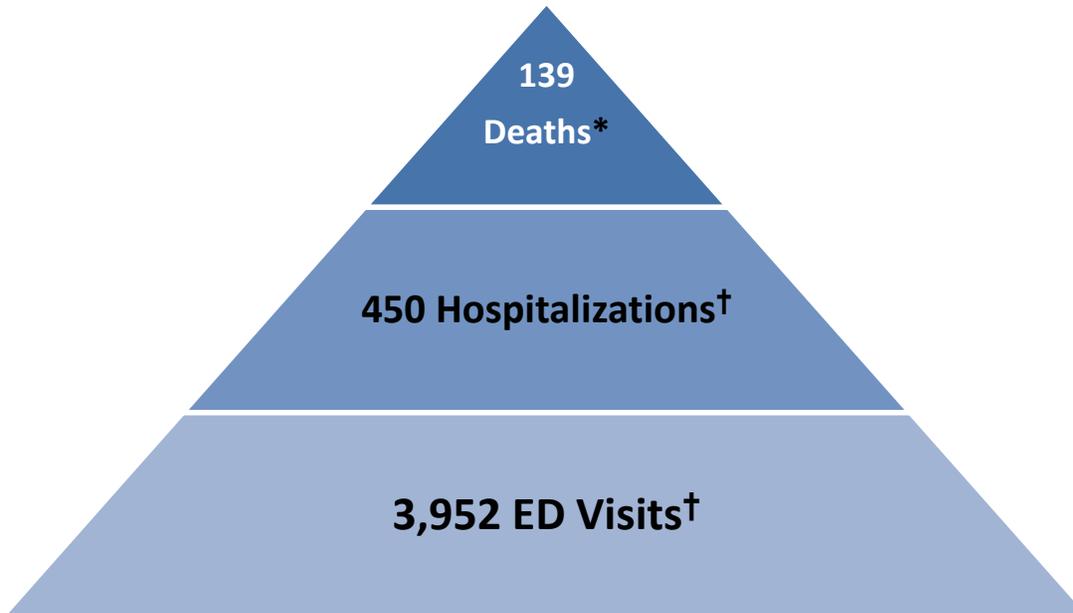


## SECTION 3.3: PEDESTRIAN INJURIES



\*SOURCE: OHIO DEPARTMENT OF HEALTH, VITAL STATISTICS

† SOURCE: OHIO HOSPITAL ASSOCIATION

### CHAPTER HIGHLIGHTS:

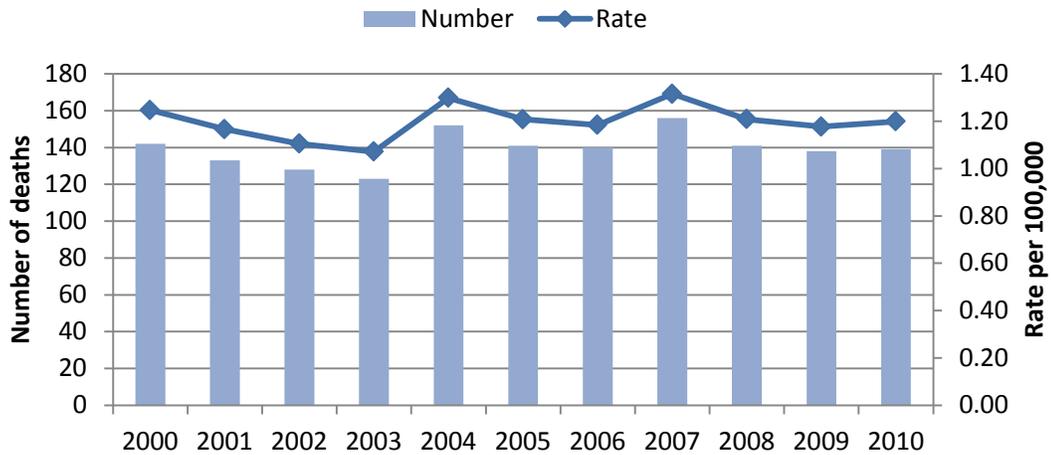
#### Patterns:

- The highest fatality rates were found among adults ages 75-84 and blacks.
- The highest rates of non-fatal pedestrian injuries occurred among youth and adults ages 15-24.
- Most fatal and non-fatal pedestrian injuries resulted from motor vehicle traffic crashes.

#### Trends:

- Death and ED visit rates have largely remained the same over time.
- Hospitalization rates have increased 31 percent since 2002.
- Most fatal and non-fatal pedestrian injuries were associated with motor vehicle traffic crashes throughout the study period.

