"> • Cervical Spinal Cord Injury • Thoracic/Dorsal Spinal Cord Injury • Lumbar Spinal Cord Injury • Sacrum Coccyx Spinal Cord Injury • Spine & Back, Unspecified Spinal Cord Injury
Vertebral Column	<ul style="list-style-type: none"> • Cervical Vertebral Column Injury • Thoracic/Dorsal Vertebral Column Injury • Lumbar Vertebral Column Injury • Sacrum Coccyx Vertebral Column Injury • Spine & Back, Unspecified Vertebral Column Injury
Torso	<ul style="list-style-type: none"> • Chest (Thorax) • Abdomen • Pelvis & Urogenital • Trunk • Back and Buttock
Upper Extremity	<ul style="list-style-type: none"> • Shoulder & Upper Arm • Forearm & Elbow • Wrist, Hand & Fingers • Other & Unspecified Upper Extremity
Lower Extremity	<ul style="list-style-type: none"> • Hip • Upper Leg & Thigh • Knee • Lower Leg & Ankle • Foot & Toes • Other and Unspecified Lower Extremity
Other & Unspecified	<ul style="list-style-type: none"> • Other/multiple • Unspecified Site
System-wide & Late Effects	<ul style="list-style-type: none"> • System-wide & Late Effects

1. Recorded evidence of an intracranial injury or a moderate or prolonged loss of consciousness (LOC), Shaken Infant Syndrome (SIS), or injuries to the optic nerve pathways.
2. No recorded evidence of intracranial injury, and LOC of less than one hour, or LOC of unknown duration, or unspecified level of consciousness.
3. No evidence of intracranial injury and no LOC.

APPENDIX D

Cause and Manner/Intent of Injury and Corresponding E-codes

TABLE D-1 (Page 1 of 2)
ICD-9-CM Codes Defining Cause and Manner/Intent of Injury Categories

Mechanism	Manner/Intent				
	Unintentional	Intentional Self-harm	Assault	Undetermined	Other
Cut/pierce	E920	E956	E966	E986	E974
Drowning/submersion	E830, E832, E910	E954	E964	E984	
Boat-related	E830, E832				
Non-boat-related	E910				
Boat-related non-drowning*	E831				
Fall	E880-E886, E888	E957	E968.1	E987	
Fire/hot objects or substances	E890-E899, E924	E958.1,.2,.7	E961, E968.0,.3	E988.1,.2,.7	
Fire/flame	E890-E899	E958.1	E968.0	E988.1	
Hot object/substance	E924	E958.2,.7	E961, E968.3	E988.2,.7	
Firearm	E922.0-.3, .8, .9	E955.0-.4	E965.0-.4	E985.0-.4	E970
Machinery	E919				
Motor vehicle traffic	E810-E819	E958.5	E968.5	E988.5	
Occupant	E810-E819(.0,.1)				
Motorcycle	E810-E819(.2,.3)				
Pedalcyclist	E810-E819(.6)				
Pedestrian	E810-E819(.7)				
Other specified	E810-E819(.4,.5,.8)				
Unspecified	E810-E819(.9)				
Pedalcyclist, other	E800-E807(.3), E820-E825(.6), E826.1,.9,E827-E829(.1)				
Pedestrian, other	E800-E807(.2), E820-E825(.7), E826-E829(.0)				

* This cause is contained within "Other Transport" in the framework provided by the U.S. Centers for Disease Control and Prevention.¹⁴ It was separated out for this report due to state-specific interest in boat-related non-drowning injuries.

TABLE D-1 (Page 2 of 2)
ICD-9-CM Codes Defining Cause and Manner/Intent of Injury Categories

Mechanism	Manner/Intent				
	Unintentional	Intentional Self-harm	Assault	Undetermined	Other
Snowmobile, non-traffic*	E820				
Transport, other**	E800-E807(.0,.1,.8,.9), E821-E825(.0-.5,.8,.9), E826.2-.8, E827-E829(.2-.9), E833-E845	E958.6		E988.6	
Natural/environmental	E900-E909, E928.0-.2	E958.3		E988.3	
Bites & stings	E905(.0-.6,.9), E906(.0-.5,.9)				
Other	E900-E904, E905.7,.8, E906(.6-.8), E907-E909, E928.0-.2				
Overexertion	E927				
Poisoning	E850-E869	E950-E952	E962	E980-E982	E972
Struck by, against	E916-E917		E960.0, E968.2		E973, E975
Suffocation, strangulation	E911-E913	E953	E963	E983	
Other specified & classifiable	E846-E848, E914-E915, E918, E921, E922.4, E923, E925-E926, E928.3, E929.0-.5	E955.5, .6, .9, E958.0,.4	E960.1, E965.5-.9, E967, E968.4, .6, .7	E985.5, .6, E988.0,.4	E971, E978, E990-E994, E996, E997.0-.2
Other specified, not elsewhere classifiable	E928.8, E929.8	E958.8, E959	E968.8, E969	E988.8, E989	E977, E995, E997.8, E998, E999
Unspecified	E887, E928.9, E929.9	E958.9	E968.9	E988.9	E976, E997.9
Adverse effects/events***					E870-E879, E930-E949
Medical care					E870-E879
Drugs					E930-E949

* This cause is contained within "Other Transport" in the framework provided by the U.S. Centers for Disease Control and Prevention.¹⁴ It was separated out for this report due to state-specific interest in snowmobile injuries.

** The framework provided by the U.S. Centers for Disease Control and Prevention includes boat-related non-drownings and snowmobile, non-traffic incidents in this category. These injury causes have been separated out for this report.

*** Adverse effects are part of the CDC framework. However, per the recommendations of the national panel on using hospital discharge data,¹¹ adverse effects were excluded from calculations of E-coding rates and in all cause of injury analyses.

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