

PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Where Children Drown, United States, 1995

Ruth A. Brenner, Ann C. Trumble, Gordon S. Smith, Eileen P. Kessler and Mary D. Overpeck

Pediatrics 2001;108:85-89

DOI: 10.1542/peds.108.1.85

This information is current as of November 7, 2006

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://www.pediatrics.org/cgi/content/full/108/1/85>

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2001 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



Where Children Drown, United States, 1995

Ruth A. Brenner, MD, MPH*; Ann C. Trumble, PhD*; Gordon S. Smith, MB, ChB, MPH‡; Eileen P. Kessler§; and Mary D. Overpeck, DrPh, MPH*||

ABSTRACT. *Context.* Drowning is the second leading cause of unintentional injury death among children ages 1 to 19 years. Details about the specific site of submersion are important for implementation of primary prevention efforts, but are not routinely available from national data.

Objectives. To provide national data about the specific sites of drowning among US children and to examine site-specific drowning rates by age, race, and gender.

Setting. United States, 1995.

Design. Information was abstracted from death certificates for unintentional drownings among children <20 years of age. The site of drowning was coded from free text on death certificates. Proportional distributions of the site of drowning by age, region, gender, and race were examined. Site-specific drowning rates were calculated by age, race, and gender. Denominators were based on US Census Bureau, June 1995 estimates of the US population.

Results. For 1995, death certificates were obtained for 1420 unintentional drownings among children <20 years of age, 98% of the number of drowning deaths reported by the National Center for Health Statistics for the same year. Site of drowning was specified on 1308 (92%) death certificates. Fifty-five percent of infant drownings were in bathtubs. Among children between the ages of 1 to 4 years, 56% of drownings were in artificial pools and 26% were in other bodies of freshwater. Among older children, 63% of drownings were in natural bodies of freshwater. Site-specific drowning rates varied by race. Importantly, after the age of 5 years, the risk of drowning in a swimming pool was greater among black males compared with white males with rate ratios of 15.1 (95% confidence interval: 6.7–38.5) among 10- to 14-year-olds and 12.8 (95% confidence interval: 6.5–26.9) among 15- to 19-year-olds.

Conclusion. The variety of sites in which children drown, even within specific age groups, emphasizes the need for a multifaceted approach to prevention. Reductions in the relatively high rates of drowning among black adolescent males will require targeted interventions to prevent swimming pool drownings among this group. *Pediatrics* 2001;108:85–89; *drowning, child, mortality, epidemiology.*

ABBREVIATIONS. ICD-9, *International Classification of Diseases, Ninth Revision*; CPSC, Consumer Product Safety Commission; NCHS, National Center for Health Statistics; CI, confidence interval; RR, rate ratio.

Drowning is an important and preventable cause of death in childhood. In 1998, >1500 US children under 20 years of age drowned.¹ Most of these deaths (93%) were unintentional and were not related to boating. Groups at increased risk of drowning include toddlers and adolescent males, with particularly high rates among black adolescent males.^{2–4} Factors that place black males at increased risk of drowning are not well understood, attributable at least in part to lack of information about the circumstances surrounding submersion events.

Information about the bodies of water in which children drown might help explain racial disparities in drowning rates, as well as aid in the design of appropriately targeted preventive strategies. However, there are no national studies in the United States describing sites of childhood drownings. This is primarily attributable to the lack of specificity of drowning codes in the *International Classification of Diseases-Ninth Revision (ICD-9)*, the system used to code deaths that occurred before 1999.⁵ The bathtub is the only body of water for which there is a specific ICD-9 code. In 1998, bathtub drownings comprised >50% of unintentional drownings among infants; however, after the age of 1 year, <10% of drownings occurred in bathtubs.¹

A number of regional studies have examined the most common sites of drowning by age. Studies in California, Texas, and Washington found that younger children were most likely to drown in swimming pools, whereas older children were most likely to drown in natural bodies of freshwater such as rivers and lakes.^{6–10} In contrast, most drownings in Minnesota among children <5 years old seemed to occur in natural bodies of water, whereas in Pinellas county, a coastal community in Florida, after the age of 11 years drownings were most likely to occur in salt water.^{11,12}

The purpose of the current study was to provide national data about the most common sites of drowning among US children and to examine site-specific drowning rates by age, gender, and race.

