



## *Summary of Reportable Injuries in Oklahoma*

### *Submersion Injuries in Oklahoma, 1988-2003*

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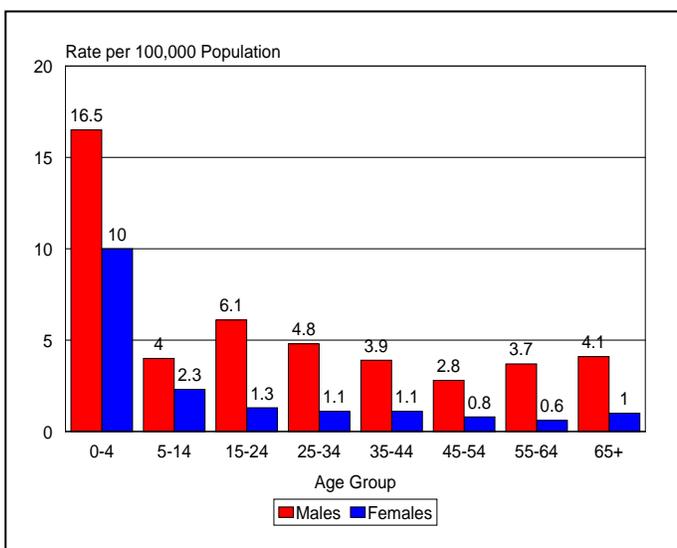


## Submersion Injuries in Oklahoma, 1988-2003

### Background

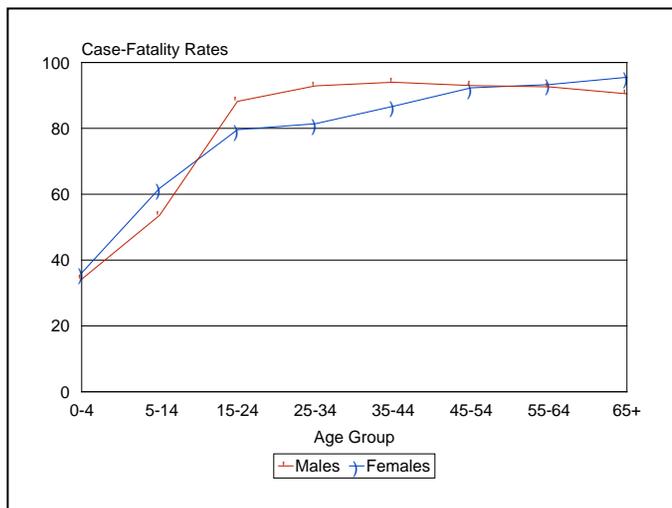
Statewide fatal and hospitalized submersion injuries have been reported to the Oklahoma State Department of Health since October 1987. Surveillance data were gathered from hospital medical records, the Office of the Chief Medical Examiner, the Oklahoma Lake Patrol, newspaper clippings, and the Department of Public Safety. Average annual rates were calculated using U.S. Census bridged-race population estimates summing the 16 years of data. A total of 1822 Oklahoma residents were hospitalized or died from a submersion injury (rate 3.4 per 100,000 population).

**Figure 1. Submersion Injury Rates by Age and Gender, Oklahoma, 1988-2003**



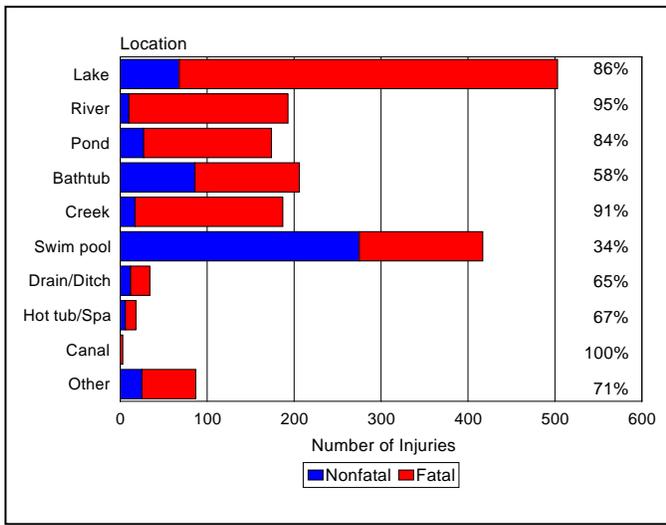
- The 0-4 year age group had the highest rate (13.2 per 100,000 population) followed by the 15-24 age group (3.7).
- Rates for males were higher across all age groups. The rate for males (5.2) was three times higher than for females (1.8); males accounted for 74% of all injuries.
- Alcohol was a contributing factor for 36% of persons over 14 years of age; drugs were a factor in 9% of injuries.

**Figure 2. Case-Fatality Rates of Submersion Injuries by Gender and Age Group, Oklahoma, 1988-2003**



- Seventy-one percent of submersion injuries were fatal.
- Case-fatality rates increased steadily by age group from 36% among 0-4 year olds to over 90% among persons 65 years and older.
- Females 0-14 years old and females over 55 years old had higher case-fatality rates than males in these age groups.

