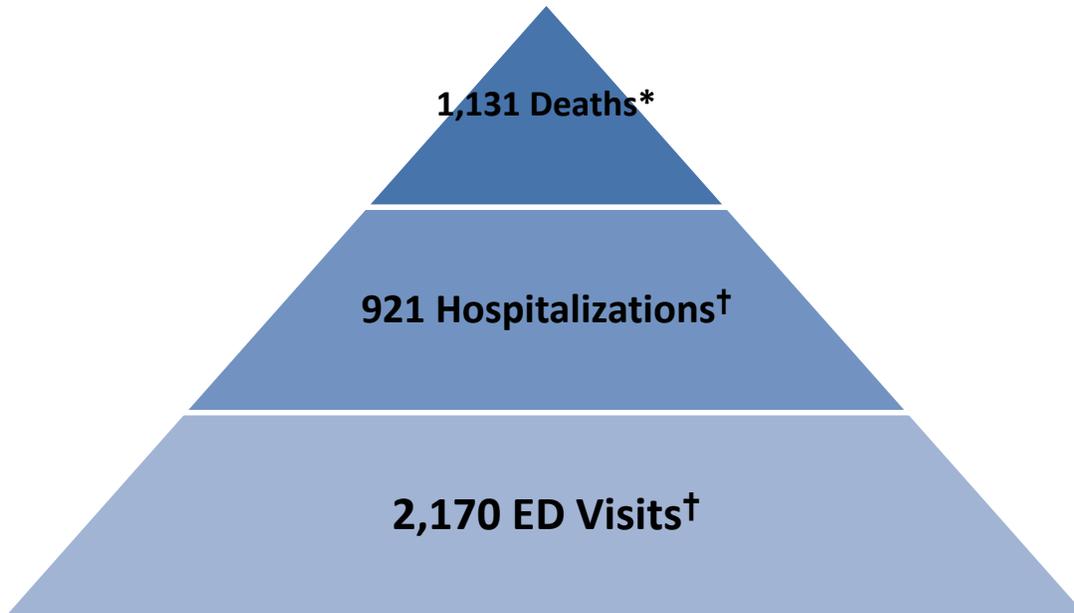


## SECTION 4.3: FIREARMS



\*SOURCE: OHIO DEPARTMENT OF HEALTH, VITAL STATISTICS, 2010

† SOURCE: OHIO HOSPITAL ASSOCIATION

### CHAPTER HIGHLIGHTS:

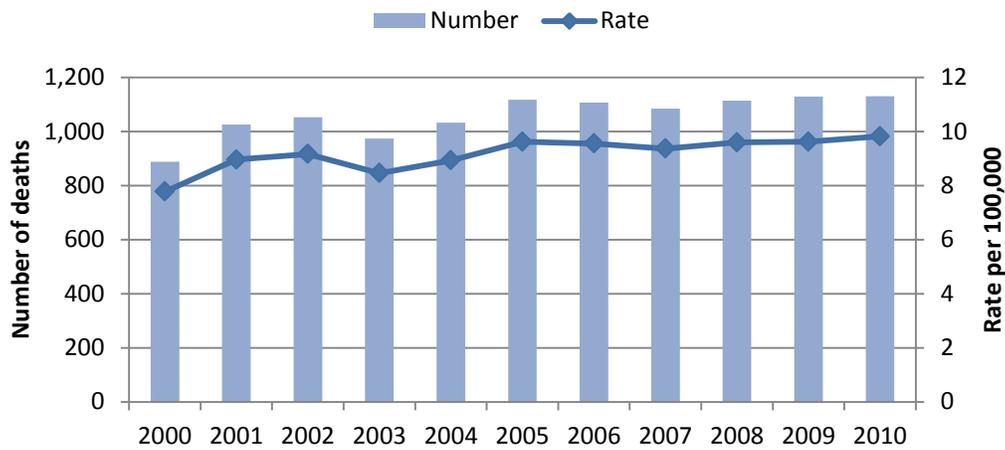
#### Patterns:

- 3 people die from a firearm fatality in Ohio each day.
- Males were more likely to experience a fatal or non-fatal injury than females.
- Blacks were 6 times more likely to die from a firearm related injury than whites.
- Highest rates of fatal and non-fatal injuries were found among persons age 15-34.
- Among households with a firearm, nearly one-half reported the firearm was in an unlocked location.

#### Trends:

- Firearm related fatalities increased 26 percent since 2000.
- Hospitalization and ED visit rates increased from 2002 to 2006 then decreased between 2006 and 2010.
- Fatal and non-fatal firearm injury rates were consistently higher among males and ages 15-34.
- Fatal injury rates were consistently higher among blacks compared to other race or ethnic groups.

