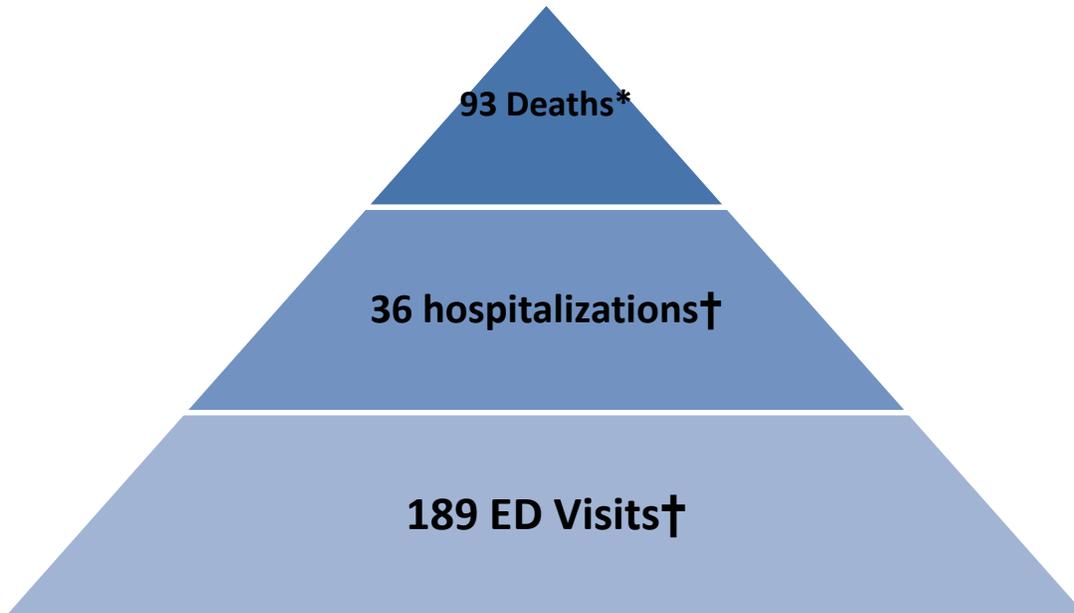


## SECTION 3.7: DROWNING



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

† SOURCE: OHIO HOSPITAL ASSOCIATION

### CHAPTER HIGHLIGHTS:

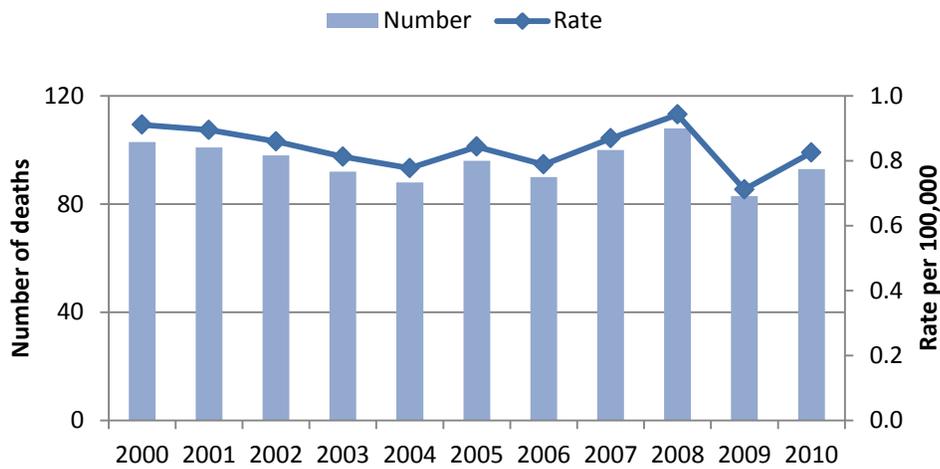
#### Patterns:

- Highest rates of fatal and non-fatal drowning were found among children less than 5 years of age.
- Rates of fatal or non-fatal drowning were higher among males than females.
- Nearly one-half of fatal drowning occurred in natural bodies of water.
- Unintentional drowning was the most common cause of non-fatal drowning.

