

# Lifeguards Watch, But They Don't Always See!

**T**he drowning statistics are frightening for aquatic professionals, facility owners and managers, and their customers: The Centers for Disease Control reports that six people drown in U.S. swimming pools every day. And four times that many people are victims of near-drowning incidents—some resulting in devastating disabilities. Many of these incidents happen in pools staffed with certified professional lifeguards.

In addition, the Foundation for Aquatic Injury Prevention indicates that an estimated 5,000 children ages 14 and under are hospitalized due to near-drownings each year; 15 percent die in the hospital and as many as 20 percent suffer severe, permanent neurological disability.

**For every child who drowns, four are hospitalized for near drowning.**

*American Academy of Pediatrics*

The typical medical costs for a near-drowning victim can range from \$75,000 for initial emergency room treatment to \$180,000 a year for long-term care. The cost of caring for a near-drowning victim who suffers brain damage can be more than \$4.5 million.

In spite of the industry's high levels of awareness, commitment, and investment in aquatic safety, the swimming pool is not a risk-free recreation site. The implications for all involved in a water accident are serious.

Lifeguarding is the primary means for preventing water accidents. Every second counts in a drowning incident. The longer a victim is submerged in the water, the greater the chance of permanent brain damage or death. If a lifeguard can spot a swimmer in distress within the first ten seconds of a drowning incident, and reach him or her to initiate aid within an additional 20 seconds, it is unlikely a drowning accident will occur. But too often that standard—the 10/20 Swimmer Protection Rule—is not achieved and the outcome is tragic.

**Six people drown in U.S. pools every day. Many of these pools are public facilities staffed with certified professional lifeguards.**

*Centers for Disease Control*

Lifeguarding is not foolproof. We know, after all, that it is a function performed by human beings in often less-than-ideal environments. With all of the extensive training programs and sophisticated methods



for scanning and victim recognition, drowning statistics point to the critical need for improvement in the area of swimming pool safety.

## VIGILANCE STUDIES

Two studies were designed to measure actual lifeguard performance in detecting drowning incidents at swimming pools and to identify the factors that influence lifeguard vigilance. One study, conducted by Jeff Ellis & Associates, was a pioneering, on-site test of how quickly lifeguards could spot a swimmer in trouble underwater. More than 500 tests were performed at 90 U.S. pools and waterparks during the summer of 2001. The facilities had no prior knowledge that the study was being conducted.



In each case, testers placed a mannequin on the pool bottom during an open recreation swimming session at the facility. The tester started the clock when the mannequin was fully submerged and the lifeguard was then videotaped to document behavior and the length of time it took to detect the mannequin on the pool bottom. This process was randomly repeated in both shallow and deep-water lifeguard zones and during a variety of operating conditions for both indoor and outdoor facilities.

**In tests, it took one minute and 14 seconds, on average, for lifeguards to spot the mannequin.**

Check out the July/August issue of the *World Waterpark Magazine™* to learn more about:

## The Psychology of Lifeguarding

Aquatic safety professionals are successfully applying lessons from the world of sports and performance psychology to enhance lifeguard effectiveness. The Yerkes-Dodson Law and the Inverted U Theory, Flow Theory and the Law of Association can all play a significant role in the performance of your aquatic staff.

In the July/August issue of *World Waterpark Magazine™* Tom Griffiths, Ed.D. will discuss research on the psychology of performance improvement and the tips and techniques lifeguards can use to optimize vigilance and increase bather safety. Dr. Griffiths is Penn State University's Director of Aquatics and Safety Officer in State College, PA. He will chair an international task force on lifeguard scanning at the World Congress on Drowning, June 26-28 in Amsterdam, the Netherlands.

**Drowning is the second-leading cause of unintentional, injury-related death among children under age 15.**  
*National Center for Health Statistics*

The study showed that on average, it took one minute and 14 seconds for lifeguards to spot the mannequin. Lifeguards noted the presence of the mannequin on only 46 occasions (or in 9 percent of the tests) within 10 seconds, and in 30 seconds or less in 43 percent of the tests. In 41 percent of the tests it took over one minute; it took more than three minutes in 14 percent of the tests. These dramatic results show that drowning or near-drowning would have occurred in the majority of the test cases, even though the videotapes substantiated that the lifeguards were using standard scanning techniques to survey the pool. They clearly look, but do not always see.