**Figure 13.1. Number and age adjusted death rate for firearm related injuries by year, Ohio, 2002-2010**



Source: Ohio Department of Health, Office of Vital Statistics

**DEATHS:**

In 2010, 1,131 people died from a firearm related injury in Ohio. The firearm related fatality rate was 9.8 per 100,000 (Figure 13.1). Males were 6 times more likely to die from a firearm related injury than females (17.6 per 100,000 versus 2.6 per 100,000). The age distribution of firearm related fatalities differed by sex. Among males, the highest rates were found among ages 25-34 and 85 or older. Among females, the highest rates were found ages 15-44 (Figure 13.2). The highest fatality rates were found among ages 25-34 (17 per 100,000) and 15-24 (13 per 100,000). Blacks (22 per 100,000) were 6 times more likely to die from a firearm related injury than whites (3.7 per 100,000). See Table 13.1 for a firearm death risk profile. Most firearm related deaths were associated with suicides (63 percent) and homicides (34 percent).

Table 13.1 Firearm Death Risk Profile		
	2010 At Risk Groups	Annual Trend since 2000
Overall		+26%
Sex	Males	Males (largest increase)
Age	25-34	25-34 (largest increase)
Race and ethnicity	Blacks	Blacks (largest increase)

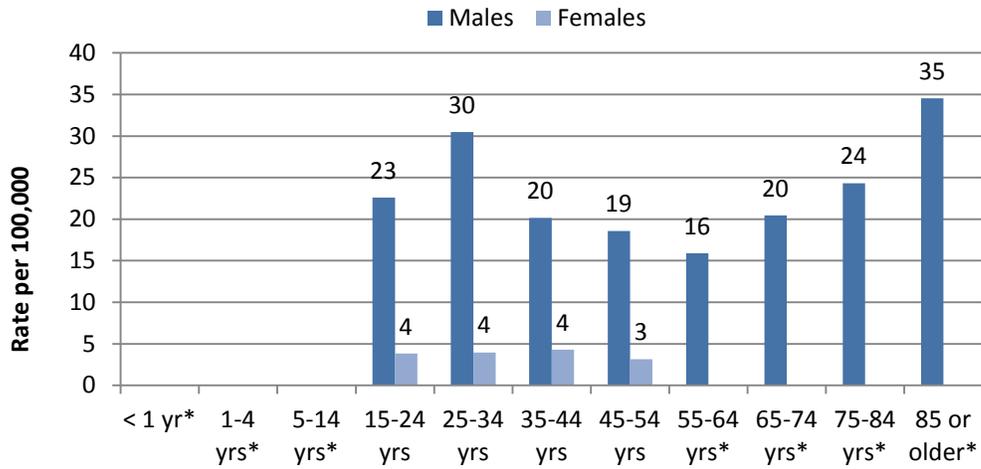
**TRENDS:**

Firearm related death rates increased 26 percent from 7.8 per 100,000 in 2000 and 9.8 per 100,000 in 2010. The average annual increase was 0.15 per 100,000 per year. Rates increased by an average of 0.2 per 100,000 per year among males while rates did not follow a consistent trend among females. The largest increases in rates were found among ages 25-34 (0.5 per 100,000 per year) and ages 35-44 (0.2 per 100,000 per year). A decrease in rates was found among older adults ages 75-84 (0.4 per 100,000 per year). Increases were found among both blacks and whites with a larger annual increase found among blacks (0.6 per 100,000 per year). The number of firearm related homicides increased by an average of 14 per year while the number of firearm

Ohio Violence and Injury Prevention Program, Ohio Department of Health

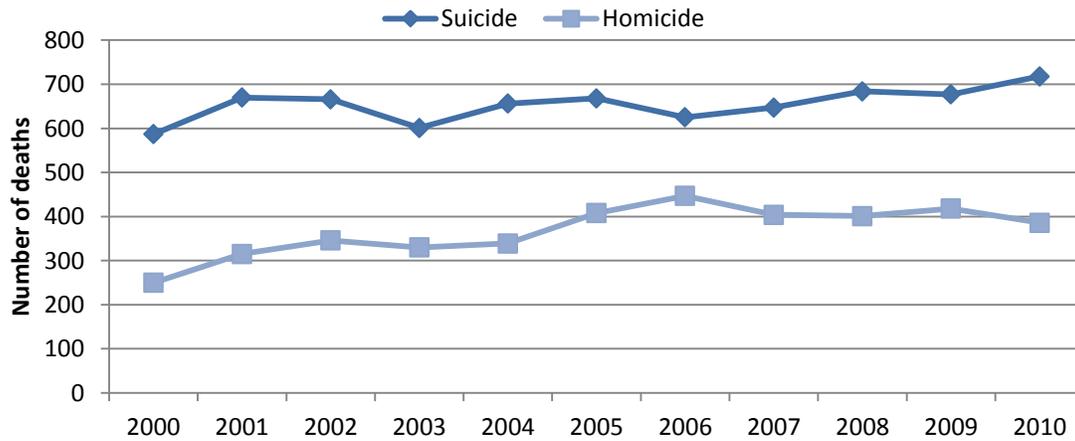
related suicides did not follow a consistent pattern (Figure 13.3). See Tables 48a-c located at the end of this section for more detailed information on firearm related deaths in Ohio.