#### Trends:

- Fatal and non-fatal drowning rates have not followed a consistent linear trend.
- Highest rates of fatal and non-fatal drowning were consistently found among children less than 5 years of age.
- Natural bodies of water were the most common location for fatal drowning since 2000.
- Unintentional drowning was most common cause of non-fatal drowning throughout the study period.

**Figure 9.1. Number and age adjusted rate for unintentional drowning deaths by year, Ohio, 2002-2010**



Source: Ohio Hospital Association

**DEATHS:**

In 2010, 93 people died from an unintentional drowning in Ohio. The drowning fatality rate was 0.83 per 100,000 (Figure 9.1). The fatality rate was 3 times higher among males (1.25 per 100,000) compared to females (0.42 per 100,000). The highest fatality rate was found among children ages 1-4 years at 2.2 per 100,000 which were 3 times higher than other age groups (Figure 9.2). Fatality rates were 50 percent higher among blacks (1.2 per 100,000) than whites (0.8 per 100,000). See Table 9.1 for an unintentional drowning death risk profile.

The most common place of occurrence for drowning was in a natural body of water (47 percent) followed by swimming pools (17 percent) (see Figure 9.3). Of note, 27 percent of drowning occurred in an unspecified location.

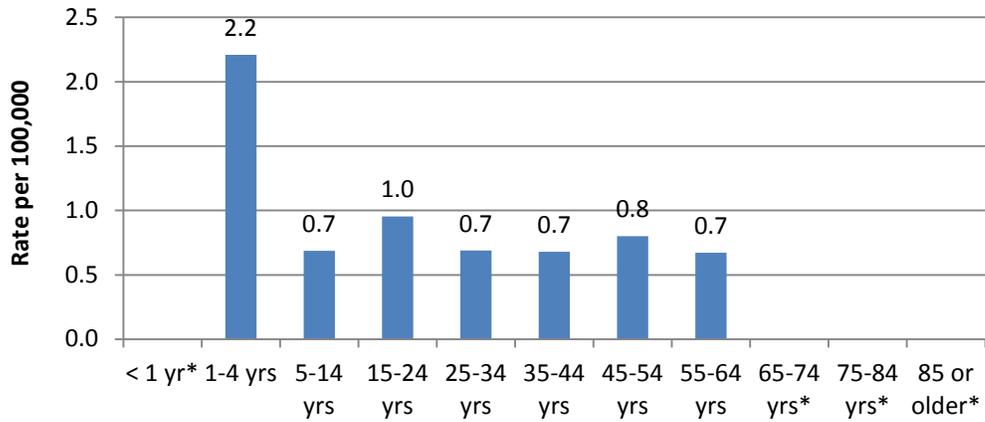
**TRENDS:**

Between 2000 and 2010, unintentional drowning fatality rates did not follow a consistent linear trend. Inconsistent trends were found by gender, age, and race or ethnicity. The number of fatal drowning in natural bodies of water increased on average by 2 drownings per year while the number of unspecified drowning decreased on average by 2 drownings per year. See Tables 34a-c located at the end of this section for more detailed information on the number and rates of unintentional drowning in Ohio.

**Table 9.1 Unintentional Drowning Death Risk Profile**

	2010 At Risk Groups	Annual trend since 2000
<b>Overall</b>		Inconsistent trends
<b>Sex</b>	Males	Inconsistent trends
<b>Age</b>	1-4 yrs	Inconsistent trends
<b>Race and ethnicity</b>	Blacks	Inconsistent trends

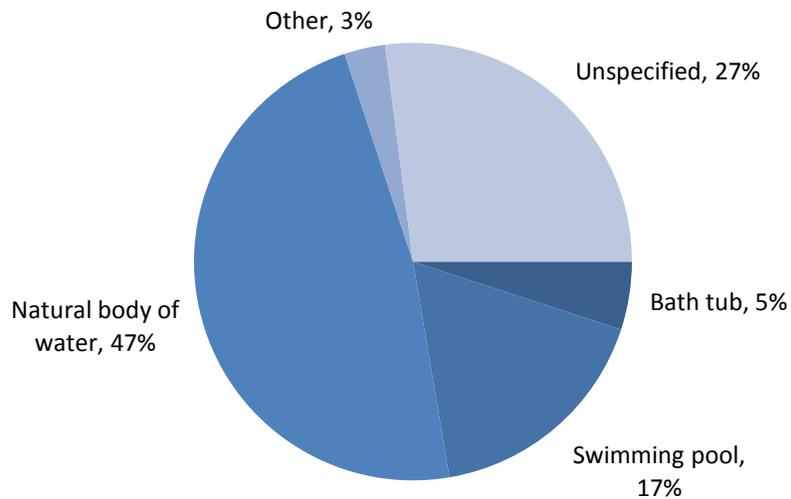
**Figure 9.2. Rate of unintentional drowning death rate by age group, Ohio, 2008-2010**



