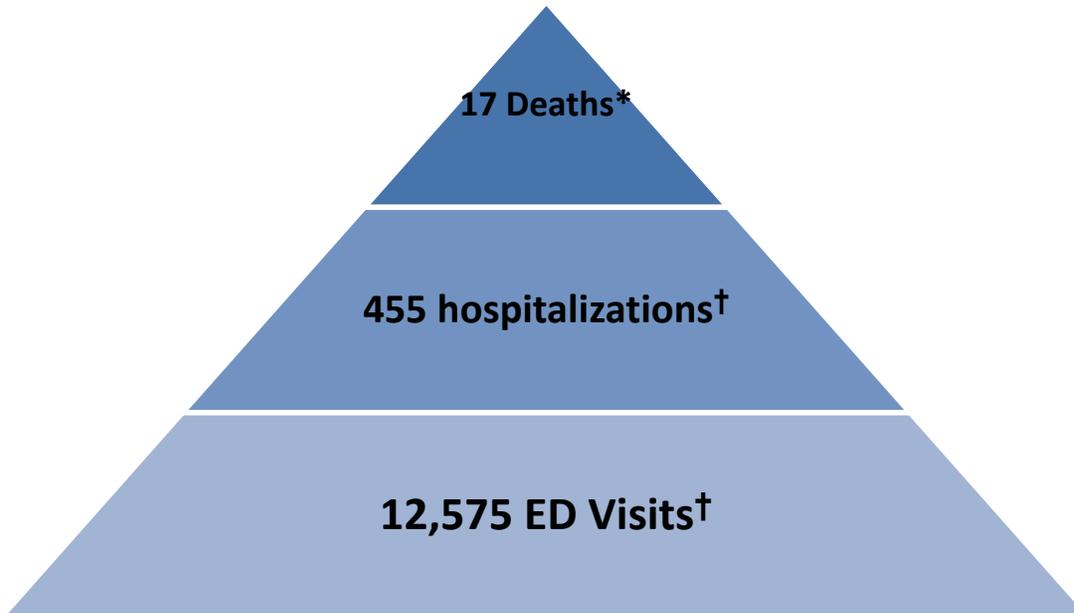


SECTION 3.4: PEDAL CYCLE INJURIES



*SOURCE: OHIO DEPARTMENT OF HEALTH, VITAL STATISTICS

† SOURCE: OHIO HOSPITAL ASSOCIATION

CHAPTER HIGHLIGHTS:

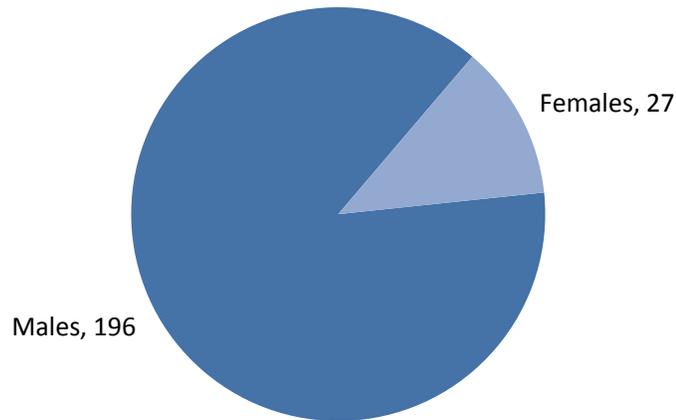
Patterns:

- Males were 8 times more likely than females to die from pedal cycle related injury.
- Approximately one pedal cycle related hospitalization occurs each day in Ohio.
- 39 visits are made to an emergency department every day in Ohio for a pedal cycle related injury.
- Male children ages 5-14 are most likely to experience a non-fatal pedal cycle injury.
- Most non-fatal pedal cycle injuries resulted from collisions with other road vehicles.
- Only 50% of children under 18 years of age frequently wear a helmet when riding a pedal cycle.

Trends:

- 223 pedal cycle related deaths have occurred in Ohio since 2000.
- Hospitalizations increased 33 percent in 2002-2008 then decreased 26 percent in 2008-2010.
- ED visits increased 9 percent in 2002-2010.
- Males were likely to experience a non-fatal pedal cycle injury throughout study period.
- Adults ages 45-54 were most likely to experience a hospitalization and children ages 5-14 were more likely to experience an ED visit.
- Most non-fatal pedal cycle injuries resulted from collisions with other road vehicles throughout the study period.

