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One Family’s Story

Our three-year-old son, Levi, drowned in June 2018 while we were on a beach vacation with friends. One moment, he was sitting on the couch watching TV while I cleaned up dinner. In the next, I pulled him from the bottom of the pool. Levi had somehow slipped out of the kitchen filled with people, including myself, my husband, and five other physician friends. We weren’t drinking, weren’t on our phones, and the pool was not in our line of vision.

I was the one who glanced, unsuspectingly, over the balcony and found our son in the pool. My husband, a cardiothoracic anesthesiologist, was the first to perform CPR. Despite being out of sight for only a moment and receiving immediate medical attention, we lost our Levi just hours later.
My husband and I failed to keep our son safe. How were years of intentional parenting canceled out within seconds? I have since learned that water safety goes beyond the assumed foolproof advice of “watch your kids while swimming.”

Parents only know what they know. I thought I was doing everything right. Levi wore a puddle jumper, and I always got into the pool with him. I did not know drowning was a leading cause of death for his age group or that toddlers were frequently drowning during unanticipated swim time. My son, this little boy with so much life to live, drowned when he was wearing khaki shorts and we had finished swimming for the day.

Levi had multiple layers of protection in place, but none of these saved him. His puddle jumper, which I thought was an important safety measure, actually gave him a false sense of security. I was waiting until I thought he was “ready” to begin swimming lessons.

We cannot avoid water, but we can keep our children safe.

The staggering statistics on drowning speak of the importance of taking this danger seriously.

Children need multiple layers of protection in between them and the water, especially the ability to survive should they ever reach water alone.

—Nicole Hughes, Levi’s mom
Context and Cause for Concern

Drowning is a leading cause of unintentional injury death among children.

According to the Centers for Disease Control and Prevention (CDC), there were 3710 fatal, unintentional, non-boating related drownings in the United States in 2018. This is equivalent to 50 busloads of people. One-fifth of these deaths were to children 14 years and younger.

Despite significant reductions in fatal drownings since the mid 1980’s, among fatalities caused by preventable injuries, drowning was the leading cause of death for children ages 1-4 years in 2018.2,3

In addition to being the leading cause of death for children in this age group, among children 1-4 years old who died from an unintentional injury of any kind, almost one in every three died from drowning. Most infant drownings occur in the bathtub.4 Among children age 1-4, drowning is likeliest to occur in a home pool, while children five years and older are more likely to drown in natural water, such as ponds, lakes, or rivers. This is an increasingly important prevention consideration when more than 4 in 10 Americans live in a county directly on a shoreline.5

While many children tragically die from drowning incidents, the impact of childhood drowning affects many more. For every child who dies from drowning, another five receive emergency department care for nonfatal submersion injuries.6

Racial and socioeconomic disparities persist in fatal drowning outcomes, raising questions about access to needed drowning prevention education and interventions. African American children ages 5-19 drown in swimming pools at rates 5.5 times higher than those of Whites. In the 11-12 year age group, African American children drown in swimming pools at rates 10 times those of Whites.7,8 Additionally, research indicates

Structural Inequity:
Some families lose infants, children and youth to the types of deaths reviewed by fatality review teams not as the result of the actions or behaviors of those who died, or their parents or caregivers. Social factors such as where they live, how much money or education they have and how they are treated because of their racial or ethnic backgrounds can also contribute to a child’s death. Segregation impacts access to high-quality education, employment opportunities, healthy foods and health care. Combined, the economic injustices associated with residential, educational and occupational segregation have lasting health impacts that include adverse birth outcomes, infant mortality, high rates of homicide and gun violence and increased motor vehicle deaths.
that communities with lower median income and lower educational attainment have higher drowning rates. These disparities in outcomes between groups should be understood in the context of the social determinants of health and well being, including structural inequity.

The National Fatality Review Case Reporting System (NFR-CRS) collects fatality case review data from child death review teams. Forty-five states contribute data to NFR-CRS. These data are not population-level statistics, as different states have different case selection criteria for including cases in fatality review. Nonetheless, CDR data from interdisciplinary case reviews provides insights that would not otherwise be available through vital statistics or other reporting methods.

Between 2004 and 2017, 5985 drowning cases were submitted to NFR-CRS from 39 states; of those, 5463 were unintentional drownings of children ages 17 and under. Among this sample, 70% of the cases were males. Death investigations were conducted in 96% of cases, and autopsies were performed in 83% of cases. High rates of missing and unknown responses make it challenging to report whether or not the children in the cases were able to swim; the information was missing in 21% of the cases, and teams indicated it was unknown in another 20% of the cases. The data in the following sections examines data on locations and supervision from among the accidental drownings in the NFR-CRS.

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2 "https://www.safekids.org/poolsafety".