Source: Ohio Department of Health, Vital Statistics

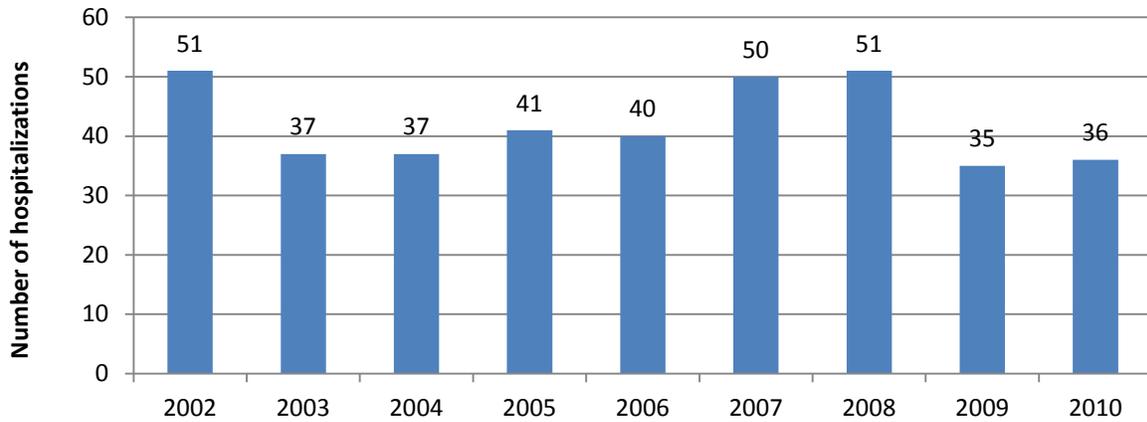
\*Rates suppressed due to small cell sizes