**Figure 13.2. Firearm related fatality rates by age and sex, Ohio, 2010**



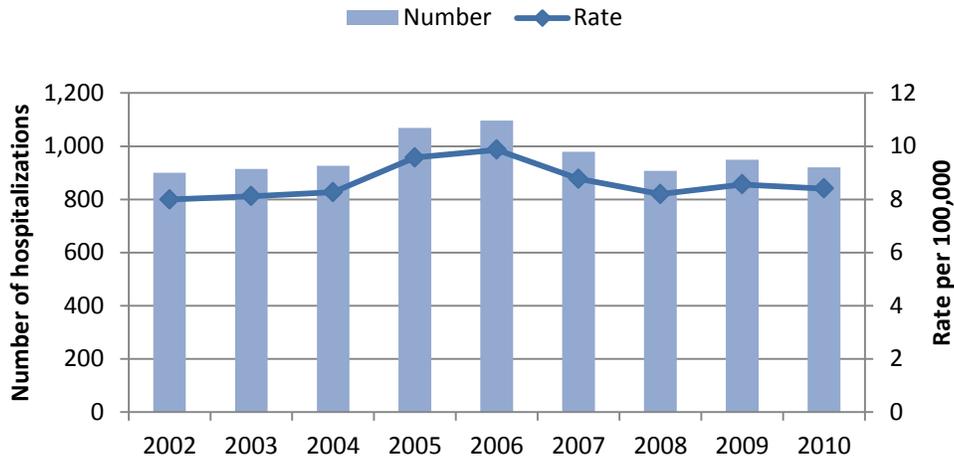
Source: Ohio Department of Health, Office of Vital Statistics  
 \*Data suppressed due to less than 20 deaths

**Figure 13.3. Number of firearm related deaths by intent and year, Ohio, 2000-2010**



Source: Ohio Department of Health, Office of Vital Statistics

**Figure 13.4. Number and age adjusted rate for firearm related hospitalizations by year, Ohio, 2002-2010**



Source: Ohio Hospital Association

**HOSPITALIZATIONS:**

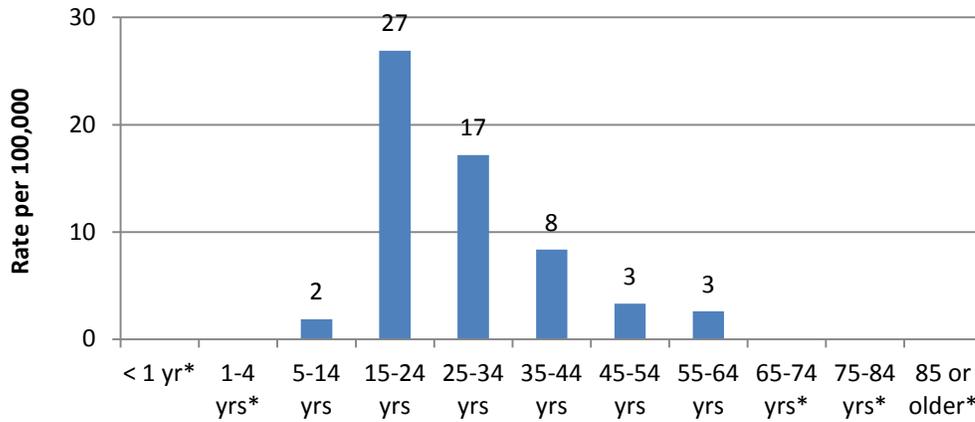
In 2010, approximately 900 hospitalizations were associated with firearms. The hospitalization rate was 8.4 per 100,000 (Figure 13.4). The rate was over 10 times higher among males (15.5 per 100,000) than females (1.4 per 100,000). Among males and females, the highest hospitalization rates were found among ages 15-24 (25 per 100,000) followed by ages 25-34 (18 per 100,000) (Figure 13.5). See Table 13.2 for an assault hospitalization risk profile. Approximately 68 percent of firearm related hospitalizations were associated with assaults and 20 percent were related to unintentional mechanisms (Figure 13.6).

