

## **A Pilot Study of Lifeguard Perceptions**

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This pilot study compared and evaluated lifeguard perceptions of accidents and rescues with actual accident and rescue reports. Although lifeguards were relatively accurate in identifying locations, they were not so in identifying causes. Obviously, knowing what causes accidents is the first step in their reduction or prevention. Additional analysis was conducted on lifeguard perceptions of obstacles and challenges to vigilance and the value of in-service training and periodic staff meetings. All are important components of providing a safe swimming environment. It should be noted that this study was limited in size and scope and should be followed by more geographically diverse research.

**Key Words:** aquatic risk management, lifeguarding, rescues, swimming pools, water safety

In the summer of 2003, a pilot study was conducted at nine private or commercial and public swimming pools located in eastern North Carolina on lifeguards' perceptions related to accidents and rescues, as well as their perceptions of the value of various training exercises and practices employed by typical pool lifeguard staffs. Although a few studies have focused on lifeguard perceptions (Griffiths, Steele, & Vogelsong 1997; Griffiths, Vogelsong, & Steele, 1999), on the importance of lifeguard training (Vogelsong, Griffiths, & Steele, 2000; Turner, Vogelsong, & Wendling, 2003), and in what areas of a pool rescues are most likely to occur (Ellis and Associates, 1996), very little research has actually compared lifeguard perceptions with documented accident data.

### **Method**

In the current study, data were collected by on-site pool managers or assistant managers using a standardized accident/rescue report form that asked lifeguards about their opinions and perceptions of where and why swimming-pool accidents and rescues occurred, obstacles that limited their ability to make rescues and challenges to maintaining their surveillance of swimmers, and the value of skills testing and staff meetings. A total of 34 lifeguards were given questionnaires to complete and return to their pool managers; 23 of these guards responded for a 70% return rate.

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## Results

### Guard Perceptions of Accidents and Rescues

A comparison was conducted to determine whether there were differences between lifeguards' perceptions of where accidents/rescues occurred and what caused them and the actual location and causes of accidents/rescues as reported in accident/rescue reports. As presented in Tables 1 and 2, there were considerable similarities between where reported accidents/rescues in fact occurred and where lifeguards perceived their locations to be.

The three most frequently reported and perceived locations of accidents were the decks, slides and diving boards, and shallow ends of pools (Table 1). The most frequently reported and perceived locations of rescues, as shown in Table 2, were the middle and shallow ends of the pools, followed by the deep ends, and in the water below the slides, which was typically 3–4 ft (~1 m) deep.

As shown in Table 1, lifeguards' perceptions of how frequently accidents occur at various locations match well with the actual frequencies as documented in accident reports. The greatest discrepancies were for the deck location, where

**Table 1 Actual Locations of Reported Accidents and Lifeguard Perceptions of the Locations of Accidents**

Location	Actual %	Perceived %	Difference	95% confidence interval
Baby pool	7.9	10.0	-2.1	-13.6 to 9.4
Basketball goal	2.6	0.0	2.6	-2.5 to 7.7
Bathroom	7.9	0.0	7.9	-0.7 to 16.5
Deck	31.6	20.0	11.6	-6.3 to 29.5
Deep end	10.5	5.0	5.5	-5.7 to 16.7
Outside pool area	5.3	10.0	-4.7	-15.1 to 5.7
Shallow end	15.8	18.3	-2.5	-17.7 to 12.7
Slide and diving board	13.2	25.0	-11.8	-27.2 to 3.6
Steps	5.3	11.7	-6.4	-17.2 to 4.4

Note.  $n = 38$  for actual and 60 for perceived.

**Table 2 Actual Locations of Rescues and Lifeguard Perceptions of the Locations of Rescues**

Location	Actual %	Perceived %	Difference	95% confidence interval
Basketball goal	0.0	6.7	-6.7	-15.6 to 2.2
Bottom of slide	20.0	6.7	13.3	-13.1 to 39.7
Deep end	30.0	33.3	-3.3	-36.3 to 29.7
Middle/Shallow end	50.0	53.3	-3.3	-39.1 to 32.5

Note.  $n = 10$  for actual and 30 for perceived.

lifeguards underestimated the frequency of accidents by 11.6%, and the slide and diving-board areas, where lifeguards overestimated the frequency of accidents by 11.8%. Because all the confidence intervals include the value zero, none of the differences between actual percentages and perceived percentages were statistically significant.

Although the emphasis of our statistical analysis is on interval estimation of the size of the difference between lifeguards' perceptions and the facts as stated in accident reports, one might wonder because of our relatively small sample size whether we had sufficient power to detect whether such differences were significantly different from zero. We employed the GPOWER statistical program (Erdfelder, Faul, & Buchner, 1996) to conduct power analyses. For the analyses presented in Table 1, the sample size produced sufficient statistical power to achieve an 84% probability of detecting a medium-size effect,  $w = .3$ .