**Figure 9.3. Distribution of deaths resulting from unintentional drowning by location, Ohio, 2010**



Source: Ohio Department of Health, Vital Statistics

**Figure 9.4. Number of unintentional drowning hospitalizations by year, Ohio, 2002-2010**



Source: Ohio Hospital Association

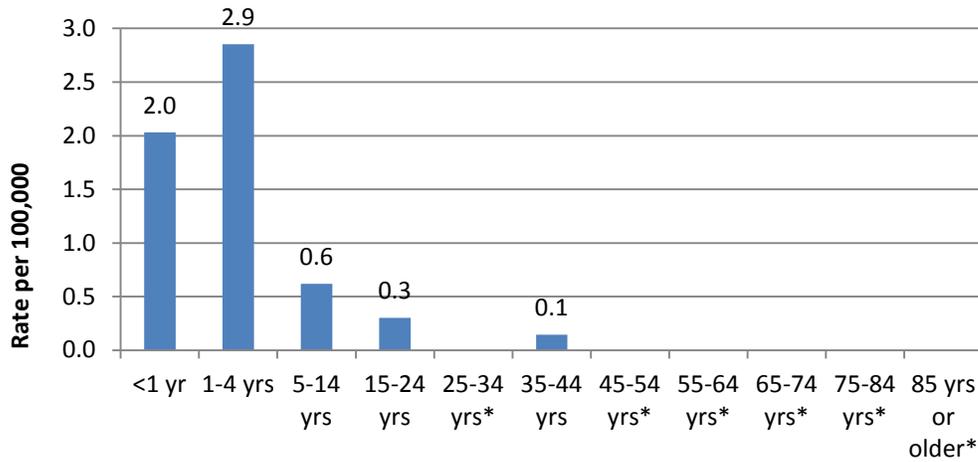
**HOSPITALIZATIONS:**

Between 2002 and 2010, 378 hospitalizations resulted from unintentional drowning (Figure 9.4). The drowning hospitalization rate was 0.39 per 100,000. The hospitalization rate was two times higher for males (0.54 per 100,000) than females (0.23 per 100,000). The highest rates were found among infants less than 1 year of age (2.0 per 100,000) and children 1-4 years (2.9 per 100,000) (see Figure 9.5). The majority of drowning (95 percent) were caused by unintentional drowning (Figure 9.6). See Tables 35a-c located at the end of this section for more detailed information on the number and rate of unintentional drowning hospitalizations.

**Table 9.2 Unintentional Drowning Hospitalization Risk Profile**

	At Risk Groups in 2002-2010
Overall	
Sex	Males
Age	<5 years

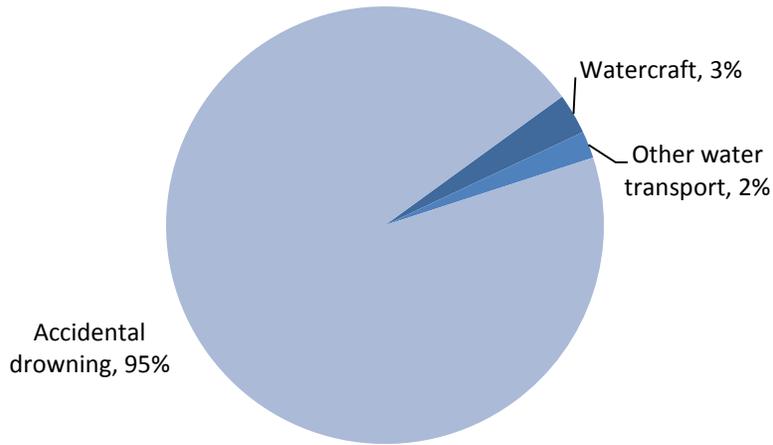
**Figure 9.5. Unintentional drowning hospitalization rates per 100,000 by age, Ohio, 2002-2010**



Source: Ohio Hospital Association

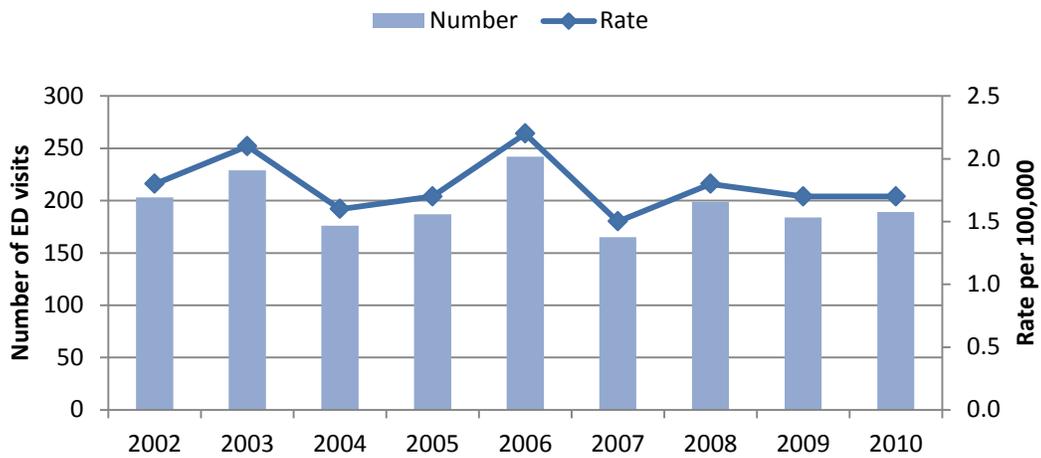
\*Rate suppressed due to < 20 hospitalizations

**Figure 9.6. Distribution of hospitalizations resulting from unintentional drowning by cause, Ohio, 2002-2010**



Source: Ohio Hospital Association

**Figure 9.7. Number and age adjusted rate for unintentional drowning ED visits by year, Ohio, 2002-2010**



Source: Ohio Hospital Association

**EMERGENCY DEPARTMENT VISITS:**

One hundred eighty nine ED visits were associated with unintentional drowning in 2010. The ED visit rate was 1.7 per 100,000 (Figure 9.7). Males were more likely than females to visit an ED for a drowning. ED visits increased from birth through age 4 and then steadily decreased after age 5 (Figure 9.8). See Table 9.3 for an unintentional drowning ED visit risk profile. Unintentional drowning caused 92 percent of visits and water transport was associated with 8 percent of visits (Figure 9.9).