Figure 6.1. Number of pedal cycle deaths by sex, Ohio, 2000-2010



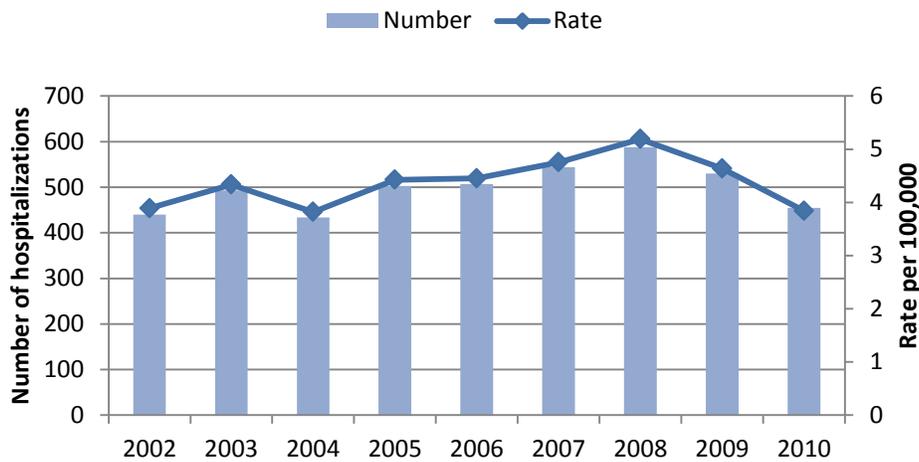
Source: Ohio Department of Health, Vital Statistics

DEATHS:

Since 2000, 223 deaths have resulted from pedal cycle injuries. The annual death rate for the period was 0.2 per 100,000. Males were 8 times more likely to die from a pedal cycle related injury than females. Little variation was found across age groups among ages 5-64. Pedal cycle deaths were very uncommon among children younger than 5 or adults ages 65 or older. Death rates were similar among whites and blacks while pedal cycle related deaths were rare among other race and ethnic groups. See Table 6.1 for a pedal cycle death risk profile. Nearly all deaths (92 percent) involved a motor vehicle traffic crash. See Tables 19a-c located at the end of this section for more detailed information on pedal cycle related deaths in Ohio.

Table 6.1 Pedal Cycle Death Risk Profile	
	At Risk Groups
Sex	Males
Age	Similar across age groups
Race and ethnicity	Similar among whites and blacks

Figure 6.2. Number and age adjusted rate for pedal cycle injury hospitalizations by year, Ohio, 2002-2010



Source: Ohio Hospital Association

HOSPITALIZATIONS:

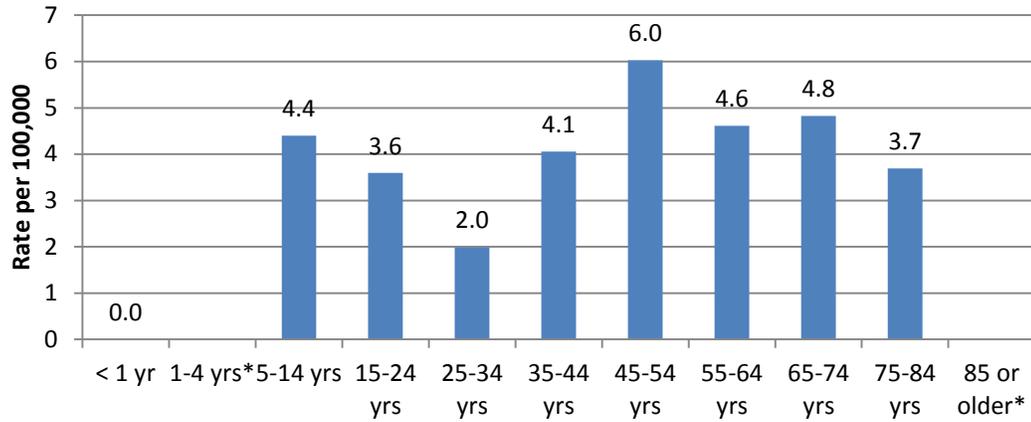
Approximately 450 hospitalizations resulted from pedal cycle injuries in 2010. The hospitalization rate was 3.8 per 100,000 (Figure 6.2). Males were 4 times more likely than females to be hospitalized due to pedal cycle injury. Hospitalization rates fluctuated throughout the lifespan with the highest rates found among children ages 5-14 and adults ages 45-74 (Figure 6.3). See Table 6.2 for a pedal cycle hospitalization risk profile. Most hospitalizations resulted from collisions with other road vehicles (76 percent) and motor vehicle traffic crashes (24 percent) (Figure 6.4).