METHODS

Data Sources

The free text on hard copies of death certificates often provides details about injury events and, for drownings, may include in-

From the *National Institute of Child Health and Human Development, Bethesda, Maryland; †Johns Hopkins University School of Public Health, Baltimore, Maryland; ‡Consumer Product Safety Commission, Bethesda, Maryland; and the ||Maternal and Child Health Bureau, Rockville, Maryland.

Received for publication Jun 15, 2000; accepted Nov 6, 2000.

Reprint requests to (R.A.B.) Division of Epidemiology, Statistics, and Prevention Research, National Institute of Child Health and Human Development, 6100 Executive Blvd, Room 7B03, Bethesda, MD 20892. E-mail: brennerr@nih.gov

PEDIATRICS (ISSN 0031 4005). Copyright © 2001 by the American Academy of Pediatrics.

formation about the body of water in which the submersion occurred. However, these data are not routinely coded or available in national data sets. As detailed below, information abstracted from hard copies of death certificates was used to describe the epidemiology of childhood drownings.

As part of ongoing injury surveillance activities, the Consumer Product Safety Commission (CPSC) has arrangements with each of the 50 states and 2 major health jurisdictions (New York City and Washington, DC) for the purchase of specific death certificates where the death is likely to involve a consumer product. For drownings, this includes only those submersions that occur at a home, public building, residential institution, or place of sports/recreation. If staff at the CPSC determine that the death is product-related, detailed information, including the complete narrative describing the event, is entered into the CPSC death certificate data file. If no consumer product is involved, only the external cause of injury code, date, and state of death are entered into the database.

To obtain detailed data on all childhood drownings, the above procedures were modified. State contracts were modified so that death certificates for all nonboat-related childhood drownings were sent to the CPSC. At the CPSC, procedures were also modified so that detailed data were abstracted from death certificates for all drownings, both product-related and nonproduct-related, among children and adolescents <20 years old. Although data were collected for drownings that occurred between 1993 and 1995, data were most complete for 1995; thus, we restricted the analysis to that year.

Information from death certificates was abstracted and keyed by trained coders. Variables abstracted from the death certificate included age on the date of death, race and gender of the decedent, date of the event, date of death, city and state of death, general place of injury (eg, home, farm, street, school, etc), external cause of injury code, and the complete narrative describing how and where the injury occurred. If additional information about the site of drowning appeared on the death certificate in fields outside of the narrative field, this information was also entered. The age at the time of submersion was estimated from the age at death, the date of the event, and the date of death. Only 16 deaths occurred ≥ 30 days after submersion.

Classification of Site of Drowning

The site of drowning was coded by 1 of the investigators (R.A.B.) and was based on documentation in the narrative, place of injury, or other fields on the death certificate, as described above. Specific drowning sites (eg, lagoon, pond, swimming pool, etc) were further grouped into 4 broad categories: artificial pools, other natural or manmade bodies of freshwater (referred to hereafter as freshwater), domestic sites (eg, bathtubs and buckets), and salt water. For 31 deaths, the site of drowning was determined by examining both the narrative field and the city of death. For example, 14 deaths reportedly occurred at a "beach." By looking at the location of the city in relation to the closest known body of water, it was concluded that 3 of these deaths were in rivers, 3 in lakes, and 8 in oceans.

Analyses

To estimate the completeness of ascertainment, CPSC data were compared with data reported by the National Center for Health Statistics (NCHS). For 1995, 1447 unintentional, nonboat-related drownings among children <20 years of age were reported by NCHS (ICD-9 codes E910.0 through E910.9).¹³ For the same year, 1420 death certificates for unintentional childhood drownings were submitted to the CPSC. The 1420 deaths in the CPSC dataset were comparable to the 1447 deaths reported by NCHS with respect to age, gender, race, and state of death ($P > .05$).

