

**Public Hearing Phoenix, Arizona  
Tuesday, July 27, 2004**

**Statement of the Problem**

Over the last twenty years drowning has remained one of the major causes of accidental death of children in the United States. And the number 1 cause of accidental death in children under 5 in Arizona. The tragedy of pool drownings, unlike car accidents, is that they are almost always preventable. The solution to this huge problem is adequate fencing, parent education and the effective training of young children in aquatic survival techniques. This essay will address the issues of effective aquatic survival training for children under the age of 5, including: (1) the techniques and credentials of those offering survival training, (2) the best ages to introduce water safety lessons, (3) realistic performance goals needed in aquatic lessons, (4) non-traumatizing methods desired in training young children aquatic skills, (5) appropriate sequencing required for skill mastery in survival lessons, and (6) long term retention and over-learning that needs to be incorporated into aquatic survival skills training.

The Internet is full of information about swimming lessons for small children that claim to "set the standard" in water survival instruction. There is a tremendous range of expertise and abilities among the different approaches and their instructors. There are no real national standards in this industry. Although, there are organizations that have very rigid standards that train and certify instructors, continue with the education of their instructors and serve to advance the industry of aquatic survival training.

The Swimkids' USA method has been nationally recognized for its expertise in teaching, testing and establishing norms for aquatic survival skills for young children. Developed in 1971, our method is the result of 7 years of Arizona State University research and 33 years of empirical data. Swimkids founder, Lana Whitehead has a B.A. Degree in Exercise Physiology and Masters Degree in Special Education. She has authored several aquatic books, swimming videos, lectured nationally for professional educational forums and is a member of the American College of Sports Medicine. Lana and her staff continue their training yearly at the United States Olympic Training Center with USA Swimming, at United States Swim School Association classes, in World Aquatic Baby Congress Seminars, and at American Red Cross re-certification courses in

Lifesaving, CPR and First Aid for the Professional Rescuer. The Swimkids' method has trained over 50,000 children in one of the most effective aquatic survival techniques in the Nation.

The issue of when to introduce youngsters to water has been debated for years. The Council for National Cooperation in Aquatics (CNCA), comprised of 36 national member organizations (e.g. Red Cross, YMCA, YWCA, Park and Recreation Associations, etc.) and the American Academy of Pediatrics (AAP) have issued statements that recommend "minimum age for organized swimming instruction be set at age 3" (AAP, 1982; CNCA, 1973).

Developmentalists suggest that we should view development as an interaction between genetic factors and environmental experience and not as a maturation hypothesis formed from generalizations regarding children's motoric & cognitive stages. Stephen Langendorfer (1986) has stated that use of an automatic age limit or range is often not advisable from a developmental point of view, and that "motoric repertoire of the 1 to 3 year old holds many similarities between the development of upright locomotion and independent swimming" (p. 42). Langendorfer suggests that an age range of between "12 and 18 months, or the onset of independent walking, represents a starting point for swimming instruction consistent with motor development literature" (p. 42). Research to date, specific to the appropriate age to introduce water safety skills to young children was conducted during the 1970's at the Infant Swimming Research in Florida (Barnett, 1972) and the Swimming Institute of Munich Germany (Gebhardt & Bauermeister, 1970). Barnett, a physical educator, who has conducted 26 aquatic research studies at the Infant Swimming Research in Florida, recommends 12 months to begin teaching a young child to roll over and float (Barnett, 1972). Results from a longitudinal study conducted by the Swimming Institute of Munich Germany suggest 22 months as the recommended starting point for appropriate mental maturity and physical agility to execute swimming survival skills. The Swimming Institute of Munich Germany conducted this four-year research program with 669 children (237 up to 12 months, 225 from 13 months to 3 years, 207 from 3 years to 5 years) in an effort to collect extensive data on when and how to teach swimming to very young children.

Performance goals used in aquatic survival programs should promote independent mobility, safety and survival skills (breath holding, then blowing bubbles, floating, rotating from front to back, kicking to the steps and side, and climbing out), and water adjustment. At Swimkids USA, Inc., we introduce 8 to 18 month olds to the water in parent/tot classes that teach basic aquatic survival skills while encouraging bonding between parent and child. Children who begin swimming at 18 to 22 months are taught to swim to the side or step, jump into the water, rotate onto their backs where they can float alone and cry for help. Once a child has mastered the beginning survival subtasks, he/she can progress to an advanced sequence of, swimming the length of the pool while rotating onto their backs to breathe and rest, alone. This entire process can take anywhere from 10 to 40 lessons depending on the young child's age and familiarity with the aquatic environment.

Traumatizing methods used in instruction have become a source of great controversy and concern to the American Academy of Pediatrics (1982), and the California Medical Association (1984). Both institutes have issued reports stating that any method, which traumatizes children, is highly inadvisable. Threat, compulsion and punishment can be traumatizing. Acceptable methods utilize purposeful play in a nurturing environment. Well sequenced, activities geared for instruction, enjoyment and developmental levels of children will create an atmosphere of learning (CNCA, 1973). The benefit of activities and games in a nurturing, water safety environment is viewed as highly beneficial and rewarding. At Swimkids, criterion skills are assigned a key word and activity that represent and cue specific responses. For example, the word "pop" signals a child to dive to bottom of pool, pick up a colored ring, push off the bottom, climb to the surface, rotate to the back and float in "airplane". Airplane is the key word for back floatation. The child floats in a supine position, legs straight, with his arms directly out to the side of his body like airplane wings. The child is then trained to fall in to the water fully clothed, rotate on to his back to rest and breathe and rotate to a prone position to swim to the safety of the wall or stairs. When we ask our students what they would do if they fell in the pool, they yell, "Airplane", while flinging their arms into the

back float position. The total aquatic experience can become one of enjoyment, achievement and success.

