

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

“Injury is probably the most under recognized major public health problem facing the nation today, and the study of injury represents unparalleled opportunities for reducing morbidity and mortality and for realizing significant savings in both financial and human terms—all in return for a relatively modest investment.”

From: Injury Prevention: Meeting the Challenge, The National Committee for Injury

SECTION 2: THE OVERALL BURDEN OF INJURY IN OHIO

INJURY AS A CAUSE OF DEATH IN COMPARISON TO OTHER PUBLIC HEALTH ISSUES

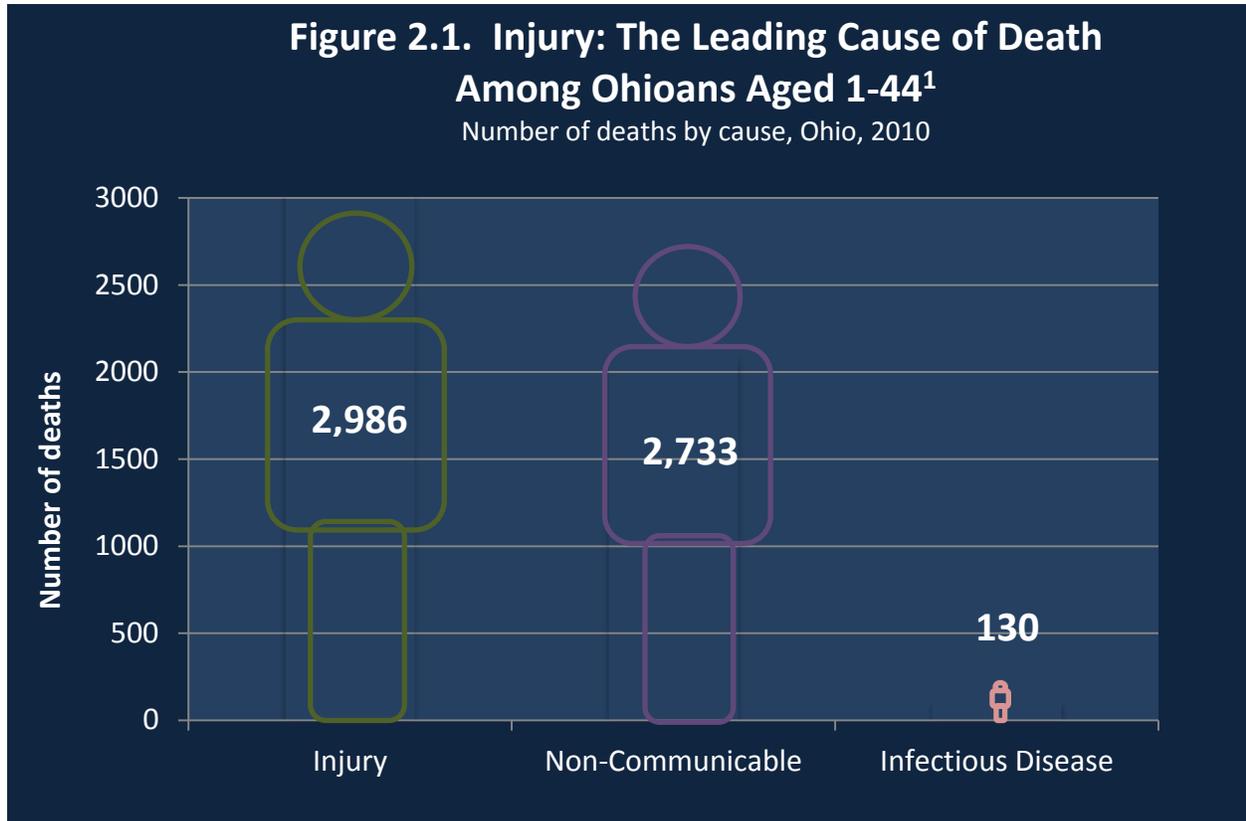
Injuries are a serious public health problem throughout the lifespan in Ohio. Injuries were consistently in the top five leading causes of death for most age groups in 2009 (Table 2.1). Unintentional injuries are the 5th-leading cause of death overall and the leading cause of death for ages 1-44. Homicides were one of the 5 leading causes of death for ages 1-9 and 15-44 while suicides were one of the 5 leading causes of death for ages 10-54.

Table 2.1 Five Leading Causes of Death											
Number of deaths by age groups, Ohio 2009											
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	All Ages
1	Short Gestation 216	Unintent. Injury 37	Unintent. Injury 15	Unintent. Injury 35	Unintent. Injury 330	Unintent. Injury 448	Malignant Neoplasm 533	Malignant Neoplasm 2,347	Malignant Neoplasm 4,691	Heart Disease 20,676	Heart Disease 25,453
2	Congenital Anomalies 209	Congenital Anomalies 15	Malignant Neoplasm 14	Malignant Neoplasm 15	Suicide 143	Suicide 168	Unintent. Injury 509	Heart Disease 1,469	Heart Disease 2,722	Malignant Neoplasm 17,333	Malignant Neoplasm 25,149
3	SIDS 80	Homicide 14	Homicide ---	Suicide 14	Homicide 129	Malignant Neoplasm 147	Heart Disease 416	Unintent. Injury 681	Chronic Lower Respiratory Disease 747	Chronic Lower Respiratory Disease 5,609	Chronic Low. Respiratory Disease 6,642
4	Maternal Pregnancy Comp. 69	Malignant Neoplasm ---	Heart Disease ---	Influenza & Pneumonia ---	Malignant Neoplasm 55	Homicide 142	Suicide 227	Liver Disease 328	Diabetes Mellitus 553	Cerebro-vascular 4,798	Cerebro-vascular 5,576
5	Unintent. Injury 54	Heart Disease ---	Congenital Anomalies ---	Benign Neoplasm ---	Heart Disease 26	Heart Disease 116	Diabetes Mellitus 93	Suicide 274	Cerebro-vascular 436	Alzheimer's Disease 3,833	Unintent. Injury 4,012

Source: CDC WISQARS

--- Number suppressed due to counts less than 10

Among those aged 1 to 44, injuries caused more deaths than all infectious and non-communicable diseases (e.g., heart disease, cancer, stroke, diabetes, Alzheimer's, liver disease, etc.) combined (see Figure 2.1).



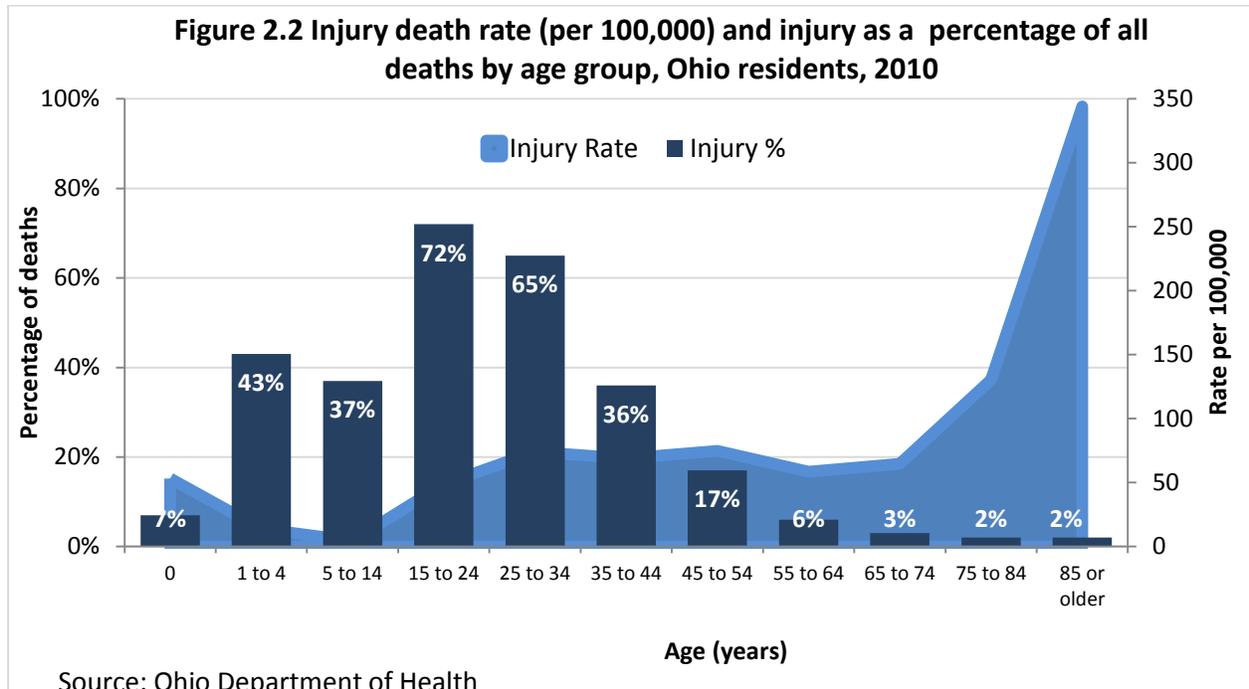
¹Source: ODH Office of Vital Statistics

Another way to explore the burden of injury in relation to other causes of death throughout the lifespan is shown in Figure 2.2 below. This figure demonstrates the proportion of all 2010 deaths in a particular age group that were accounted for by injury. Injuries accounted for a substantial percentage of all deaths among ages 1-44. They were associated with the greatest proportion of deaths among those ages 15-34 years. For the ages 15-24, if all injury deaths were prevented, 72 percent of all deaths in this age group would be eliminated. Injuries were associated with a smaller percentage of deaths among infants less than 1 year and adults ages 45 or older. For young children ages 1 to 4 years, 43 percent of deaths were caused by injuries, and for children ages 5 to 14, more than one-third of all deaths in 2010 were injury-related. From age 25 on, the proportion of deaths due to injury steadily decreased down to 2 percent for older Ohioans as the number of deaths from chronic diseases and other causes increases.