Using CPSC data, proportional distributions of the site of drowning by age, race, gender, and region of the country were examined. Differences in proportional distributions were evaluated using the χ^2 statistic. Overall and site-specific drowning rates were calculated by age, gender, and race and are reported as deaths per 100 000 person-years. Numerators were based on the CPSC data, and denominators were based on US Census Bureau, June 1995 estimates of the US population.¹⁴ Confidence intervals (CIs) around rate ratios (RR) were based on a Poisson distribution and calculated using the SAS Version 8.1 statistical software package (SAS, Inc, Cary NC).¹⁵

RESULTS

Death certificates were reviewed for 1420 unintentional drownings. Demographic characteristics of decedents are shown in Table 1. Thirty-seven percent of drowning victims were between 1 and 4 years of age, and 29% were between 15 and 19 years of age. Seventy-four percent of victims were male. The race was listed as white for 72%, black for 22%, other races for 4%, and was not stated for 1%.

Site of Drowning

Among the 1420 drowning deaths for which death certificates were available, 669 (47%) occurred in freshwater, the most common sites being rivers/creeks, lakes, and ponds, and 457 (32%) were in artificial pools (Table 2). Domestic sites, such as bathtubs, accounted for 125 (9%) deaths, and 57 (4%) drownings were in salt water. The place of drowning was not specified on 112 (8%) death certificates. Those with no site specified were comparable to those with a specified site with respect to age, gender, and race ($P > .05$).

Among infants, the majority (78%) of drownings occurred in the home (Table 3), with 71% of these in bathtubs and 16% in buckets (data not shown). Children between the ages of 1 and 4 years were most likely to drown in artificial pools (58% and 51% of drownings among 1- to 2- and 3- to 4-year-olds, respectively). Freshwater submersions also accounted for a sizable proportion of drownings in this age group (22% and 36% of drownings among 1- to 2- and 3- to 4-year-olds, respectively). After the age of 5 years, children were most likely to drown in freshwater: 54%, 61%, and 69% of drownings among 5- to 9-, 10- to 14-, and 15- to 19-year-olds, respectively.

In the West, Midwest, South, and New England, freshwater drownings were most common followed by submersions in artificial pools and domestic sites. In the Mid-Atlantic, freshwater drownings were also most common followed by submersions in artificial pools. However, the number of drownings in salt

TABLE 1. Characteristics of Children Who Drowned, United States, 1995

Characteristic*	Number (%)
Age†	
<1	65 (5)
1-4	521 (37)
5-9	208 (15)
10-14	219 (15)
15-19	407 (29)
Gender	
Male	1050 (74)
Female	370 (26)
Race	
White	1026 (72)
Black	317 (22)
Native American	37 (3)
Asian	8 (1)
Other	15 (1)
Not stated	17 (1)

* Data obtained from death certificates of 1420 unintentional, nonboat-related drownings that occurred in 1995.

† Age on the date of submersion.

TABLE 2. Childhood Drownings by Site, United States, 1995

Site	Number (%)
Artificial pools	457 (32)
Swimming pools	435 (31)
Jacuzzi/hot tub/whirlpool/spa	22 (2)
Domestic	125 (9)
Bathtub	81 (6)
Buckets	26 (2)
Other specified sites	15 (1)
Other unspecified sites	3 (<1)
Natural freshwater	669 (47)
Fresh outdoor still	
Lakes	231 (16)
Ponds, pits, quarries	123 (9)
Other specified sites	10 (<1)
Fresh outdoor waterways	
River, creek	235 (17)
Canal	46 (3)
Other specified sites	18 (1)
Fresh, other (unclear if still or moving)	6 (<1)
Salt water	57 (4)
Unspecified	112 (8)
Total—all sites	1420 (100)

water exceeded the number in domestic settings. Age-specific patterns within each region were similar to national age-specific patterns, with infants being most likely to drown in domestic sites, 1- to 4-year-olds in swimming pools, and children >5 years old in other freshwater sites (data not shown).