In teaching very young children, structure and order are essential. The teacher must assess the student's current level of performance, define precisely the skill to be learned, and skills must be ordered in an appropriate sequence (Howell & Morehead, 1987). Researchers, McKenzie and Jaks (1984) believe that very young children typically progress in very small steps, so it is essential to break a gross motor task (such as aquatic survival skills) into small easy-to-teach subtasks. This process is called task analysis. Each subtask or skill is stated in its appropriate order of occurrence and sets the occasion for the occurrence of the next behavior (sequencing). Swimkids has engaged in comprehensive research projects at Arizona State University to develop empirically based techniques that are well sequenced and task analyzed. In our aquatic survival program, a student must master one skill before moving up the sequence to the next skill. This philosophy fosters confidence and builds self-esteem while the child is learning self-discipline, focus and persistence.

Children's retention of swim skills must also be addressed. The California Medical Association (1984) in its official statement on risks of toddler swim programs reports, "parents cannot expect their toddlers to learn and remember the rules of true water safety or know how to act in an emergency" (p.1). Basically, skeptics agree that some two year olds can swim across the pool, but one cannot expect them to behave appropriately in water emergencies (Micheli, 1985). The California Medical Association, however, has failed to recognize some very basic learning principles, that if applied correctly could further skill retention in a small child and train him/her to respond appropriately when falling into a vacated pool. Dr. Howell (1987) describes these basic learning principles or proficiency levels as: (1) accuracy (proportion of items or skills done correctly), (2) mastery (fluency or rate with which items or skills are done correctly), and (3) automaticity (ability to maintain a correct and fluid display of knowledge or skills under varying conditions).

When students begin to learn skills they must allocate so much attention to tasks that even slight distractions will affect the accuracy and the rate at which the skills are

performed. At Swimkids, once the skill has reached the accuracy level (100% of skills performed accurately) the rate at which the task is performed is increased until the task is mastered. This practice beyond the criterion of one perfect trial while increasing the rate has an enormous effect on subsequent retention. Our Swimkids' students must practice airplane (back float sequence) over and over, increasing the rate at which the skill is executed correctly until it is mastered. Once the child can perform "airplane" alone, accurately and quickly, we add varying conditions (clothes, different pools, no instructor etc.) to see if he/she is automatic (can do it without thinking about it). For example, when a child who is trained just to accuracy and mastery in the "Airplane", jumps into the pool fully clothed for the first time, the subject usually forgets a step or two of the floating sequence because he/she is so pre-occupied with the shock of wearing clothes, a varying condition. Therefore, children must be taught beyond mastery to automaticity (over-learning) in order to perform accurately and quickly under real-world conditions, such as a child falling into a pool with no adult supervision. The student continues to work on the accuracy and mastery of "airplane" until he can demonstrate the skill alone under real-world conditions for at least 4 - 6 lessons. Students who can work well under varying conditions or real-world situations are assumed to have better knowledge and skills than students who can only work under one condition. When he/she has passed the automatic level in "airplane", he/she progresses to our advanced sequence of swimming the length of the pool rotating to the back to breathe and rest. Water survival methods must teach students to the automaticity level in order for them to retain their skills and transfer their learning outside of swim class. Hall (1982), Krueger (1929), Postman (1962), Fitts & Posner (1967) and Howell & Morehead (1987) substantiate this theory with research studies that demonstrated that over learning (automaticity) significantly influences retention from 50% to 95%-100%.

References noted in this paper were taken from sections of my Master's Thesis from Arizona State University, May 1991. If you would like a copy of the bibliography or have any questions regarding the research, please contact me (Lana E. Whitehead) at Swimkids USA, Inc., 2725 W. Guadalupe Rd, Mesa, Arizona, 85202-7236, ph (480) 820-9109, fax (480) 820-3590.

## **Pediatric Drowning in Arizona: 1995-2002**

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Drowning is an important and preventable cause of death in childhood. The drowning rate for Arizona children < 4 years old is 7/100,000 which is double the national rate of 2.95/100,000. (1,2,3) Approximately 38 children drown in Arizona annually and drowning is the second most common cause of death for children 1 to 4 years old. (4)

We have reviewed the Arizona Child Fatality Review Program (ACFRP) records on all drowning deaths that occurred from 1995 to 2002 in Arizona. When a child or adolescent < 18 years old dies in Arizona, a copy of their death certificate is sent to the ACFRP. The death certificate is then forwarded to a child fatality review team in the child's county of residence. This local team then requests the child's autopsy report, hospital records, child protective services records, law enforcement reports and any other relevant documents that provide insight into the child's death including the first responder's drowning scene investigation report that is usually completed by the local fire department's paramedics who were at the scene of the drowning. After reviewing all the documents, the local team completes a standardized data sheet that includes extensive information regarding the circumstances surrounding the death. For drowning deaths, the team records the site of the drowning and if the death occurred in a pool, the barriers around the pool are noted.

From 1995-2002, 307 Arizona children died due to accidental drowning. Half of these deaths (153/307) occurred in a backyard pool and 87% of the children who

drowned in a backyard pool were < 5 years old. The second most common drowning site was lakes/rivers (15% of deaths) followed by canals (11.4% of deaths) and bathtubs (8.8% of deaths). Eleven children (3.6%) drowned in buckets and 13 (4.2%) drowned in public or multifamily pools. (Table 1)

The age group at highest risk for drowning were children 1- 4 yrs old (188 deaths) followed by 5-9 year olds (36 deaths), 10-14 year olds, adolescents 15-17 years old (32 deaths) and infants < 1 year old (22 deaths). (Table 2) While the 1-4 year olds were most likely to drown in a backyard pool, older children were most likely to drown in lakes or rivers and infants were most likely to drown in bathtubs. (Table 1) Over 65% of the drowning victims were boys; 54% were white non-Hispanic and 29% were Hispanic. (Table 2) More drowning deaths occurred on Saturday (52 deaths) than any other day. The second most common day was Wednesday (48 deaths).