8 “Factors such as access to swimming pools, the desire or lack of desire to learn how to swim, and choosing water-related recreational activities may contribute to the racial differences in drowning rates. Available rates are based on population, not on participation. If rates could be determined by actual participation in water-related activities, the disparity in minorities/ drowning rates compared to whites would be much greater."-- "https://www.cdc.gov/homeandrecreationalsafety/water-safety/waterinjuries-factsheet.html".

LOCATION:

- 52% of the drownings occurred in the child's own home or the home of a relative or friend.

- Drownings occurred most frequently in pools, hot tubs, or spas, accounting for 49% of cases, followed by open water which accounted for 33% of cases. Bathtubs were the location of the incident in 11% of cases. These patterns were consistent, regardless of the child’s race.

- Of children drowning in pools, spas or hot tubs (2593), 73% were between 1 and 4 years old.

- Children under 1 year old were overwhelmingly more likely to have drowned in a bath tub than in any other location.
Children ages 1-4 years and children 5-9 years were likeliest to have drowned in a pool, hot tub, or spa; children ages 10-14 years and 15-18 years were likeliest to have drowned in open water, with the older group the likeliest of all to have drowned in open water.

Of drownings in open water, 55% were to children age 10 and older, while 28% were to children between 1 and 4 years old.

In cases where geographic context was reported, 37% occurred in a rural location; 33% occurred in a suburban area; and 29% occurred in an urban setting.
By identifying risk and protective factors shared across drowning cases, fatality review teams are well-positioned to help decrease these preventable deaths and injuries through effective case review, data collection, and catalyzing prevention tailored to the unique context of their communities.

SUPERVISION:

- In cases where supervision status was reported, the child was supervised in 46% of the drownings.
- In 48% of the deaths there was no supervision, but the case review team indicated it was appropriate and needed.
- Teams determined that there no supervision, but it also was not needed, in 6% of the drownings.
- Among cases where the type of supervisor was specified, the biological mother was the most common supervisor at the time of the incident, supervising in 48% of cases. Biological fathers were the supervisors in 19% of cases, and other relatives were supervising in 7% of cases.
Key Questions to Ask

Key Questions to Ask During an Investigation When a Child Drowns:

Closely evaluate the location. What types of physical barriers may have been present to help keep people safe? What was it made of and what were its dimensions? If there was a gate, was it locked at the time of the incident? How did the child get through the barrier?

If the drowning occurred in open water, what were the water and weather conditions?

Was the child supervised at the time of the incident? By whom? Was the supervisor impaired by a substance or any other factors at the time of the incident?

Did the child know how to swim? Had he/she participated in formal swimming lessons? If so, what type? Could the child float on his/her back independently?

Were there any witnesses to the drowning who could provide details?

Did the child have any blood relatives who died suddenly and unexpectedly before the age of 50? Did any blood relatives have a history of heart disease before age 50, seizure disorders, or other neurologic disorders?

Important Timeframes for an Effective Review

When considering the context, risk factors, and causes of a drowning, there are three timeframes and sets of questions that are important for an effective review.

The first is the initial investigation, usually conducted by a law enforcement officer or coroner/medical examiner. In order to complete an effective review, the information gathered in the investigation must be thorough.

Next, the data collected for case review must be as thorough as possible. Finally, the discussion of the case in review must be robust and thoughtful.

Considering the following questions and ideas will help ensure an effective process from investigation, to case review, to data entry.
Data Collection: The National Fatality Review-Case Reporting System (NFR-CRS)

Case review teams are comprised of diverse professionals who provide relevant records from their own agencies to support the case review process. Typical team members include child welfare agencies, public health professionals, law enforcement, medical examiners or coroners’ offices, prosecutors, first responders, pediatricians, injury prevention professionals, mental health specialists, and suicide prevention professionals. By providing their agency records on a case, the whole team together creates a more complete picture of the death and its context in the case review meeting, including histories that the family may have had with participating agencies, the death investigation records, and the autopsies. These records are used to answer questions posed by the NFR-CRS.

NFR-CRS Questions:

The following questions are included in drowning section of the NFR-CRS case report tool (URL: https://www.ncfrp.org/wp-content/uploads/NCRPCD-Docs/CDR_CRS_v5-1.pdf) to support fetal, infant, and child death review teams’ data collection. The questions will likely be addressed in a thorough death scene investigation, though not every detail may be included in a report. It is helpful to invite the investigator(s) to the case review meeting to share insights if your state statutes allow ad-hoc members.
Where was the child last seen before drowning?

What was the child last seen doing before drowning?

Was the child forcibly submerged?

The location of the drowning.

The specific type of open water, if applicable (e.g., lake river, pond, etc.).

Contributing environmental factors, if applicable (e.g., weather, temperature, riptide, etc.).