Among males, 52% of drownings were in freshwater sites and 30% in artificial pools. Among females, the proportion of drownings in freshwater and artificial pools were 33% and 38%, respectively. Among whites, submersions were most common in freshwater sites (50%) followed by artificial pools (31%). Among blacks, the order was reversed with a higher proportion of drownings in artificial pools (38%) than in freshwater sites (35%).

Site-Specific Drowning Rates by Age, Race, and Gender

To determine if known racial disparities in drowning rates were because of an increased risk of drowning in specific locations, we compared site-specific drowning rates for blacks versus whites (Table 4). Among 1- to 4-year-olds, drowning rates were highest in swimming pools for all groups; males, females, blacks, and whites. Among males in this age group, the risks of drowning in both swimming pools and freshwater sites were slightly lower among blacks than whites, whereas among females, drowning rates were comparable for both races.

After the age of 5 years, drowning rates were significantly higher among black males compared with white males. Drowning rates in freshwater were comparable for black and white males except among 10- to 14-year-olds where rates were higher among blacks (RR: 2.7; 95% CI: 1.8–4.1). Conversely, rates of drowning in swimming pools were much higher

among black males than among white males with rate ratios of 4.4 (95% CI: 2.4–8.0) among 5- to 9-year-olds, 15.1 (95% CI: 6.7–38.5) among 10- to 14-year-olds, and 12.8 (95% CI: 6.5–26.9) among 15- to 19-year-olds. Among females, drowning rates were low after the age of 5 years. Although the number of drownings in swimming pools was small (18 white females and 16 black females, ages 5 to 19 years) black females were also at increased risk of drowning in a swimming pool as compared with white females of the same age (Table 4).

Between the ages of 5 and 19 years, 41 white males and 67 black males drowned in swimming pools. Among white males, 18 (44%) drownings were in private residential pools, 4 (10%) in hotel or motel pools, 4 (10%) in public pools (1 each in a wave pool, water park, club, and an unspecified public pool), 2 (5%) in pools located at apartment complexes, and 13 (32%) were unspecified. Among black males, 14 (21%) drownings were in private residential pools, 10 (15%) in hotel or motel pools, 14 (21%) in public pools (5 in city pools, 3 in unspecified public pools, and 1 each in a boys/girls club, local pool, community pool, high school, water park, and swim club), 7 (10%) in pools located at apartment complexes, and 22 (33%) were unspecified ($P = .09$).

DISCUSSION

This study provides the first national data describing the bodies of water in which children drown. Infants were most likely to drown in bathtubs, young children in swimming pools, and older children and adolescents in natural bodies of freshwater. However, ~25% of drownings in children ages 1 to 4 years occurred in natural freshwater settings. After the age of 10 years, the risk of drowning in a swimming pool was >10 times greater among black males compared with white males. Saltwater drownings were uncommon in all age groups

Study Limitations

Although the site of submersion was included on 92% of death certificates, other important details about the event generally were not documented. For example, bathtub seats were not mentioned in any of the bathtub drownings, yet other sources show they were involved in at least 9 drowning deaths in 1995, the year of the study.¹⁶ Similarly, for drownings in swimming pools information was lacking regarding fencing, and blood alcohol levels were not available for drownings among adolescents. A second limitation was the analysis of deaths occurring in only 1 year, 1995. Beginning with deaths occurring in 1999, injury-related deaths are coded using the *International Classification of Diseases-Tenth Revision*, which includes specific codes for drownings in bathtubs, swimming pools, and natural water.¹⁷ This expanded coding scheme will facilitate monitoring of drowning patterns in the future. Finally, the specific site of submersion was known for 1308 deaths, which represents 90% of the number of deaths reported to NCHS. Thus, site-specific rates reported herein prob-

TABLE 3. Childhood Drownings by Site and Selected Characteristics: United States, 1995