Table 6.2 Pedal Cycle Hospitalization Risk Profile		
	2010 At Risk Groups	Annual Trend Since 2002
Overall		No change
Sex	Males	Similar for males and females
Age	45-54	45-54 (largest increase)

TRENDS:

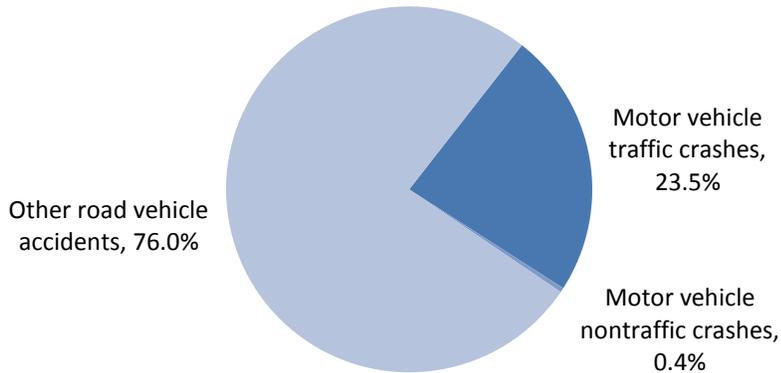
The hospitalization rate for pedal cycle injuries did not change between 2002 and 2010 (Figure 6.2). Rates among males were consistently higher than females during the study period. In 2002-2009, the highest rates of hospitalization were found among children ages 5-14 years. A large decrease in rates among children ages 5-14 occurred from 2009 to 2010. In contrast, a steady rise in hospitalization rates was found among adults ages 45-74 in 2002-2010. Continued monitoring and evaluation is needed to understand the reasons for the decrease in rates by age group. Most hospitalizations resulted from collisions with other road vehicles and motor vehicle traffic crashes throughout the study period. See Tables 20a-c located at the end of this section for more information on hospitalizations resulting from pedal cycle injuries.

Figure 6.3. Hospitalization rates resulting from pedal cycle injuries, by age, Ohio, 2010



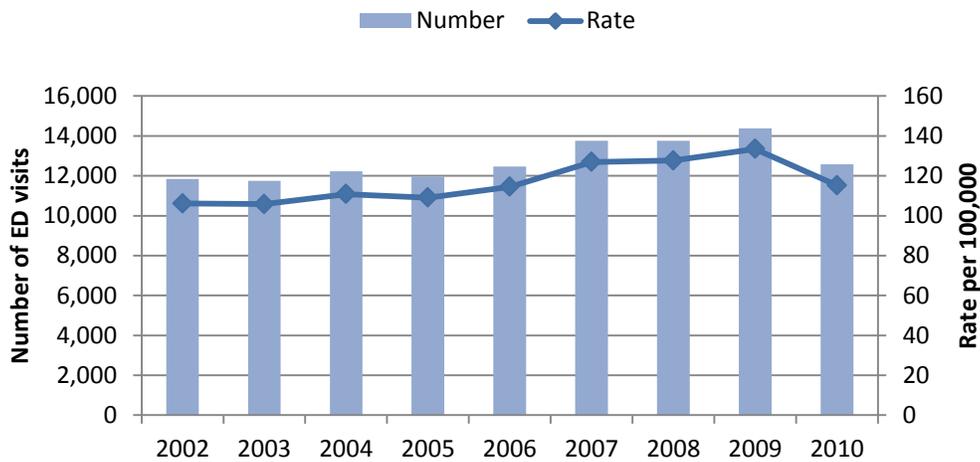
Source: Ohio Hospital Association
*Rates suppress due to small cell sizes