Among the 153 drowning incidents that occurred in a backyard pool, complete information on pool fencing and gates was available for 123 of these drowning deaths. A review of the scene investigation data on these 123 deaths revealed that 62 of these drowning incidents occurred in backyard pools where there was no fence separating the pool from the home and in another 57 of these drowning incidents, the pool was fenced, but the fence was not appropriately secured (eg. gate was not in good condition, fence not intact, gate left unlocked or open). Thus, 96.7% (119/123) of the drowning incidents were associated with inadequate or no pool fencing. Only 4 of these deaths occurred in a backyard pool that was appropriately fenced with a self-locking, self-latching gate.

Among the 27 children who drowned in bathtubs, 22 were < 5 years old and 11 were < 1 year old. (Table 1) In 17 of these 27 deaths, the ACFRP data indicated that the

child was inadequately supervised while bathing. All of the children over age 4 years who drowned in bathtubs had medical conditions which likely led to loss of consciousness while bathing, including 3 children with known seizure disorders and 2 others who had medical conditions that are associated with seizures (eg. preeclampsia).

Eleven children drowned in buckets. All of these children were <5 years old and 2 were < 1 year old. Eight of these 11 children were Hispanic. The majority of these deaths (6/11) of these deaths occurred on Saturday or Sunday.

Fergusson and Horwood estimated that the risk of drowning in an unfenced domestic swimming pool is 2-5 times higher than in a fenced pool. They have also concluded that introduction of pool fencing would reduce the number of drowning in domestic pools by 40-67%.<sup>(7)</sup> Stevenson has reported that two thirds of swimming pools in which children have drowned had only 3-sided fencing.<sup>(8)</sup> Thompson and Rivara also concluded that pool fencing significantly reduces the risk of drowning and that isolation fencing (enclosing the pool only) is superior to perimeter fencing (enclosing the property and pool).<sup>(6)</sup> In an Australian study, Pitt et al reported that the risk of drowning or near drowning involving unintended access to an unfenced pool is 3.76 times higher than the risk associated with a fenced pool.<sup>(9)</sup> The importance of pool fencing in the prevention of backyard pool drowning is further supported by our study. Among drowning incidents in which a scene investigation report included information on the status of pool fencing, we found that 96.7% (119/123) of the drowning incidents were associated with inadequate or no pool fencing. The American Academy of Pediatrics has recommended that if a home has a residential swimming pool, it should be surrounded by a fence that prevents direct access to the pool from the house. Almost 50% of all drowning deaths in



Arizona occurred in backyard pools and 86.9% of the children who drowned in backyard pools were < 5 years old. An effective barrier between the home and a backyard pool can help mitigate the risk of drowning during short periods of parental inattention when a toddler can slip unseen out of an unlocked door and into a backyard pool. Indeed, if the AAP recommendations on pool fencing had been followed, the deaths of 119 Arizona children from 1995-2002 could have potentially been prevented.

For children < 1 yr, our findings are consistent with those of Brenner who reported that the majority of infant drowning occurs in the home. (10) Of the 22 children < 1 year old who drowned, 11 drowned in a bathtub, 2 drowned in buckets and 6 drowned in backyard pools. The US Consumer Product Safety Commission (CPSC) has reported that 292 children < 5 years old drowned in bathtubs from 1996-1999 and 50% of these children were < 1 year old. (11) We also found that 50% of the children who drowned in bathtubs were < 1 year old. Information about caregiver supervision was available in 231 of the drowning incidents reported to the CPSC and revealed that 96% (222/231) of these children were not being supervised. (11) This is similar to our data, which showed that at least 63% of the children were unsupervised bathing unsupervised at the time of the drowning. Although 81.5% of all bathtub-drowning deaths in Arizona occurred in children < 4 years old, there were 5 deaths that occurred in older children/adolescents. All of these older victims had medical conditions that might have resulted in loss of consciousness while bathing.

Eleven Arizona children drowned in buckets. The US CPSC has reported that 58 children < 5 years old drowned in buckets from 1996-1999. In our study, 72% of these children were Hispanic and the majority of these deaths occurred on weekends. In

Arizona, 5-gallon buckets are common in the home. Pool chemicals and detergents are often purchased in 5-gallon buckets and these buckets are commonly reused for cleaning or as water dishes for pets.

Over 18.5 million American households own or have access to a swimming pool. In Arizona, approximately half of all drowning deaths occur in backyard pools and for children 1-4 yrs, 67.5% of drowning deaths occur in backyard pools. **Based upon our review of ACFRP data on 123 backyard pool drownings that included complete scene investigation reports, only 4 of these deaths occurred in a pool that was known to have a four-sided fence with an appropriate self-latching, self-closing gate.** These findings support the AAP recommendation for residential swimming pool fencing that prevents direct access from the home to a backyard pool. While parents should be advised on the importance of adult supervision of children around water, inevitable lapses of supervision make supervision alone insufficient to prevent drowning deaths. Parents also should be counseled on the importance of checking their pool gate regularly to make certain that it is kept locked and in good working condition. Other important drowning prevention strategies supported by our study include adult supervision of young children in bathtubs and continued adult supervision of older children who may lose consciousness while bathing. Parents should also be advised on the dangers of leaving 5-gallon buckets with water around the home.

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Table 1: Pediatric Drowning by Location and Age, Arizona, 1995-2002

<i>Location</i>	<i>&lt; 1yr</i>	<i>1-4 yrs</i>	<i>5-17 yrs</i>	<i>Total</i>	<i>% Of deaths</i>
Artificial Pools					
Backyard Pool	6	127	20	153	49.8%
Other Pool <sup>1</sup>	0	6	7	13	4.2%
Domestic					
Bathtub	11	11	5	27	8.8%
Bucket	2	9	0	11	3.6%
Freshwater					
Lakes/River	1	7	38	46	15.0%
Canal	0	18	17	35	11.4%
Other	2	10	9	21	6.8%
Unknown	0	0	1	1	0.3%

1. Includes multifamily pools, public pools

Table 2. Characteristics of Children who Drowned, Arizona, 1995-2002

Characteristics	Number	%
Age		
<27 d	1	0.3
28 d-1yr	21	6.8
1-4 yr	188	61.2
5-9 yr	36	11.7
10-14 yr	29	9.4
15-17 yr	32	10.4
Gender		
Male	202	65.8
Female	105	34.2
Ethnicity		
White non-Hispanic	167	54.4
Hispanic	89	28.9
Native American	27	8.8
Black	17	5.5
Other	7	2.3