As shown in Table 2, lifeguards' perceptions of how frequently rescues occur at various locations match well with the actual frequencies as documented in accident reports. The greatest discrepancy was for the bottom of the slide, where lifeguards underestimated the frequency of accidents by 13.3%. None of the differences between actual percentages and perceived percentages were statistically significant because they all fell within the confidence intervals. It should be noted that statistical power for the analyses reported in Table 2 was low because we had only 48% probability of detecting a medium-size effect.

### **Lifeguard Perceptions of Causes of Accidents and Rescues**

Lifeguards' perceptions of the causes of accidents/rescues were significantly different from the actual causes as reported on accident/rescue reports. As shown in Table 3, lifeguards identified horseplay (74%) as the most frequent cause of accidents. Accident-report data revealed the five most frequent accident causes, representing 86% of the total number of accidents, as walking (23%), horseplay (20%), normal playing (18%), swimming (15%), and climbing pool steps (10%). With the exception of horseplay, lifeguards did not identify any of these top five causes.

As shown in Table 3, lifeguards' perceptions of the relative frequency of the causes of accidents differed significantly on several counts from the relative frequencies as reported on accident reports. Lifeguards greatly overestimated the frequency of accidents caused by horseplay while underestimating the frequency of walking, playing, swimming, and climbing pool steps as causes. The statistical power for detecting differences was 84% for the analyses reported in Table 3.

With regard to causes of accidents associated with rescues, lifeguards' perceptions were again significantly different from the reported actual causes. Once again, as presented in Table 4, lifeguards perceived horseplay (49%) as the most frequent cause of the need for rescues. The second- and third-most perceived causes were swimmers overestimating their abilities (24%) and lack of help from adults in enforcing rules (19%). Rescue reports, however, indicated that the three most frequent actual causes of rescues were swimmers moving into water too deep for their capabilities (67%), jumping into water too deep for their skill (13%), and using the slide (13%). These three scenarios accounted for 93% of all reported causes for requiring rescues. Lifeguards did not identify these three causes, although it should

**Table 3 Actual Causes of Reported Accidents and Lifeguard Perceptions of the Causes of Accidents**

Cause	Actual %	Perceived %	Difference	95% confidence interval
Adults not enforcing rules	0.0	5.3	-5.3	-11.1 to 0.5
Attention-deficit disorder	0.0	1.8	-1.8	-5.3 to 1.7
Climbing pool steps	10.0	0.0	10.0*	7 to 19.3
Clumsiness	0.0	3.5	-3.5	-8.3 to 1.3
Drunkenness	0.0	3.5	-3.5	-8.3 to 1.3
Diving	0.0	3.5	-3.5	-8.3 to 1.3
Exploring	0.0	5.3	-5.3	-11.1 to 0.5
Getting out of pool	7.5	0.0	7.5	-0.7 to 15.7
Horseplay	20.0	73.7	-53.7*	-70.6 to -36.8
In skimmer	5.0	0.0	5.0	-1.8 to 11.8
Not holding rail when entering water	0.0	1.8	-1.8	-5.3 to 1.7
Panic	0.0	1.8	-1.8	-5.3 to 1.7
Playing	17.5	0.0	17.5*	5.7 to 29.3
Previous injury flare-up	2.5	0.0	2.5	-2.3 to 7.3
Swimming	15.0	0.0	15.0*	3.9 to 26.1
Walking	22.5	0.0	22.5*	9.6 to 35.4

Note.  $n = 40$  for actual and 57 for perceived.

\* $p < .05$ .

**Table 4 Actual Locations of Reported Accidents and Lifeguard Perceptions of the Locations of Accidents**

Location	Actual %	Perceived %	Difference	95% confidence interval
Attention-deficit disorder	0.0	2.7	-2.7	-7.9 to 2.5
Drunkenness	0.0	5.4	-5.4	-12.7 to 1.9
Horseplay	0.0	45.9	-45.9*	-62.0 to -29.8
Jumping in water too deep	13.3	0.0	13.3	-3.9 to 30.5
Moving in water too deep	66.7	0.0	66.7*	42.8 to 90.6
No help from adults enforcing rules	0.0	18.9	-18.9*	-31.5 to -6.3
Overestimating ability	0.0	24.3	-24.3*	-38.1 to -10.5
Panic	0.0	2.7	-2.7	-7.9 to 2.5
Playing in pool	6.7	0.0	6.7	-6.0 to 19.4
Using slide	13.3	0.0	13.3	-3.9 to 30.5

Note.  $n = 15$  for actual and 37 for perceived.

\* $p < .05$ .

be noted that overestimating one's ability might or might not include moving or jumping into too-deep water.

As shown in Table 4, lifeguards' perceptions of the relative frequency of the causes for performing rescues differed significantly on several counts from the relative frequencies as reported on the rescue reports. Lifeguards greatly underestimated the frequency of rescues in response to swimmers moving into too-deep water (66.7%) and overestimated the frequency of rescues caused by horseplay (45.9%), overestimation of ability (24.3%), and failure of adults to help with enforcement of the rules (18.9%). Statistical power for being able to detect significant differences was 58% for the analyses reported in Table 4.

