

# INJURY UPDATE

*A Report to Oklahoma Injury Surveillance Participants\**

July 16, 2004

## The Unrecognized Hazard in Homes: Bathtub Submersion Injuries in Oklahoma, 1988-2003

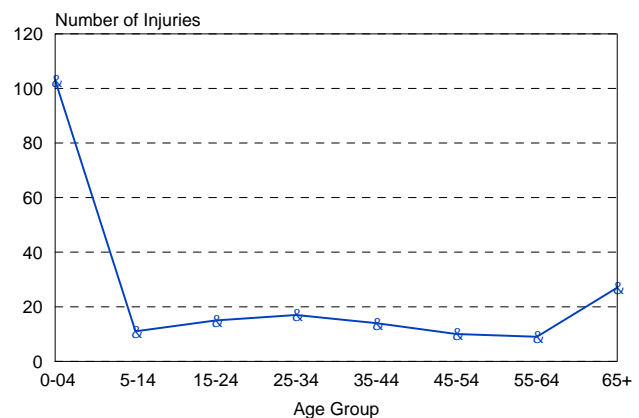
### INTRODUCTION

From the beginning of recorded history, bathtubs have been a place of cleansing, treatment, comfort, and potential danger. Today, whether used for bathing or showering, bathtubs are a common fixture in the great majority of homes in the United States. As a water container, a tub's shape, surface, and depth may lead to entrapment, falls, and other hazards resulting in submersion injury (drowning or near drowning). Of the 1820 submersion injuries reported in Oklahoma from 1988 to 2003, bathtubs were the third most frequent place of injury with 206 submersions (11%), following lakes with 504 events (28%) and swimming pools with 415 submersions (23%). Although most submersions occur in recreational waters outside of the home, bathtub events take place in the inner home environment. This report describes the occurrence of submersion injury in bathtubs and the demographic and epidemiologic factors associated with these injuries. Spa and hot tub injuries are not included. Common hazards and unique differences in drowning situations are discussed. Specific recommendations for prevention are made based upon the data, case history briefs, and consideration of effective ways to help reduce bathtub-associated injuries and their sequelae.

### DESCRIPTIVE EPIDEMIOLOGY

According to surveillance data collected on persons who were hospitalized or died, a total of 206 submersion injuries occurred in bathtubs in Oklahoma from 1988 to 2003; 119 persons (58%) died. The rate of bath-related injuries was 0.39 per 100,000 population compared to the overall state submersion rate of 3.4 per 100,000 population. The number of injuries fluctuated over the years with no discernable trends. Injuries were dispersed across 44 of Oklahoma's 77 counties. The age of persons injured ranged from 0 to 98 years. Age distribution was skewed to younger ages with fifty percent (103/206) of injuries occurring in the 0-4 year age group; the 65+ year group had the second highest number of injuries (27/206, 13%) (Figure 1). Males accounted for 53% of injuries (rate 0.42 per 100,000 population compared to 0.35 for females). Whites accounted for the highest number of injuries (81%) and the highest rate (0.70 per 100,000 population) followed by African Americans and Native Americans with 0.67 and

Figure 1. Bathtub-Related Submersion Injuries by Age Group Oklahoma, 1988 to 2003



N=206

\*The INJURY UPDATE is a report produced by the Injury Prevention Service, Oklahoma State Department of Health. Other issues of the INJURY UPDATE may be obtained from the Injury Prevention Service, Oklahoma State Department of Health, 1000 N.E. 10<sup>th</sup> Street, Oklahoma City, Oklahoma 73117-1299, 405/271-3430 or 1-800-522-0204 (in Oklahoma). INJURY UPDATES and other IPS information is also available at [www.health.state.ok.us/program/injury](http://www.health.state.ok.us/program/injury).

0.11 per 100,000 population respectively. Of the 151 cases (73%) with known time of injury, 76% were spread quite evenly across the day from 10:00 a.m. to 10:00 p.m. (Figure 2). Ninety percent of submersions were unintentional, 4% suicide, 2% homicide, and 4% were of unknown intent. Among persons over 14 years of age, alcohol and drugs contributed to 15% and 12% of the submersion injuries.

Bathtub drownings varied by age and other characteristics as noted in Table 1. The likelihood of death in a submersion event increased with age. There was also a significantly higher risk of drowning for females compared to males (RR 1.37; 95% CI 1.00<RR<1.88). Survival was highest when submersion time was under five minutes and decreased dramatically thereafter. Resuscitation was attempted in 141 cases by parents/relatives (54%), medical professionals (35%) or friends (11%). Seizures (16%), other neurologic or physical conditions (18%), impaired mental status (6%), and mental retardation (4%) were reported to be contributing factors for the occurrence of submersion injury.