# **Arizona Drownings**

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# **Arizona Child Fatality Review Program**

- Established in 1993
- Team members include physicians, medical examiners, law officers, and public health representatives
- Reviews all pediatric deaths in the state of Arizona
  - Death certificate
  - Autopsy report
  - Hospital records
  - Child protective services records
  - Law enforcement reports
  - The first responder's report

# **Arizona Drowning Deaths 1995 to 2002**

307 pediatric drowning fatalities

153 deaths in backyard pools

46 deaths in lakes/rivers

35 deaths in canals

27 deaths in bathtubs

13 other pools

11 buckets

# Demographics

## Gender

- Male 202 (65.8 %)
- Female 105 (34.2%)

## Ethnicity

- White non-Hispanic 167 (54.4%)
- Hispanic 89 (28.9%)
- Native American 27 (8.8%)
- Black 17 (5.5%)
- Other 7 (2.3%)



## **Infant deaths\***

Bathtub:	11
Backyard Pool:	6
Bucket:	2
River:	1
Other:	2
Total:	22

*\*Less than 1 year*

# **Toddler Deaths\***

Backyard Pool:	127
Canals:	18
Bathtub:	11
Bucket:	9
Lakes/Rivers:	7
Other Pool:	6
Other:	10
Total:	188

*\*1-4 years old*

# Older Children Deaths\*

Lakes/River:	38
Backyard Pool:	20
Canal:	17
Other Pool:	13
Bathtub:	5
Other:	21
Total:	97

*\* 5-17 years old*

# **The Role of Pool Fencing in Backyard Pool Drowning**

1. Complete data available on 123/153 deaths
2. Only 4 deaths occurred in homes where the pool was adequately fenced
3. 96.7% of deaths occurred in pools with inadequate or no fencing

# **Product Safety Issues**

1. 15 deaths associated with self-latching gates that were not functioning
2. 4 deaths associated with pet doors

# **Bathtub Drowning**

1. 27 deaths
2. 17 of these deaths associated with inadequate supervision
3. 22 of these children < 5 yrs old
4. 11 of these children < 1 yr old
5. All children > 4 who drowned had underlying disease

# **Bucket Drowning**

1. 11 deaths
2. All were < 5 years
3. 8/11 were Hispanic
4. 6/11 deaths were on weekend

# Summary

1. Backyard pools are deadly, especially for toddlers
2. 97% of these drowning deaths are potentially preventable with adequate fencing and supervision
3. Fencing and gates must be maintained



**Thank you**

**Testimony of T. Kent Denmark, MD for the US Consumer Product Safety Commission**

“The CPSC is committed to protecting consumers and families from products that ...can injure children”

Our common goal is to protect children. When we cannot completely protect them, we try to minimize the risk or limit the extent of injury. In that spirit, I recommend the following actions based on the available medical literature, to protect toddlers from submersion injuries.

According to studies by Stevenson, Morganstern and Pitt, legislation requiring pool fencing is not effective by itself. The most recent study by Stevenson of western Australia in 2003, found the compliance rate with enactment of pool fencing legislation to be initially almost 60%, but decreased to a steady 40% within several years.

The government inspectors were interviewed by Stevenson, et al, and overwhelming felt that inspections were effective, but too infrequent. After interacting with the pool owners and their families they also felt that public awareness of the danger of drowning and pool fence legislation was inadequate.

In a 1997 study by Fisher, it was found that pool owners did not see their pool as a danger to their toddlers, which is consistent with the findings of the pool inspector interviews by Stevenson.

The Stevenson study also addressed the relative risk of drowning in a perimeter vs. isolation fence, and found a two-fold increase in the risk of drowning with perimeter fencing. In addition, all the drownings that occurred in their study population with isolation fencing were due to either a faulty mechanism in the gate, or the gate being propped open.

Morganstern in Los Angeles County further supported the inadequacy of legislation alone by finding that 81% of the drownings for children < 10 years of age occurred in pools that were by law required to have a fence. Due to the lack of an ongoing pool inspection program in LA County, one of the limitations of the study was inability to verify the presence or state of the fence in each individual drowning cases. A second limitation should be mentioned, that during the study period, only a perimeter fence was required by law.

In Queensland, Australia, Pitt evaluated drowning rates in children age 1-4 years of age before and after the enactment of pool fencing legislation. While there was an initial decrease in the rate of drownings, this effect only lasted for three years following which the rate increased again.

Pitt found that 87% of the pools in which children drowned did not comply with the fencing regulations. While some of the rebounding rate was obviously from the fences

coming to some state of disrepair, it was also felt that the decrease in public awareness and concern after the intense media scrutiny following enactment of the legislation contributed to the increasing rate of drowning.

Lastly, once a submersion incident has occurred, Kyriacou in 1994 found that bystander CPR was the best early predictor of good outcome, and yet according to Wintemute in 1991, only 50% of pool owners know CPR.

Therefore, the most effective strategy based on the current literature, is legislation requiring isolation fencing around pools. This needs to be enforced with regular pool compliance inspections, and recurrent public awareness campaigns. Additionally, pool permit applicants should be required to present a valid CPR card prior to a permit being issued, with current certification required at the time of periodic compliance inspections.

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I would like to first begin by thanking you for the opportunity to address the Commission with my thoughts and recommendations regarding such a grave and serious problem. My organization, Aqua Safe, Inc. has evolved from our two other businesses. One being a commercial pool construction company and the other a Pool Management Service.

Our construction and repair service of over 20 years has provided us with much experience within the existing pool market place. A history in many cases of how not to build or maintain a swimming pool. Many pools may have initial been built correctly, however, after several years of poor maintenance procedures or jerry rigging leaving them with a cluster of unidentified pipes and valves creating a hydraulic and safety nightmare.