**Table 9.3 Unintentional Drowning ED Visit Risk Profile**

	2010 At Risk Groups	Trend since 2002
<b>Overall</b>		Did not change
<b>Sex</b>	Males	Males (-12%)
<b>Age</b>	1-4 years	1-4 years (+37%)

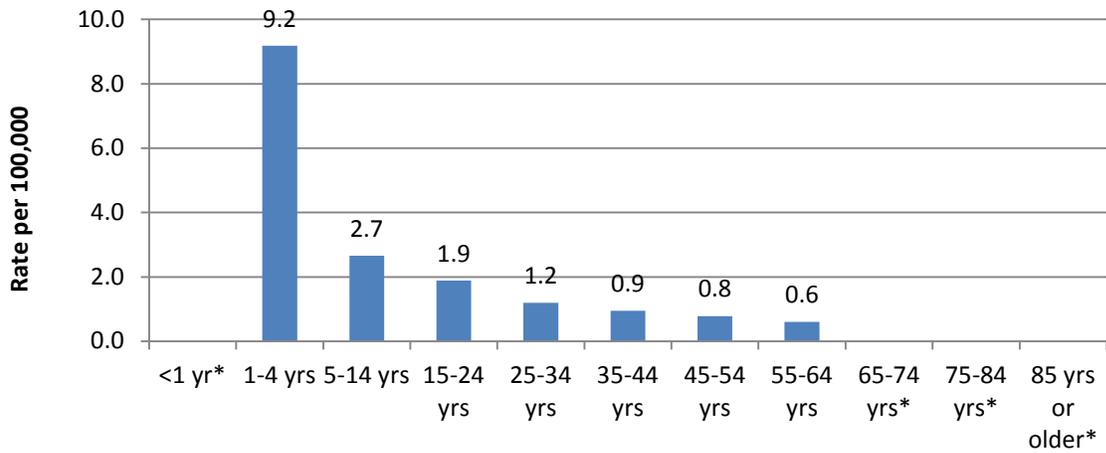
**TRENDS:**

ED visits resulting from unintentional drowning fluctuated throughout the study period with a high of 2.2 per 100,000 in 2006 and a low of 1.5 per 100,000 in 2007. Males and children ages 1-4 years were highest risk groups throughout the study period. The distribution in the causes of drowning related ED visits did not change over time. See Tables 36a-c located at the end of this section for more detailed information on the number and rate of unintentional drowning ED visits.

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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

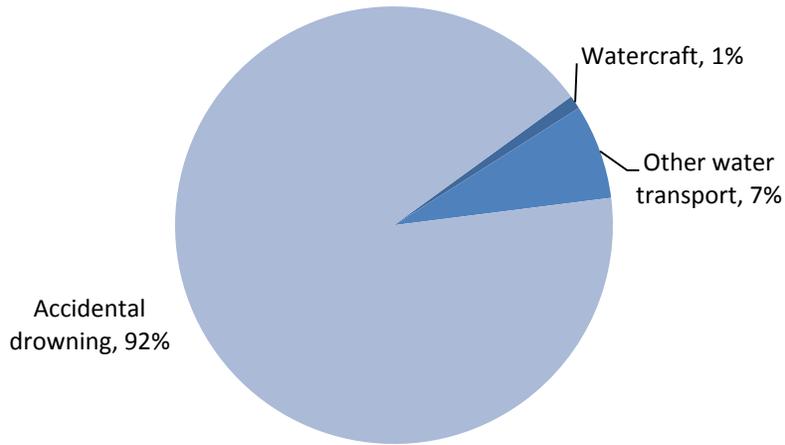
**Figure 9.8. Unintentional drowning ED visit rates per 100,000 by age, Ohio, 2002-2010**