**Figure 5.1. Number and age adjusted rate of pedestrian deaths by year, Ohio, 2000-2010**



Source: Ohio Department of Health, Vital Statistics

**DEATHS:**

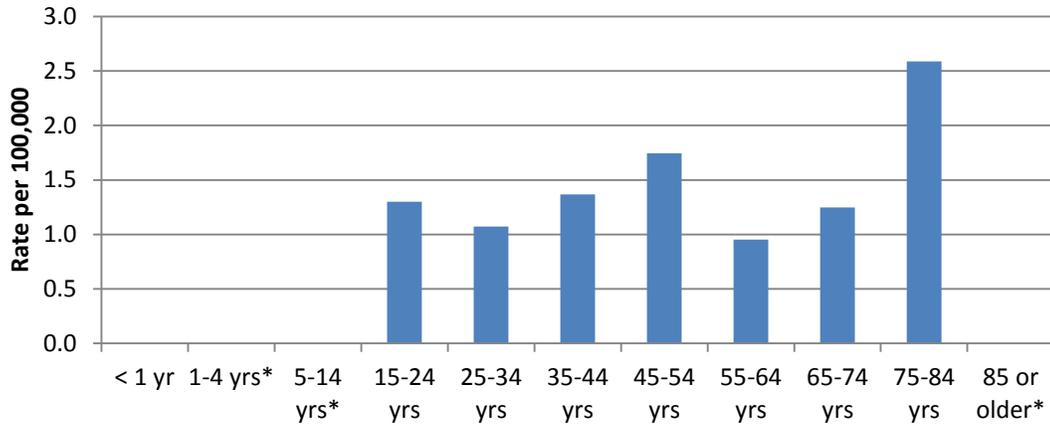
In 2010, 139 deaths resulted from pedestrian injuries. The death rate was 1.2 per 100,000 (Figure 5.1). Death rates were two times higher among males (1.7 per 100,000) compared to females (0.8 per 100,000). The highest death rates were found among adults 75-84 years (2.6 per 100,000) and 45-54 years (1.8 per 100,000) (Figure 5.2). Fatality rates among blacks (2.0 per 100,000) were two times higher than whites (1.1 per 100,000). See Table 5.1 for a pedestrian injury death risk profile. Approximately 80 percent of pedestrian fatalities were associated with motor vehicle traffic and 15 percent were associated with non-traffic situations while 5 percent were unspecified (Figure 5.3).

	2010 At Risk Groups	Annual trend since 2000
Overall		Inconsistent
Sex	Males	Inconsistent
Age	75-84	45-54 (+0.07/100,000)
Race and ethnicity	Blacks	Whites (-0.05/100,000)

**TRENDS:**

Pedestrian fatality rates decreased slightly from 1.25 per 100,000 in 2000 to 1.20 per 100,000 in 2010 (Figure 5.1). The annual rate changes were inconsistent over time for both males and females. Slight increases were found in average annual rates among ages 45-54 years (0.07 per 100,000 per year) and 15-24 years (0.03 per 100,000 per year) while a slight decrease was found among ages 55-64 years (-0.03 per 100,000 per year). Fatality rates decreased on average by -0.05 per 100,000 per year among whites while rates did not follow a consistent trend among blacks. See Tables 16a-c located at the end of this section for more detailed information on the number and rate of pedestrian deaths in Ohio.

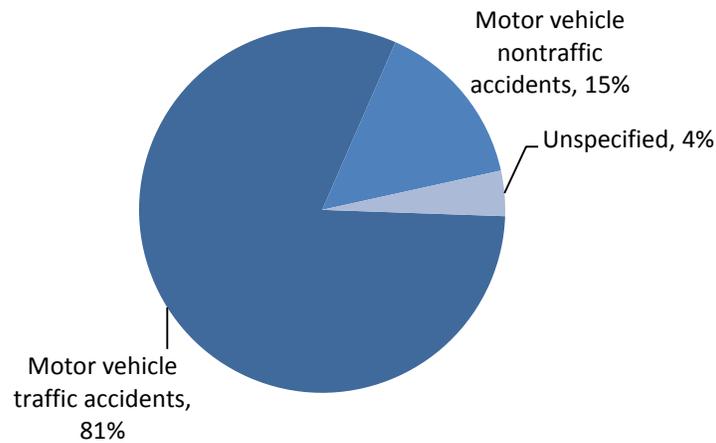
Figure 5.2. Death rates resulting from pedestrian injuries, by age, Ohio, 2009-2010



Source: Ohio Department of Health, Vital Statistics

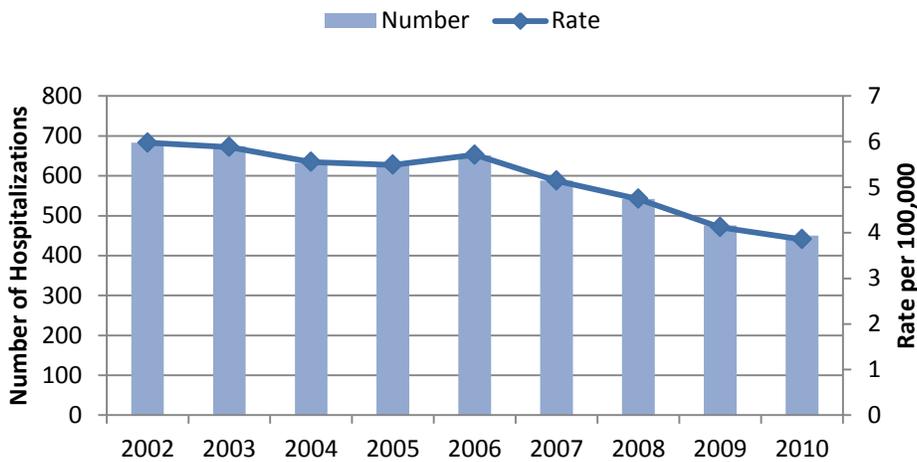
\*Rates suppress due to small cell sizes

Figure 5.3. Distribution of deathss resulting from pedestrian injuries by cause, Ohio, 2010