## DISCUSSION

Immersion, leading to water in the lungs or paroxysm of the larynx, may quickly lead to anoxia of the brain or death and thus must be avoided. According to these case histories, leaving a child (children) in a tub in any amount of water unattended and adults taking a bath alone when suffering from physical or mental conditions were the main factors leading to submersion injury. Parents and caregivers who prepare for children's baths should not leave to get something nor should they allow distractions by telephone or activities of other children. Common behavioral risk factors associated with these submersion injuries were the curiosity and mobility of children with access to partially-filled bathtubs or empty bathtubs where they could turn on the faucet, caregivers' dependence on siblings to help watch younger children, and adults bathing while intoxicated or unsupervised while in a weakened condition. In those instances with multiple children in a tub, siblings may call the parent if the child seems to be in trouble while others may not notice what has happened. A different situation may arise when the sibling, not understanding the consequences, precipitates the event by sitting on the child or holding the child underwater.

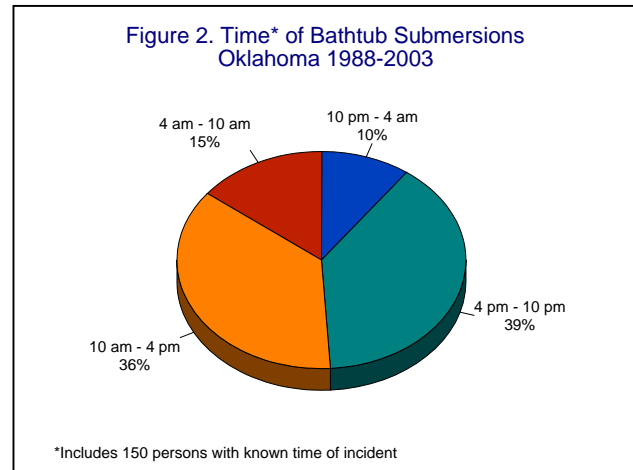


Table 1. Characteristics Related to Non-survival in Bathtub-Related Submersion Injuries, Oklahoma, 1988 to 2003

Factor	# Deaths/Total	Percent Fatal
Age group		
0-4	31/103	30%
5-14	5/11	45%
15-24	12/15	80%
25-34	17/17	100%
35-44	13/14	93%
45-54	9/10	90%
55-64	9/9	100%
65+	24/27	89%
Sex		
Female	63/96	66%
Male	57/110	52%
Race		
Asian	2/2	100%
Black	17/28	61%
Indian	3/5	60%
White	97/166	58%
Other/Unknown	1/5	20%
Time submerged		
1-4 minutes	10/76	13%
5-9 minutes	14/18	78%
10-14 minutes	9/9	100%
15-30 minutes	6/6	100%
>30 minutes	41/41	100%
Resuscitation efforts		
No	46/52	88%
Yes	63/141	45%

Note: Time of submersion not known for 56 cases. Resuscitation attempt not known for 13 cases.

## CASE BRIEFS

- A child of six months was placed in a bath device that encircled him and had suction cups on the bottom. His father left him unattended for a few minutes. When the father returned, the device had lifted and turned over leaving the baby submerged. The father initiated CPR and emergency medical services transported him to the hospital. He was discharged two days later with no residual problems.
- A 9-month old child was found floating in an overflowing tub. The mother was running a bath and had closed the door but the 2 year-old sister opened it and the younger child entered and fell into the tub. The child did not survive.
- A 22-year old woman suffered a seizure while running a bath and fell head first into one foot of water. She was found by family and did not survive.
- A father left a 10-month old child unattended in three inches of soapy water to check on a sibling. He returned 2-4 minutes later, found the child face down in the water and called 911. The father, emergency medical services, and police gave CPR, but the child did not respond.
- A one-year old child was left in the bathtub with 2 and 3 year-old siblings while the grandmother left to get their clothes. When she returned, the child was underwater and unresponsive. He had been held underwater by one of the older siblings. Resuscitation was successful.
- A one-year old and two brothers were playing in waist-level water in the tub. Their mother left them for less than 5 minutes and one child began screaming. The mother found the child face down and attempted CPR. Resuscitation attempts were continued by emergency medical services and the emergency department, but were unsuccessful.
- A mother left a one-year old child with a 2-year old sister for a moment. When she returned, the sister was sitting on the younger child's chest in the water. The child was resuscitated.
- On the day a family moved into their new home, the father started to run a bath and went outside to the van to get a towel, leaving three young children aged 1, 2, and 3 years in the house. He accidentally locked himself out. When he got back into the house, the one-year old was found face down and unresponsive in the tub. Resuscitation was successful.

## RECOMMENDED PREVENTIVE MEASURES

- Never leave a young child alone for a moment. Take the child with you if you have to leave the bathroom for any reason.
- Do not rely on bathtub devices to hold infants and young children above water; these devices may overturn.
- Persons with disabilities, a history of seizures, or other medical conditions should have someone monitor them while bathing in a tub.
- Tub bathing should be avoided when taking certain types of medications, and after medical and surgical procedures.
- Bathtubs should always be empty of water when not in use.
- Families should learn CPR skills.
- Ingestion of alcohol and/or drugs should be avoided before and while taking a bath.

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