Source: Ohio Hospital Association

\*Rate suppressed due to < 20 hospitalizations

**Figure 9.9. Distribution of ED visits resulting from unintentional drowning 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 34a. Number of deaths resulting from unintentional drowning, by year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	103	101	98	92	88	96	90	100	108	83	93
<b>Sex</b>											
Males	80	72	84	69	68	72	68	77	81	68	69
Females	23	29	14	23	20	24	22	23	27	15	24
<b>Age</b>											
< 1 yr	6			7			7			<5	
1-4 yrs	24			42			38			39	
5-14 yrs	34			33			21			31	
15-24 yrs	38			59			63			45	
25-34 yrs	23			33			27			30	
35-44 yrs	28			26			33			31	
45-54 yrs	24			30			43			42	
55-64 yrs	8			23			17			28	
65-74 yrs	5			16			14			13	
75-84 yrs	9			<5			14			17	
85 or older	5			6			9			5	
<b>Race and ethnicity</b>											
White‡	153			216			230			214	
Black‡	47			46			45			56	
Hispanic	<5			8			8			9	
Other‡	0			6			<5			5	

‡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 34b. Death rates per 100,000 resulting from unintentional drowning, by year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	0.91	0.90	0.86	0.81	0.78	0.84	0.79	0.87	0.94	0.71	0.83	<-0.1 (NL)
<b>Sex†</b>												
Males	1.43	1.31	1.51	1.24	1.20	1.31	1.21	1.36	1.45	1.18	1.25	<-0.1 (NL)
Females	0.40	0.50	*	0.40	0.34	0.41	0.38	0.39	0.47	*	0.42	<0.1 (NL)
<b>Age</b>												
< 1 yr	*			*			*			*		*
1-4 yrs	1.99			2.33			2.14			2.21		<0.1 (NL)
5-14 yrs	1.04			0.69			0.45			0.69		<-0.1 (NL)
15-24 yrs	1.22			1.24			1.33			0.95		<-0.1 (NL)
25-34 yrs	0.77			0.74			0.61			0.69		<-0.1 (NL)
35-44 yrs	0.78			0.51			0.68			0.68		<-0.1 (NL)
45-54 yrs	0.75			0.60			0.83			0.80		<0.1 (NL)
55-64 yrs	0.39			0.68			0.45			0.67		<0.1 (NL)
65-74 yrs	*			*			*			*		*
75-84 yrs	*			*			*			*		*
85 or older	*			*			*			*		*
<b>Race and ethnicity†</b>												
White‡	0.81			0.76			0.80			0.75		<-0.1 (NL)
Black‡	1.58			1.06			0.99			1.23		<-0.1 (NL)
Hispanic	*			*			*			*		*
Other‡	*			*			*			*		*

\*Rates suppressed due to fewer than 20 deaths.

‡Non-Hispanic

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

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 34c. Number of deaths resulting from unintentional drowning, by location and year, Ohio, 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Bath tub	13	14	7	11	9	7	17	15	18	11	5	*	*
Swimming pool	19	14	14	8	10	22	11	9	17	15	16	17%	*
Natural body of water	24	28	30	31	26	39	39	44	47	39	44	47%	2.1
Other	7	10	10	11	8	<5	<5	11	<5	<5	<5	*	*
Unspecified	40	35	37	31	35	27	22	21	24	16	25	27%	-2.0

\*Suppressed due to fewer than 20 deaths.

Source: Ohio Department of Health, Office of Vital Statistics

**Table 35a. Number of hospitalizations resulting from unintentional drowning by year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Overall	53	37	37	41	40	50	51	35	36
<b>Sex</b>									
Males	40	27	23	29	30	33	36	24	26
Females	13	10	14	12	10	17	15	11	10
<b>Age</b>									
< 1 yr					27				
1-4 yrs					152				
5-14 yrs					86				
15-24 yrs					43				
25-34 yrs					13				
35-44 yrs					21				
45-54 yrs					15				
55-64 yrs					8				
65-74 yrs					<5				
75-84 yrs					5				
85 or older					6				

Source: Ohio Hospital Association

*Burden of Injury in Ohio, 2000-2010*

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 35b. Hospitalization rates per 100,000 resulting from unintentional drowning, Ohio, 2002-2010**

