



Position on Childhood Drowning and Water Safety

Safe Kids Austin supports efforts to develop, maintain, and strengthen childhood drowning prevention initiatives. This position outlines the multiple factors that influence drowning and ways that drowning risk can be reduced.

Background

Drowning remains a leading cause of death for children despite significant decreases in drowning deaths over the past few decades.¹ The Centers for Disease Control and Prevention (CDC) ranks drowning as the leading cause of death for children ages 1-4 and the second leading cause of death for children ages 5-9, second only to motor vehicle crashes. Among all ages, drowning is the fifth leading cause of unintentional injury death in the United States, resulting in about 4,000 deaths each year.^{2,3} Of these 4,000 deaths, 800 are children ages 0 to 17, which equates to about two children drowning per day.⁴ Over two-thirds of these deaths occur during the summer months from May to August.⁴

In Texas, there were 107 fatal drownings among children under age 18 in 2016. This represents a 43% increase from 2015 when there were 75 fatal childhood drownings in Texas.⁵ In 2014, a total of 420 fatal and nonfatal drownings were reported in Texas. Of the 363 with known outcomes, 67 drownings were fatal. Most of these drownings (332) occurred among children ages 14 and younger with the greatest proportion among children 1-4 years old.⁶ The majority of drownings in Texas occur between April and September with nearly one-third of all pool drownings occurring in July.⁶ Drowning is a reportable condition in Texas, meaning it must be reported by physicians, hospitals, medical examiners, and justice of the peace.⁶

Locally, in central Texas, Dell Children's Medical Center reported 48 children admitted for submersions in 2013, 50 in 2014, and 25 in 2015.⁷ In Travis County, Austin-Travis County Emergency Medical Services responds to 11 to 15 drowning incidents per year involving individuals under the age of 19 years. These drowning incidents occur predominantly in the summer months, on the weekends, and in pools and primarily involve children between the ages of 1-4 years old.⁸

Drowning is often quick and silent and can happen in mere seconds.^{9,10} Defined by the World Health Organization as "the process of experiencing respiratory impairment from submersion/immersion in liquid", drowning can be fatal or nonfatal.¹¹ A nonfatal drowning can severely damage the brain causing life-long disabilities.^{12,13} Brain damage occurs within five minutes of submersions and the severity

worsens with each passing minute.^{14,15} Most fatal drownings among children occur after the child was submerged for only six to ten minutes.⁹

Drowning Risk

Drowning is more common among certain groups than others. Male children have an increased risk of drowning after one year of age compared to female children.¹ In fact, compared to girls, fatal drowning is twice as common in boys up to age 12 and is 10 times higher for boys during adolescence.¹ In regards to income, drowning rates are higher among lower income populations.¹⁰ Drowning rates are also higher among African-American children, adolescents, and young adults compared to any other racial/ethnic group, especially in swimming pools.¹⁶

Each child's drowning risk is influenced by a variety of factors, including child's swimming ability and the physical and environmental surroundings.^{1,17} According to the CDC, the main factors that impact drowning risk are swimming ability, access, supervision, life jacket use, and seizures.¹⁸

Main Factors that Impact Drowning Risk:

- **Lack of Close Supervision by an Adult Caregiver:** Drowning can happen quickly and quietly in any setting with water, including bathtubs, buckets, or swimming pools, even in the presence of lifeguards.¹⁹ In a review of 1,284 fatal pool drownings among children between 2005 and 2014, parent supervision was found to be missing nearly half of the time. Even when supervision was present, over half of the caregivers were not adequately supervising the children due to drugs, alcohol, injury, illness, or distraction.⁹
- **Lack of Sufficient Barriers:** Barriers, such as pool fencing, prevent children from accessing the pool without an adult present. The lack of a barrier, barriers that are damaged, or barriers that are used incorrectly will not adequately prevent children from accessing the pool. According to the National Child Death Review from 2005 to 2014, a barrier failed to prevent a child from gaining pool access in 47% of 1,466 pool drowning deaths in the U.S. during this time.²⁰ Inadequate fencing was the most common problem, followed by lack of proper gates, doors, and pool alarms.⁹ To be an effective barrier, a four-sided fence must surround all sides of the pool, entirely separating the pool from the yard and house, have a self-closing and self-latching gate, and be at least 4 feet tall.^{21,22} Problems with fencing around pools included gaps in the fencing large enough for children to climb through, damage to the fence, and fence heights below four feet that children could climb over.^{9,20}
- **Lack of Swimming Ability:** Many adults and children in the U.S. report that they cannot swim.²² The American Academy of Pediatrics recommends that all children be taught to swim after the age of four when children have the motor development needed for swimming. Recent evidence suggests that swim lessons even for younger children (under age 4) may be a protective factor and reduce drowning risk but previous research has indicated that children under age 4 are not able to master basic swimming skills.^{24,25} The Red Cross has designated the following five critical water safety skills to indicate water competency:

1. Step or jump into the water over one's head and return to the surface.

2. Tread water for one minute without using a flotation device.
3. Turn around in a full circle and find an exit from the pool.
4. Swim 25 yards without stopping.
5. Exit a pool without using a ladder.²⁶

A 2014 survey conducted by the Red Cross found that only 40% of parents of children ages 4 to 17 reported that their child could perform all five water competency skills but over 92% of these parents said that their child is likely to participate in water activities during the summer.²⁶

- **Location:** The location, meaning the type of body of water, such as a bathtub, pool, or lake, is a factor in drowning risk. In Texas, pools at single family residences are the most common location for drowning, making up 40% of submersions with known location reported in 2014.⁶ Characteristics of these different locations, such as currents in open water or unsafe drains in pools, can impact drowning risk. Additionally, the risk of drowning in each location varies by age. Among infants, the majority of drownings occur in bathtubs or buckets. For children ages 1-4, most drownings occur in backyard swimming pools and, among individuals 15 years or older, most drowning occur in natural bodies of water.¹⁰
- **Failure to Wear Life Jackets:** According to the U.S. Coast Guard, increased life jacket use could prevent many boat-related drownings.²⁷ In 2015, the U.S. Coast Guard received reports for 4,158 boating incidents, resulting in 2,613 injuries and 626 deaths.²⁸ Of these boating deaths, 76% were caused by drowning and 85% of the victims were not wearing life jackets.²⁸ Although life jacket use rates in the U.S. have increased over the past decade, use remains low among teens. In a national observational study, only about 37% of teens ages 13 to 17 wear a life jacket when boating and this age group is most at risk for open water drowning.²⁸
- **Seizure Disorders:** Drowning is the most common cause of unintentional injury death in persons with seizure disorders, and the bathtub is the site of highest drowning risk.²⁹ Autism may also be a related risk factor as deaths by seizures and drowning were more than three times higher among the autistic population than the general population in one statewide study.³⁰

Drowning Prevention

Prevention efforts should target these aforementioned factors that increase drowning risk to prevent fatal and nonfatal drowning, especially among populations with higher risk. Research has found the following strategies to be effective at reducing drowning risk.

Effective Prevention Strategies to Reduce Drowning Risk among Children:

- **Provide constant supervision to children in or near water and swim in lifeguarded areas.** Because drowning is often silent and can happen quickly, constant and close supervision by a capable adult is a necessary prevention strategy.²¹ The adult supervising the child should be able to act and intervene to rescue the child if needed.²² Lifeguards help to prevent drowning as well by enforcing rules and limiting risk-taking, dangerous behaviors.²² If a drowning occurs, lifeguards can rescue the child and provide emergency care and resuscitation. Nearly all swimmers rescued by lifeguards (95%) do not require transport for additional medical care, suggesting that lifeguards are regularly able to rescue a swimmer quickly or before an incident

leads to significant harm.²² As such, it is recommended that children swim in pools or natural bodies of water where lifeguards are present.²⁴ However, a lifeguard's role is not to actively supervise all children but rather to scan the entire area and respond to an emergency if needed. In other words, adult supervision is needed even in the presence of lifeguards.²¹