Characteristic	Domestic n (%) [*]	Artificial Pools n (%) [*]	Freshwater n (%) [*]	Saltwater n (%) [*]	Unspecified n (%) [*]
Age (y)					
<1	51 (78)	9 (14)	4 (6)	0 (0)	1 (2)
1–2	48 (14)	203 (58)	77 (22)	0 (0)	22 (6)
3–4	3 (2)	88 (51)	61 (36)	0 (0)	19 (11)
5–9	9 (4)	64 (31)	113 (54)	5 (2)	17 (8)
10–14	5 (2)	46 (21)	134 (61)	13 (6)	21 (10)
15–19	9 (2)	47 (12)	280 (69)	39 (10)	32 (8)
Region†					
West	33 (10)	130 (38)	154 (45)	13 (4)	15 (4)
Midwest	28 (10)	64 (23)	161 (59)	0 (0)	21 (8)
South	52 (9)	201 (34)	258 (43)	26 (4)	59 (10)
New England	5 (13)	8 (21)	21 (54)	2 (5)	3 (8)
Mid-Atlantic	7 (4)	54 (33)	75 (45)	16 (10)	14 (8)
Gender					
Male	53 (5)	317 (30)	548 (52)	52 (5)	80 (8)
Female	72 (19)	140 (38)	121 (33)	5 (1)	32 (9)
Race					
White	82 (8)	314 (31)	518 (50)	34 (3)	78 (8)
Black	38 (12)	121 (38)	110 (35)	19 (6)	29 (9)
Other/unknown	5 (6)	22 (29)	41 (53)	4 (5)	5 (6)

* Row percent: percent of total number of drownings within the specific age, region, gender, or race category.

† Regions defined as follows: New England: CT, MA, ME, NH, RI, VT; Mid-Atlantic: NY, NJ, PA, MD, DE, DC, VA; Midwest: IA, IL, IN, KS, MI, MN, MO, ND, NE, SD, OH, WI, WV; South: AL, AR, MS, FL, GA, KY, LA, NC, OK, SC, TN, TX; West: AK, AZ, HI, CA, CO, ID, MT, NM, NV, OR, UT, WA, WY.

TABLE 4. Risk of Drowning for Blacks Compared With Whites by Age, Gender, and Site

Age, y	All Drownings* Rate†			Natural Freshwater Rate‡			Swimming Pools Rate‡		
	Black	White	RR‡ 95% CI	Black	White	RR‡ 95% CI	Black	White	RR‡ 95% CI
Male									
1–4	2.8	4.4	0.6 (0.4–0.9)	0.3	1.2	0.3 (0.1–0.6)	1.7	2.5	0.7 (0.4–1.0)
5–9	3.0	1.3	2.3 (1.6–3.2)	1.1	0.9	1.3 (0.7–2.1)	1.3	0.3	4.4 (2.4–8.0)
10–14	4.8	1.1	4.4 (3.2–6.0)	2.3	0.8	2.7 (1.8–4.1)	1.4	0.1	15.1 (6.7–38.5)
15–19	5.7	3.6	1.6 (1.2–2.0)	2.8	2.8	1.0 (0.7–1.4)	1.9	0.1	12.8 (6.5–26.9)
Female									
1–4	2.2	2.5	0.9 (0.6–1.3)	0.5	0.6	0.8 (0.3–1.7)	1.2	1.2	1.0 (0.5–1.7)
5–9	0.6	0.4	1.4 (0.6–2.7)	0.1	0.2	0.3 (0.0–1.5)	0.5	0.1	4.3 (1.5–12.1)
10–14	1.1	0.5	2.2 (1.2–3.9)	0.4	0.3	1.1 (0.4–2.7)	0.4	0.1	3.2 (1.0–9.7)
15–19	0.8	0.4	2.0 (1.0–4.0)	0.3	0.2	1.3 (0.4–3.7)	0.3	0.0	10.1 (2.0–72.5)

* Includes other sites not shown separately.

† Number of drowning deaths per 100 000 person-years.

‡ RR—Rate ratio comparing drowning rates among blacks versus whites.

ably underestimate actual site-specific rates by about 10%.