	<b>2002-2010</b>
Overall†	0.39
<b>Sex†</b>	
Males	0.54
Females	0.23
<b>Age</b>	
< 1 yr	2.03
1-4 yrs	2.85
5-14 yrs	0.62
15-24 yrs	0.30
25-34 yrs	*
35-44 yrs	0.14
45-54 yrs	*
55-64 yrs	*
65-74 yrs	*
75-84 yrs	*
85 or older	*

\*Rates suppressed due to less than 20 hospitalizations

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

Source: Ohio Hospital Association

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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 35c. Number and percentage of hospitalizations resulting from unintentional drowning by type, Ohio, 2002-2010**

	<b>2002-2010</b>	<b>2002-2010</b>
	<b>Number</b>	<b>Percent</b>
Caused by watercraft	10	3%
Other water transport	8	2%
Unintentional drowning	362	95%

Source: Ohio Hospital Association

**Table 36a. Number of ED visits resulting from unintentional drowning 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	203	229	176	187	241	165	199	184	189
<b>Sex</b>									
Males	134	156	105	123	176	101	121	119	0
Females	69	73	71	64	65	64	78	65	0
<b>Age</b>									
< 1 yr	9	7	5	7	5	6	<5	5	11
1-4 yrs	30	41	53	55	47	44	59	52	51
5-14 yrs	52	51	49	32	76	36	44	40	36
15-24 yrs	47	58	24	32	68	38	29	29	31
25-34 yrs	20	26	12	15	13	14	16	19	17
35-44 yrs	24	27	14	16	10	9	13	16	14
45-54 yrs	14	7	7	16	8	11	17	8	16
55-64 yrs	<5	<5	<5	7	9	<5	9	12	<5
65-74 yrs	0	<5	7	<5	<5	<5	5	<5	<5
75-84 yrs	<5	<5	<5	<5	0	<5	<5	0	<5
85 or older	<5	<5	0	<5	<5	<5	<5	0	<5

Source: Ohio Hospital Association

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

Ohio Violence and Injury Prevention Program, Ohio Department of Health

**Table 36b. ED visit rates per 100,000 resulting from unintentional drowning by year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Trend (per yr)
Overall†	1.8	2.1	1.6	1.7	2.2	1.5	1.8	1.7	1.7	<-0.1 (NL)
<b>Sex†</b>										
Males	2.5	2.8	1.9	2.2	3.2	1.8	2.2	2.2	2.1	-0.1 (NL)
Females	1.2	1.3	1.3	1.2	1.2	1.2	1.4	1.2	1.4	<0.1 (NL)
<b>Age</b>										
< 1 yr		4.7			*			*		*
1-4 yrs		6.9			8.3			9.2		0.4
5-14 yrs		3.2			3.1			2.7		-0.1
15-24 yrs		2.7			2.9			1.9		-0.1
25-34 yrs		1.3			1.0			1.2		<-0.1 (NL)
35-44 yrs		1.3			0.7			0.9		-0.1 (NL)
45-54 yrs		0.6			0.7			0.8		<0.1 (NL)
55-64 yrs		*			*			0.6		*
65-74 yrs		*			*			*		*
75-84 yrs		*			*			*		*
85 or older		*			*			*		*

\*Rates are suppressed due to less than 20 ED visits †Rates are age adjusted to 2000 U.S. standard population

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

Source: Ohio Hospital Association

**Table 36c. Number of ED visit rates resulting from unintentional drownings by type and year, Ohio, 2002-2010**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	% in 2010	Trend (per yr)
Caused by watercraft	7	7	<5	<5	0	<5	<5	5	<5	1%	*
Other water transport	21	18	17	12	8	11	12	13	13	7%	*
Unintentional drowning	175	204	156	172	233	151	184	166	174	92%	-1 (NL)

\*Rates are suppressed due to less than 20 ED visits

Source: Ohio Hospital Association

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

## **APPENDICES**

## **APPENDIX 1: DATA SOURCES**

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

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

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

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

### ***Death Records***

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

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

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

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

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

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

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

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

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

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### ***Ohio 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.
-

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*

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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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