In contrast, fatal injury rates decreased from birth through age 14 then increased from ages 15 to 34 and was similar among ages 35-74. Fatal injury rates increased dramatically among adults ages 75 or older. So while the proportion of all deaths due to injury decreases with age after 24 years, the impact of injury across the lifespan continues to be significant as death rates rise.

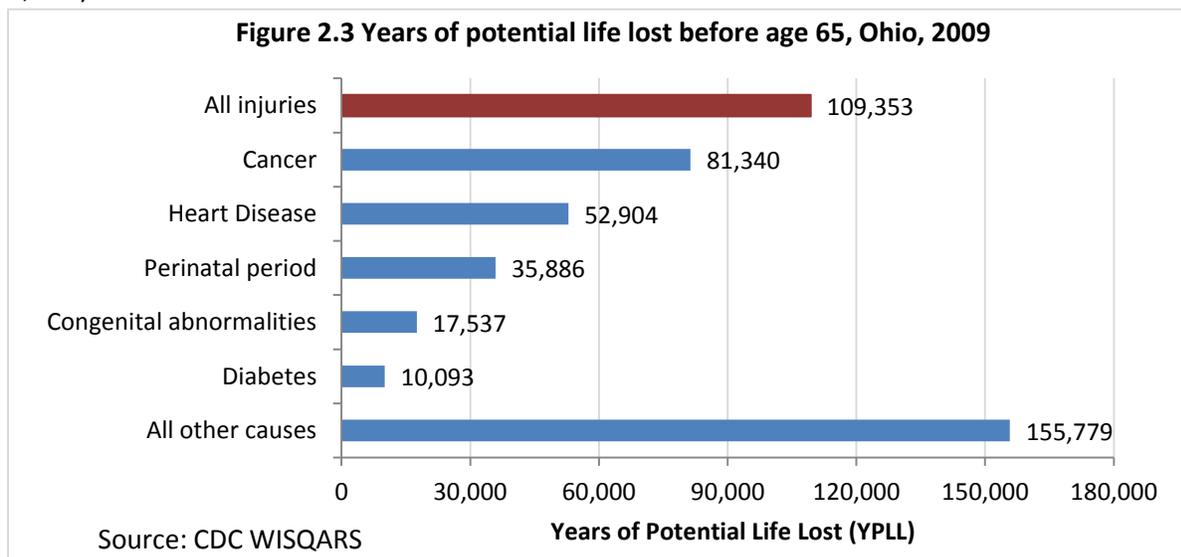
Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health



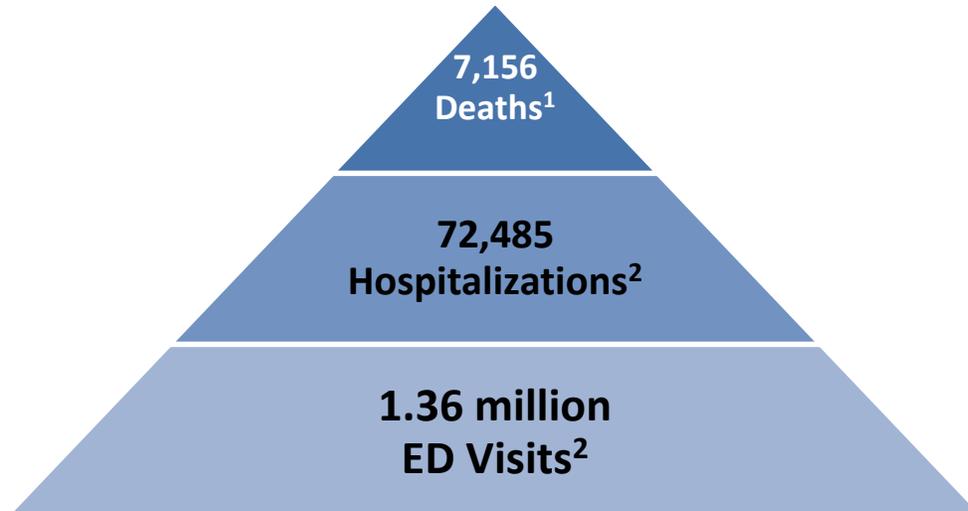
YEARS OF POTENTIAL LIFE LOST (YPLL)

Another measure of the burden of injury is Years of Potential Life Lost (YPLL), or life lost by a premature death. YPLL involves estimating the average time a person would have lived had he or she not died prematurely. This measure is used to help quantify social and economic loss owing to premature death, especially for specific causes of death affecting younger age groups. According to the CDC WISQARS web-based query system, injuries were the leading contributor to YPLL for Ohio in 2009 (See Figure 2.3). Approximately 109,000 YPLL were attributed to all injuries. Unintentional injuries contributed 65,239 YPLL followed by suicides (24,287 years) and homicides (16,675).



SECTION 2A: OVERVIEW OF INJURY IN OHIO

Ohio Injury Pyramid, 2010



¹Source: Ohio Department of Health, Vital Statistics ²Source: Ohio Hospital Association

BURDEN OF INJURY:

Injuries are a significant public health problem in Ohio. On average in Ohio in 2010, there was more than one injury-related hospitalization every 7 minutes and an emergency department visit every 23 seconds, amounting to more than 72,000 hospitalizations and 1.36 million ED visits (Table 2.2). In addition, there was an average of nearly 20 injury-related deaths per day to Ohioans in 2010.

All injuries include unintentional causes such as motor vehicle traffic, drowning, poisoning as well as homicides and suicides.

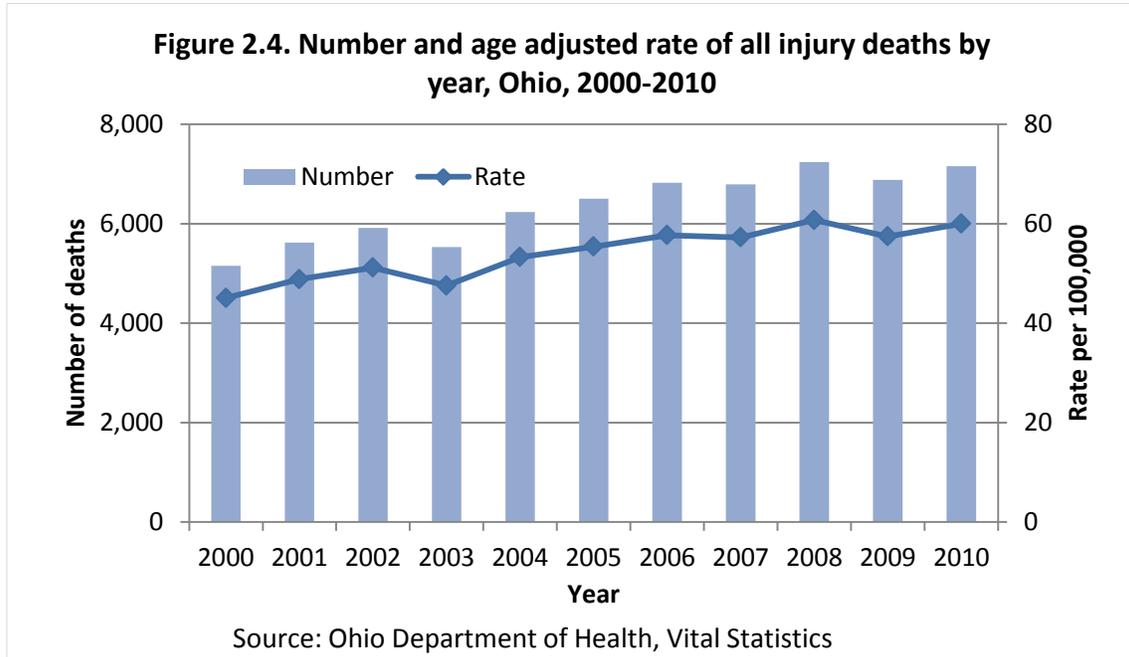
Table 2.2 Ohio Average Injury Frequency, 2010

Injury-related	Total 2010 Number	Per Day	Per Hour	Per Minute	Seconds...
ED Visits	1,360,000	3,726	155	2.6	An ED visit every 23 seconds
Hospitalizations	72,485	199	8	A hospitalization every 7 minutes	
Deaths	7,156	20	A death every 1 hour 23 minutes		

These injuries impact the state on a variety of levels. Injuries can lead to declines in physical health, well-being, and quality of life ranging from several days to many years. The large volume and treatment charges of injuries have taken a heavy toll on Ohio's health care systems. In 2010, fatal and non-fatal injuries cost Ohio \$13.4 billion in medical care and work loss. If these costs were equally divided among all Ohioans, injuries would cost every man, woman and child more than \$1,200 per year.