Relation to Previous Studies

Consistent with previous studies, we found that infants were most likely to drown in bathtubs.^{3,7} Buckets also played a role in this age group, and it is disheartening to report that 10 years after the publication of 2 articles describing the risks of large buckets, the number of bucket-related drownings per year remains unchanged.^{18,19} Swimming pools presented the greatest risk for children between the ages of 1 and 4 years, and older children were most likely to drown in freshwater. These findings are also largely consistent with regional studies.^{6–10}

In the adolescent age group, the increased risk of drowning among black males has been well described; however, factors underlying this increased risk are unknown.²⁰ In our study, drowning rates in swimming pools were 12 to 15 times greater among black males compared with white males ages 10 to 19

years, such that much of the increased risk of drowning among black males could be explained by the increased risk of drowning in a swimming pool. Ellis et al²¹ also reported increased rates of nonfatal swimming pool submersions among black males. Based on data from the current study, it seems that this elevated risk may be attributable to an increased risk of drowning in a pool that was accessible to the public rather than a private residential pool. It is possible that the public pools in which black adolescent males swim are inherently less safe, ie, with more crowded conditions and/or poor supervision. Alternatively, the increased risk of drowning among black teens could be explained by a difference in swimming ability, which in turn may be attributable to fewer opportunities to participate in swimming lessons.^{22,23} Little data are available about swimming ability in the general population. A study published in 1977 reported results of a survey of 9420 students in grades 1 through 8; 60% of black males reported an inability to swim in deep water versus 25% of

white males.²² A more recent 1994 survey of swimming ability among adults had similar results with 62% of blacks reporting limited swimming ability versus 32% of whites.²³

Implications for Preventive Counseling

In a 1993 policy statement that addressed the prevention of childhood drownings, the American Academy of Pediatrics recommended multiple topics for preventive counseling including: constant supervision of infants and young children when they are in the bathtub or around other bodies of water; installation of isolation fencing that separates the pool from the house for homes with residential pools; use of personal floatation devices when riding on a boat or playing near a river, lake, or ocean; the importance of teaching children never to swim alone or without adult supervision; the dangers of alcohol and drug consumption during aquatic activities; and the need for parents and teens to learn cardiopulmonary resuscitation.²⁴ Our data support this multifaceted approach, given the variety of sites in which children drown, even within specific age groups. The American Academy of Pediatrics also recommends that after the age of 5 years, all children learn how to swim.^{24,25} Because a relatively high proportion of black children between the ages of 5 and 19 years drown in swimming pools, sites that are inherently less dangerous than natural bodies of water, our data suggest that this recommendation may be particularly relevant for this group.

ACKNOWLEDGMENTS

This research was funded through an interagency agreement between the National Institute of Child Health and Human Development and the Consumer Product Safety Commission. Dr Gordon Smith was supported by the National Institute of Alcohol Abuse and Alcoholism (R29AA07700) and the University of Auckland Injury Prevention Research Center.

We thank Dr Mark Klebanoff, Dr Peter Scheidt, and Tom Schroeder for their thoughtful reviews of the manuscript.