Figure 6.4. Distribution of hospitalizations resulting from pedal cycle injuries by cause, Ohio, 2010



Source: Ohio Hospital Association

Figure 6.5. Number and age adjusted rate for pedal cycle injury ED visits by year, Ohio, 2002-2010



Source: Ohio Hospital Association

EMERGENCY DEPARTMENT VISITS:

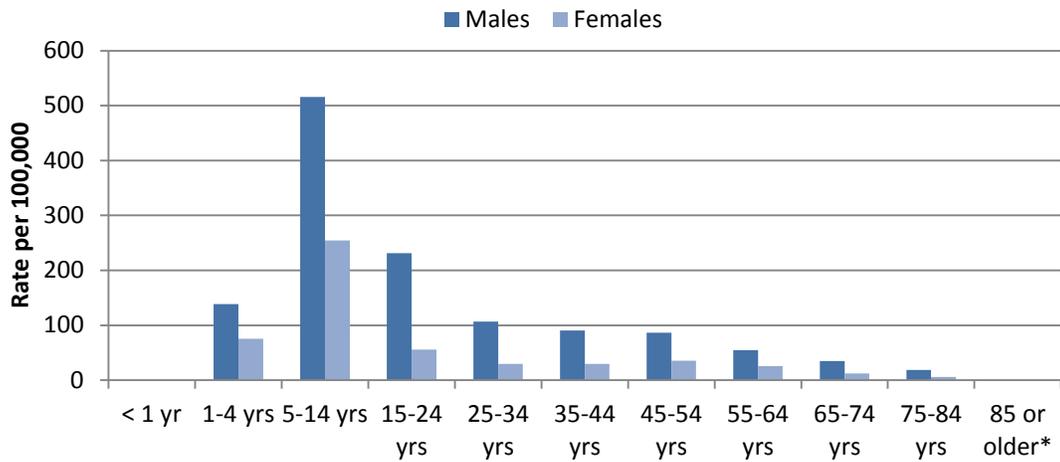
In 2010, approximately 12,000 ED visits resulted from pedal cycle injuries. The ED visit rate was 115 per 100,000 (Figure 6.5). Males were more likely than females to experience an ED visit throughout the lifespan (Figure 6.6). The highest rates were found among children ages 5-14. See Table 6.3 for a pedal cycle injury ED visit risk profile. Nearly all ED visits were associated with a collision with any other road vehicle (91 percent) or motor vehicle traffic (9 percent) (Figure 6.7).

Table 6.3 Pedal Cycle Injury ED Visit Risk Profile		
	2010 At Risk Groups	Annual trend since 2002
Overall		+8%
Sex	Males	Males (largest increase)
Age	5-14	15-24 (largest increase)

TRENDS:

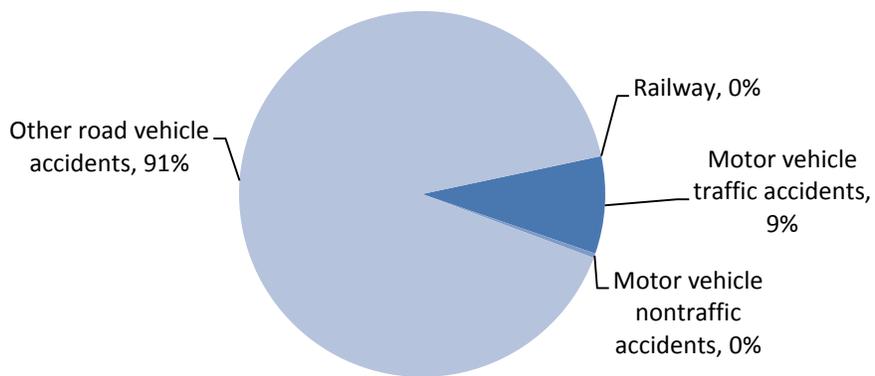
ED visit rates resulting from pedal cycle injuries increased from 106 per 100,000 in 2002 to 115 per 100,000 in 2010 (Figure 6.5). The average annual increase was 2.8 per 100,000 per year. The average annual increase was greater among males (4.0 per 100,000 per year) than females (1.7 per 100,000 per year). The highest rates of ED visits were found among children ages 5-14 throughout the study period. The largest annual increases were found among youth and young adults ages 15-24 (6 per 100,000 per year) and adults ages 45-54 (4.4 per 100,000 per year). Almost all ED visits were associated with a collision with any other road vehicle throughout the study period. ED visits involving motor vehicle traffic collisions increased by 38 visits per year while trends in other road crashes and non-traffic crashes did not follow a linear pattern. See Table 21a-c located at the end of this section for more information on ED visits associated with pedal cycle injuries.

