

## Governor's EMS and Trauma Advisory Council (GETAC)

### Injury Prevention Committee

#### Position Statement: Childhood Drowning and Water Safety

November 2016

*The Governor's EMS and Trauma Advisory Council's Injury Prevention Committee is dedicated to providing scientifically sound recommendations to prevent injuries in the State of Texas. Based on the findings from leading researchers, medical societies and injury and violence prevention professional associations, the Committee presents the following information on childhood drowning and water safety for injury and violence prevention professionals in Texas.*

Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid, and can be fatal or non-fatal.<sup>1</sup> During a drowning event, the instinctive drowning response occurs, causing children to extend their arms to the side so they can push their mouths above the water line, but this is difficult for young children.<sup>2</sup> Should the child survive, a near-drowning event can severely damage the brain causing chronic disabilities such as learning disorders, memory problems, and permanent loss of basic functioning, or a permanent vegetative state.<sup>3,4</sup> Brain damage occurs within five minutes of submersions, and the severity worsens with each passing minute.<sup>5,6</sup> As oxygen does not circulate to the child's brain, the risk of brain damage and death continues to rise.<sup>7</sup> Drowning and near-drownings are reportable conditions in Texas, meaning it must be reported by physicians, hospitals, medical examiners, and justice of the peace.<sup>8</sup>

The Centers for Disease Control and Prevention (CDC) ranks drowning fifth among the leading causes of unintentional injury death in the United States.<sup>9</sup> Annually, 4,000 people die from drowning in the United States.<sup>10</sup> Of these 4,000 deaths, 800 are children each year ages 0 to 17, which equates to two children drowning per day.<sup>11</sup> Over two-thirds of these deaths occur during the summer months from May to August.<sup>11</sup> Drowning is responsible for more deaths in children ages 1 to 4 years than any other cause of unintentional injuries.<sup>12</sup> Drowning is the second leading cause of unintentional injury death for children ages 5-14, and the third leading cause for children 15 to 17 and under 1 year of age.<sup>12</sup>

According to the Texas Submersion Registry, of the 408 submersions reported in 2014 with age identified, 81% (332/408) were among children ages 14 years and younger. Among children less than 15 years of age, 60% (199/332) were among children 1-4 years of age, followed by children ages 5-9 years (22%, 72/332). According to the Centers for Disease Control and Prevention, there were 60 drowning deaths in children 0-14 years in Texas in 2014.<sup>11</sup> Toddlers aged 1-4 years were most commonly affected (32/60 or 53%).<sup>11</sup>

#### **The main factors that impact drowning risk as reported by the CDC:**

- **Lack of Swimming Ability:** Many adults and children report that they cannot swim.<sup>13</sup> The American Academy of Pediatrics recommends that all children be taught to swim after the age of 5 years when children have the motor development needed for swimming.<sup>14,15</sup> The Red Cross has designated five critical water safety skills to indicate water competency.<sup>16</sup> These include the ability to:

1. Step or jump into the water over one's head and return to the surface.<sup>16</sup>
2. Tread water for one minute without using a flotation device.<sup>16</sup>
3. Turn around in a full circle and find an exit from the pool.<sup>16</sup>
4. Swim 25 yards without stopping.<sup>16</sup>
5. Exit a pool without using a ladder.<sup>16</sup>

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.<sup>16</sup>

- **Lack of Sufficient Barriers:** Barriers, such as pool fencing, prevent children from accessing the pool without an adult if they are without issues.<sup>17</sup> According to the 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 during this time.<sup>7</sup> Issues with fencing included gaps in the fencing large enough for children to climb through, fencing damages, and fence heights below four feet that children could climb over.<sup>18,19</sup> The four-sided fence must surround all sides of the pool to entirely separate the pool from the yard and house to be an effective isolation fence.<sup>7,20</sup> The U.S. Consumer Product Safety Commission recommends that fences be a minimum of 4-5 feet high with self-closing, self-latching gates. The spacing between vertical members and within decorative cutouts should not exceed 1¾ inches. This size is based on the foot width of a young child and is intended to reduce the potential for a child to gain a foothold and attempt to climb the barrier. However, public and private pools in the United States are rarely inspected, and ordinances, should they exist, are rarely enforced.<sup>17</sup> 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.<sup>12</sup> However, the law does not extend barrier and entrapment protection for pools at private residences.<sup>7</sup> More recently, the International Swimming Pool and Spa Code was created in 2012 and it seeks to improve the VGB law by enforcing its entrapment standards in all residential and public pools, and creating fencing and barrier requirements on all new pool construction.<sup>21</sup> To date, only Georgia, Michigan, Montana, New Jersey, Virginia, and Washington D.C. have adopted this code.<sup>22</sup>
- **Lack of Close Supervision by an Adult Caregiver:** Drowning can happen quickly and quietly in any setting with water, such as bathtubs, swimming pools, or buckets, even in the presence of lifeguards.<sup>23</sup> One study discovered that a majority of parents had an inadequate understanding of the events surrounding drowning and had misconceptions about the role of swimming ability, swimming lessons, and adult supervision of children in any setting with water.<sup>24</sup> In the event of infants in bathtub and bucket drownings, it was often reported that the adult had momentarily left the infant alone, or in the care of another child, to answer the phone or do household chores.<sup>25</sup> However, appropriate supervision alone is still an insufficient preventive measure because of the inevitable lapses in supervision that are known to occur.<sup>26</sup>
- **Location:** The locations of drowning vary by age.<sup>26</sup> Most drownings among children ages 1 to 4 occur in backyard swimming pools whereas, among individuals 15 years or older, most drownings occur in natural bodies of water.<sup>27</sup> Also, many items in and around the home, such as bathtubs, wells, toilets, and decorative ponds, can pose as a potential drowning situation.<sup>7</sup> In 2014, 67 children died from bathtub drownings, and 78% of these

children were under five years old.<sup>10</sup> The majority of drowning events in infants are in bathtubs and buckets.<sup>25</sup>