Table 13.2 Assault Hospitalization Risk Profile		
	2010 At Risk Groups	Annual Trend Since 2002
Overall		Increase then decrease
Sex	Males	Females (largest decrease)
Age	15-34	15-24 (largest increase)

**TRENDS:**

Rates of firearm related hospitalizations increased between 2002 and 2006 then decreased from 2006 to 2010. A slight decrease was found among females (-0.1 per 100,000 per year) while rates among males did not follow a consistent pattern. An increase in rates was found among ages 25-34 (0.3 per 100,000 per year) while rates among other age groups did not follow a consistent trend over time. The distribution of assault related hospitalizations by mechanism remained the same throughout the study period. See Tables 49a-c located at the end of this section for more detailed information about assault related hospitalizations in Ohio.

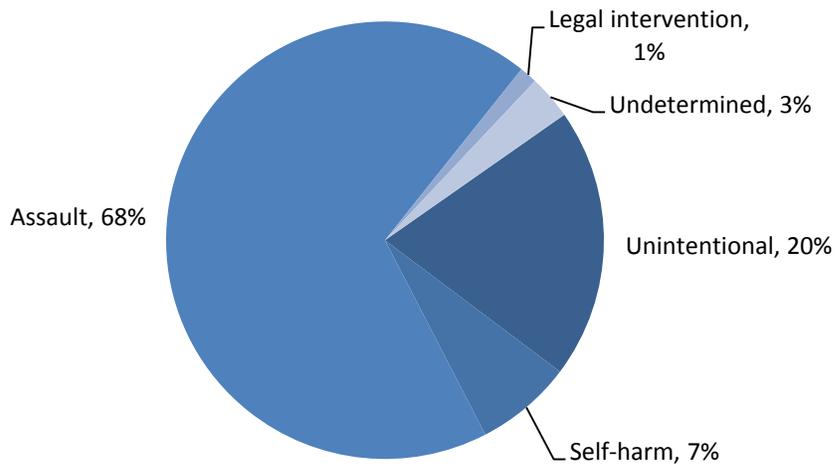
**Figure 13.5. Hospitalization rates for firearm related injuries by age, Ohio, 2010**



Source: Ohio Hospital Association

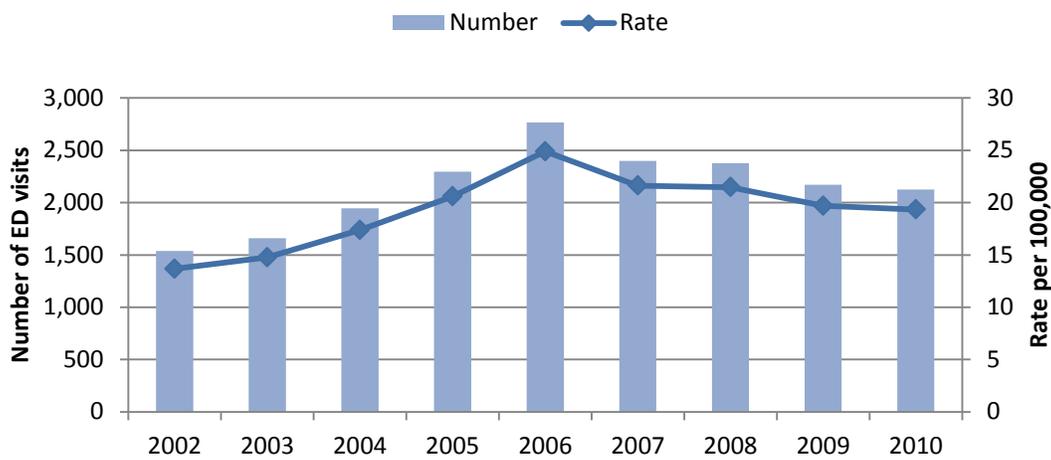
\*Rates suppressed due to less than 20 hospitalizations