**Figure 3. Submersion Injuries by Location and Percent Fatal, Oklahoma, 1988-2003**



- 58% of all injuries occurred in natural bodies of water; 88% of these were fatal.
  - Nearly half of these injuries occurred in lakes (48%); 33% occurred in rivers and creeks.
  - 53% of flood-related injuries occurred in creeks followed by rivers (16%).
- Fatal submersions were lowest for swimming pools and highest for canals and rivers.
- Among persons over 14 years of age, when alcohol was involved, the percent of fatal submersions was 100% in bathtubs, hot tubs and ponds compared to 70% in swimming pools.

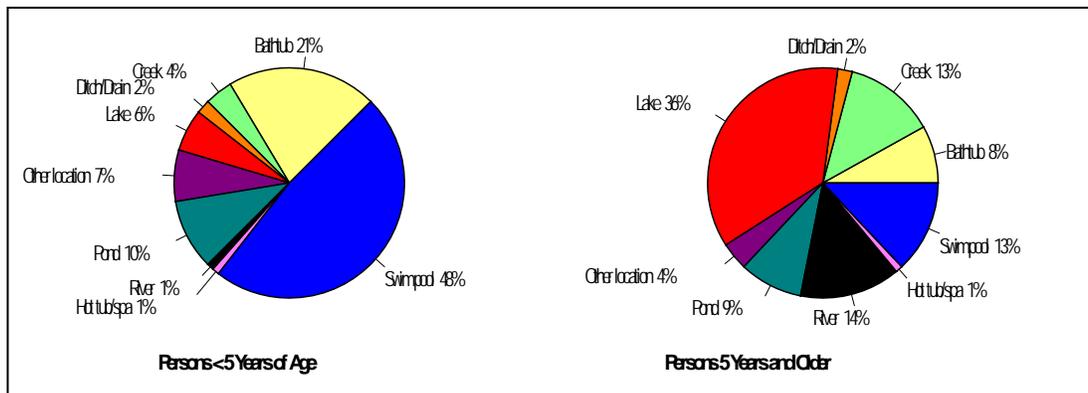
**Table 1. Location of Submersions by Year of Injury, Oklahoma, 1988-2003**

Location	Year																Total
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
Lake	41	32	26	23	38	26	28	29	25	36	38	30	34	28	27	37	502
Swim Pool	19	22	28	31	24	30	23	30	14	29	33	29	28	33	25	29	417
River	13	16	15	22	10	13	5	18	9	19	7	14	18	8	13	3	193
Bathtub	9	7	11	13	15	11	11	15	12	5	21	11	9	11	12	16	205
Creek	9	6	16	7	17	18	15	10	15	5	16	13	12	8	10	6	187
Pond	18	16	10	9	7	13	12	19	11	17	10	3	17	8	6	12	174
Hot tub/Spa	1	3	0	1	0	4	0	0	2	0	0	2	0	1	2	2	18
Other*	4	9	7	7	12	10	8	5	7	13	7	12	10	7	6	5	124
Total	114	111	113	113	123	125	102	126	95	124	132	114	128	104	101	110	1822

\*Includes canals, ditches, buckets, and other locations.

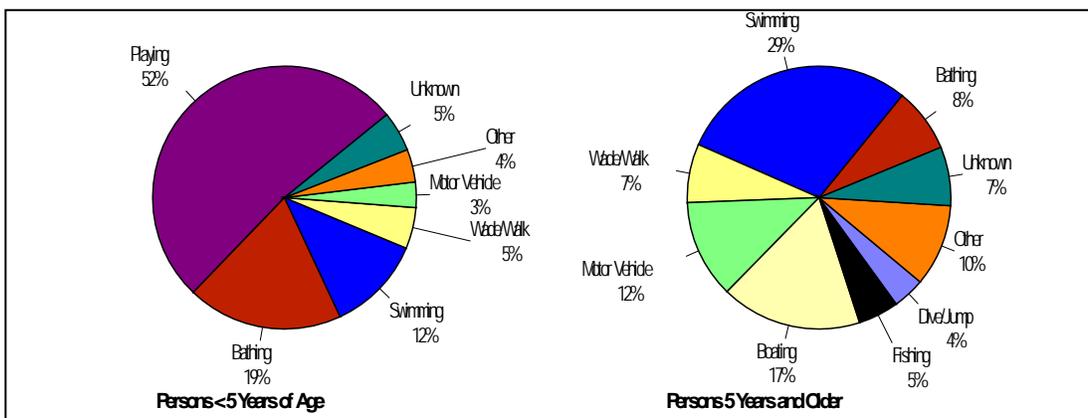
- Overall, the occurrence and location of submersions varied over the 16-year period but no definite trends were observed.
- An average of 114 injuries occurred each year (range 95-132 injuries) during the 16 years.
- The most common locations for submersion injuries were natural waters (lakes, rivers, and creeks), swimming pools, and bathtubs.