Source: Ohio Department of Health, Vital Statistics

**Figure 5.4. Number and age adjusted rate for pedestrian injury hospitalizations by year, Ohio, 2002-2010**



Source: Ohio Hospital Association

**HOSPITALIZATIONS:**

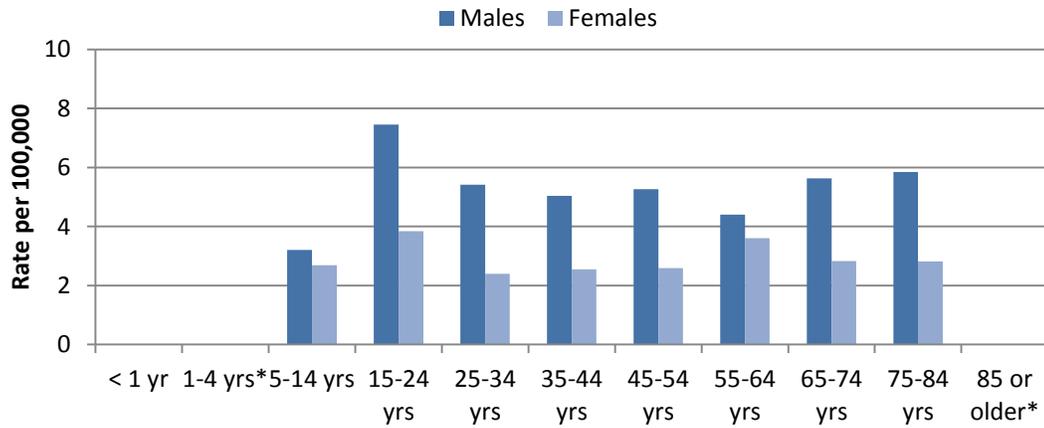
In 2010, 450 hospitalizations resulted from pedestrian injuries. The hospitalization rate was 3.9 per 100,000 (Figure 5.4). Rates among males were two times higher than females (5.6 versus 2.8 per 100,000). For males, hospitalization rates increased from birth through age 24 then decreased among ages 25-34 and leveled off ages 35 or older. For females, hospitalizations were fairly consistent across the lifespan (Figure 5.5). See Table 5.2 for a pedestrian injury hospitalization risk profile. Nearly 90 percent of pedestrian injuries were associated with motor vehicle traffic crashes (Figure 5.6).

Table 5.2 Pedestrian Injury Hospitalization Risk Profile		
	2010 At Risk Groups	Annual trend since 2002
Overall		-35%
Sex	Males	Females (largest decrease)
Age	15-24	75-84 and 5-14 (largest decreases)

**TRENDS:**

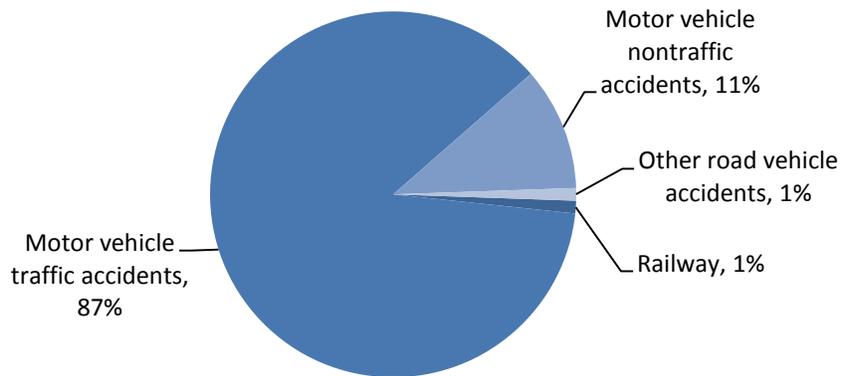
Hospitalization rates decreased from 6.0 per 100,000 in 2010 to 3.9 per 100,000 in 2002 (Figure 5.4). The average annual decrease was -0.2 per 100,000 per year. Rates decreased -0.2 per 100,000 per year among females while rates among males did not follow a consistent trend. Hospitalization rates decreased among all age groups with the largest decreases found among ages 75-84 (0.5 per 100,000 per year) and children ages 5-14 (0.4 per 100,000 per year). The number of hospitalizations associated with motor vehicle traffic crashes decreased 28 per year while non-traffic related hospitalizations did not follow a consistent trend over time. See Tables 17a-c located at the end of this section for more detailed information on unintentional pedestrian injury hospitalizations.

Figure 5.5. Hospitalization rates resulting from pedestrian injuries, by age and sex, Ohio, 2010



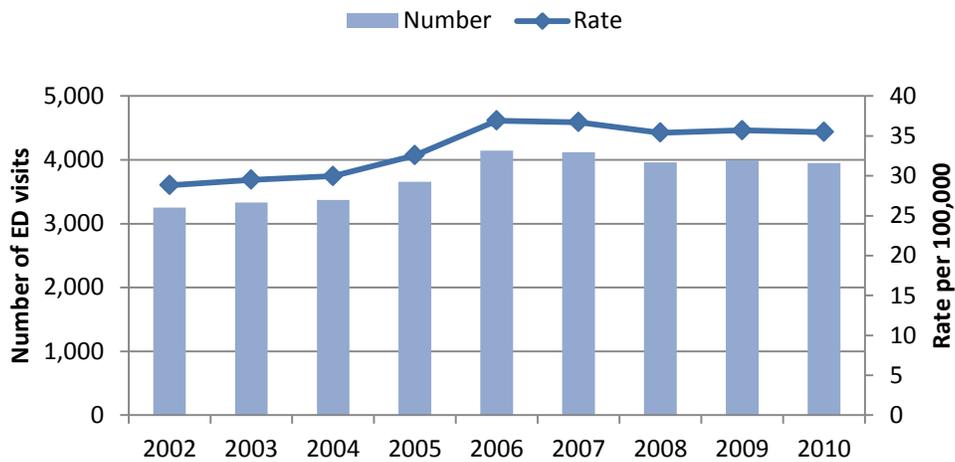
Source: Ohio Hospital Association  
\*Rates suppress due to small cell sizes

Figure 5.6. Distribution of hospitalizations resulting from pedestrian injuries by cause, Ohio, 2010