Type of boat, if applicable, and whether the child was piloting the boat.

If the child was found in the pool/hot tub, or on/under the cover, as applicable.

Whether it occurred in a public or private pool, as applicable.

Length of time the owners had owned the pool/hot tub/spa, if applicable.

Whether a flotation device was used, and if so, what type.

What layers/types of barriers limited access to the water.

What type of fencing was present, including height, and what types of doors, latches, and alarms may have been present.

Type of cover, if applicable.

Local ordinances regulating water access.

How layers of protection may have been breached.

Whether rescue was attempted and by whom.

If the rescuer also drowned.

Was appropriate rescue equipment present?
POINTS TO INCLUDE IN THE NARRATIVE:

The narrative section allows teams to share summaries of salient points that can inform prevention efforts. In addition to the variables outlined above, it is helpful to include more detail in the narrative. Specifically, providing answers to the Key Questions to Ask During the Investigation outlined in the previous section can maximize the impact of the qualitative data in the narrative.

Do not include any personally identifiable information in the narrative, such as names, dates, or specific locations.

You can do this by referring to the child as “the decedent” or “the child;” by referring to pools as “the public pool,” and not by its specific name; and by referring to individuals around the child in general terms like, “his sister,” “the child’s babysitter,” or “her mother.”
Key questions to ask during the review meeting:

These are questions to consider including in your review discussion. Some of them are not included in the NFR-CRS Case Report Tool, but they will equip fatality review teams to better understand the context of the incident and target prevention.

- **WHAT LAYERS OF PROTECTION WERE IN PLACE TO PREVENT THE CHILD FROM DROWNING?**
  
  Layers of protection include supervision, physical barriers and other warning equipment, water safety education, survival swimming skills—especially the ability to float, and use of a personal flotation device for weak or non-swimmers.

- **DID THE CHILD HAVE THE SKILLS TO SURVIVE IN THE WATER? COULD THE CHILD SWIM?**
  
  Teams are challenged to include this information in the NFR-CRS, so it is likely this is difficult to ascertain through the initial investigation. It is nonetheless an important question, and teams may want to think creatively about how best to get this information. An even closer examination should evaluate if the child had water competency, the skills to be able to surface from the water, roll, float on the back, roll again, and swim to the edge of a pool.

- **ARE SWIMMING LESSONS OR DROWNING PREVENTION INITIATIVES, ACTIVITIES, AND RESOURCES AVAILABLE IN THE COMMUNITY?**
  
  Were there barriers for the family to participating in swimming lessons or accessing these resources? Was the family unable to afford or access swimming lessons? Was transportation a challenge? Did the family have access to a pool for the child to practice their skills? Were resources available in linguistically/culturally-appropriate ways?

- **IS THE AVAILABLE SWIMMING INSTRUCTION FOCUSED ON SURVIVAL SWIMMING SKILLS?**
  
  For more information, visit the water survival skills fact sheet (URL: https://www.safekids.org/other-resource/pool-safety-poster).

- **DO WE KNOW HOW MANY Fatal AND NON-FATAL CHILDHOOD DROWNINGS OCCUR IN THE COMMUNITY?**
  
  This will provide the team with the scope of the problem, in addition to the potential for prevention impact.
WERE LOCAL/STATE REGULATIONS ABOUT BARRIERS TO POOLS/HOT TUBS OBSERVED IN THIS CASE?

ARE THE GUIDELINES OR REGULATIONS ADEQUATE?

WAS THERE WARNING SIGNAGE RELATED TO DROWNING RISK AT THE LOCATION?

WAS EXPOSURE TO HAZARDS OR LACK OF SUPERVISION A FACTOR IN THIS DEATH?

WAS THE SUPERVISOR EQUIPPED TO SAVE THE CHILD?
Did the supervisor have the needed skills and resources to save the child? Some examples may include the supervisor’s ability to swim, knowledge of cardio pulmonary resuscitation (CPR), or presence of a life ring.
Opportunities for Prevention:

When crafting and implementing prevention efforts, consider the 3 E's of Injury Prevention: environment, enforcement, and education. Initiatives that include all three “E’s” are generally more effective. These suggestions are not exhaustive, but they provide a good place for teams to start when considering prevention recommendations.

The National Center has created a fatality review training module series (URL: https://mediasite.mihealth.org/Mediasite/Catalog/catalogs/cnpi) to support review teams. The modules Writing Recommendations and Partnering for Prevention may be helpful as teams consider recommending prevention initiatives.
ENVIRONMENT:

☐ **Evaluate existing drowning prevention resources for adequacy and accessibility.**

If drowning prevention resources and instruction exist in the community, consider if they were the most effective ones available, or if there were barriers to community participation, including availability of infrastructure to support swimming lessons (e.g., pools), handicap accessibility, or language or cultural barriers (e.g., female swimming instructors and female-only classes). The best water safety curricula focus on survival skills, not simply helping children enjoy water or learn to swim. Life jacket loaner boards at designated water recreation areas are another effective local strategy.