Fortunately injuries can be prevented through a combination of changes in individual behavior, the physical and social environment, as well as the implementation of policies aiming to reduce risk for injury.

The following sections of this report present information on specific types of injuries, the number of Ohioans affected, trends over time, and the economic impact on health care systems.



DEATHS:

In 2010, 7,156 Ohioans or roughly 20 per day died from an injury or violence-related cause. The death rate for injuries was 60.0 per 100,000 (see Figure 2.4). Males were more likely than females to die from an injury (82.0 versus 35.4 per 100,000). Injury fatality rates varied by age group with the highest rates found among adults ages 75 or older (see Figure 2.5). The highest fatal injury rates were found among African Americans (62.6 per 100,000) and whites (60.4 per 100,000) while lower rates were found among Hispanics (39.3 per 100,000). Table 2.3 highlights these injury risk profiles.

Table 2.3: All Injury Death Risk Profile, Ohio, 2010		
	2010 At Risk Groups	Annual trend since 2000
Overall		+33%
Sex	Males	Males (largest increase)
Age	75 or older	85 or older (largest increase)
Race and ethnicity	Blacks	Whites (largest increase)

TRENDS:

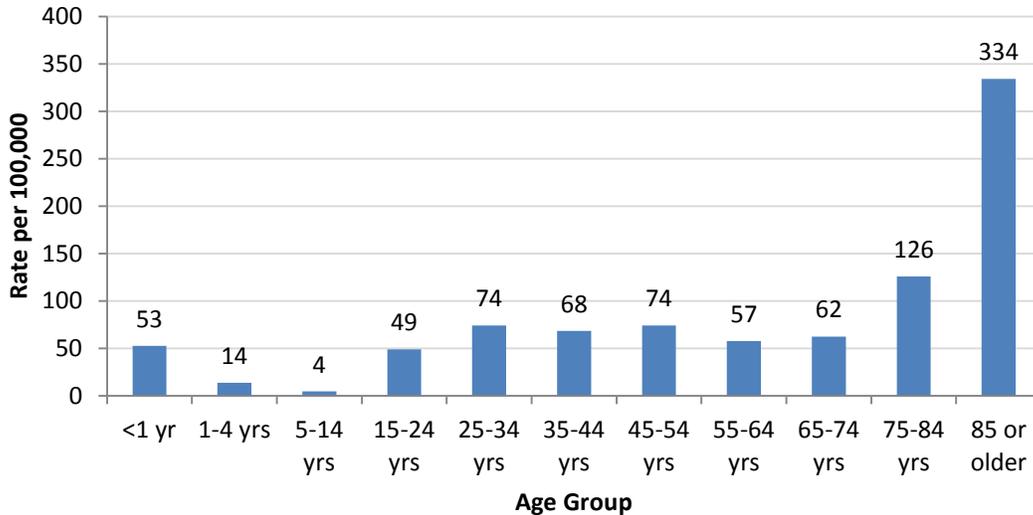
Since 2000, fatal injury rates have increased 33 percent from 45 per 100,000 in 2000 to 60 per 100,000 in 2010 (see Figure 2.4). The death rate increased by an average of 1.5 deaths per 100,000 per year. The average annual increase was greater among males (+1.7 per 100,000) than females (0.95 per 100,000). Death rates increased among most age groups, with the largest increases by age found among adults aged 85 or older (+4.5 per 100,000 per year) followed by ages 45-54 (3.2 per 100,000 per year) (see Figure 2.6).

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

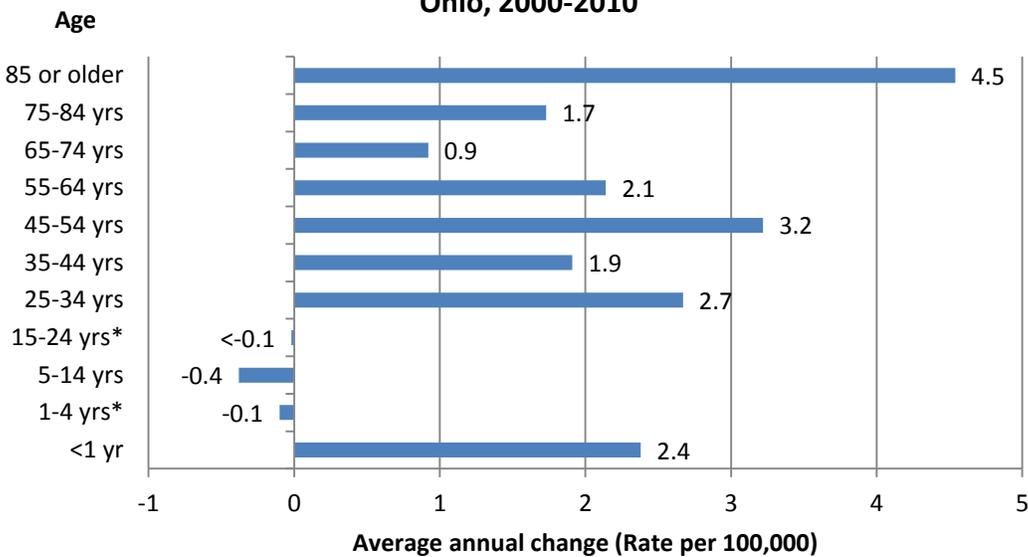
These increases are largely attributable to rising drug overdose rates and falls among older adults. A decrease in rates was found among children ages 5-14 (-0.4 per 100,000 per year). Fatal rates increased by an average of 1.6 per 100,000 per year for whites while rates remained the same for other race and ethnic groups. See tables 1a and 1b located at the end of this section for more detailed information on the number and rate of injury fatalities in Ohio.

Figure 2.5. Rate per 100,000 for all injury deaths by age, Ohio, 2010



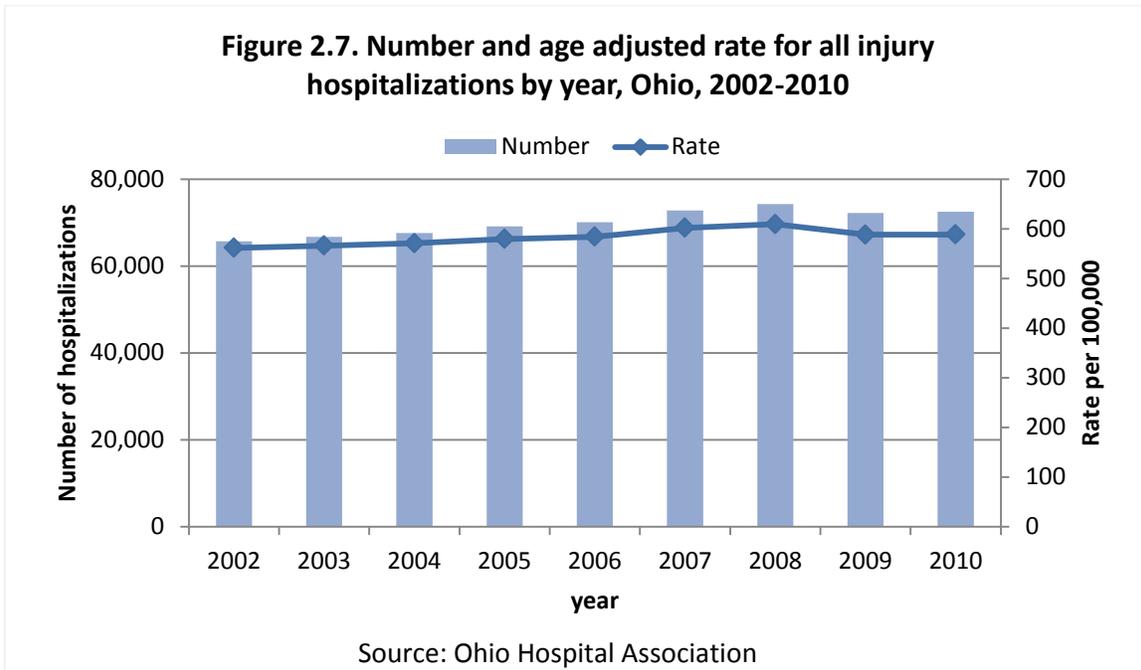
Source: Ohio Department of Health, Vital Statistics

Figure 2.6. Average annual change in all injury death rates by age, Ohio, 2000-2010



Source: Ohio Department of Health, Vital Statistics

*Interpret with caution, does not follow linear trend



HOSPITALIZATIONS:

Over 72,000 hospitalizations resulted from injuries in Ohio in 2010. The injury hospitalization rate was 588 per 100,000 (Figure 2.7). Overall males (614 per 100,000) were more likely to be hospitalized for an injury than females (545 per 100,000). For both males and females, the rate of hospitalizations decreased from birth to 14 years of age and then steadily increased with age among individuals 15 or older with the highest rates found among older adults 75 or older. From birth to age 64, hospitalization rates were higher among males than females. This pattern was reversed among adults aged 65 or older with higher rates found among females (see Figure 2.8). This trend is attributable to growing rates of fall-related injury among older females. Table 2.4 highlights these injury risk profiles.