Source: Ohio Hospital Association

**Figure 5.7. Number and age adjusted rate for pedestrian injury ED visits by year, Ohio, 2002-2010**



Source: Ohio Hospital Association

**EMERGENCY DEPARTMENT VISITS:**

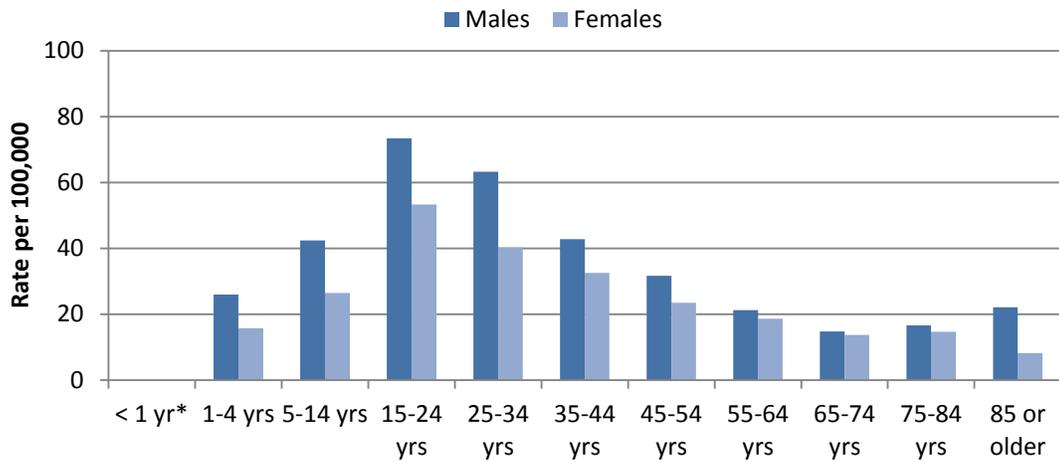
In 2010, roughly 4,000 ED visits resulted from pedestrian injuries. The ED visit rate was 35.5 per 100,000 (Figure 5.7). The rate of ED visits was higher among males (42 per 100,000) than females (29 per 100,000). For both males and females, ED visit rates increased with age from birth through age 24 then steadily decreased after age 25 (Figure 5.8). See Table 5.3 for a pedestrian injury ED visit risk profile. Approximately 81 percent of pedestrian injury related ED visits were associated with motor vehicle traffic crashes. Nearly 12 percent of ED visits were associated with motor vehicle non-traffic crashes and 7 percent involved other road vehicles (Figure 5.9).

	2010 At Risk Groups	Annual trend since 2002
Overall		+24%
Sex	Males	Males (largest increase)
Age	15-24	15-24 (largest increase)

**TRENDS:**

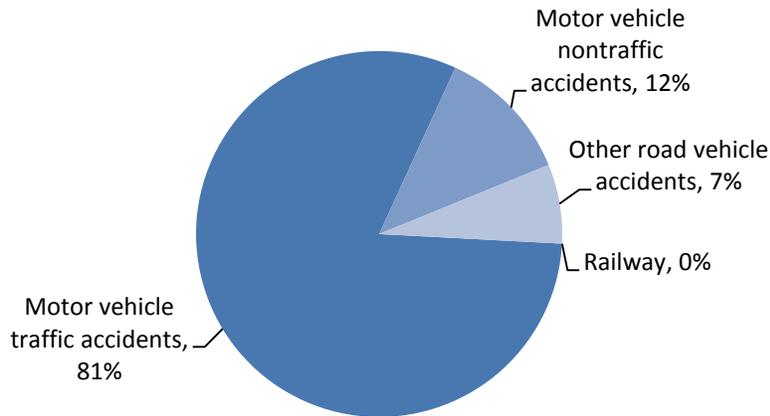
ED visit rates increased from 29 per 100,000 in 2002 to 36 per 100,000 in 2010 (Figure 5.7). The average annual increase was 1.0 per 100,000 per year. The average annual increase was two times higher among males (1.7 per 100,000 per year) than females (0.9 per 100,000 per year). Increases in rates were found among ages 15-64 with the largest increase found among ages 15-24 (2.5 per 100,000 per year). Rates among children and adults ages 65 or older did not follow a linear trend. ED visits resulting from motor vehicle traffic crashes increased on average by 97 ED visits per year. Non-traffic and other road crashes did not follow a consistent trend over time. See Tables 18a-c for more detailed information on the number and rate of ED visits associated with unintentional pedestrian injuries.

Figure 5.8. ED visit rates resulting from pedestrian injuries by age and sex, Ohio, 2010



Source: Ohio Hospital Association  
\*Suppressed due to small cell sizes

Figure 5.9. Distribution of ED visits resulting from pedestrian injuries by cause, Ohio, 2010



Source: Ohio Hospital Association

**Burden of Injury in Ohio, 2000-2010**

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 16a. Number of deaths resulting from unintentional pedestrian injuries, by year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	142	133	128	123	152	141	140	156	141	138	139
<b>Sex</b>											
Males	90	96	86	84	113	89	94	105	106	94	94
Females	52	37	42	39	39	52	46	51	35	44	45
<b>Age</b>											
< 1 yr	0	0	0	0	0	0	0	0	0	0	0
1-4 yrs	7	6	5	12	9	5	<5	7	6	<5	5
5-14 yrs	21	16	10	12	9	13	9	10	13	9	<5
15-24 yrs	20	17	14	10	27	21	17	22	21	17	24
25-34 yrs	13	18	19	10	13	17	20	17	17	14	17
35-44 yrs	25	24	14	24	18	18	14	16	18	19	22
45-54 yrs	18	14	23	15	26	17	31	28	30	33	28
55-64 yrs	12	15	13	14	17	18	15	19	13	13	14
65-74 yrs	13	9	9	9	8	9	10	13	10	9	12
75-84 yrs	10	12	14	9	20	13	14	18	8	18	10
85 or older	<5	<5	7	8	5	10	6	6	5	<5	<5
<b>Race and ethnicity</b>											
White‡	109	105	102	95	121	106	105	124	111	113	101
Black‡	24	21	19	18	25	26	34	24	25	17	29
Hispanic	9	6	5	10	<5	6	<5	7	5	5	<5
Other‡	0	<5	<5	0	<5	<5	0	<5	0	<5	6