Through our pool management services, we have over the past few years, trained and provided thousands of lifeguards to area communities. In addition to providing lifeguards, we are responsible for the maintenance of pool equipment, water quality and the overall condition of the pool itself. This situation again has provided us a long history of “**real world scenarios**” of what actually takes place from the drains to the deck at a swimming pool. I have seen it all, plugged dual drains, skimmers packed tight with debris, damaged and missing drain covers, and uncovered suction lines.

In 1999 the Texas Department of Health established a committee to identify the different types and causes of swimming pool and spa entrapment. I was fortunate to be included on this committee. The committee was comprised of pool and spa builders, engineers, manufacturers, law firms, state officials and Troy Whitfield from your office. Our primary task was to investigate and identify the types of entrapment hazards; the potential causes and finally make recommendations for possible solutions to be added to our state codes.

The even larger challenge was to develop a series of guidelines and codes that would be an effective minimum for the new pool and spa construction market place but could also be applicable and cost affectively applied to the large existing pool and spa market.

This pain staking process has taken several years filled with many meetings and discussion. Dealing with real world scenarios of what it is like out in the field and how to promote codes that will have a lasting affect. Educating all members to understand the proper hydraulics of a pool or spa and the cause and affect of what the smallest changes may make to the overall safety of the system.

I have also worked with many other state health departments gaining their knowledge and sharing information from state to state. The issues are always the same. This not rocket science and there is no reason to reinvent the wheel. The one constant that I have heard from every state health department is “ We are anxious to see the new soon to be released guidelines from the CPSC”. I am not sure what is taking so long.

Texas is a no license state meaning it has no licensing requirement for pool builders or service companies. The company that builds your pool today may be selling mufflers tomorrow. As contractors in an unlicensed state the rules and guidelines from State and Federal levels plays an important role in establishing minimum safety measures. These guidelines and industry recommendations are all that we have to go by.

My bottom line comment to the Commission is, “ what is taking so long”. I have been hearing the same comments over and over again. Issues of dual drains, vent lines, SVRS's, safety and anti-vortex covers. These all can and should play a role in increased aquatic safety.

It is common knowledge that multiple layers of protection are necessary to insure the worst-case scenarios are covered. Education and awareness, proper plumbing and maintenance, the use of new technologies should all be included and recommended to consumers and the industry to make all pools and spa's safe.

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7/18/04

As the agency designated to protect the public against unreasonable risks and injuries associated with consumer products, the U.S. Consumer Product Safety Commission (CPSC) has failed to protect the public, specifically young children, from swimming pool and spa drain suction entrapment.

As I stated at the June 21, 2004 CPSC hearing in Tampa, the CPSC has publicly admitted it has been aware of pool and spa drain suction entrapment hazards since 1973. For the last 31-years the CPSC, in cooperation with the National Pool and Spa Institute (NSPI), has cautioned, warned, recommended, and advised pool and spa owners and builders on entrapment hazards and methods that can eliminate these hazards. However during this time hundreds of young children have drowned, been disemboweled, or injured by pool and spa drains (CPSC only documents entrapment incidents (147) from 1985-2002).

Let me note that on Thursday July 15, 2004, according to the Elk Grove California Police Department, an 8-year old girl drowned when her hair became entangled in a dual drain pool suction system where "the two intakes of the drain appeared to be intact and covered."

At this time the CPSC continues to "muddle along" revising guidelines and conducting public hearings on pool and spa drain suction entrapment. After 31-years this is totally unacceptable. That is why I am here today to demand that the CPSC declare swimming pool and spa drain suction entrapment an "imminent hazard" to young children.

In order to warn the public about this imminent hazard I suggest that CPSC hire a professional advertising agency to develop and undertake a national pool and spa drain suction entrapment awareness program that will reach every pool and spa owner in the country. CPSC press releases and videos do not work.

Furthermore, in order to prevent this problem in the future I suggest that the CPSC immediately endorse the International Code Council (ICC) Standard AG-106 for entrapment protection in residential pools. This standard which is specifically based on the 1998 CPSC Guidelines for Entrapment Protection, includes the three layers of protection against pool and spa drain suction entrapment as recommended by the CPSC. This standard has been reviewed, analyzed and approved by the hundreds of state and local building officials who represent the ICC membership.

An almost identical standard was adopted by the Florida Building Code (FBC) Commission in 2000. I submitted the original request to modify the Florida Building Code to include entrapment protection. Under State Law I was required to submit an Economic Impact Statement which was posted for public comment and Commission analysis. I can tell you that the cost of adding the layers of protection recommended by the CPSC was as little as \$150.00 and no more than \$700.00, depending upon the quality of the devices used. No one from the pool or spa industry ever commented on or challenged my statement. Since that time the cheap devices offered by the pool and spa industry have come under review by the Florida Building Code Commission due to serious concerns over their ability to safely perform.

Pool and spa drain suction entrapment must finally be designated an imminent hazard. 31-years of knee-jerk action by the CPSC and the NSPI has allowed too many innocent children to be killed. In my opinion the failure to exercise the degree of care necessary to prevent pool and spa drain suction entrapment has resulted in the negligent homicide of young, innocent children, who were happy at play in the water environment they loved.

Thank you for this opportunity to testify.

CPSC is responsible for protecting the public, especially young children, against unreasonable risks and injuries. They have failed to do this with regard to pool and spa drain suction entrapment

Congress gave the Commission the authority to issue mandatory safety standards, especially for products associated with child safety. But after 30-years the CPSC has only issued warnings, advisories, and voluntary guidelines on pool and spa drain suction entrapment.

CPSC insists on continuing the creation of a voluntary standard to prevent pool and spa drain suction entrapment. Voluntary standards do not work

For 30-years the CPSC has worked with the NSPI to develop voluntary standards and recommendations which have been ignored, overlooked, and forgotten by the pool and spa industry

CPSC's failure to develop and implement mandatory safety standards preventing pool and spa drain suction entrapment has contributed to the death and injury of innocent children playing in their backyard pool

Mandatory requirements like those adopted by the State of Florida, and the International Code Council, which have ANSI/ASME approval, and were promulgated based on the three layers of protection in the 1998 CPSC Guidelines, should be immediately endorsed by the CPSC. Why does CPSC continue to ignore these existing requirements?