Figure 6.6. ED visit rates resulting from pedal cycle injuries by age and sex, Ohio, 2010



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

Figure 6.7. Distribution of ED visits resulting from pedal cycle 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 19a. Number of deaths resulting from unintentional pedal cycle injuries, Ohio, 2000-2010

	2000-2010
Overall	223
Sex	
Males	196
Females	27
Age	
< 1 yr	0
1-4 yrs	3
5-14 yrs	35
15-24 yrs	24
25-34 yrs	24
35-44 yrs	32
45-54 yrs	46
55-64 yrs	31
65-74 yrs	13
75-84 yrs	12
85 or older	<5
Race and ethnicity†	
White‡	184
Black‡	33
Hispanic	5
Other‡	<5

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 19b. Death rates per 100,000 resulting from unintentional pedal cycle injuries, Ohio, 2000-2010

	2000-2010
Overall†	0.17
Sex†	
Males	0.31
Females	0.04
Age	
< 1 yr	0.00
1-4 yrs	*
5-14 yrs	0.20
15-24 yrs	0.14
25-34 yrs	0.15
35-44 yrs	0.18
45-54 yrs	0.25
55-64 yrs	0.23
65-74 yrs	*
75-84 yrs	*
85 or older	*
Race and ethnicity†	
White‡	0.17
Black‡	0.21
Hispanic	*
Other‡	*

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

*Rates suppressed due to fewer than 20 deaths.

‡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 19c. Number of deaths resulting from unintentional pedal cycle injuries, by mechanism and year, Ohio, 2000-2010

	2000-2010	Percent
Traffic	205	92%
Nontraffic	18	8%

Source: Ohio Department of Health, Office of Vital Statistics

Table 20a. Number of hospitalizations resulting from pedal cycle injuries by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	440	493	434	503	507	544	588	530	455
Sex									
Males	332	389	333	402	395	419	448	397	362
Females	108	104	101	101	112	125	140	133	93
Age									
< 1 yr	0	0	0	<5	0	<5	<5	0	0
1-4 yrs	11	7	8	7	12	12	6	7	3
5-14 yrs	177	182	145	160	179	175	204	159	67
15-24 yrs	70	80	54	80	76	83	79	81	57
25-34 yrs	35	33	35	33	27	36	40	34	28
35-44 yrs	47	50	53	61	41	37	47	47	60
45-54 yrs	43	66	62	73	87	103	98	86	105
55-64 yrs	33	35	37	53	48	57	59	57	67
65-74 yrs	15	22	20	22	19	24	36	38	41
75-84 yrs	7	15	20	10	13	14	17	20	20
85 or older	<5	<5	0	<5	5	<5	<5	<5	7