	2010 At Risk Groups	Annual trend since 2002
Overall		+5%
Sex	Males	Males (largest increase)
Age	75 or older	85 or older (largest increase)

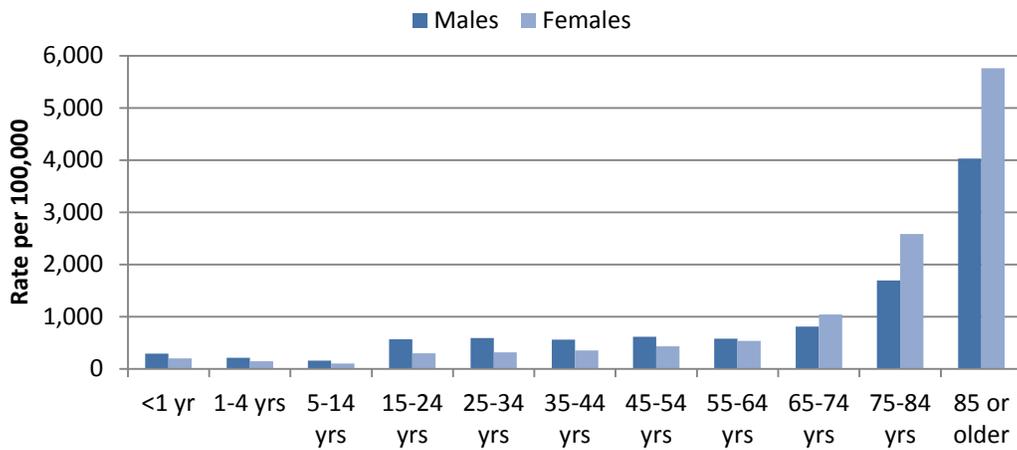
TRENDS:

Since 2002, injury hospitalization rates have increased 5 percent from 561 per 100,000 in 2002 to 588 per 100,000 in 2010. The average increase was 4.6 hospitalizations per 100,000 per year. The average annual increase was larger among males (+5.6 per 100,000) compared to females (4.1 per 100,000). Injury hospitalization rates increased among most age groups with the largest increase found among adults ages 85 or older (40 per 100,000 per year). A decrease in hospitalization rates occurred among children ages 5-14 (-4 per 100,000) while rates among children 4 years or less, ages 15-24 and 35-44 did not follow a linear trend (see Figure 2.9). See Tables 2a and 2b for more detailed information located at the end of this section on the number and rate of all injury hospitalizations.

Burden of Injury in Ohio, 2000-2010

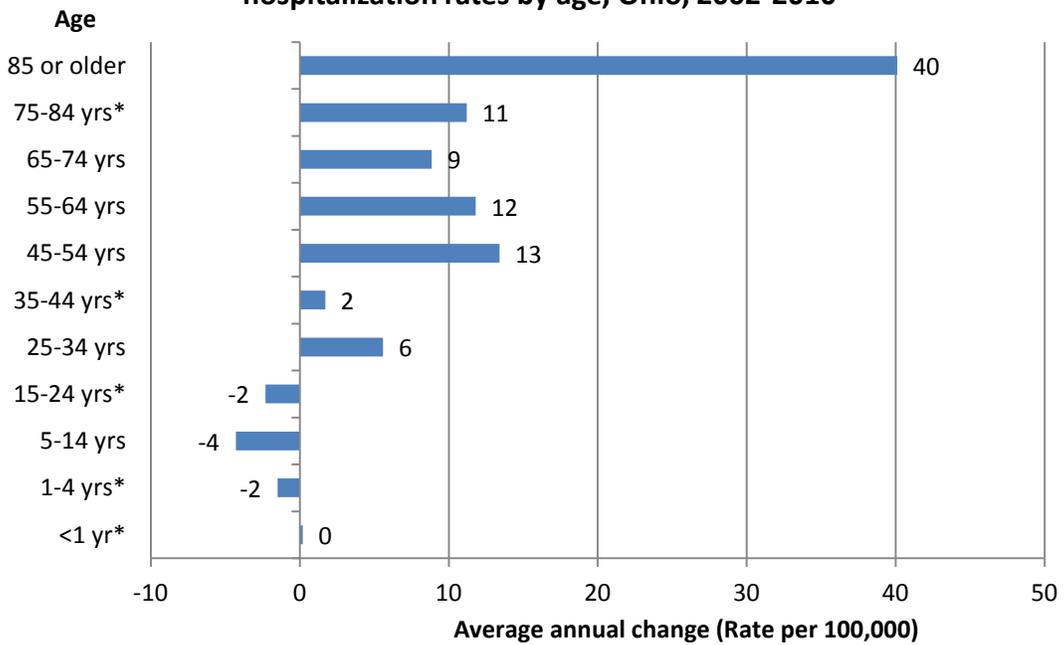
Ohio Violence and Injury Prevention Program, Ohio Department of Health

Figure 2.8. Rates for all injury hospitalizations by age and sex, Ohio, 2010



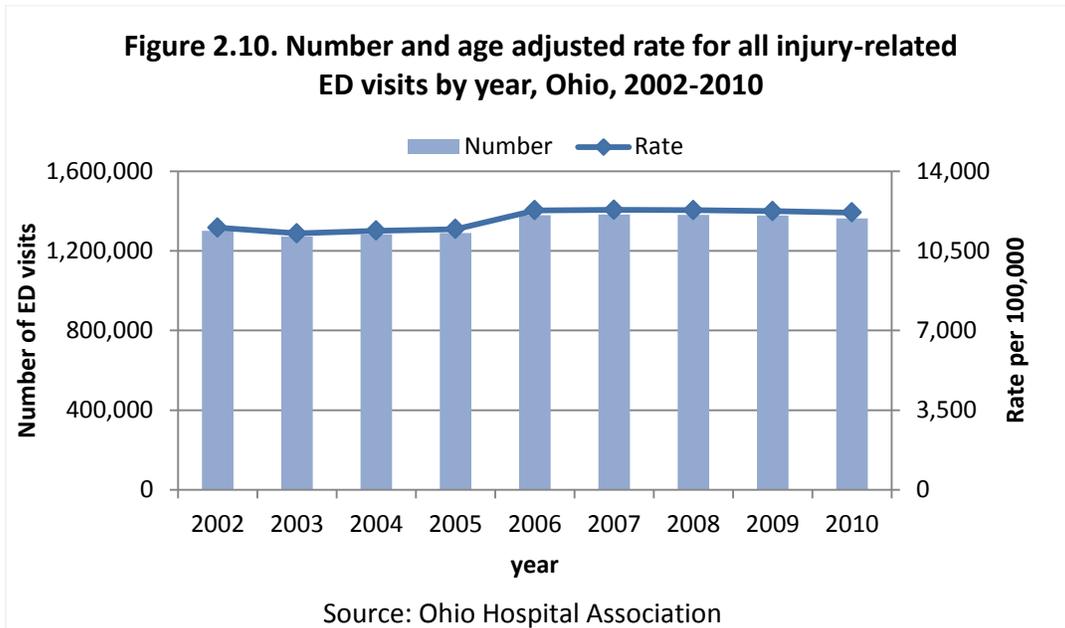
Source: Ohio Hospital Association

Figure 2.9. Average annual change in all injury hospitalization rates by age, Ohio, 2002-2010



Source: Ohio Hospital Association

*Interpret with caution, does not follow linear trend



EMERGENCY DEPARTMENT VISITS:

Nearly 1.36 million emergency department visits resulted from injuries in 2010. The injury ED visit rate was 12,181 per 100,000 (see Figure 2.10). The rate of ED visits was slightly higher among males compared to females (12,739 versus 11,567 per 100,000). ED visit rates increased with age from birth through age 34, steadily decreased from ages 35 to 64, and subsequently increased among adults 65 or older. From birth to age 54, ED visit rates were higher among males than females. This pattern was reversed among adults aged 55 or older with higher rates found among females (see Figure 2.11) due to higher rates of fall-related injury among older females. Table 2.4 highlights these injury risk profiles.