Since 1974, the NSPI claims to have taken steps to prevent pool and spa drain suction entrapment. But even today pools and spas are being built without any protection against drain suction entrapment and young children continue to die. Voluntary compliance does not work

Serious questions have been raised by the ASTM F-15 committee on suction entrapment regarding the NSPI designs for dual drains and vent-lines. Independent research indicates these systems may fail to release a small child from an entrapment. NSPI however has failed to address these questions and refuses to provide reproducible data needed to evaluate these systems



The NSPI is using the same tactics the tobacco industry did. They produce industry experts that tell us that their pools and spas are safe even though young innocent children are being killed and seriously injured by drain suction entrapment

Drain suction entrapment can be prevented in any new pool or spa constructed for under \$ 700.00

Older pools or spas that have entrapment hazards can be made safe for under \$ 400.00

Voluntary standards developed by the pool and spa industry, and guidelines offered by the CPSC have not worked. Mandatory requirements, like those within the International Code Council Standards, which were developed by professional building officials from across the country must be adopted and implemented by every municipality in the country. 43 States and the DOD have already approved the use of the ICC Codes

Oral Presentation – Swimming Pool Safety Covers  
ASTM Standard F1346-91

CPSC/Public Field Hearing/ July 27, 2004

Presented by: Pam Westman

In 1988, the Consumer Product Safety Commission, along with safety advocates and cover manufacturers started meetings to write standards for safety pool covers. The result is ASTM F1346-91 standard. The basic reason for a national standard is to give uniformity of language as well as information on safety and performance requirements. This tells state and local agencies, as well as the consumer, how the safety device must perform in order to comply with the barrier code. Once this standard was completed, safety covers were written into many state, city and county codes throughout the country – Arizona being one such state. Cities such as Phoenix and Scottsdale have had covers in their swimming pool barrier codes since the early 1990's. Other states wrote safety covers into their codes even before the ASTM standard was written, such as Indiana, which is a state with an established cover market. To my knowledge, Arizona has not had a drowning in a pool with an ASTM safety cover installed. This is the only barrier with such a stellar safety record.

There are several different types of safety covers on the market – most of the safety covers already accepted in the barrier codes are motorized covers that can cover or uncover the pool within 30 to 60 seconds. There are many manual covers that meet ASTM safety standards but

because they take more time to cover or uncover the pool, many code officials do not consider them as the primary permanent layer of protection to prevent drowning. They are, however, very safe when used properly.

The consumer that buys a safety cover seldom buys this system for safety purposes alone. Many consumers, feeling that they don't have a safety issue, will buy safety covers for its other benefits. Because of these benefits, they will cover the pool when it is not being used. Some of these benefits include –

- a. Preventing water and chemicals from evaporating out of the pool. With drought conditions in the West, water evaporation has become an important issue.
- b. By using the pool cover, the pool is heated longer and for less money. This will extend the swimming season without incurring additional costs.
- c. The cover seals the pool, thus keeping leaves and debris out, keeping the pool water clean

Many times, the consumer, no longer feeling they have a pressing safety issue, will prop open their gates or won't repair their broken gate latch. Thus they no longer have a barrier. Safety covers will be continued to be used, not only for its safety features but for the other benefits as well.

Multiple “layers of protection” are vital to maintaining a safe pool. Pool owners should take several measures to create a safer pool environment, the most important being constant adult supervision. A safety pool cover is the only

barrier that cuts off complete access to the water . Safety covers should be considered one layer of protection.

Having viable options such as safety covers in barrier codes will give the consumer choices and more willingness to comply. It will help us keep our children, who rely on us, safe and secure around water.

Dr. Tim Flood, from the Arizona Department of Health Services, has been producing excellent data about water-related deaths and incidents since 1988 in the Phoenix area. However, there isn't a clearing house for statistics throughout the country or for various programs that people have started. CPSC could be used as a clearing house for that type of information. Nationwide statistics would help to develop one Model Barrier Code that government agencies could use as guidance on which safety devices to use in their legislation.



**NATIONAL  
SPA & POOL  
INSTITUTE**

Oral Presentation  
U.S. Consumer Product Safety Commission  
Swimming Pool Drownings Field Hearing  
Phoenix, Arizona  
July, 27, 2004

By:

Carvin DiGiovanni, Senior Director  
National Spa and Pool Institute

What the industry has to offer in preventing drowning in pools and spas:

Standards

ANSI/NSPI -1 2003 Standard for Public Pools  
ANSI/NSPI -2 1999 Standard for Public Spas  
ANSI/NSPI -3 1999 Standard for Permanently Installed Residential Spas  
ANSI/NSPI -4 1999 Standard for Aboveground/Onground Pools  
ANSI/NSPI -5 2003 Standard for Residential Inground Swimming Pools  
ANSI/NSPI -6 1999 Standard for Portable Spas

Safety Brochures

Sensible Ways to Enjoy Your Inground Swimming Pool  
Sensible Ways to Enjoy Your Aboveground Pool  
Sensible Ways to enjoy Your Spa  
Layers of Protection  
Children Aren't Waterproof  
Pool and Spa Emergency Procedures for Infants and Children  
Plan Your Dive, Steer Up

Consumer Safety Information on NSPI Website: [WWW.NSPI.org](http://WWW.NSPI.org)

Free NSPI Consumer Information: 1 800 323 3996

**(OVER)**

## Recommendations to the CPSC

Efforts need to be focused on public awareness, educating the public to use pools and spas safely.

- CPSC should implement a yearly national drowning awareness campaign
- Develop PSA's on pool and spa safety
- Endorse Drowning Prevention coalitions
- Produce media campaigns for pool and spa safety

### Data Collection:

- Produce a unified accident report form to better determine how an incident occurred
- CPSC should conduct more In-Depth Investigations to avoid missing information related to drowning incidents

The CPSC should work with pool builders and manufacturers to distribute a video/DVD to everyone who purchases a new pool

The CPSC should develop a model pool inspection safety checklist for industry to give to pool owners

The CPSC should actively endorse the voluntary consensus pool and spa standards that are relied upon to preclude the need for CPSC mandatory legislation.