**In tests, lifeguards spotted a submerged mannequin within 10 seconds only 9% of the time.**

A second study examined the many factors—environmental, physiological, cognitive—that can affect vigilance. The study, a literature review titled *Bibliographic Study on Lifeguard Vigilance*, was written by vigilance experts at the Applied Anthropology Institute in Paris, France, and published in September 2001. The institute is renowned worldwide for its work with major airline and car manufacturers, including Airbus.

*Joshua Brener* is the vice president of North American Aquatic Safety for Poseidon Technologies, Inc. Poseidon is a computer-aided drowning detection system designed to work alongside human lifeguards. The system is made up of an advanced camera network that constantly surveys the pool and of a specialized software system that analyzes, in real-time, the trajectories of swimmers.



*Michael Oostman* is the Director of Litigation Support and the Walt Disney lifeguard training program for Jeff Ellis and Associates. Michael has worked with Jeff Ellis & Associates, Inc. since 1991 and currently provides all of the consulting needs involving lifeguard training and day-to-day consultation to Walt Disney World. Jeff Ellis and Associates is an international aquatic safety and risk management consulting firm that has revolutionized lifeguard training in the United States.



**Josh and Michael will present: Your Lifeguards Scan, But Do They Really See? on Wednesday, October 9, from 8:30 a.m. to 10:30 a.m. at the WWA Convention in Las Vegas, Nevada.**

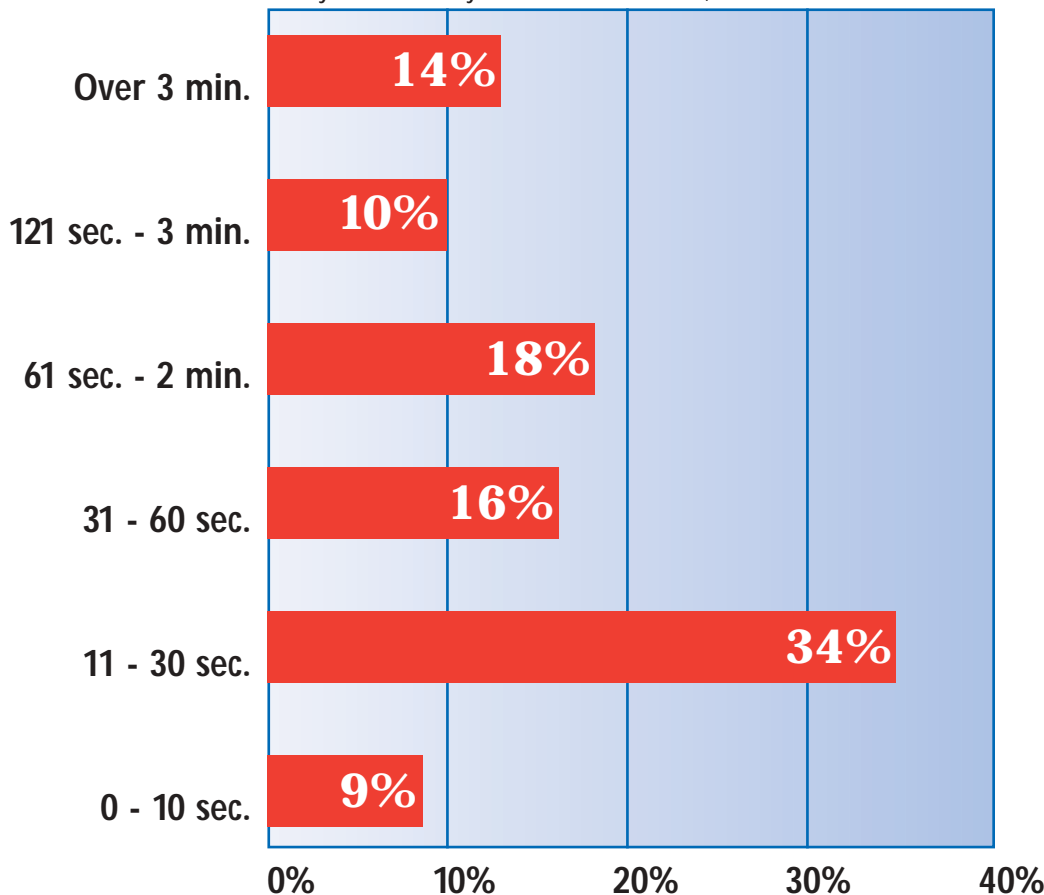
The session highlights the results of the vigilance study completed in 2001, and will include additional data collected during the summer of 2002.

The 2002 study results will be presented for the first time at the World Waterpark Association Annual Symposium.