Table 2.4 All Injury ED Visit Risk Profile		
	2010 At Risk Groups	Annual trend since 2002
Overall		+8%
Sex	Males	Females (largest increase)
Age	15-34	85 or older (largest increase)

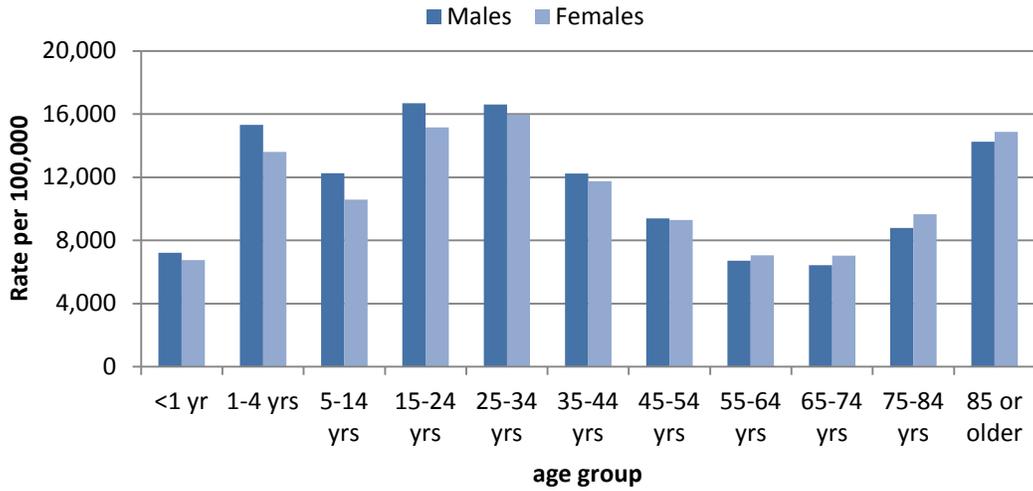
TRENDS:

Injury ED visit rates resulting from all injuries increased 8 percent from 11,518 per 100,000 in 2002 to 12,495 in 2010. The average annual increase was 137 per 100,000 per year. The average annual increase was 185 per 100,000 among females while the trend for males did not follow a linear pattern. ED visit rates increased among almost all age groups with the largest increase found among adults aged 85 or older (479 per 100,000) (see Figure 2.12). See Tables 3a and 3b located at the end of this section for more detailed information on the number and rate of all injury ED visits.

Burden of Injury in Ohio, 2000-2010

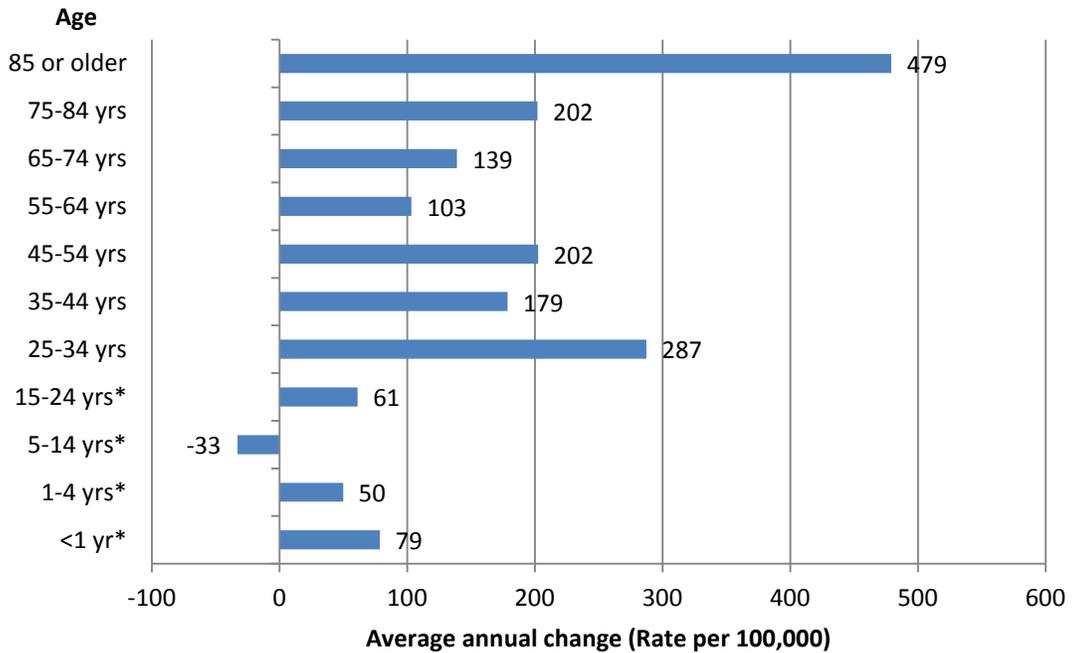
Ohio Violence and Injury Prevention Program, Ohio Department of Health

Figure 2.11. Rates for all injury ED visits by age and sex, Ohio, 2010



Source: Ohio Hospital Association

Figure 2.12. Average annual changes in all injury ED visit rates by age, Ohio, 2002-2010



Source: Ohio Hospital Association

*Does not follow a linear trend

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 1a. Number of deaths resulting from all injuries, by year, Ohio, 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	5,150	5,618	5,916	5,532	6,233	6,503	6,824	6,790	7,237	6,880	7,156
Sex											
Males	3,474	3,785	3,952	3,711	4,238	4,331	4,541	4,567	4,803	4,558	4,750
Females	1,676	1,833	1,964	1,821	1,995	2,172	2,283	2,223	2,434	2,322	2,406
Age											
< 1 yr	46	68	65	68	68	83	80	83	98	90	73
1-4 yrs	93	79	56	91	70	67	58	74	73	72	80
5-14 yrs	169	111	124	114	120	123	130	71	95	85	68
15-24 yrs	707	769	822	813	907	867	834	860	786	703	774
25-34 yrs	660	725	782	751	787	869	937	929	977	959	1,043
35-44 yrs	916	991	1,023	837	965	1,018	1,031	1,059	1,100	1,018	1,012
45-54 yrs	693	862	892	797	1,077	1,084	1,254	1,230	1,312	1,311	1,290
55-64 yrs	383	423	480	435	548	606	683	690	780	773	835
65-74 yrs	387	415	427	381	424	423	417	426	483	471	531
75-84 yrs	584	659	644	627	679	688	678	662	743	670	680
85 or older	512	516	601	618	588	675	722	706	790	728	770
Race and ethnicity											
White‡	4,349	4,714	4,975	4,627	5,196	5,404	5,702	5,687	6,096	5,786	6,088
Black‡	701	782	783	769	859	928	996	944	974	944	890
Hispanic	60	79	90	90	109	106	80	108	124	108	114
Other‡	28	35	33	22	35	34	32	41	36	38	57

‡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 1b. Death rates per 100,000 resulting from all injuries, by year, Ohio, 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	45.0	48.8	51.1	47.5	53.3	55.4	57.7	57.2	60.7	57.4	60.0	1.5
Sex†												
Males	66.3	71.5	74.3	69.2	78.2	79.5	82.6	82.9	86.9	81.8	82.0	1.7
Females	26.3	28.6	30.6	27.9	30.7	33.3	34.6	33.6	36.7	35.1	35.4	1.0
Age												
< 1 yr	30.7	44.3	44.2	46.1	45.6	56.7	54.0	54.7	64.2	60.9	52.5	2.4
1-4 yrs	15.4	13.2	9.3	15.2	11.8	11.3	9.9	12.6	12.3	12.2	13.8	-0.1 (NL)
5-14 yrs	10.3	6.8	7.7	7.1	7.6	7.9	8.5	4.7	6.3	5.7	4.5	-0.4
15-24 yrs	45.5	49.0	51.9	51.0	56.8	54.4	52.7	54.6	50.0	44.9	48.8	-0.02 NL
25-34 yrs	43.6	48.6	53.0	51.2	53.9	59.6	64.3	63.6	66.8	64.9	74.0	2.7
35-44 yrs	50.8	55.7	58.6	49.0	57.6	61.8	63.5	66.5	70.7	67.0	68.4	1.9
45-54 yrs	44.0	52.8	54.2	47.7	63.5	63.1	72.2	70.4	74.9	74.7	74.0	3.2
55-64 yrs	37.8	41.3	44.3	38.7	46.9	49.9	54.3	53.1	58.5	55.8	57.5	2.1
65-74 yrs	49.1	53.2	55.4	49.6	55.2	55.2	54.2	54.5	59.8	56.4	62.5	0.9
75-84 yrs	107.7	120.1	116.4	112.8	122.2	124.1	123.4	121.9	138.9	123.6	125.6	1.7
85 or older	288.1	284.9	318.2	315.4	293.3	326.1	336.1	317.3	345.5	320.1	334.2	4.5
Race and ethnicity†												
White‡	43.9	47.3	49.8	46.2	51.6	53.6	56.2	56.1	59.8	56.8	60.4	1.6
Black‡	55.9	60.9	60.5	58.8	65.5	69.1	73.6	69.4	71.6	68.8	62.6	1.16 (NL)
Hispanic	32.7	44.6	45.1	47.4	43.5	45.5	32.6	40.2	45.2	38.2	39.3	-0.16 (NL)
Other‡	21.6	22.7	20.7	13.8	21.3	19.9	16.7	21.0	19.0	18.3	27.2	0.14 (NL)