- **Installation of four-sided fencing:** Barriers, such as four-sided pool fencing, prevent young children from gaining access to the pool area without caregivers' awareness.³¹ A successful pool barrier prevents a child from getting over, under, or through to gain access to a pool.³¹ The risk of a child drowning in a pool with a four-sided isolation fence, which completely separates the pool area from the house and yard, is significantly lower than the risk in a pool with three-sided property-line fencing.³² Estimates indicate that over 50% of all swimming pool submersion injuries in young children can be avoided by four-sided fencing which completely separates the pool from the house and yard area.³²⁻³⁴ According to the pool barrier guidelines from the U.S. Consumer Product Safety Commission, pool fences should be at least four feet high, four-sided to completely separate the pool area from the house and yard, and have a space between vertical slats no more than 4 inches.³¹ The use of self-closing and self-latching gates that open outward with latches that are out of reach of children is effective.¹⁸ Ornamental and iron bar fences are more difficult for children to climb, compared to chain link fences.³⁵ Additional layers of protection such as automatic door locks and alarms can be useful as a way to alert a caregiver if a child enters the pool area.¹⁷ However, research does not support or recommend that these devices be used as an alternative to four-sided fencing.^{1,9,20} The Virginia Graeme Baker Pool and Spa Safety Act of 2007, or the VGB Law, is a federal law that mandates all public pools and spas to have anti-entrapment drain covers, among other pool safety initiatives.²¹ The 2012 International Swimming Pool and Spa Code seeks to take the VGB Law further by enforcing its entrapment standard in all residential and public pool and enhancing fencing and barrier requirements on all new pool construction. Adoption by states of this new code would increase and improve pool barriers. Currently, the code has been adopted by Georgia, Michigan, Montana, New Jersey, Virginia, and Washington D.C.^{21,36}
- **Formal swimming lessons for children:** All children should learn to swim. Although swimming skills will not always prevent drowning, learning to swim is one layer of protection in increasing water safety.¹ The American Academy of Pediatrics (AAP) recommends that children 4 years old and older learn to swim. Starting at age 4, children have usually developed the motor skills needed to learning the basic of swimming. New research suggests that participation in formal swimming lessons by children under age 4 (ages 1 to 4 years old) can reduce the risk of drowning up to 88%.^{18,23} However, this research is limited and it remains unclear as to if swimming lessons will result in increased water safety skills and reduce drowning risk for all children under 4. Additionally, early swim lessons have been shown to give some parents overconfidence in their child's swimming ability, which could lead to less supervision and increased risk.¹ As such, the AAP continues to strongly recommend swim lessons for children under 4 and encourages parents of children under age 4 to decide if their child will benefit from earlier swim lessons. Introduction to swimming skills should be related to the child's emotional maturity, physical ability, and frequency of exposure to water.¹

- **Use of U.S. Coast Guard approved life jackets:** Life jackets may help prevent 50% of drowning deaths among recreational boaters.³⁷ Air-filled swimming devices, such as inflatable arm bands, are not safe alternatives to U.S. Coast Guard approved life jackets because they can deflate and are not designed for water safety.¹ A federal law established in 2002 requires children to wear life jackets in boats.¹⁷ In Texas, children under the age of 13 or those on vessels under 26 feet must wear a U.S. Coast Guard approved wearable life jacket while on the water.³⁸
- **Ensuring pool drains meet safety standards:** Children can drown if they become trapped by the strong force of the pool drain's suction and are unable to free themselves. A total of 98 pool drain entrapment incidents and 15 deaths were reported to the Consumer Product Safety Commission from 1990 to 2007. The majority of the incidents involved children under age 15.¹ Drain entrapment can be prevented by ensuring drains meet safety standards through the use of, for example, special drain covers, safety release systems, and/or pumps with multiple drains. The Virginia Graeme Baker Pool and Spa Safety Act of 2007 (VGB Law) requires safe pool drains for all public pools and spas in the U.S.²¹ Even though these standards are not required for private pools, all pool owners should follow the recommendations in the VGB Law to prevent drain entrapment.¹
- **Learning and using CPR (Cardio Pulmonary Resuscitation):** If a drowning does occur, CPR has been shown to save lives of and improve outcomes for drowning victims.¹⁸ The possibility of improved outcomes for the victim increases the faster rescue breathing is started.^{39,40} A child's chances of survival with no chronic health problems increases three to five times if CPR begins right after the drowning event and Emergency Medical Services (EMS) arrives in under nine minutes.^{14,39}

Safe Kids Austin Position:

Safe Kids Austin maintains the position that childhood fatal and nonfatal drowning is preventable. Safe Kids Austin advocates the use of multi-layered interventions that are supported by the best available research evidence to minimize the morbidity and mortality of childhood drowning.

Best Practices Currently Supported by Safe Kids Austin:

- Parents or caregivers should constantly provide "touch supervision" for infants, toddlers, or weak swimmers, meaning the child is within arm's reach of a caregiver at all times, when in or near a pool, bathtub, or other body of water.
- Parents or caregivers should provide constant, capable, and undistracted visual supervision of older children and better swimmers.
- Children should swim in areas under the supervision of certified lifeguards.
- Children should learn to swim. Parents or caregivers should provide water safety education for children starting at age four, if appropriate for their emotional maturity, physical ability, and frequency of exposure to water. Children can begin swim lessons or water safety skills classes as early as age 1 although evidence is limited as to the effectiveness of these early lessons on drowning prevention.

- Pool-owners should install and maintain four-sided fencing that completely isolates the pool from the house and yard to prevent children from accessing the pool without an adult.
- Children who are weak-swimmers and non-swimmers should wear properly fitted U.S. Coast Guard approved life jackets that are in good condition for swimming and boating. All children should wear a life jacket when boating.
- Pool owners should ensure that pool drains follow the safety standards in the 2007 Virginia Graeme Baker Pool and Spa Safety Act to prevent drain entrapment. The law does not require that private residential pools follow these standards but it is recommended.
- Parents, caregivers, and pool owners should learn CPR.

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