### **Lifeguard Perceptions of Obstacles and Challenges to Lifeguard Vigilance**

Another objective of the study was to identify what lifeguards perceived as obstacles to making rescues and challenges to maintaining vigilant surveillance. This is especially relevant considering that a study conducted by Griffiths et al. (1999) indicated that on-duty lifeguards spend nearly as much time not watching the water as they do watching it. When asked if anything limited their ability to make rescues, 22% (5) responded yes and 78% (18) responded no. The five respondents identified the following five obstacles:

- Going too long without a break (1)
- Only one lifeguard at the pool (1)
- People talking to guard on duty (1)
- Safety rope (1)
- The way the lifeguard stand is situated (1)

Lifeguards were also asked to identify challenges to maintaining surveillance of swimmers. The three most frequently identified challenges were

- Heat (too long without a break; 11)
- People talking to guard while on duty (8)
- Boredom (few people at the pool; 4)

Additional challenges identified included sun in the eyes, making sure members wore identification bands, lack of respect by members, worries about following upper management rules, large number of swimmers, people acting stupid, and jumping off unstaffed lifeguard stands. These challenges are consistent with earlier findings that indicated lifeguards are oftentimes distracted by boredom and talking with others (Griffiths et al., 1999). The effect of heat as a challenge to lifeguard surveillance was a novel finding.

### **Lifeguard Perceptions of the Value of In-Service Training and Staff Meetings**

The final purpose of this pilot study was to identify lifeguard perceptions of the value of in-service training and staff meetings. In-service training is considered of paramount concern according to the finding of Griffiths et al. (1997) that an

alarming percentage of certified lifeguards are not highly confident in their ability to make a rescue. At all nine pools surveyed, a monthly skills test (a total of four were given) required that every lifeguard demonstrate his or her skills relevant to rescuing victims for an active drowning, a surface passive drowning, a submerged passive drowning, an obstructed airway, adult/child/infant CPR, surface spinal injuries, and submerged spinal injuries. A standardized check sheet encompassing these seven skills was used. Lifeguards were tested by managers certified by the American Red Cross in adult/child/infant CPR, first-aid, and lifeguard training. Skills improperly demonstrated were corrected during testing. Lifeguards receiving a proficiency score below 90% were taken off the pool's work schedule and retested at a later date. Only 13% (3) viewed in-service skills as "not valuable," 13% (3) viewed it as having at least some value, and 74% (17) viewed it as very or extremely valuable.

All nine pools also held weekly staff meetings. Lifeguards were asked how valuable weekly staff meetings were relevant to 10 topics. Based on their responses, the 10 staff-meeting topics were ranked in order from most (1) to least (10) valuable:

1. Work schedule
2. Change in rules
3. Pool activities
4. Bather complaints
5. Pool cleaning
6. Rule enforcement
7. Recent accidents
8. Surveillance techniques
9. Recent rescues
10. Water testing

The topic receiving the highest ranking was discussing the upcoming work schedule. Although topics 1-9 were each viewed as very or extremely important by over half the lifeguards, the tenth topic, water testing, was viewed as not valuable by nearly one third. It also should be noted that the four topics ranked lowest (i.e., 6-10) related to safety (i.e., recent accidents and rescues, surveillance techniques, and water testing).

## Discussion

Our study results had some obvious limitations. Our sample was both small and geographically limited (i.e., eastern North Carolina). Although for the most part we achieved moderate to adequate statistical power to identify meaningful differences, whether our results are generalizable to other pool or water-park lifeguard staffs such as those trained by the YMCA of the USA or Ellis and Associates or to surf beach staffs is unknown. In addition, we used accident reports as the criterion measures against which we compared the survey results of lifeguard perceptions. Accident reports, even though compiled at the time of accidents and rescues, are not infallible and potentially contained errors and misconceptions. This might be

particularly true of the identified causes of accidents and rescues that called for judgments by those who completed the accident reports.

## Summary

Providing a safe swimming environment for bathers is a paramount concern for pool managers and their lifeguard staff. Important components of providing such a safe aquatic environment include, but are not limited to, adequately perceiving and anticipating accidents and rescues, periodic in-service skills testing and staff meetings, and removing obstacles to surveillance and rescues. As shown by the results of this pilot study, the lifeguards we surveyed were surprisingly accurate in identifying the primary locations where accidents and rescues occurred but mainly did not correctly attribute the causes of accidents or need for rescues. Generally, lifeguards did value the need for common practices such as in-service training and regular staff meetings.

This pilot study identified the concern that, pending further research, improved swimming-pool safety might well be limited by lifeguard perceptions. That concern was the disparity between lifeguards' perceptions of the causes of accidents/rescues and actual causes as contained in accident reports. Helping lifeguard staff accurately identify and address behaviors that lead to accidents and rescues should result in a safer swimming environment.

Of course, as a pilot study, this work must be followed by other larger and more geographically diverse studies to determine the degree to which these results might be generalizable. The authors welcome others to contact us to obtain a copy of our standardized accident/rescue-report form as a means of accurately replicating our initial pilot study. In addition, the major lifeguard-training agencies such as the American Red Cross, YMCA of the USA, and Ellis and Associates must heed our and subsequent findings and account for them in revised training programs.

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