The NSPI has a long standing history of working cooperatively with the CPSC on drowning prevention and looks forward to continuing these efforts in the future.



*Dr. Thomas Lachocki*

**Attachment 1: Text of Oral Presentation to Consumer Product Safety Commission;  
Swimming Pool Hearing: Phoenix, July 27, 2004.**

The National Swimming Pool Foundation® will attract more people to healthy aquatic activities and protect people who do go in the water. We are a non-profit that was founded in 1965 that create value through educational programs and reinvests our earnings in research. Exercise helps provide many societal benefits when heart disease, obesity, type-2 diabetes, and other health and psychological maladies plague our society. These maladies darken our nation's vision to provide affordable health insurance and support for the elderly with programs like Social Security, Medicare, and Medicaid. Exercise and diet improve our ability to reduce the burden on our great nation. The role aquatic environments play in providing a venue for exercise will grow as our society ages.

The National Swimming Pool Foundation has many capabilities that can help our public safety partners communicate and educate people involved in recreational water. We disseminate information to pool & spa operators (40,000), public health officials (5,000), academic and industrial researchers (3,000) quarterly. Our newsletters contain important safety messages including entrapment avoidance, drowning prevention, & disease prevention (attachments). We are in the process of publishing a Safety Compendium from leading scholars on injury prevention (see attachment). A draft chapter is included on Entrapment prevention based on research sponsored by NSPF (see attachment). Our certified instructors educate over 15,000 people in 2004. A completely updated Certified Pool – Spa Operator® Handbook will publish in the fall of 2004 and contains many important safety messages (see attachment). We will hold the first Aquatic Health™ Conference on October 3-5<sup>th</sup>, 2004 in Atlanta with leading speakers on injury prevention and health benefits.

The educational programs we sponsor create value for the participants and the revenue to fund research. Our research focus matches our mission. On the one hand we invest in attracting more people to exercise in aquatics. On the other hand, we invest protecting people. We have budgeted over \$ 300,000 in grants in 2004. About 1/3 of that budget is committed to the Centers for Disease Control & Prevention to reduce disease outbreaks due to chlorine-resistant pathogens (see attachment). NSPF also funds graduate-student research fellowships to encourage talented young scientists to explore advancement of recreational water.

We will continue on our mission to benefit mankind. We will do it through the research. We will do it through education. We will improve public health. We will be strong at protecting the weak.

**“If a disease were killing our children in the proportions that accidents are, people would be outraged and demand that this killer be stopped.**

**The greatest threat to the average American child is his own family and his own home environment. That doesn’t make sense and we’ve got to change it.”**

**C. Everett Koop, MD  
Former United States  
Surgeon General**

*Alan Moschioni*



- **The most prominent cause of death for a child under 5 years of age in the United States is an unintentional injury.**

National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System [database]. Available at:

<http://webapp.cdc.gov/sasweb/ncipc/leadcaus10.html> Accessed 2004

- **Among toddlers 12 to 23 months of age, it was the leading cause of injury death and the second leading cause of death overall. Because injuries occur disproportionately among youth, they are the leading cause of years of potential life lost (YPLL). Among unintentional injuries, drownings are the third leading cause of YPLL, with 120 470 YPLL attributable to drownings in 2000.**

<http://www.cdc.gov/ncipc/wisqars>. Accessed 2004

# Those who do survive

- “Near-drownings also take a tremendous financial toll on affected families and society as a whole. Typical medical costs for a near-drowning victim can range from \$75,000 for initial treatment to \$180,000 a year for long-term care. The total cost of a single near-drowning that results in brain injury can be more than \$4.5 million.<sup>8 9 10</sup> The total annual lifetime cost of near-drownings among children ages 14 and under is approximately \$6.8 billion, with children ages 4 and under accounting for \$3.4 billion, or half, of these costs.” <http://www.safekids.org/NSKW.cfm>

## **A description of drowning 1994**

**“The traditional description of drowning has been that the victims experience a sense of panic and then initiate an exhausting struggle to keep their head above the water or to reach safety... breath holding begins with submersion. After a variable period, the victim swallows water, vomits, and coughs violently. Finally, involuntary gasping causes the air passages and lungs to become flooded. The subsequent unconsciousness and convulsive movements are followed by death.”**

**Andrew Newman, M.D.**

**Scientific American Medicine. August, 1994**

# Medical definition of Drowning and challenges to data analysis

The Center for Disease Control (CDC) defines and reports this cause of death within ICD codes (International Classification of Diseases)  
<http://webapp.cdc.gov/sasweb/ncipc/mortrate.html>

## **DROWNING IS NOT A PHYSICIAN REPORTABLE PHENOMENON IN THE UNITED STATES.**

**Drowning** ... death within 24 hours of immersion in liquid, either due to anoxia or cardiac arrest

**Near drowning** ... death within 24 to 48 hours post immersion in liquid

If death occurs 48 hours post immersion, the cause of death can be coded within a variety of categories (cardiac arrest, respiratory arrest, etc.) and will NOT be reported or counted as a drowning death.

In addition,

- “ The coding of mortality data changed significantly in 1999 from ICD-9 to ICD-10, so you may not be able to compare number of deaths and death rates from 1998 and before with data from 1999.
- ICD-10 coding of mortality data was updated in March 2003, which may affect some WISQARS mortality reports.”