†Rates age-adjusted to 2000 U.S. standard population
Source: Ohio Department of Health, Office of Vital Statistics

‡Non-Hispanic

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

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 2a. Number of hospitalization resulting from all injuries, by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	65,657	66,738	67,628	69,119	70,096	72,775	74,231	72,233	72,485
Sex									
Males	30,540	31,005	31,574	32,279	32,757	34,199	34,478	33,687	34,060
Females	35,117	35,733	36,054	36,840	37,339	38,576	39,753	38,546	38,425
Age									
< 1 yr	381	374	367	390	376	369	395	407	340
1-4 yrs	1,238	1,186	1,224	1,096	1,123	1,115	1,179	1,224	1,037
5-14 yrs	2,753	2,702	2,609	2,434	2,349	2,355	2,295	2,159	1,990
15-24 yrs	7,176	7,253	7,188	7,420	7,446	7,308	6,931	6,971	6,837
25-34 yrs	5,942	5,970	6,070	6,145	6,319	6,590	6,500	6,266	6,378
35-44 yrs	7,701	7,489	7,579	7,555	7,297	7,401	7,111	6,839	6,735
45-54 yrs	6,888	7,315	7,671	8,167	8,270	8,983	9,235	8,882	9,083
55-64 yrs	5,090	5,580	5,811	6,271	6,552	7,067	7,627	7,698	8,104
65-74 yrs	6,664	6,826	6,787	6,955	6,919	7,393	7,819	7,538	7,948
75-84 yrs	12,178	12,425	12,448	12,439	12,640	12,755	13,142	12,230	12,009
85 or older	9,646	9,618	9,874	10,247	10,805	11,439	11,997	12,019	12,024

Source: Ohio Hospital Association

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 2b. Hospitalization rates resulting from all injuries, by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	561	566	571	580	584	602	609	588	588	4.6
Sex†										
Males	579	582	590	599	604	627	629	613	614	5.6
Females	521	527	530	538	540	554	568	545	545	4.1
Age										
< 1 yr	259	254	246	266	254	243	259	276	245	0.2 (NL)
1-4 yrs	206	198	206	184	191	190	199	207	178	-1.5 (NL)
5-14 yrs	170	169	165	157	153	155	153	144	131	-4.3
15-24 yrs	454	455	450	466	471	464	441	445	431	-2.3 (NL)
25-34 yrs	403	407	415	422	434	451	444	424	452	5.6
35-44 yrs	441	439	452	459	450	464	457	450	455	1.7 (NL)
45-54 yrs	418	437	452	476	476	514	527	506	521	13.4
55-64 yrs	470	496	497	517	521	544	572	555	558	11.8
65-74 yrs	864	888	884	908	899	945	969	902	935	8.9
75-84 yrs	2,201	2,235	2,240	2,244	2,300	2,350	2,456	2,256	2,218	11.2 (NL)
85 or older	5,107	4,908	4,926	4,951	5,030	5,141	5,247	5,285	5,218	40.1

†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 3a. Number of ED visits resulting from all injuries by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	1,300,058	1,271,812	1,283,535	1,289,019	1,379,288	1,382,187	1,379,696	1,377,385	1,362,301
Sex									
Males	694,087	675,119	681,182	681,895	728,084	725,604	717,694	707,396	698,758
Females	605,971	596,693	602,353	607,124	651,204	656,583	662,002	669,989	663,513
Age									
< 1 yr	10,428	10,089	10,122	9,832	10,982	10,714	10,945	11,629	10,025
1-4 yrs	91,108	88,351	87,475	84,207	91,046	86,098	86,870	90,837	89,206
5-14 yrs	208,318	199,556	197,444	189,549	202,428	190,240	186,884	187,702	186,672
15-24 yrs	269,397	260,896	263,584	265,353	280,877	276,797	271,514	269,321	264,793
25-34 yrs	216,218	208,472	212,274	216,734	230,195	236,084	235,763	234,654	234,167
35-44 yrs	196,680	187,237	186,762	186,606	195,211	195,817	190,740	185,028	181,242
45-54 yrs	133,765	136,456	140,012	145,935	157,683	164,036	166,988	164,248	163,625
55-64 yrs	66,400	70,482	74,207	76,904	84,799	90,083	93,807	95,456	97,488
65-74 yrs	43,720	44,637	45,072	45,964	49,774	52,840	55,033	55,968	54,605
75-84 yrs	42,983	43,671	44,085	44,526	48,877	49,989	49,792	49,960	47,630
85 or older	21,041	21,965	22,498	23,409	27,416	29,489	31,360	32,582	32,848

Source: Ohio Hospital Association

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Table 3b. ED visit rate per 100,000 resulting from all injuries by year, Ohio, 2002-2010

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	11,518	11,265	11,383	11,450	12,278	12,297	12,283	12,245	12,181	137.3
Sex†										
Males	12,482	12,146	12,275	12,311	13,179	13,142	13,013	12,821	12,739	89.3 (NL)
Females	10,497	10,326	10,438	10,536	11,314	11,392	11,495	11,612	11,567	185.1
Age										
< 1 yr	7,086	6,845	6,782	6,711	7,412	7,067	7,173	7,872	7,210	78.6 (NL)
1-4 yrs	15,140	14,773	14,688	14,169	15,508	14,645	14,695	15,349	15,332	48.9 (NL)
5-14 yrs	12,896	12,484	12,504	12,199	13,188	12,557	12,487	12,561	12,260	-33.1 (NL)
15-24 yrs	17,025	16,357	16,519	16,658	17,755	17,582	17,275	17,210	16,687	60.7 (NL)
25-34 yrs	14,655	14,217	14,528	14,871	15,806	16,156	16,110	15,874	16,608	287.2
35-44 yrs	11,267	10,971	11,145	11,325	12,032	12,288	12,261	12,174	12,247	178.5
45-54 yrs	8,127	8,160	8,255	8,497	9,078	9,386	9,536	9,363	9,392	202.4
55-64 yrs	6,129	6,263	6,349	6,337	6,747	6,936	7,039	6,887	6,713	103.1
65-74 yrs	5,667	5,806	5,873	6,001	6,470	6,755	6,818	6,696	6,422	138.9
75-84 yrs	7,770	7,855	7,932	8,033	8,894	9,208	9,307	9,216	8,798	202.0
85 or older	11,139	11,209	11,224	11,310	12,762	13,252	13,715	14,327	14,255	479.1

†Rates are age adjusted to 2000 U.S. standard population
Source: Ohio Hospital Association

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

INJURY MECHANISM

Table 2.6 provides the leading mechanisms for fatal injuries and injuries treated as hospital inpatient care and in the emergency department in 2010. Poisoning, falls, transportation, firearms, and suffocation were the leading causes of injury death for Ohioans of all ages.

Of non-fatal injuries with an external cause of injury code (E-Code), falls, poisoning, transportation, struck by or against, and firearms were leading causes of injury hospitalization while falls, struck by or against, transportation, overexertion, and cut/pierce were the leading causes of injury treated in emergency departments.

Please note that these data include all intents (i.e., unintentional, homicide, suicide, undetermined). Intent will be specified in later sections of the report.

External Cause of Injury Coding (E-Code) Limitations

A substantial percentage of hospital inpatient (38%) and emergency department (26%) records did not list an external cause mechanism. This missing information is an important limitation to our ability to accurately describe the burden of injuries in Ohio by mechanism and to design efforts to prevent injuries from occurring in the future.