**Figure 13.6. Percentage of hospitalizations resulting from assaults, by intent, Ohio, 2010**



Source: Ohio Hospital Association

**Figure 13.7. Number and age adjusted rate for firearm related ED visits by year, Ohio, 2002-2010**



Source: Ohio Hospital Association

**EMERGENCY DEPARTMENT VISITS:**

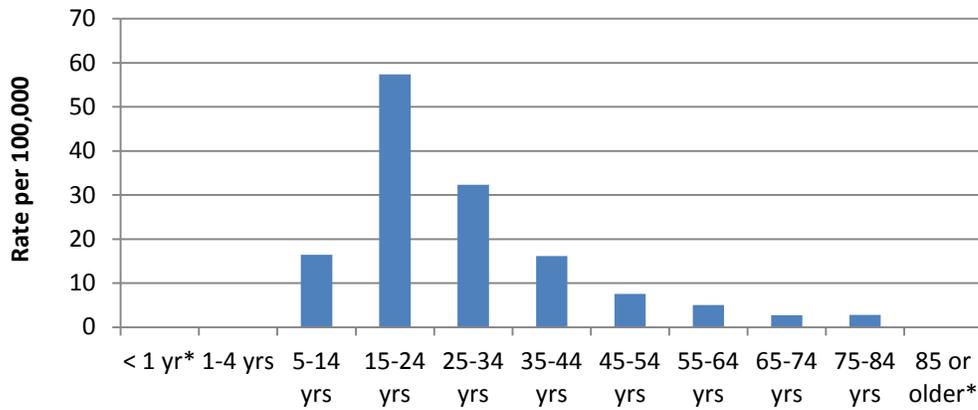
Approximately 2,100 ED visits were associated with firearms in 2010. The ED visit rate was 19.3 per 100,000 (Figure 13.7). Males were 7 times more likely than females to visit the ED for a firearm related injury. For both males and females, ED visits increased from birth through age 24 and then steadily decreased after age 25 (Figure 13.8). The highest rates occurred among ages 15-24. See Table 13.3 for a firearm ED visit risk profile. Over half of ED visits were associated with unintentional mechanisms (58 percent) and 31 percent resulted from assaults.

Table 13.3 Firearm ED Visit Risk Profile		
	2010 At Risk Groups	Annual trend since 2002
Overall		Increase then decrease
Sex	Males	Females (largest increase)
Age	15-24	Inconsistent trends

**TRENDS:**

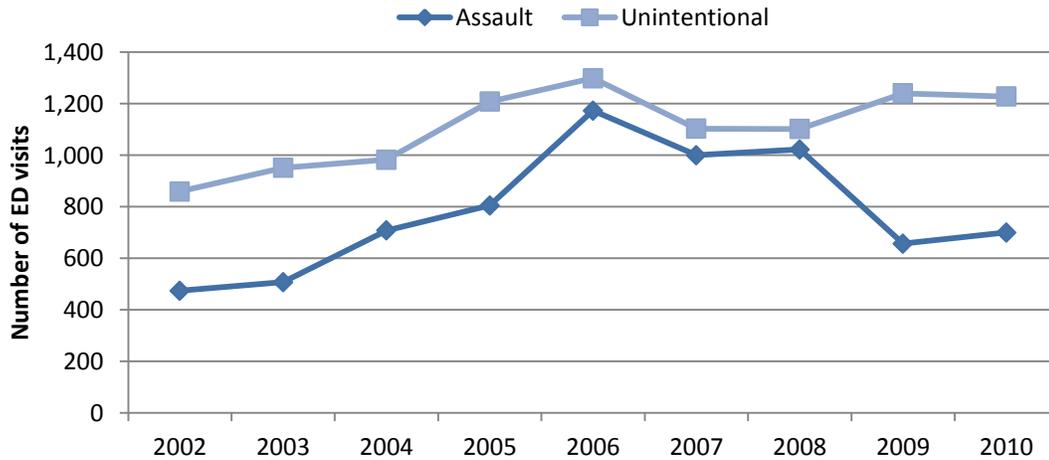
ED visit rates resulting from firearm related injuries increased between 2002 and 2006 then decreased from 2007 to 2010. Rates among females increased slightly (0.2 per 100,000 per year) while rates among males did not follow consistent trend. Rates did not follow a consistent trend among any age group. The number of ED visits associated unintentional mechanisms increased by an average of 41 per year while the number of ED visits resulting from assaults increased in 2002-2006 and then decreased in 2007-2010 (Figure 13.9). See Tables 50a-c located at the end of this section for more detailed information on self-harm related ED visits.

**Figure 13.8. ED visit rates resulting from firearm injuries by age and sex, Ohio, 2010**



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

**Figure 13.9. Number of ED visits resulting from firearm injuries, by intent and year, Ohio, 2002-2010**



Source: Ohio Hospital Association

**FIREARMS AND STORAGE PRACTICES IN HOMES:**

According to the results from the Behavioral Risk Factor Surveillance System, an estimated 1.7 million or 37 percent of households in Ohio reported a firearm in their home. Males were more likely to report a firearm in their home than females (43 percent versus 31 percent). Respondents from households above the federal poverty level (39 percent) were more likely to report a firearm in their home than respondents below the poverty level (25 percent). Respondents from suburban (40 percent), rural (44 percent) or Appalachian (53 percent) counties were more likely to have a firearm in their home compared to respondents from households from metropolitan (28 percent) counties. The percentage of respondents with a firearm in their home was similar across all age groups (Table 13.4). See Tables 51a for more detailed information on the percentage of adults who reported a firearm in their home.

Table 13.4 Firearm Storage Risk Profile		
	Firearm in home	Unlocked firearm in home
Overall	1.7 million*	800,000*
Sex	Males	Males
Age	Similar for all ages	45 or older
Household income	Above poverty	Similar for all income levels
Economic development	Rural and Appalachian	Similar for all county groups
*Households in Ohio		

Among households with a firearm, nearly 800,000 or one-half (46 percent) reported their firearm was in an unlocked location. Males were more likely to report an unlocked firearm in their home than females (50 percent versus 40 percent). Adults ages 45 or older were more likely report unlocked firearms in their home than adults less than 45 years of age. No differences were found by poverty levels or county economic development level (Table 13.4). See Table 51b located at the end of this section for more detailed information on the percentage of adults who reported an unlocked firearm in their home.