Source: Ohio Hospital Association

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 20b. Hospitalization rates per 100,000 resulting from pedal cycle injuries by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	3.9	4.3	3.8	4.4	4.5	4.8	5.2	4.6	3.8	0.1 (NL)
Sex†										
Males	5.9	6.9	5.9	7.2	7.0	7.4	8.0	7.1	6.3	0.1 (NL)
Females	1.9	1.8	1.8	1.8	1.9	2.2	2.4	2.2	1.5	<0.1 (NL)
Age										
< 1 yr	0.0	0.0	0.0	*	0.0	*	*	0.0	0.0	*
1-4 yrs	*	*	*	*	*	*	*	*	*	*
5-14 yrs	11.0	11.4	9.2	10.3	11.7	11.6	13.6	10.6	4.4	-0.3 (NL)
15-24 yrs	4.4	5.0	3.4	5.0	4.8	5.3	5.0	5.2	3.6	<0.1 (NL)
25-34 yrs	2.4	2.3	2.4	2.3	1.9	2.5	2.7	2.3	2.0	<-0.1 (NL)
35-44 yrs	2.7	2.9	3.2	3.7	2.5	2.3	3.0	3.1	4.1	<0.1 (NL)
45-54 yrs	2.6	3.9	3.7	4.3	5.0	5.9	5.6	4.9	6.0	0.4
55-64 yrs	3.0	3.1	3.2	4.4	3.8	4.4	4.4	4.1	4.6	0.2
65-74 yrs	1.9	2.9	2.6	2.9	2.5	3.1	4.5	4.5	4.8	0.3
75-84 yrs	*	*	3.6	*	*	*	*	3.7	3.7	*
85 or older	*	*	*	*	*	*	*	*	*	*

*Rates suppressed due to cell sizes less than 20.

†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

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 20c. Number of hospitalizations resulting from pedal cycle injuries by type and year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Railway	0	0	0	<5	<5	0	<5	0	0	0%	*
Motor vehicle traffic crashes	102	116	104	107	136	120	156	107	107	24%	2 (NL)
Motor vehicle nontraffic crashes	7	<5	<5	<5	<5	<5	6	<5	<5	*	*
Other road vehicle crashes	331	373	326	391	368	422	425	420	346	76%	7 (NL)

*Suppressed due to less than 20 hospitalizations

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

Source: Ohio Hospital Association

Table 21a. Number of ED visits resulting from pedal cycle injuries by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	11,848	11,750	12,229	11,948	12,467	13,751	13,765	14,376	12,575
Sex									
Males	8,558	8,391	8,747	8,500	8,828	9,876	9,852	10,208	9,016
Females	3,290	3,359	3,482	3,448	3,639	3,875	3,913	4,168	3,559
Age									
< 1 yr	0	<5	0	<5	<5	0	<5	<5	0
1-4 yrs	681	672	706	664	658	677	719	784	627
5-14 yrs	6,996	7,011	7,083	6,576	6,596	7,078	6,891	7,335	5,911
15-24 yrs	1,844	1,821	1,981	2,066	2,198	2,483	2,480	2,504	2,296
25-34 yrs	686	660	683	740	792	948	980	1,058	958
35-44 yrs	805	699	789	776	875	953	969	898	887
45-54 yrs	488	531	596	686	796	977	1,009	1,028	1,055
55-64 yrs	211	218	237	274	356	433	482	486	575
65-74 yrs	92	92	99	117	131	139	164	192	193
75-84 yrs	38	35	48	39	59	55	58	71	60
85 or older	7	8	7	9	5	8	11	16	13

Source: Ohio Hospital Association

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 21b. ED visit rates per 100,000 resulting from pedal cycle injuries by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall	106	106	111	109	114	127	128	133	115	2.8
Sex										
Males	151	149	157	153	160	180	181	187	164	4.0
Females	60	62	64	64	68	72	74	79	66	1.7
Age										
< 1 yr	0	*	0	*	*	0	*	*	0	*
1-4 yrs	113	112	119	112	112	115	122	132	108	0.8 (NL)
5-14 yrs	433	439	449	423	430	467	460	491	388	0.8 (NL)
15-24 yrs	117	114	124	130	139	158	158	160	145	5.8
25-34 yrs	46	45	47	51	54	65	67	72	68	3.7
35-44 yrs	46	41	47	47	54	60	62	59	60	2.5
45-54 yrs	30	32	35	40	46	56	58	59	61	4.4
55-64 yrs	19	19	20	23	28	33	36	35	40	2.8
65-74 yrs	12	12	13	15	17	18	20	23	23	1.6
75-84 yrs	7	6	9	7	11	10	11	13	11	0.7
85 or older	*	*	*	*	*	*	*	*	*	*

*Rates suppressed due to less than 20 ED visits

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 21c. Number of ED visit rates resulting from pedal cycle injuries by type and year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Railway	<5	<5	<5	<5	<5	<5	<5	<5	0	*	*
Motor vehicle traffic crashes	860	854	830	907	1,039	1,094	1,107	1,069	1,078	8.6%	38
Motor vehicle nontraffic crashes	50	63	51	51	31	34	50	50	53	0.4%	-1 (NL)
Other road vehicle crashes	10,936	10,832	11,346	10,988	11,397	12,620	12,606	13,256	11,443	91.0%	224 (NL)