‡Non-Hispanic

Source: Ohio Department of Health, Office of Vital Statistics

**Burden of Injury in Ohio, 2000-2010**

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 16b. Death rates per 100,000 resulting from unintentional pedestrian injuries, by year, Ohio, 2000-2010<sup>1</sup>**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	1.25	1.17	1.10	1.07	1.30	1.21	1.18	1.32	1.21	1.18	1.20	<0.01 (NL)
<b>Sex†</b>												
Males	1.64	1.75	1.59	1.58	2.06	1.60	1.67	1.88	1.91	1.69	1.66	<0.01 (NL)
Females	0.87	0.61	0.67	0.64	0.64	0.83	0.74	0.82	0.57	0.71	0.75	<-0.01 (NL)
<b>Age</b>												
< 1 yr		0.00		0.00		0.00		0.00		0.00		*
1-4 yrs		*		1.75		*		*		*		*
5-14 yrs		0.96		0.66		0.71		0.76		*		*
15-24 yrs		1.08		1.17		1.20		1.37		1.30		0.03
25-34 yrs		1.11		0.78		1.26		1.16		1.07		0.01 (NL)
35-44 yrs		1.18		1.24		0.98		1.08		1.37		<0.01 (NL)
45-54 yrs		1.13		1.22		1.39		1.65		1.75		0.07
55-64 yrs		1.28		1.35		1.33		1.21		0.95		-0.03
65-74 yrs		1.32		*		*		1.43		1.25		*
75-84 yrs		2.19		2.59		2.42		2.36		2.59		0.03 (NL)
85 or older		*		*		*		*		*		*
<b>Race and ethnicity†</b>												
White‡	1.1	1.1	1.0	1.0	1.2	1.1	1.0	1.2	1.1	1.1	1.1	-0.05
Black‡	1.9	1.6	*	*	1.8	1.8	2.5	1.7	1.9	*	2.0	*
Hispanic	*	*	*	*	*	*	*	*	*	*	*	*
Other‡	*	*	*	*	*	*	*	*	*	*	*	*

\*Rates suppressed due to fewer than 20 deaths.

‡Non-Hispanic

Source: Ohio Department of Health, Office of Vital Statistics

†Rates are age adjusted to 2000 U.S. standard population

NL: Interpret with caution because trend does not follow linear pattern

**Table 16c. Number of deaths resulting from unintentional pedestrian injuries, by mechanism and year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Traffic	105	103	98	101	119	104	104	109	112	96	113	81%	0.5 (NL)
Nontraffic	24	9	23	13	24	29	19	26	22	30	21	15%	*
Unspecified	13	21	7	9	9	8	17	21	7	12	5	4%	*

NL: Interpret with caution because trend does not follow linear pattern

\*Suppressed due to fewer than 20 deaths.

Source: Ohio Department of Health, Office of Vital Statistics

## Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 17a. Number of hospitalizations resulting from pedestrian injuries by year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	683	674	632	628	651	588	542	476	450
<b>Sex</b>									
Males	412	414	411	368	410	368	320	311	281
Females	271	260	221	260	241	220	222	165	169
<b>Age</b>									
< 1 yr	0	0	0	0	0	<5	<5	0	0
1-4 yrs	25	26	23	22	33	22	19	20	10
5-14 yrs	117	100	89	91	97	103	90	59	45
15-24 yrs	118	111	102	103	124	98	87	84	90
25-34 yrs	65	75	76	73	78	67	76	57	55
35-44 yrs	112	104	116	97	91	76	61	65	56
45-54 yrs	85	91	100	85	78	85	91	66	68
55-64 yrs	51	67	42	57	61	64	45	61	58
65-74 yrs	40	47	34	44	34	25	33	25	35
75-84 yrs	54	38	40	38	40	37	26	31	22
85 or older	16	15	10	18	15	9	13	8	11

Source: Ohio Hospital Association

**Burden of Injury in Ohio, 2000-2010**

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 17b. Hospitalization rates per 100,000 resulting from pedestrian injuries by year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	6.0	5.9	5.6	5.5	5.7	5.1	4.7	4.1	3.9	-0.26
<b>Sex†</b>										
Males	7.5	4.8	7.4	6.6	7.4	6.6	5.7	5.6	5.0	-0.18 (NL)
Females	4.6	4.3	3.7	4.3	4.1	3.7	3.8	2.8	2.8	-0.20
<b>Age</b>										
< 1 yr	0.0	0.0	0.0	0.0	0.0	*	*	0.0	0.0	*
1-4 yrs	4.2	4.3	3.9	3.7	5.6	3.7	3.2	3.4	*	*
5-14 yrs	7.2	6.3	5.6	5.9	6.3	6.8	6.0	3.9	3.0	-0.37
15-24 yrs	7.5	7.0	6.4	6.5	7.8	6.2	5.5	5.4	5.7	-0.23
25-34 yrs	4.4	5.1	5.2	5.0	5.4	4.6	5.2	3.9	3.9	-0.10 (NL)
35-44 yrs	6.4	6.1	6.9	5.9	5.6	4.8	3.9	4.3	3.8	-0.39
45-54 yrs	5.2	5.4	5.9	4.9	4.5	4.9	5.2	3.8	3.9	-0.19
55-64 yrs	4.7	6.0	3.6	4.7	4.9	4.9	3.4	4.4	4.0	-0.13 (NL)
65-74 yrs	5.2	6.1	4.4	5.7	4.4	3.2	4.1	3.0	4.1	-0.28
75-84 yrs	9.8	6.8	7.2	6.9	7.3	6.8	4.9	5.7	4.1	-0.51
85 or older	*	*	*	*	*	*	*	*	*	*