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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 48a. Number of deaths resulting from firearms, by year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	888	1,026	1,053	974	1,033	1,118	1,107	1,085	1,114	1,129	1,131
<b>Sex</b>											
Males	763	894	922	868	885	983	957	959	989	971	983
Females	125	132	131	106	148	135	150	126	125	158	148
<b>Age</b>											
< 1 yr	0	0	0	<5	0	0	0	0	0	<5	0
1-4 yrs	0	<5	<5	<5	0	<5	<5	<5	<5	7	<5
5-14 yrs	19	11	11	6	8	17	16	10	7	13	7
15-24 yrs	155	193	203	208	206	224	229	226	226	211	212
25-34 yrs	164	188	199	211	204	209	242	222	227	219	242
35-44 yrs	166	195	188	153	167	176	168	183	188	170	180
45-54 yrs	140	165	159	152	191	198	193	194	181	206	187
55-64 yrs	74	98	98	95	98	124	109	109	127	149	128
65-74 yrs	69	76	89	65	79	65	58	63	84	73	86
75-84 yrs	75	74	79	62	65	75	68	58	55	54	60
85 or older	26	24	26	19	15	27	21	17	18	26	25
<b>Race and ethnicity</b>											
White‡	676	747	767	686	744	762	739	736	748	775	785
Black‡	201	260	256	269	260	326	341	326	332	328	320
Hispanic	5	12	15	13	24	23	20	14	26	23	17
Other‡	<5	7	6	<5	<5	<5	5	8	7	<5	8

‡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 48b. Death rates per 100,000 resulting from firearms, by year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	7.8	9.0	9.2	8.5	8.9	9.6	9.6	9.4	9.6	9.6	9.8	0.15
<b>Sex†</b>												
Males	14.3	16.5	17.0	15.7	16.0	17.6	17.1	17.1	17.6	17.1	17.6	0.22
Females	2.1	2.3	2.2	1.8	2.5	2.3	2.6	2.1	2.1	2.7	2.6	0.04 (NL)
<b>Age</b>												
< 1 yr	*	*	*	*	*	*	*	*	*	*	*	*
1-4 yrs	*	*	*	*	*	*	*	*	*	*	*	*
5-14 yrs	*	*	*	*	*	*	*	*	*	*	*	*
15-24 yrs	10.0	12.3	12.8	13.1	13.0	14.1	14.5	14.4	14.4	13.5	13.4	0.28 (NL)
25-34 yrs	10.8	12.6	13.4	14.3	13.8	14.2	16.5	15.1	15.4	14.8	17.2	0.46
35-44 yrs	9.2	11.0	10.8	9.0	10.0	10.7	10.3	11.4	12.0	11.2	12.2	0.23
45-54 yrs	8.9	10.1	9.7	9.1	11.3	11.5	11.1	11.1	10.3	11.7	10.7	0.20 (NL)
55-64 yrs	7.3	9.6	9.0	8.4	8.4	10.2	8.6	8.4	9.5	10.8	8.8	0.13 (NL)
65-74 yrs	8.8	9.7	11.5	8.4	10.3	8.5	7.5	8.0	10.3	8.7	10.1	-0.04 (NL)
75-84 yrs	13.8	13.5	14.2	11.1	11.6	13.4	12.2	10.5	10.0	10.0	11.1	-0.37
85 or older	14.6	13.3	14.1	*	*	13.6	10.2	*	*	11.5	10.9	-0.5 (NL)
<b>Race and ethnicity†</b>												
White‡	2.1	2.8	2.7	2.9	2.8	3.6	3.8	3.6	3.7	3.6	3.7	0.15
Black‡	15.1	19.2	18.7	19.4	18.4	22.7	23.8	22.5	22.9	22.5	21.7	0.64
Hispanic	*	*	*	*	8.3	8.9	6.2	*	8.4	8.6	*	*
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 48c. Number of deaths resulting from firearms, by intent and year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Unintentional	33	25	19	18	19	26	23	17	12	13	8	1%	*
Suicide	587	670	666	601	656	668	625	647	684	677	718	63%	7 (NL)
Homicide	250	315	346	330	339	408	447	404	401	418	386	34%	14
Undetermined	11	8	12	11	10	5	5	9	9	9	10	1%	*
Legal intervention	7	8	10	14	9	11	7	8	8	12	9	1%	*

\*Trends suppressed due to fewer than 20 deaths.