<http://webapp.cdc.gov/sasweb/ncipc/mortrate.html>

# United States 2000

## 568 0 to 5 years, drowning deaths

Arizona (27) , California (87), Florida (85) and Texas (67) account for 266 of the 568 reported drownings for children 0 to 5 years of age. CDC data

<http://webappa.cdc.gov/cgi-bin/broker.exe> (accessed 7/26/04)

**The 266 figure from the CDC for those 4 states exceeds the number of 250 supplied by the CPSC to the national media.**

### **ACCURATE NUMBERS ARE NEEDED TO...**

- DRAW THE ATTENTION NEEDED TO SOLVE THIS PROBLEM
- 2. PROVIDE AN ACCURATE MEASUREMENT DEVICE FOR DROWNING PREVENTION EFFORTS

Background and History mortality figures...

a problem of differing numbers

Even though they use the same definition and parameters, these 2 organizations report very different numbers...

- CDC All Races, Both Sexes,                      • Consumer Product Safety Commission
- Ages 0 to 5 years                                      • About 250 "annually"                      0 to 5 years
- ICD-9 Codes: E830, E832, E910
- 1990 716    • <http://www.cpsc.gov/library/alarm.pdf>
- 1991 789
- 1992 697
- 1993 714
- 1994 626
- 1995 677    • Consumer Product Safety Commission
- 1996 639    About 300 "annually"                      0 to 5 years
- 1997 616
- 1998 650
- 1999 632
- 2000 625
- 2001 568
- <http://webapp.cdc.gov/cgi-bin/broker.exe>

<http://www.cpsc.gov/cpsc/pub/pubs/359.pdf>

# Mortality figures ... a problem of differing numbers

“Irresponsible action could be decreased by **impressing mothers with mortality figures for unattended infants.**” Jerome Modell, M.D.

1971

CDC    **568**    0-5 years of age (2001)    [www.cdc.gov/ncipc/wisqars](http://www.cdc.gov/ncipc/wisqars)  
<http://webapp.cdc.gov/sasweb/ncipc/mortcnts9.html>

CPSC    **~250**    0-5 (“annually”)    <http://www.cpsc.gov/cpsc/pub/pubs/359.pdf>

## WHILE ELSEWHERE IN THE MEDICAL LITERATURE...

*M. J. Responder*  
M. J. Responder

• Spyker's numbers **4,000 (0-5) Injury Factbook 1992**

• Redding's numbers **4,600 (0-5) medline**

• American Academy of Pediatrics **1,400** under 20 years of age (2000) yet 0-5 is most prevalent age group...

*USA  
Dr.*

# **Accurate figures ... 250 to 4,600 !**

- Young children and infants are drowning in the United States in alarming numbers ...
- In Arizona, California, Florida and Texas, it is the number one cause of accidental death for children under five years of age. In the United States, we do not know how many are drowning each year due to obscure definitions and inadequate reporting protocols. The range is 250 to 4,600 per year.



# Arizona has the best data collection system in the United States for drowning and near drowning incidents...

<http://www.sosnet.com/safety/current.stories/04.ytd.totals.html>

## Water Related Incidents and Fatalities Report January 1, 2004 - July 23, 2004

[Children's Safety Zone Home Page](#)

[Current Stories Index](#) [Detailed Report of 2002 Incidents from AZ Dept. of Health Services, pdf.](#)

[Detailed Report of 2001 Incidents from AZ Dept. of Health Services, pdf.](#)

[2003 Water Incidents Statistics](#) [2002 Water Incidents Statistics](#)

[2001 Water Incidents Statistics](#) [2000 Water Incidents Statistics](#) [1999 Water Incidents Statistics](#) [1998 Water Incidents Statistics](#)

40 deaths, including 11 children, have resulted from the  
90 Water Related Incidents this year.

Water related incidents are reported to the Children's Safety Zone by the various Fire Department Public Information Officers from across the valley, usually within 48 hours of their occurrence.

**but we have a huge problem.**

The Arizona Department of Health Services reported that 42 children died from drowning in 2000 compared to 22 in the previous year. The Arizona Child Fatality Review Team determined that 36 of these 42 deaths were preventable. Over half of these deaths (22) occurred in backyard pools. Lack of supervision played a role in all 22 of these children's deaths. In 13 cases there was either no pool fencing or inadequate pool fencing. Five children had gained access to the pool from either a sliding glass door or a "pet door" that led directly to the pool. <http://www.hs.state.az.us/news/2001-edc/childfatalitiesreport.htm>

# The Problems

Orlando Sentinel TUESDAY, JUNE 22, 2004

In the first of two national hearings on the issue of pool and spa safety, the commission Monday heard from parents and experts pushing for mandatory safety measures such as pool fences, alarms and devices that will shut off high-suction drains that can pull a child under.

Nationwide, about 250 children younger than 5 drown each year. Most drownings happen in pools, and studies have shown that usually an adult was nearby but not watching the child when he or she fell in the pool.

The data, as it is currently collected and reported minimizes the magnitude of the problem. The under reporting of infant and young child drowning will prevent this from becoming a priority... fences will only diminish the numbers by 20%... four States have more than 250 every year...

“usually” is really 90 %...  
The media needs accurate numbers from credible sources.

**“Irresponsible action could be decreased  
by impressing mothers with mortality  
figures for unattended infants.”**

Jerome Modell, M.D.

The Pathophysiology and Treatment  
of Drowning and Near-Drowning

1971, pg 6.

# Safe Kids?

New research revealed (May 2004) by the National SAFE KIDS Campaign and Johnson & Johnson shows that 88 percent of children who drowned were under the supervision of another person, usually a family member. Supervision was defined as being in the care of another individual, not necessarily in their direct line of sight.

While better quality supervision is critical, the study also found that many adults were not properly fencing pools, requiring use of personal flotation devices (PFDs), or teaching their children how to swim. Additionally, SAFE KIDS found that the majority (55 percent) of parents say they are “not at all worried” or “not very worried” about their child drowning.

[http://www.safekids.org/tier3\\_cd.cfm?folder\\_id=300&content\\_item\\_id=14291](http://www.safekids.org/tier3_cd.cfm?folder_id=300&content_item_id=14291)

**The public needs to know how serious  
this problem really is.**

what MUST change

- Drowning must be defined in a way that speaks to the issue of the incident itself. Make it a physician reportable phenomenon to state and federal health agencies.

One of too many...