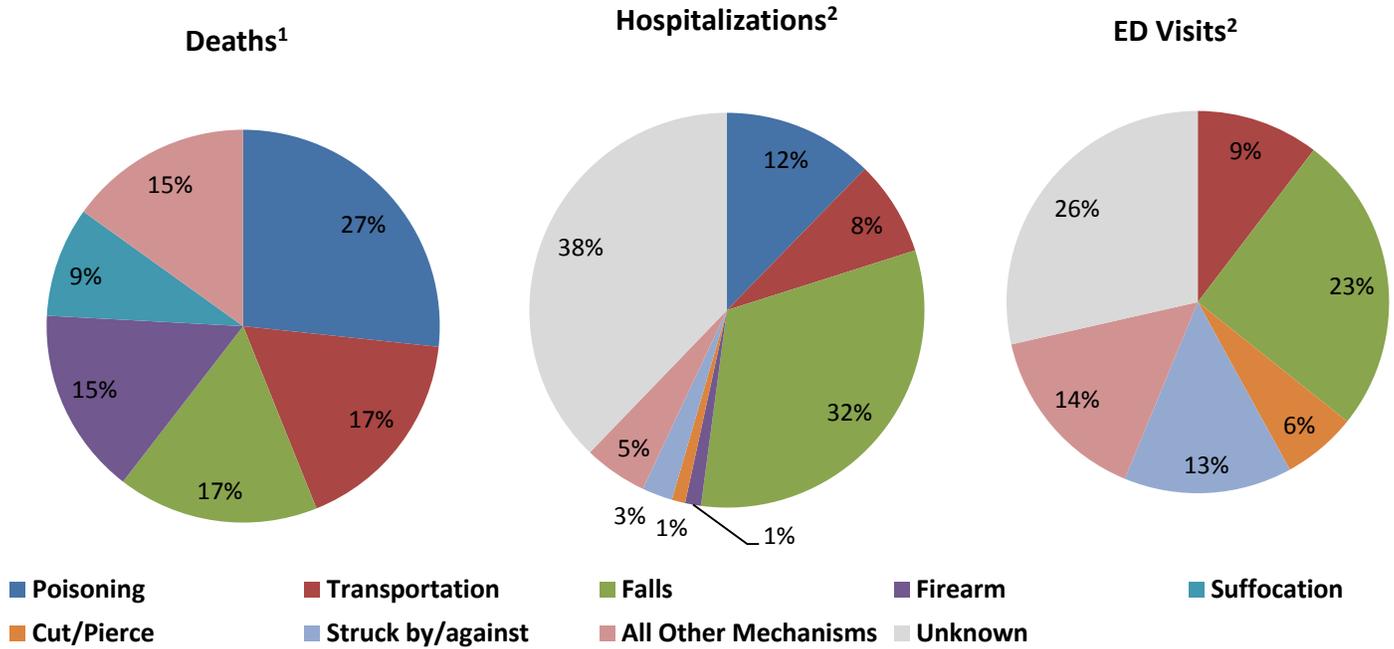
Table 2.6: Leading Causes of Injury Death¹, Hospitalization² and ED Visits² by Mechanism, Ohio, 2010

RANK	DEATHS ¹ 2010	HOSPITALIZATIONS ² 2010	ED VISITS ² 2010
1	Poisoning (27.4%)	Falls (32.0%)	Falls (23.2%)
2	Transportation (17.7%)	Poisoning (12.3%)	Struck by/against (12.9%)
3	Falls (16.5%)	Transportation (7.8%)	Transportation (9.4%)
4	Firearm (15.8%)	Struck by/against (2.5%)	Overexertion (9.1%)
5	Suffocation (9.3%)	Firearm (1.3%)	Cut/Pierce (5.7%)
6	Not specified (4.5%)	Cut/Pierce (1.1%)	Other specified (3.2%)
	All other mechanisms (11.0%)	All other mechanisms (5.2%)	All other mechanisms (10.6%)
MISSING E-CODE		37.8%	25.9%

Sources: 1 ODH Office of Vital Statistics, 2 Ohio Hospital Association

Figure 2.13 presents this same information in chart format. The chart format clearly illustrates the problem of missing E-codes in hospital and ED data where the mechanism of injury is simply missing in more than one-third of the hospitalized injuries and more than one-fourth of the ED visits.

Figure 2.13. Leading Causes of Injury-related Death, Hospitalization, and ED Visits by Mechanism, Ohio, 2010



Sources: 1 ODH Office of Vital Statistics, 2 Ohio Hospital Association

INJURY ACROSS THE LIFESPAN

Age is a significant factor affecting the occurrence, severity and type of injury. As demonstrated in the table below, risk for different type of injury varies across the lifespan.

YOUNG OHIOANS:

Injury is the leading cause of death and disability for children. Their dynamic cognitive and development abilities play a significant role in their vulnerability to injury.

While fatal injury risk varies greatly as children age (see Table 2.7), non-fatal risk is much less variable. Falls are the leading cause of non-fatal (ED and hospitalizations) injury for children birth to age 9. Falls remain the leading cause of injury-related hospitalization through age 15 when self-harm and motor vehicle traffic crashes surpass them. Falls remain the 2nd-leading cause of injury-related ED visits from ages 10 to 24.

Infants

During the first year of life, risk of death due to injury is higher than any other age group until age 24 (Figure 2.2). Suffocation and homicide are the leading causes of injury death to infants while falls and assault lead to the most injury-related hospitalizations. Falls and unintentional struck by/against cause the greatest number of injury-related ED visits among Ohio infants.

Children

For young children ages 1 to 4, homicide, drowning, motor vehicle traffic and fire/burn are the leading causes of injury death in Ohio. As described above, falls are the leading cause of injury-related hospitalization and ED visits for young children. Poisoning and fire/burn are the 2nd- and 3rd-leading causes of injury-related hospitalizations, respectively for this age group. Struck by/against is the 2nd cause of injury-related ED visits.

For children ages 5 to 9, motor vehicle traffic and homicide are the two leading causes of injury death. Falls are the leading cause of non-fatal injury for both ED visits and hospitalizations. Motor vehicle traffic crashes are the 2nd-leading causes of injury-related hospitalizations and struck by/against is the second leading cause of injury related ED visits.

Teens and Young Adults

For ages 10-24, motor vehicle traffic crashes remain the leading cause of injury-related death followed by suicide and then homicide. Self-harm, motor vehicle traffic crashes and falls are the three-leading causes of injury-related hospitalization in order. Struck-by against followed by falls are the leading causes of injury-related ED visits for ages 10 -24.

Burden of Injury in Ohio, 2000-2010

Ohio Violence and Injury Prevention Program, Ohio Department of Health

Adults have significant risks for injury. Over the past decade, rates have been increasing largely due to the prescription drug abuse epidemic leading to fatal drug overdoses. For ages 25 – 54, unintentional poisoning (drug overdose), suicide and motor vehicle traffic cause the most injury fatalities. Most injury-related hospitalizations are caused by self-harm, falls and motor vehicle traffic among this age group. Falls, overexertion and struck-by/against are the three-leading causes of injury-related ED visits.

For ages 55-64, suicide emerges as the leading cause of injury death. Falls and motor vehicle traffic are the two-leading causes for non-fatal injury-related hospitalizations and ED visits.

OLDER ADULTS

Older adults have the highest rates of injury death. As with children, anatomical, physiological and cognitive changes help to explain the heightened risk. Sight, balance and coordination wane with age leading to an increased risk for falls. In addition, increasing use of medications and possible drug interactions may also be a risk factor for falls. Falls are the leading cause of injury-related death, hospitalization and ED visits for older Ohioans aged 65 and older. In 2010, older adults accounted for 14 percent of Ohio's population while accounting for 82 percent of the fatal falls.

Reaction times increase leading to risk for motor vehicle crashes, the 2nd-leading cause of injury-related death,

hospitalization and ED visits. Poor sight or decreased mental capacity and memory may lead to unintentional drug overdoses or poisonings. In addition, physical changes may lead to greater severity of injury and less resiliency.

Older adults may also be socially isolated and depressed leading to risk for substance abuse or self-harm/suicide.

Table 2.7 provides a detailed listing of leading causes of fatal and non-fatal injury by intent, mechanism and age group.

Leading Causes of Injury by Age Group Summary, Ohio, 2006-10

Age Group	Fatal ¹	Non-fatal ²
Infants (< 1 year)	Suffocation*	Falls*
Toddlers (1-4 years)	Homicide	Falls*
Children (5 to 9 years)	Motor vehicle traffic*	Falls*
Tweens to Young Adults (10-24 years)	Motor vehicle traffic*	Struck-by/against* (e.g., in sports)
Adults (25 – 64 years)	Poisoning*	Falls*
Older Adults (65+)	Falls*	Falls*

Sources: 1 ODH Office of Vital Statistics
2 Ohio Hospital Association

*Unintentional

Burden of Injury in Ohio, 2000-2010

Table 2.7 Leading causes of injury deaths¹ by intent²; inpatient hospitalizations³ and ED visits³ by age-group, Ohio, 2008-2010