Source: Ohio Department of Health, Office of Vital Statistics

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 49a. Number of hospitalizations resulting from firearms 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	900	915	926	1,069	1,096	979	907	949	921
<b>Sex</b>									
Males	804	820	826	966	996	904	824	877	846
Females	96	95	100	103	100	75	83	72	75
<b>Age</b>									
< 1 yr	0	0	<5	0	0	0	0	<5	0
1-4 yrs	<5	<5	<5	<5	6	<5	<5	<5	<5
5-14 yrs	18	18	23	28	45	33	23	28	15
15-24 yrs	348	394	381	477	465	424	401	421	400
25-34 yrs	262	241	267	276	301	242	223	254	250
35-44 yrs	129	132	138	166	157	136	138	127	130
45-54 yrs	83	82	82	75	75	90	68	58	80
55-64 yrs	21	24	22	24	26	34	24	36	24
65-74 yrs	14	9	9	14	8	10	20	12	13
75-84 yrs	13	10	<5	7	10	5	5	8	<5
85 or older	9	<5	0	<5	<5	<5	<5	<5	<5

Source: Ohio Hospital Association

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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 49b. Hospitalization rates per 100,000 resulting from firearms by year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	8.0	8.1	8.3	9.6	9.9	8.8	8.2	8.6	8.4	0.03 (NL)
<b>Sex†</b>										
Males	14.5	14.6	15.1	17.3	17.9	16.2	14.9	15.8	15.5	0.1 (NL)
Females	1.69	1.67	1.75	1.84	1.77	1.35	1.49	1.27	1.37	-0.06
<b>Age</b>										
< 1 yr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	*
1-4 yrs	*	*	*	*	*	*	*	*	*	*
5-14 yrs	*	*	1.5	1.8	2.9	2.2	1.5	1.9	*	*
15-24 yrs	22.0	24.7	23.9	29.9	29.4	26.9	25.5	26.9	25.2	0.33 (NL)
25-34 yrs	17.8	16.4	18.3	18.9	20.7	16.6	15.2	17.2	17.7	-0.11 (NL)
35-44 yrs	7.4	7.7	8.2	10.1	9.7	8.5	8.9	8.4	8.8	0.12 (NL)
45-54 yrs	5.0	4.9	4.8	4.4	4.3	5.1	3.9	3.3	4.6	-0.13 (NL)
55-64 yrs	1.9	2.1	1.9	2.0	2.1	2.6	1.8	2.6	1.7	0.01 (NL)
65-74 yrs	*	*	*	*	*	*	2	*	*	*
75-84 yrs	*	*	*	*	*	*	*	*	*	*
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 trend pattern

Source: Ohio Hospital Association

**Table 49c. Number of hospitalizations resulting from firearms by intent and year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Unintentional	202	195	173	197	205	200	172	203	184	20%	-1 (NL)
Self-harm	86	76	74	61	69	72	63	71	66	7%	-2 (NL)
Assault	528	561	601	685	729	640	619	630	629	68%	10 (NL)
Legal intervention	9	16	13	18	8	13	16	9	12	*	*
Undetermined	75	67	65	108	85	55	37	36	30	3%	-6 (NL)

\*Suppressed due to less than 20 hospitalizations

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

Source: Ohio Hospital Association

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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 50a. Number of ED visits resulting from firearms 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	1,538	1,661	1,946	2,296	2,766	2,398	2,377	2,170	2,125
<b>Sex</b>									
Males	1,371	1,467	1,713	2,019	2,457	2,122	2,106	1,934	1,831
Females	167	194	233	277	309	276	271	236	294
<b>Age</b>									
< 1 yr	0	0	<5	<5	<5	<5	0	<5	0
1-4 yrs	12	8	13	11	9	7	22	11	16
5-14 yrs	217	246	264	281	341	239	285	274	250
15-24 yrs	589	666	781	996	1,238	1,037	1,041	898	911
25-34 yrs	313	336	430	474	594	528	483	493	456
35-44 yrs	206	201	240	294	300	297	252	244	239
45-54 yrs	103	107	135	150	153	172	181	126	132
55-64 yrs	35	60	49	48	64	63	61	68	73
65-74 yrs	26	24	20	27	36	24	30	24	23
75-84 yrs	23	10	10	9	20	20	13	22	15
85 or older	14	<5	<5	<5	10	10	9	9	10