**On-Site Lifeguard Vigilance Study Results**

**Time Elapsed Before Mannequin Spotted**

Study conducted by Jeff Ellis & Associates, 2001



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# Lifeguards Watch, But They Don't Always See!

## Factors affecting lifeguard vigilance include:

- Vigilance capacity cannot be maintained at an optimum level for more than 30 minutes. The detection of critical signals (signs of a swimmer in trouble) in this type of task is never 100 percent.
- Laboratory studies show that the vigilance level will be higher as the number of relevant signals increases and the amount of non-relevant signals (signals other than a swimmer in trouble) decreases. However, drowning incidents with their associated signals are rare, and they occur only randomly.
- Noise, one of the major environmental factors at a pool, generally has an unfavorable effect on lifeguard vigilance. Moreover, noise hinders the ability to share one's attention and tends to focus one's attention on the signals present in the central vision, to the detriment of those signals present in the peripheral vision.
- The performance of lifeguards can be affected by monotony, stress and fatigue. The particular environment in which the job is performed heightens the fragile nature of the performance.
- Heat is one of the factors that has a major effect on vigilance. Given the seasonal aspect of lifeguarding activities, lifeguards are often exposed to heat and to conditions that are not conducive to their performance. When the temperature is over 30°C / 86°F, vigilance is significantly reduced—by 45 percent.

The lifeguard's job is critical to any aquatic safety program. Yet the obstacles to performing that job effectively are great. It is nearly impossible for anyone to see everything that is happening in a pool, especially below the surface of the water and when other factors, such as heat, noise, and boredom, increase. Furthermore, when additional conditions exist, including emotional stress, sleep deprivation, poor diet, and/or dehydration, the lifeguard's ability to visually process information, remain attentive, and make sound judgments is further compromised. Maintaining vigilance at optimum levels is indeed very difficult.

## Solutions:

No pool can be guaranteed to be 100 percent safe. There are inherent risks in any swimming activity. But there are things that pool operators can do to optimize lifeguard performance and ensure that pools are as safe as possible.

Conduct rigorous training for lifeguards, including exercises that simulate an accident from start to finish. Audit guards periodically to track performance, identify opportunities for improvement, and provide feedback and/or re-training. Re-evaluate the lifeguarding environment. Vigilance capacity decreases with long hours of monotonous work. Consider shorter shifts for lifeguards and implement some type of rotation system so lifeguards are able to engage in different tasks throughout their shifts. As the study indicated, vigilance cannot be maintained at an optimum level for more than 30 minutes, so it would be ideal to schedule rotations every 30 minutes.

## SIGNS OF FATIGUE

- Yawning
- Eyes wandering out of focus
- Trouble concentrating
- Blurred vision
- Rocking back and forth
- Trouble keeping head up—"nodding dog"
- Suddenly come around—"vacant time"

Provide adequate temperature control, sun protection, and water breaks. Educate or coach lifeguards on proper diet and nutrition, on avoidance of alcohol or other substance usage, and on appropriate sleep maintenance. Consider allowing for a 20-minute power nap for each lifeguard during a shift. As indicated by the Bibliographic Study on Lifeguard Vigilance, monotony, stress, and fatigue can affect lifeguards' performance. Learn to recognize and monitor for signs of fatigue, and teach your lifeguards to do the same.

Don't become complacent. Even when lifeguards appear to be alert and actively displaying accepted scanning techniques to monitor the pool, the study conducted by Ellis and Associates showed that drowning or near-drowning would have occurred in the majority of the test cases.

**A non-guarded swimming pool is 14 times more likely than a motor vehicle to be involved in the death of a child age four and under.**

*Orange County California Fire Authority*

Adopt new technology, such as automatic drowning-detection systems that complement lifeguards and can alert them in seconds to a swimmer in trouble underwater. In its Bibliographic Study on Lifeguard Vigilance, The Applied Anthropology Institute concluded, "The maintaining of lifeguard vigilance at a high and constant level throughout his or her surveillance period is particularly difficult due to the nature of the task." The study found that given this difficulty, "Automatic systems that help detect drowning accidents provide essential assistance and are a determining factor in improving safety. For such systems, it is important to take into account and to optimize the functioning of the human/system team in order to maximize the overall performance."

Awareness is a first, important step in improving aquatic safety. The recent lifeguard vigilance studies along with the U.S. drowning statistics certainly raise the awareness that the need for improvement is present.

Taking some steps to review aquatic safety programs, including day-to-day lifeguard scheduling, management practices, and the use of technology and other tools, can be useful in finding ways to raise the level of aquatic safety in facilities all across the United States and the world. 