Age Group	Deaths by Mechanism (Unintentional, Intentional and Undetermined Intent)	Deaths by Intent (Unintentional unless Homicide/Suicide)	Inpatient Hospitalizations	Emergency Department Visits
It 1	<ol style="list-style-type: none"> 1. Suffocation (176) 2. Other specified (22) 3. Not specified (18) 4. MV Traff (17) 	<ol style="list-style-type: none"> 1. Suffocation (164) 2. Homicide (43) 3. Undetermined (18) 4. MV Traffic (15) 	<ol style="list-style-type: none"> 1. Falls (206) 2. Assault (191) 3. Fire/burn (71) 4. Other specified and poisoning (43 each) 	<ol style="list-style-type: none"> 1. Falls (11,352) 2. Struck by/against (2,652) 3. MV Traffic (1,721) 4. Other specified (1,273)
1-4	<ol style="list-style-type: none"> 1. Drowning (42) 2. Fire/burn (36) 3. MV Traffic (33) 4. Other specified (18) 	<ol style="list-style-type: none"> 1. Homicide (56) 2. Drowning (39) 3. MV Traffic (33) 4. Fire/burn (27) 	<ol style="list-style-type: none"> 1. Falls (625) 2. Poisoning (539) 3. Fire/burn (287) 4. Other specified (156) 	<ol style="list-style-type: none"> 1. Falls (77,975) 2. Struck by/agnst (31,241) 3. Other Specified (16,351) 4. Ntl Environment (15,711)
5-9	<ol style="list-style-type: none"> 1. MV Traffic (28) 2. Fire/Burn (16) 3. Drowning (13) 4. Firearm (12) 	<ol style="list-style-type: none"> 1. MV Traffic (28) 2. Homicide (17) 3. Fire/burn (16) 4. Drowning (13) 	<ol style="list-style-type: none"> 1. Falls (674) 2. MV Traffic (275) 3. Pedal Cycle (175) 4. Struck by/against (131) 	<ol style="list-style-type: none"> 1. Falls (59,595) 2. Struck by/agnst (38,290) 3. Ntl Environment (14,085) 4. Cut/pierce (13,184)
10-14	<ol style="list-style-type: none"> 1. MV Traffic (46) 2. Suffocation (39) 3. Drowning (18) 4. Firearm (15) 	<ol style="list-style-type: none"> 1. MV Traffic (46) 2. Suicide (35) 3. Drowning (18) 4. Homicide (15) 	<ol style="list-style-type: none"> 1. Falls (561) 2. MV Traffic (321) 3. Struck by/against (283) 4. Self-harm (273) 	<ol style="list-style-type: none"> 1. Struck by/angst (68,364) 2. Falls (64,416) 3. Overexertion (26,062) 4. Cut/pierce (15,705)
15-19	<ol style="list-style-type: none"> 1. MV Traffic (326) 2. Firearms (235) 3. Suffocation (113) 4. Poisoning (89) 	<ol style="list-style-type: none"> 1. MV Traffic (326) 2. Suicide (217) 3. Homicide (155) 4. Poisoning (73) 	<ol style="list-style-type: none"> 1. Self-harm (1,921) 2. MV Traffic (1,469) 3. Assault (816) 4. Falls (591) 	<ol style="list-style-type: none"> 1. Struck by/angst (65,976) 2. Falls (52,439) 3. MV Traffic (39,633) 4. Overexertion (37,018)
20-24	<ol style="list-style-type: none"> 1. Firearms (414) 2. MV Traffic (365) 3. Poisoning (342) 4. Suffocation (136) 	<ol style="list-style-type: none"> 1. MV Traffic (365) 2. Suicide (316) 3. Poisoning (301) 4. Homicide (296) 	<ol style="list-style-type: none"> 1. Self-harm (1,891) 2. MV Traffic (1,648) 3. Assault (1,393) 4. Falls (684) 	<ol style="list-style-type: none"> 1. Falls (55,998) 2. MV Traffic (43,332) 3. Struck by/agst (40,876) 4. Overexertion (40,462)
25-34	<ol style="list-style-type: none"> 1. Poisoning (1,145) 2. Firearm (668) 3. MV Traffic (524) 4. Suffocation (284) 	<ol style="list-style-type: none"> 1. Poisoning (1,017) 2. Suicide (667) 3. MV Traffic (486) 4. Homicide (271) 	<ol style="list-style-type: none"> 1. Self-harm (3,537) 2. MV Traffic (2,326) 3. Assault (1,875) 4. Falls (1,665) 	<ol style="list-style-type: none"> 1. Falls (111,034) 2. Overexertion (86,778) 3. Struck by/angst (65,054) 4. MV Traffic (63,363)
35-44	<ol style="list-style-type: none"> 1. Poisoning (1,409) 2. Firearms (538) 3. MV Traffic (486) 4. Suffocation (264) 	<ol style="list-style-type: none"> 1. Poisoning (1,173) 2. Suicide (800) 3. MV Traffic (702) 4. Homicide (419) 	<ol style="list-style-type: none"> 1. Self-harm (3,772) 2. Falls (2,641) 3. MV Traffic (2,208) 4. Assault (1,280) 	<ol style="list-style-type: none"> 1. Falls (101,490) 2. Overexertion (68,302) 3. MV Traffic (47,134) 4. Struck by/against (46,653)
45-54	<ol style="list-style-type: none"> 1. Poisoning (1,757) 2. MV Traffic (579) 3. Firearms (574) 4. Suffocation (290) 	<ol style="list-style-type: none"> 1. Poisoning (1,451) 2. Suicide (955) 3. MV Traffic (579) 4. Homicide (229) 	<ol style="list-style-type: none"> 1. Falls (5,496) 2. Self-Harm (3,469) 3. MV Traffic (2,358) 4. Poisoning (1,758) 	<ol style="list-style-type: none"> 1. Falls (111,481) 2. Overexertion (68,794) 3. MV Traffic (40,918) 4. Struck by/against (36,319)
55-64	<ol style="list-style-type: none"> 1. Poisoning (706) 2. MV Traffic (431) 3. Firearms (404) 4. Fall (283) 	<ol style="list-style-type: none"> 1. Suicide (610) 2. Poisoning (525) 3. MV Traffic (431) 4. Falls (271) 	<ol style="list-style-type: none"> 1. Falls (7,570) 2. MV Traffic (1,578) 3. Self-harm (1,248) 4. Poisoning (1,202) 	<ol style="list-style-type: none"> 1. Falls (89,277) 2. MV Traffic (23,224) 3. Overexertion (23,124) 4. Struck by/against (18,595)
65-74	<ol style="list-style-type: none"> 1. Falls (395) 2. MV Traffic (260) 3. Firearms (243) 4. Suffocation (143) 	<ol style="list-style-type: none"> 1. Falls (394) 2. Suicide (311) 3. MV Traffic (260) 4. Suffocation (106) 	<ol style="list-style-type: none"> 1. Falls (10,106) 2. MV Traffic (900) 3. Poisoning (712) 4. Self-harm (316) 	<ol style="list-style-type: none"> 1. Falls (61,720) 2. MV Traffic (10,280) 3. Overexertion (9,581) 4. Struck by/agnst (8,984)
75-84	<ol style="list-style-type: none"> 1. Falls (995) 2. MV Traffic (234) 3. Not specified (221) 4. Suffocation (194) 	<ol style="list-style-type: none"> 1. Falls (995) 2. MV Traffic (234) 3. Not specified (212) 4. Suicide (193) 	<ol style="list-style-type: none"> 1. Falls (19,472) 2. MV Traffic (824) 3. Poisoning 548) 4. Not specified (328) 	<ol style="list-style-type: none"> 1. Falls (72,253) 2. Struck by/against (6,452) 3. MV Traffic (5,652) 4. Overexertion (5,512)
85+	<ol style="list-style-type: none"> 1. Falls (1,315) 2. Not specified (407) 3. Suffocation (227) 4. MV Traffic (106) 	<ol style="list-style-type: none"> 1. Falls (1,313) 2. Not specified (398) 3. Suffocation (220) 4. MV Traffic (106) 	<ol style="list-style-type: none"> 1. Falls (20,982) 2. MV Traffic (355) 3. Not specified (287) 4. Poisoning (242) 	<ol style="list-style-type: none"> 1. Falls (57,823) 2. Struck by/against (3,637) 3. Overexertion (2,058) 4. Cut/pierce (1,774)

Burden of Injury in Ohio, 2000-2010

Totals *	<ol style="list-style-type: none"> 1. Poisoning (5,727) 2. MV Traffic (3,433) 3. Firearms (3,374) 4. Falls (3,348) 	<ol style="list-style-type: none"> 1. Poisoning (4,716) 2. Suicide (4,192) 3. MV Traffic (3,433) 4. Falls (3,277) 	<ol style="list-style-type: none"> 1. Falls (71,273) 2. Self-harm (16,645) 3. MV Traffic (14,413) 4. Poisoning (8,516) 	<ol style="list-style-type: none"> 1. Falls (920,454) 2. Struck by/against (433,095) 3. Overexertion (365,877) 4. MV Traffic (300,593)
-------------	--	---	--	--

¹ **Source:** Ohio Dept. of Health, Office of Vital Statistics

² **Intent:** The state of mind of persons involved in an injury episode which forms the basis for categorizing an injury as unintentional (traditionally termed accidental), as homicide/assault, as suicide/self-inflicted or as unable to be determined

³ **Source:** Ohio Hospital Association

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
-

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.
-

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.
-