\*Rates suppressed due to less than 20 hospitalizations

†Rates are age adjusted to 2000 U.S. standard population

NL: Interpret with caution because trend does not follow linear pattern

Source: Ohio Hospital Association

**Table 17c. Number of hospitalizations resulting from pedestrian injuries by type and year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Railway	<5	6	8	10	<5	5	6	0	5	1%	*
Motor vehicle traffic crashes	617	607	573	576	577	532	488	417	391	87%	-28
Motor vehicle nontraffic crashes	56	53	37	38	59	47	40	51	49	11%	<-1 (NL)
Other road vehicle crashes	6	8	14	13	11	<5	8	8	5	1%	*

\*Suppressed due to less than 20 hospitalizations

NL: Interpret with caution because trend does not follow linear pattern

Source: Ohio Hospital Association

**Burden of Injury in Ohio, 2000-2010**

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 18a. Number of ED visits resulting from pedestrian injuries by year, Ohio, 2002-2010**

	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
Overall	3,254	3,332	3,374	3,658	4,144	4,122	3,959	3,988	3,952
<b>Sex</b>									
Males	1,888	1,978	2,018	2,167	2,436	2,405	2,326	2,375	2,293
Females	1,366	1,354	1,356	1,491	1,708	1,717	1,633	1,613	1,659
<b>Age</b>									
< 1 yr	<5	<5	5	<5	5	<5	<5	<5	6
1-4 yrs	148	151	131	147	173	149	130	147	122
5-14 yrs	661	637	637	616	712	682	606	547	527
15-24 yrs	818	807	828	896	989	1,063	1,017	1,072	1,008
25-34 yrs	492	479	542	597	684	706	689	717	729
35-44 yrs	461	488	482	555	568	514	535	555	557
45-54 yrs	343	390	361	424	522	471	516	472	479
55-64 yrs	154	167	195	211	261	286	251	261	290
65-74 yrs	91	114	100	99	107	125	112	131	121
75-84 yrs	70	67	77	83	94	94	68	67	84
85 or older	15	31	16	28	29	29	33	17	29

Source: Ohio Hospital Association

**Burden of Injury in Ohio, 2000-2010**

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 18b. ED visit rates per 100,000 resulting from pedestrian injuries by year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	28.8	29.5	30.0	32.6	36.9	36.7	35.4	35.7	35.5	1.0
<b>Sex†</b>										
Males	33.7	24.3	36.2	39.0	43.8	43.2	41.8	42.8	41.6	1.7
Females	23.9	23.7	23.8	26.2	30.1	30.3	29.1	28.6	29.4	0.9
<b>Age</b>										
< 1 yr	*	*	*	*	*	*	*	*	*	*
1-4 yrs	24.6	25.2	22.0	24.7	29.5	25.3	22.0	24.8	21.0	NL
5-14 yrs	40.9	39.9	40.3	39.6	46.4	45.0	40.5	36.6	34.6	NL
15-24 yrs	51.7	50.6	51.9	56.2	62.5	67.5	64.7	68.5	63.5	2.3
25-34 yrs	33.3	32.7	37.1	41.0	47.0	48.3	47.1	48.5	51.7	2.5
35-44 yrs	26.4	28.6	28.8	33.7	35.0	32.3	34.4	36.5	37.6	1.3
45-54 yrs	20.8	23.3	21.3	24.7	30.1	27.0	29.5	26.9	27.5	0.9
55-64 yrs	14.2	14.8	16.7	17.4	20.8	22.0	18.8	18.8	20.0	0.7
65-74 yrs	11.8	14.8	13.0	12.9	13.9	16.0	13.9	15.7	14.2	NL
75-84 yrs	12.7	12.1	13.9	15.0	17.1	17.3	12.7	12.4	15.5	NL
85 or older	*	15.8	*	13.5	13.5	13.0	14.4	*	12.6	*

\*Rates suppressed due to fewer than 20 ED visits.

†Rates are age adjusted to 2000 U.S. standard population

NL: Interpret with caution because trend does not follow linear pattern

Source: Ohio Hospital Association

**Table 18c. Number of ED visit rates resulting from pedestrian injuries by type and year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Railway	5	9	2	13	15	7	7	5	<5	*	*
Motor vehicle traffic crashes	2,593	2,692	2,727	2,951	3,408	3,388	3,335	3,277	3,198	81%	97
Motor vehicle nontraffic crashes	389	406	452	471	486	456	424	430	464	12%	5 (NL)
Other road vehicle crashes	267	225	194	223	235	271	193	277	287	7%	5 (NL)

Source: Ohio Hospital Association

NL: Interpret with caution because trend does not follow linear pattern

\*Suppressed due to less than 20 ED visits

## **APPENDICES**

## **APPENDIX 1: DATA SOURCES**

This report uses data from behavioral risk factor surveys, hospital discharge records and death certificates to study patterns and trends in injuries among Ohio residents. The following is brief summary of each data source referenced in this report.

### ***Cost of Injuries***

The medical and work loss cost of injuries was estimated by the Centers for Disease Control and Prevention (CDC). Cost estimates for fatal and non-fatal injuries can be queried on the CDC's Web-based Injury Statistics Query and Reporting System Web (WISQARS).

[http://www.cdc.gov/injury/wisqars/pdf/WISQARS\\_Cost\\_Methods-a.pdf](http://www.cdc.gov/injury/wisqars/pdf/WISQARS_Cost_Methods-a.pdf)

### ***Death Records***

Death records are maintained by ODH's Office of Vital Statistics. Death certificates provide limited information about circumstances of injury circumstances or contributing factors. Both injuries and their external causes were classified according to the 10th Revision of the International Classification of Diseases (ICD-10). See Appendix 3 for a complete list of external cause of injury codes by mechanism and intent.