- **Failure to Wear Life Jackets:** In 2015, the U.S. Coast Guard received reports for 4,158 boating incidents with 2,613 boaters injured and 626 deaths.<sup>27</sup> This created a fatality rate of 5.3 deaths per 100,000 registered recreational vessels.<sup>27</sup> Of these boating deaths, 76% were caused by drowning, and 85% of the victims were not wearing life jackets.<sup>28</sup> Only 14% of adults and adolescents wear life jackets, and these two age groups are at the highest risk for boat-related drowning.<sup>29</sup>
- **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.<sup>30</sup> A study from California showed that this state's autistic population had elevated death rates from drowning and seizure disorders compared to the general population.<sup>31</sup>

Rates of drowning are also influenced by gender, age, socioeconomic status and race.<sup>1,29</sup> Male toddlers and male adolescents have the highest drowning rates, and male children have an increased risk of drowning after one year of age compared to female children.<sup>1</sup> In regards to income, drowning rates are higher among lower income populations.<sup>25</sup> Drowning rates are higher among black children, adolescents, and young adults than any other racial/ethnic groups, especially in swimming pools.<sup>32</sup>

**Research has found the following prevention strategies are effective at reducing drowning risk:**

- **Circumferential isolation pool fence that completely separates the pool area from the house and yard**  
Barriers, such as four-sided pool fencing, can prevent young children from gaining access to the pool area without caregivers' awareness.<sup>33</sup> A successful pool barrier prevents a child from getting over, under, or through to gaining access to a pool.<sup>33</sup> A four-sided isolation fence (separating the pool area from the house and yard) significantly reduces a child's risk of drowning by 83% compared to three-sided property-line fencing.<sup>34</sup> It is estimated that over 50% of all swimming pool immersion injuries in young children can be avoided by four-sided fencing which completely divides the pool from the house and yard area.<sup>34-36</sup> The fence should be at least four feet high and four-sided to completely separate the pool area from the house and yard.<sup>37</sup> The use of self-closing and self-latching gates that open outward with latches that are out of reach of children are effective.<sup>37</sup> Ornamental and iron bar fences are more difficult for children to climb, compared to chain link fences.<sup>38</sup> Also, additional layers of protection such as automatic door locks and alarms to prevent access can alert a caregiver if a child enters the pool area.<sup>37</sup> However, research does not support or recommend that these devices be used as an alternative to four-sided fencing.<sup>17</sup>
- **Swimming skills**  
Research has shown that participation in formal swimming lessons can reduce the risk of drowning among children aged 1 to 4 years by 88%.<sup>13</sup> However, many adults and children don't have basic swimming skills, or water safety skills, such as floating on your back.<sup>37</sup> Research is limited regarding early survival skills training (i.e., water safety skills training for children less than four years old); although it is now supported by the American Academy of Pediatrics, caution is recommended because every child is not ready to swim

at the same age.<sup>1</sup> Introduction to swimming skills should be related to the child's emotional maturity, physical limitations, and rate exposure to water.<sup>1</sup>

- **U.S. Coast Guard approved life jackets**

Life jackets may help avert 50% of deaths caused by drowning.<sup>39</sup> Air-filled swimming devices, such as inflatable arm bands, are not safe alternatives to life jackets because they can deflate and are not designed for water safety.<sup>1</sup> A federal law established in 2002 requires children to wear life jackets in boats.<sup>29</sup> 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.<sup>40</sup>

- **Clear the pool and deck of toys**

Removing floats, balls, and other toys from the pool and surrounding area immediately after use help to prevent children from being tempted to enter the pool area unsupervised.<sup>33</sup>

- **Learn CPR (Cardio Pulmonary Resuscitation)**

CPR performed by bystanders has been shown to save lives and improve outcomes in drowning victims.<sup>38</sup> The possibility of improved outcomes for the victim increases the faster rescue breathing is started.<sup>41,42</sup> 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.<sup>5,41</sup>

## **Recommendation Summary**

### ***Policy***

- Improve the Texas Submersion Registry surveillance through an active surveillance system with incentives and sanctions for mandatory reporting.
- Legislation that requires new residential swimming pools to have a circumferential isolation pool fence installed that completely separates the house and yard.

### ***Environment***

- Install circumferential isolation pool fencing that completely separates the pool area from the house and yard.
- Clear the pool area and deck of toys.
- While on watercraft, children under the age of 13 must wear an appropriate U.S. Coast Guard approved life jacket.

### ***Education***

- Active and close supervision by an adult while children are in or around water.
- Swimming lessons
- Learn CPR (Cardio Pulmonary Resuscitation)

### ***Collaboration***

- Encourage multidisciplinary collaboration between health, education, housing, not-for-profit, and corporate sectors for prevention.
- Health care providers should follow recommendations in the American Academy of Pediatrics Policy Statement on Prevention of Drowning (<http://pediatrics.aappublications.org/content/pediatrics/early/2010/05/24/peds.2010-1264.full.pdf>) regarding providing water safety counseling to clients.

## **The GETAC Injury Prevention Position Statement:**

Therefore, the position of the Injury Prevention Committee of the Governor's EMS and Trauma Advisory Council is to support these recommendations, and encourage the State of Texas and injury violence prevention professionals, organizations, agencies and health care providers across the state of Texas to **use multi-layered interventions that are supported by the best available research evidence to minimize the morbidity and mortality of childhood drowning.**

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