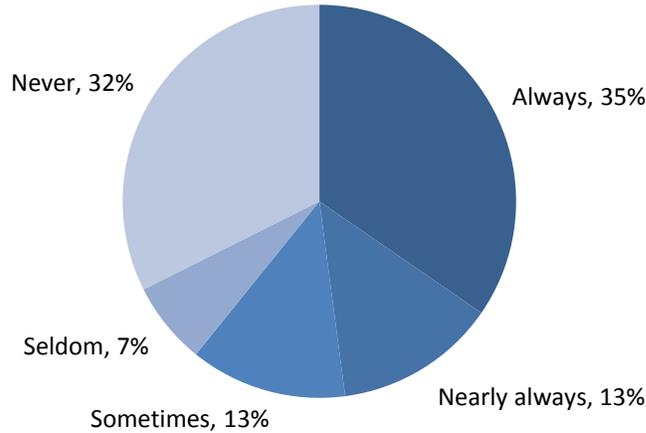
*Suppressed due to less than 20 ED visits

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

Source: Ohio Hospital Association

SECTION 3.4A: YOUTH BICYCLE HELMET USE

Figure 6.8. Percentage of children less than 18 years of age who wear a helmet when riding a bicycle, by frequency of helmet use, Ohio, 2010



Source: Ohio Behavioral Risk Factor Surveillance System

BICYCLE HELMET USE:

Research has shown wearing a bicycle helmet reduces an individual’s risk for traumatic head and brain injuries¹. In 2010, approximately 50 percent of Ohio adults reported the oldest child in their household infrequently (e.g. “never”, “rarely” or “sometimes”) wears a helmet when riding a bicycle. The frequency of bicycle helmet use varied by levels of household income and county economic development. Adults from households with income levels below poverty and slightly above poverty (less than 200 percent) were more likely to report their children infrequently wears a helmet compared to households with income 200 percent or more above poverty. Adults from rural and Appalachian counties were more likely report their children infrequently use bicycle helmets compared to adults from metropolitan counties. See Tables 22a-b located at the end of this section for more detailed information on bicycle helmet use among children less than 18 years of age in Ohio. See Appendix 10 and 11 for more detailed information on household poverty and county economic development definitions.

Table 6.4 Bicycle Helmet Use Risk Profile	
	2010 At Risk Groups
Overall	52%
Household Poverty	Below poverty and slightly above poverty
County Development*	Rural and Appalachian

¹ Ivers R. Systematic reviews of bicycle helmet research. *Injury Prev.* 2007 June; 13(3): 190.

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 22a. Bicycle helmet use among oldest child in household who ride a bicycle, by frequency of use, Ohio, 2010

	2010 Ohio BRFSS		
	N	Percent	95% CI
Always	398	34.6	(31.1-38.1)
Nearly always	152	13.3	(10.8-15.9)
Sometimes	148	12.9	(10.4-15.4)
Seldom	85	6.8	(5.0-8.5)
Never	404	32.4	(29.0-35.8)

Source: Ohio Behavioral Risk Factor Surveillance System

Table 22b. Prevalence of respondents who reported the oldest child sometimes, rarely, or never wear a helmet when riding a bicycle, Ohio, 2010

	Percent	95% CI
Overall	52.0	(48.4-55.7)
Below poverty	66.2	(55.7-76.6)
Above poverty, less than 200%	62.7	(55.3-70.2)
Above poverty, 200% or more	45.0	(40.3-49.6)
Missing household/income	61.7	(47.7-75.9)
Metropolitan	46.2	(41.3-51.1)
Suburban	50.0	(41.4-58.6)
Rural	64.9	(55.5-74.3)
Appalachian	60.8	(50.4-71.2)

Source: Ohio Behavioral Risk Factor Surveillance System

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

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

Burden of Injury in Ohio, 2000-2010

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

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

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

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.
-

Ohio Violence and Injury Prevention Program, Ohio Department of Health

- 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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

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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