☐ **Evaluate the incident environment for previous injuries or future injury risk.**

Have there been other deaths in this body of water or in this home? Any “near-misses” or non-fatal drowning events at the same location? Are there factors that make this location particularly dangerous? Is it a designated water recreation area? If not, is there a need for one to be established at that location? Is there a need for warning signage or improved barrier systems?

☐ **Identify if the jurisdiction has a water safety strategy.**

If not, consider finding like-minded partners to help champion one. Water safety strategies are available at local, county, and state levels.

☐ **Consider timing and partners.**

Consider focusing on National Water Safety Month each May, and partnering with local agencies, real estate agents, clubs, or initiatives like a Safe Kids Coalition to achieve collective impact.

☐ **Make CPR training available.**

Administering CPR on the scene of a drowning before emergency medical services (EMS) arrives increases the likelihood of survival. Offering affordable, accessible CPR classes for parents and caregivers equips them to respond to a drowning child.

ENFORCEMENT:

☐ **Consider local and state regulations related to pools, hot tubs, and barriers.**

Are these regulations adequate? Are they followed? Are pool or hot tub owners made aware of these expectations? What happens if they don't comply? Compare your local ordinances to CDC’s Model Aquatic Health Code in Section D under Resources.
Consider training for incident/scene investigators.

Certain important information is only available through the primary investigation. Providing a list of questions or a copy of NFR-CRS Case Report Tool to professionals who will investigate drownings is an important way to increase accurate data to drive effective prevention.

EDUCATION:

Partner with pediatricians to ensure water safety is an injury prevention priority in primary care settings.

As pediatricians discuss infant safe sleep, appropriate car seat use, developmental milestones, bike helmet use, and other injury prevention measures, discussions of water safety are an important addition, especially in months leading up to the seasonal spike in drowning deaths in the summer months.10,11

Ensure availability of survival-based swimming instruction.

For more information, visit the “water survival skills fact sheet” (URL: https://www.safekids.org/other-resource/pool-safety-poster).

Determine what resources are available locally for pool and hot tub owners to access safe barrier systems.

How do pool/hot tub/spa owners know about local safety regulations relative to ownership and limiting access? How would knowledge be different if a homeowner installed a pool as opposed to purchasing a home that already had one. Reaching out to local code enforcement agencies can help teams understand these processes and may offer insights into reaching out to owners for water safety education. Retailers who provide pool equipment and chemicals are another key partner in these efforts.

Find out if there are drowning-prevention initiatives in local schools.

Find out what kind of water safety instruction may exist in local schools, and at which ages it is provided. It may be on land or in the water. Some school districts have available swimming pools, and others do not. School-based swimming instruction as a part of the curriculum may provide more equitable access to instruction, increasing community safety. If a pool is unavailable, investigate if there has been one before, or what it may require to reopen or install one. Consider sending a fatality review partner and water safety champion to advocate to the school board or to provide enhanced education in schools.


Resources:

- **CDC’s Model Aquatic Health Code (MAHC)** (URL: https://www.cdc.gov/mahc/index.html)

- **Swimming instruction resources and curricula:**
  a. “USA Swimming” (URL: https://www.usaswimming.org/resources/education)
  b. “American Red Cross” (URL: https://www.redcross.org/take-a-class/swimming/lessons/kids-swim-lessons)
  c. “YMCA” (URL: https://www.ymca.net/watersafety)
  d. “Water Safety USA” (URL: https://www.watersafetyusa.org/)


- **Pool Safety Checklist** (URL: https://www.safekids.org/checklist/pool-safety-checklist)

- **Open Water Safety Checklist** (URL: https://www.safekids.org/checklist/open-water-safety-checklist)

- **Lista de Control de la Seguridad en la Piscina** (URL: https://www.safekids.org/checklist/lista-de-control-de-la-seguridad-en-la-piscina)

- **Cartel de Seguridad del Agua** (URL: https://www.safekids.org/other-resource/cartel-de-seguridad-del-agua)

- **Water Watcher Cards, Safe Kids Worldwide** (URL: https://www.safekids.org/other-resource/water-watcher-card)

- **American Academy of Pediatrics Drowning Prevention Toolkit** (URL: https://www.aap.org/en-us/about-the-aap/aap-press-room/campaigns/drowning-prevention/Pages/default.aspx). This is a helpful repository of resources focused on diverse professionals with the goal of leveraging the impact of pediatricians, parents, and policymakers.


- **Children’s Safety** (URL: https://www.childrenssafetynetwork.org/injury-topics/drowning-prevention).