<http://dwhouse.odh.ohio.gov/datawarehousev2.htm>

### ***Hospital Discharge Records***

Hospital discharge records are collected and maintained by the Ohio Hospital Association (OHA) from information provided by member hospitals. Both injuries and their external causes were classified according to the 9th Revision of the International Classification of Diseases, Clinical Modification (ICD-9-CM). For hospitalizations, a case was defined as an Ohio resident with an injury listed in the primary diagnosis field. For ED visits, a case was defined as an Ohio resident with an injury listed in the primary diagnosis field or a valid external cause of injury code any of the 15 diagnosis fields. Injury mechanisms for both hospitalizations and ED visits were based on the first listed external cause of injury. See Appendix 2 for a complete list external cause of injury codes by mechanism and intent.

<http://www.ohanet.org/>

### ***Leading Causes of Death***

The data source for WISQARS Fatal Injury Data is the National Vital Statistics System (NVSS) operated by the National Center for Health Statistics. WISQARS provides death counts and death rates for the United States and by state, county, age, race, Hispanic ethnicity, sex, and leading cause of death, injury intent, and injury mechanism categories. WISQARS can be used to query death data for the years 1999 - 2009, of which the underlying cause of death is specified using ICD-10 codes.

[http://www.cdc.gov/injury/wisqars/leading\\_causes\\_death.html](http://www.cdc.gov/injury/wisqars/leading_causes_death.html)

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## ***Burden of Injury in Ohio, 2000-2010***

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Ohio Violence and Injury Prevention Program, Ohio Department of Health

### ***Ohio Behavioral Risk Factor Surveillance System (BRFSS)***

The Ohio Behavioral Risk Factor Surveillance System (BRFSS) is a random digit dial telephone survey of non-institutionalized adults aged 18 years of older. The BRFSS has been conducted annually by the Ohio Department of Health since 1984. The survey collects information on the prevalence of health behaviors, health care usage, and disease diagnosis associated with the leading cause of disease, injury and death in the United States. Results from the survey are weighted to represent the age, sex, race, and ethnic composition of Ohio.

<http://www.odh.ohio.gov/healthstats/brfss/behrisk1.aspx>

### ***Ohio Population Estimates***

The National Center for Health Statistics releases bridged-race population estimates of the resident population of the United States for use in calculating vital rates. These estimates result from bridging the 31 race categories used in Census 2000 and Census 2010. The bridged-race population estimates are produced under a collaborative arrangement with the U. S. Census Bureau.

[http://www.cdc.gov/nchs/nvss/bridged\\_race.htm](http://www.cdc.gov/nchs/nvss/bridged_race.htm)

### ***Ohio Pregnancy Risk Assessment Monitoring System (PRAMS)***

The Pregnancy Risk Assessment Monitoring System (PRAMS) is a population-based survey designed to examine maternal behaviors and experiences before, during and after a woman's pregnancy, and during the early infancy of her child. The Centers for Disease Control and Prevention initiated PRAMS in 1987 in an effort to reduce infant mortality and the incidence of low birth weight. PRAMS were implemented in Ohio in 1999.

<http://www.odh.ohio.gov/healthstats/pramshs/prams1.aspx>

### ***Ohio Traffic Crash Reports***

The Ohio Department of Public Safety compiles statistical data on crashes that occur on Ohio's roads and highways. Crash data is available in the form of annual reports. Users can also develop customized queries of the data online.

[http://ohiohighwaysafetyoffice.ohio.gov/otso\\_annual\\_crash\\_facts.stm](http://ohiohighwaysafetyoffice.ohio.gov/otso_annual_crash_facts.stm)

### ***Ohio Youth Risk Behavior Survey (YRBS)***

The Ohio Youth Risk Factor Survey (YRBS) is an anonymous paper and pencil survey of high school students enrolled in public and non-public schools. The YRBS has been conducted in Ohio since 1993 and is collaborative project between the Ohio Departments of Education and Health. The survey collects information on the prevalence of health behaviors, health care usage, and disease diagnosis associated with the leading cause of disease, injury and death in the United States. Results from the survey are weighted to represent the age, sex, race, and ethnic composition of Ohio.

[http://www.odh.ohio.gov/odhprograms/chss/ad\\_hlth/youthrsk/youthrsk1.aspx](http://www.odh.ohio.gov/odhprograms/chss/ad_hlth/youthrsk/youthrsk1.aspx)

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## **APPENDIX 2: ANALYTIC METHODS**

This analysis was limited to descriptive statistics, which were generated through the use of Statistical Analysis System (SAS) Version 9.1, Cary, N.C. The data were analyzed using injury surveillance guidelines from the Centers for Disease Control and Prevention (CDC).

### **Deaths:**

- Injury deaths were defined as a death with the underlying cause of death listed as an injury. Traumatic brain injury deaths were defined as deaths with an injury as underlying cause of death and a traumatic brain injury listed in one of the multiple cause of death fields. See Appendix 4 for a list of ICD-10 codes for injury mechanisms and Appendix 6 for a list of mechanism subcategories.
- Deaths included in this report were restricted to Ohio residents.
- Rates were calculated by dividing the number of injuries by the number of Ohio residents. Population estimates were based on estimates from the National Center for Health Statistics. Rates were age adjusted to the 2000 U.S. standard population.