REFERENCES

1. Center for Disease Control and Prevention. Compressed Mortality File, CDC WONDER Website. Available at: <http://wonder.cdc.gov>. Accessed October 20, 2000
2. Baker SP, O'Neill B, Ginsburg MJ, Li G. *The Injury Fact Book*. New York, NY: Oxford University Press; 1992:174–183
3. Brenner R, Smith G, Overpeck M. Divergent trends in childhood drowning rates—US 1971–1988. *JAMA*. 1994;271:1606–1608
4. National Center for Health Statistics, Fingerhut L. Trends and current status in childhood mortality, United States, 1980–85. *Vital Health Stat* 3. 1989. No. 26
5. World Health Organization. *World Health Classification: Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death Ninth Revision*. Geneva, Switzerland: World Health Organization; 1977
6. Ellis AA, Trent RB. Swimming pool drownings and near-drownings among California preschoolers. *Public Health Rep*. 1997;112:73–77
7. Quan L, Gore EJ, Wentz K, Allen J, Novack AH. Ten-year study of pediatric drownings and near-drownings in King County, Washington: lessons in injury prevention. *Pediatrics*. 1989;83:1035–1040
8. Wintemute GJ, Kraus JF, Teret SP, Wright M. Drowning in childhood and adolescence: a population-based study. *Am J Public Health*. 1987;77:830–832
9. O'Carroll PW, Alkon E, Weiss B. Drowning mortality in Los Angeles county, 1976 to 1984. *JAMA*. 1988;260:380–383
10. Warneke CL, Cooper SP. Child and adolescent drownings in Harris County, Texas, 1983–1990. *Am J Public Health* 1994;84:593–598
11. Hedberg K, Gunderson PD, Vargas C, Osterholm MT, MacDonald KL. Drownings in Minnesota, 1980–85: a population-based study. *Am J Public Health* 1990;80:1071–1074
12. Nichter MA, Everett PB. Profile of drowning victims in a coastal community. *J Florida M. A*. 1989;76:253–256
13. National Center for Health Statistics. *Mortality Detail, 1995 Data, Public Use Data File Documentation*. Hyattsville, MD: US Dept of Health and Human Services; 1997
14. US Bureau of the Census, Population Division, Population Distribution Branch. 1990–1998 annual time series of state population estimates by age, sex, race and Hispanic origin. Washington, DC, 1999. Available at: www.census.gov/population/www/estimates/st_sasrh.html. Accessed January 20, 2000
15. SAS Institute, Inc. SAS/STAT software: changes and enhancements through release 6.11. Cary, NC: SAS Institute, Inc; 1996
16. Rauchschalbe R, Brenner R, Smith G. The role of bathtub seats and rings in infant drowning deaths. *Pediatrics*. 1997;100(4). URL: <http://www.pediatrics.org/cgi/content/full/100/4/e1>
17. World Health Organization. *ICD-10: International Statistical Classification of Diseases and Related Health Problems, Tenth Revision*. Geneva, Switzerland: World Health Organization; 1992
18. Mann NC, Weller SC, Rauchschalbe R. Bucket-related drownings in the United States, 1984 through 1990. *Pediatrics*. 1992;89:1068–1071
19. Jumbelic MI, Chambliss M. Accidental drowning in 5-gallon buckets. *JAMA*. 1990;263:1952–1953
20. Smith G, Brenner R. The changing risks of drowning for adolescents in the US and effective control strategies. *Adolescent Medicine: State-of-the-Art-Reviews*. 1995;6:153–169
21. Ellis AA, Trent RB. Hospitalizations for near drowning in California: incidence and costs. *Am J Public Health*. 1995;85:1115–1118
22. Schuman SH, Rowe JR, Glazer HM, Redding JS. Risk of drowning: an iceberg phenomenon. *JACEP*. 1977;6:139–143
23. Gilchrist J, Sacks JJ, Branche CM. Self-reported swimming ability in US adults, 1994. *Public Health Rep*. 2000;115:110–111
24. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Drowning in infants, children, and adolescents. *Pediatrics*. 1993;92:292–294
25. American Academy of Pediatrics, Committee on Injury and Poison Prevention. Office-based counseling for injury prevention. *Pediatrics*. 1994;94:566–567

Where Children Drown, United States, 1995

Ruth A. Brenner, Ann C. Trumble, Gordon S. Smith, Eileen P. Kessler and Mary D. Overpeck

Pediatrics 2001;108:85-89

DOI: 10.1542/peds.108.1.85

This information is current as of November 7, 2006

Updated Information & Services	including high-resolution figures, can be found at: http://www.pediatrics.org/cgi/content/full/108/1/85
References	This article cites 13 articles, 10 of which you can access for free at: http://www.pediatrics.org/cgi/content/full/108/1/85#BIBL
Citations	This article has been cited by 11 HighWire-hosted articles: http://www.pediatrics.org/cgi/content/full/108/1/85#otherarticles
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): Office Practice http://www.pediatrics.org/cgi/collection/office_practice
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.pediatrics.org/misc/Permissions.shtml
Reprints	Information about ordering reprints can be found online: http://www.pediatrics.org/misc/reprints.shtml

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