**Figure 4. Submersion Injuries by Age and Location, Oklahoma, 1988-2003**



- The location of submersion injuries varied considerably among persons under 5 years and persons 5 years and older.
  - 77% of injuries among children under 5 years occurred in the home environment such as a bathtub, pool, hot tub, or other place (toilets, buckets, etc.) compared to 26% among older children and adults.
  - Among persons 5 years and older, 72% sustained injuries in recreational waters (rivers, lakes, creeks and ponds) compared to 21% of persons under 5 years of age.
  - Bathtub submersions accounted for 20% of injuries among persons under 5 years and 17% of injuries among persons 65 years and over.
  - Among swimming pool submersions, children under 5 years of age experienced the highest number of injuries (57%) followed by persons 5-14 years (20%); percentages decreased steadily in the older age groups.

**Figure 5. Submersion Injuries by Age and Activity, Oklahoma, 1988-2003**



- Playing (52%) and bathing (19%) were the main activities of persons under 5 years.
- Ninety percent of persons 5 years and older involved in boating-related submersions died; 42% of these were 15-34 years of age.
- Ninety-four percent of motor vehicle-related submersions among persons 5 years and older were fatal. The 15-24 year age group accounted for 25% of all motor vehicle-related submersions.
- Among persons over 14 years, 17% were boating-related submersions; alcohol and drugs were involved in 46% (96% fatal) and 4% (100% fatal) of cases, respectively.



**Table 2. Submersion Injury Rates by County of Residence, Oklahoma, 1988-2003**

County	Average Annual Population	Number of Cases 1988-2003	Average Annual Rate*
Marshall	12,213	17	8.7
McIntosh	18,291	21	7.2
Harper	3,764	4	6.6
Haskell	11,403	12	6.6
Seminole	25,113	26	6.5
Mayes	36,093	37	6.4
Choctaw	15,402	15	6.1
Kiowa	10,744	10	5.8
Sequoyah	36,687	33	5.6
Noble	11,300	10	5.5
Ottawa	31,870	28	5.5
Washita	11,509	10	5.4
Pontotoc	34,642	30	5.4
Harmon	3,503	3	5.4
McCurtain	33,967	29	5.3
Coal	5,920	5	5.3
Atoka	13,479	11	5.1
Hughes	13,497	11	5.1
Cherokee	38,769	31	5.0
Pushmataha	11,397	9	4.9
Pittsburg	42,873	33	4.8
Blaine	11,783	9	4.8
Pawnee	16,062	12	4.7
Jackson	28,835	21	4.6
Ellis	4,241	3	4.4
Caddo	30,065	21	4.4
Craig	14,563	10	4.3
Latimer	10,504	7	4.2
Carter	44,558	29	4.1
Murray	12,396	8	4.0
Bryan	34,543	22	4.0
Comanche	115,358	70	3.8
Delaware	33,150	20	3.8
Johnston	10,306	6	3.6
Muskogee	69,094	40	3.6
Jefferson	6,931	4	3.6
Logan	31,898	18	3.5
Tulsa	537,309	303	3.5
Kay	48,295	27	3.5

County	Average Annual Population	Number of Cases 1988-2003	Average Annual Rate*
Adair	20,029	11	3.4
Pottawatomie	62,410	34	3.4
<b>State of Oklahoma</b>	<b>3,323,837</b>	<b>1,809</b>	<b>3.4</b>
Creek	64,720	35	3.4
Roger Mills	3,725	2	3.4
Beckham	19,227	10	3.3
Okfuskee	11,609	6	3.2
Oklahoma	636,241	312	3.1
Nowata	10,270	5	3.0
Osage	43,323	21	3.0
LeFlore	46,053	22	3.0
Love	8,457	4	3.0
Okmulgee	38,336	18	2.9
Stephens	42,992	20	2.9
Rogers	63,673	29	2.8
Cotton	6,597	3	2.8
Kingfisher	13,639	6	2.7
Payne	65,535	28	2.7
Lincoln	30,634	13	2.7
Washington	48,553	20	2.6
Canadian	82,161	32	2.4
Custer	26,341	10	2.4
Garvin	26,919	10	2.3
Cleveland	194,157	68	2.2
Grady	43,952	15	2.1
Woods	9,046	3	2.1
Texas	18,181	6	2.1
Alfalfa	6,252	2	2.0
Woodward	18,759	6	2.0
Greer	6,264	2	2.0
Tillman	9,768	3	1.9
Wagoner	53,423	15	1.8
Major	7,744	2	1.6
McClain	25,534	6	1.5
Garfield	57,379	13	1.4
Dewey	5,086	1	1.2
Beaver	5,910	1	1.1
Cimarron	3,207	0	0.0
Grant	5,403	0	0.0

\*Average annual rates per 100,000 population were computed using bridged-race population estimates summed for all 16 years of data with the exception of the years 1988-1989 for which regular census data were used.

County of residence was unknown for 13 persons