### **Hospitalizations:**

- Discharge dataset includes nonfederal, acute care, or inpatient facilities. The dataset does not include Veterans' Affairs and other federal hospitals, rehabilitation centers, or psychiatric hospitals.
- Injury hospitalizations were defined as an inpatient visit with an injury listed in the primary discharge diagnosis field. See Appendix 5 for a list of ICD-9-CM codes for injury mechanisms and Appendix 7 for a list of mechanism subcategories.
- Datasets include readmissions, transfers, and deaths occurring in the hospital.
- Hospitalizations included in this report were restricted to Ohio residents.
- The external cause of injury code used in the analysis was the first listed cause of the discharge diagnosis fields. If the codes E000-E030, E849, E967, E869.4, E870-E879, or E930-E949 were the first listed codes then the next valid external cause code was used.
- Rates were calculated by dividing the number of injuries by the number of Ohio residents. Population estimates were based on estimates from the National Center for Health Statistics. Rates were age adjusted to the 2000 U.S. standard population.

### **Emergency Department Visits:**

- Discharge dataset includes nonfederal, acute care, or inpatient facilities. The dataset does not include Veterans' Affairs and other federal hospitals, rehabilitation centers, or psychiatric hospitals.
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- Injury ED visits were defined as an ED visit with an injury listed in the primary discharge diagnosis field or a valid external cause of injury code in any of the discharge diagnosis fields. See Appendix 5 for a complete list of ICD-9-CM codes.
- ED visits included in this report were restricted to Ohio residents.
- Persons who are treated at an ED and later admitted to a hospital are removed from the ED dataset, and therefore are not included in any analysis of ED data.
- The external cause of injury code used in the analysis was the first listed cause of the discharge diagnosis fields. If the codes E000-E030, E849, E967, E869.4, E870-E879, or E930-E949 were the first listed codes then the next valid external cause code was used.
- Rates were calculated by dividing the number of injuries by the number of Ohio residents. Population estimates were based on estimates from the National Center for Health Statistics. Rates were age adjusted to the 2000 U.S. standard population.

**Trend Analysis for Deaths, Hospitalizations and Emergency Department Visits:**

- Trend analysis for annual injury death, hospitalization, and ED visit rates was conducted in Microsoft Excel. Annual injury rates were plotted and a linear trend line was drawn to minimize the distance between the trend line and data point. The goodness of fit for the linear trend line was determined by the R-squared value. Linear trends were defined as a trend line with an R-squared value of 0.5 or higher. Non-linear trends were defined as a trend line with an R-squared value of less than 0.5. The slope and goodness of fit of the trend line were reported in the data tables. Non-linear trends were labeled with (NL) next to the slope.

**Poverty Status and County Urbanity Classifications:**

- County urbanity was derived from county of residence reported by Ohio Behavioral Risk Factor Surveillance System respondents. County urbanity classifications were based on a combination of proximity and connectedness to urban core economic development area and definitions of Appalachian counties established by the Appalachian Development Commission. See Appendix 11 for a map with county classifications.
- Poverty status was derived from household income and household composition reported by Ohio Behavioral Risk Factor Surveillance System respondents. Respondents were grouped into categories based on the 2010 Federal Poverty Guidelines. See Appendix 12 for household income and composition thresholds.

**Cost of Injuries:**

- Fatal Injury costs were calculated by multiplying the number of injury deaths in Ohio by the average cost associated the death for Ohio published on the CDC's
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## *Burden of Injury in Ohio, 2000-2010*

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WISQARS website. See Appendix 8 for average cost estimates by mechanism and intent.

- Non-fatal injury costs for hospitalizations were calculated by multiplying the number of hospitalizations by the average cost associated with hospitalizations for the United States published on the CDC's WISQARS website. See Appendix 9 for average cost estimates by mechanism and intent.
  - Non-fatal injury costs for ED visits were calculated by multiplying the number of ED visits by the average cost associated with ED visits for the United States published on the CDC's WISQARS website. See Appendix 10 for average cost estimates by mechanism and intent.
  - Total injury costs were calculated by adding the estimated costs for injury deaths, hospitalizations and ED visits.
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### **APPENDIX 3: LIMITATIONS OF INJURY SURVEILLANCE DATA**

#### **Death Certificate Data:**

- The cause of death reported on the death certificate is based on the underlying cause of death determined by a physician or coroner. While physicians and coroners are well trained to investigate and determine causes of death, a standardized process for investigating and determining causes of death does not exist in Ohio. This lack of uniformity may lead to differences in how underlying causes of death are classified and pose limitations for comparing rates across local jurisdictions.

#### **Hospital Discharge Data:**

- In each year of the study period, approximately 30 percent of injuries treated in the as inpatients and emergency departments were not assigned an external cause code (E-code). This most likely resulted in an underestimate of total costs and incidence rates, because not all mechanism and intents for injuries could be identified and included in the analysis by mechanism.
- Of the non-fatally injured, only those who sought medical care were captured for this analysis.
- Discharges, not individuals, were the unit of measurement, thereby resulting in duplication when readmissions for the same initial event occurred. The inclusion of readmissions would lead to an overestimate of incidence rates.
- Race and ethnicity are largely incomplete in the hospital discharge data and were not included in the analysis.
- Ohio residents treated in out-of-state hospitals are not consistently included, thereby affecting rates, particularly of border counties.
- Severity of injury is assumed based on type of medical treatment received (i.e., inpatient treatment is for more severe injuries than ED visits).

#### **Behavioral Risk Factor Data:**

- Data from the Pregnancy Risk Assessment Monitoring System (PRAMS), Ohio Youth Risk Behavior Survey (YRBS) and Behavioral Risk Factor Surveillance System (BRFSS) are based on self-reported behaviors by respondents. The accuracy of self-reported data depends on the respondents' ability to recall and willing to report the information. Self-reported data can lead to overestimates or underestimates of the true prevalence in the population depending on the topic being asked.
  - Results from Ohio YRBS represent a random sample of students enrolled in high schools in Ohio. The results do not represent high school age youth who have dropped out of school.
  - Results from the Ohio BRFSS represent a random sample of non-institutionalized adults ages 18 or older in Ohio with a landline in their home. The BRFSS excludes institutionalized adults and adults living in cell phone only households.
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