Source: Ohio Hospital Association

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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 50b. ED visit rates per 100,000 resulting from firearms by year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	13.7	14.8	17.4	20.6	24.9	21.6	21.5	19.7	19.3	0.78 (NL)
<b>Sex†</b>										
Males	24.6	26.1	30.6	36.1	44.1	38.1	37.9	35.0	33.3	1.33 (NL)
Females	3.0	3.4	4.2	5.0	5.6	5.1	4.9	4.3	5.4	0.2
<b>Age</b>										
< 1 yr	0.0	0.0	*	*	*	*	0.0	*	0.0	*
1-4 yrs	*	*	*	*	*	*	3.7	*	*	*
5-14 yrs	13.4	15.4	16.7	18.1	22.2	15.8	19.0	18.3	16.4	0.39 (NL)
15-24 yrs	37.2	41.8	48.9	62.5	78.3	65.9	66.2	57.4	57.4	2.76 (NL)
25-34 yrs	21.2	22.9	29.4	32.5	40.8	36.1	33.0	33.4	32.3	1.44 (NL)
35-44 yrs	11.8	11.8	14.3	17.8	18.5	18.6	16.2	16.1	16.2	0.58 (NL)
45-54 yrs	6.3	6.4	8.0	8.7	8.8	9.8	10.3	7.2	7.6	0.22 (NL)
55-64 yrs	3.2	5.3	4.2	4.0	5.1	4.9	4.6	4.9	5.0	0.13 (NL)
65-74 yrs	3.4	3.1	2.6	3.5	4.7	3.1	3.7	2.9	2.7	-0.03 (NL)
75-84 yrs	4.2	*	*	*	3.6	3.7	*	4.1	2.8	*
85 or older	*	*	*	*	*	*	*	*	*	*

\*Rates suppressed due to less than 20 ED visits

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

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

Source: Ohio Hospital Association

**Table 50c. Number of ED visits resulting from firearms by intent and year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Assault	474	507	708	805	1,173	1,000	1,022	657	700	31%	36 (NL)
Legal intervention	23	25	24	36	46	25	33	57	36	3%	3 (NL)
Suicide	73	56	74	68	73	83	54	69	80	3%	1 NL
Undetermined	112	122	157	179	176	187	167	147	81	7%	<-1 (NL)
Unintentional	859	951	983	1,208	1,299	1,103	1,102	1,240	1,228	58%	41

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

Source: Ohio Hospital Association

**Table 51a. Percentage of respondents who reported a firearm in their home, Ohio, 2010\***

	<b>N</b>	<b>Percent</b>	<b>95% CI</b>
Overall	1,838	36.6	(34.8-38.4)
<b>Sex</b>			
Male	903	43.2	(40.2-46.3)
Female	935	30.7	(28.6-32.8)
<b>Age</b>			
18-24 yrs	30	32.6	(21.3-44.0)
25-34 yrs	124	32.6	(27.1-38.0)
35-44 yrs	275	38.7	(34.5-43.0)
45-54 yrs	398	37.2	(33.8-40.7)
55-64 yrs	478	38.8	(35.6-42.1)
65 or older yrs	533	35.5	(32.6-38.3)
<b>Household Poverty Status</b>			
Below poverty	97	24.7	(18.9-30.4)
Above poverty < 200%	307	34.9	(30.8-39.0)
Above poverty ≥ 200%	1,239	39.9	(37.6-42.2)
Missing household income	194	32.5	(26.9-38.0)
<b>County Urbanality</b>			
Metropolitan	909	28.4	(26.2-30.7)
Suburban	344	39.8	(35.4-44.2)
Rural	228	43.7	(38.4-49.0)
Appalachian	340	52.5	(47.5-57.5)

\*Source: Behavioral Risk Factor Surveillance System (BRFSS)

**Table 51b. Percentage of respondents who reported an unlocked firearm in their home among those who have a firearm, Ohio, 2010**

	<b>N</b>	<b>Percent</b>	<b>95% CI</b>
Overall	903	45.8	(42.6-48.9)
<b>Sex</b>			
Male	500	50.3	(45.7-55.0)
Female	403	39.9	(35.8-44.0)
<b>Age</b>			
18-24 yrs	10	+	(7.8-44.9)
25-34 yrs	52	43.6	(33.3-53.8)
35-44 yrs	98	37.0	(29.9-44.1)
45-54 yrs	197	50.9	(44.9-56.9)
55-64 yrs	249	51.6	(46.0-57.1)
65 or older yrs	297	55.7	(50.4-61.1)
<b>Household Poverty Status</b>			
Below poverty	38	38.9	(25.4-52.4)
Above poverty < 200%	143	43.5	(36.0-51.0)
Above poverty ≥ 200%	627	46.9	(43.1-50.7)
Missing household income	95	47.7	(36.7-58.7)
<b>County Urbanality</b>			
Metropolitan	438	45.2	(40.5-49.9)
Suburban	179	47.5	(40.3-54.7)
Rural	109	46.0	(37.6-54.5)
Appalachian	169	43.5	(37.0-49.9)

\*Source: Behavioral Risk Factor Surveillance System (BRFSS)

+Suppressed due to less than 20 respondents

**APPENDICES**

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## **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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### ***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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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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