

INTRODUCTION

We are pleased to present the first outcomes and recommendations of the United States Lifeguard Standards Coalition (USLSC), a project sponsored by the American Red Cross, the United States Lifesaving Association (USLA), and the YMCA of the USA. The sponsors intend for these recommendations to have a positive influence on the training of lifeguards and the practice of lifeguarding within their own organizations and, by freely sharing this research information and results, also within other lifeguard training organizations. We have undergone this process maintaining the principle that best practice in lifeguarding should be based on the best and most scientific evidence available, and that once that evidence is identified, it should be relevant for and apply to all lifeguard training.

The Problem

As lifeguarding has evolved over the years, lifeguard training methods and standards have primarily been established on the basis of experience and opinion. This can be a result of trial and error (or success), or of the recommendations of people who are considered experts. Just as experience and expertise vary in different organizations, so do methods and standards. In the case of some standards, the organizations promoting them may not even have an institutional memory regarding the reason the standard came to exist. The standards may simply have been accepted on the basis of historical adherence: “We do it that way because we have always done it that way.”

Reviewing the lifeguard training standards that are advanced by various organizations, including the American Red Cross, the USLA, the YMCA of the USA, and others, demonstrated that some practices differ within the field. The role of a lifeguard, regardless of where trained or employed, is to prevent death and injury. Using the best methods of training and standards of practice can therefore be expected to reduce the incidence of death and injury. First though, they must be identified.

In a number of areas within the scope of lifeguard training and standards, high quality scientific studies have been published and replicated. Some of these studies have been overlooked in the development of lifeguard training programs, perhaps because they were previously unknown to those developing the programs. A fundamental assumption of this project is that by identifying areas of lifeguard training and standards that are lacking a scientific basis and reviewing available scientific studies in related areas, we will be able to recommend modifications to help ensure that training and standards are based on solid evidence. We assumed from the start that in some areas, “best practice” should be followed, but that this best practice must first be determined.

History of Collaboration

The American Red Cross, the USLA, and the YMCA of the USA are all nationally recognized nonprofit organizations, part of whose mission is the development and delivery of lifeguard training in a variety of environments. All three are the US members of the International Life Saving Federation (www.ilsf.org).

In 2003, the three organizations began discussing a formal collaboration. From the beginning, a key goal was to work together to identify best practices in areas that each organization had historically been relying primarily on consensus expert opinion. This eventually evolved into a formal letter of understanding, under which the three organizations have been working since that time.

Establishment of the Coalition

In 2005, the three groups formally announced a plan to move forward with establishing guidelines for lifeguarding and water safety. Soon thereafter, this project came to be known as the United States Lifeguard Standards Coalition (USLSC). The vision of the founders was to establish a process of inviting a wide range of experts from allied fields; identifying key issues in lifeguarding that needed review, research, and resolution; researching existing scientific evidence on those issues; recommending best practice based on the evidence when possible; and when not possible, recommending additional research.

Each organization appointed a chair based on his expertise in evaluating scientific research and conducting evidence-based reviews. A wide variety of groups were invited to appoint representatives, and face-to-face meetings were conducted in 2006, 2007 and 2008. The coalition benefited greatly by grants from the National Swimming Pool Foundation, as well as from extensive contributions of resources and personnel from the three sponsoring organizations and the many other organizations who provided experts.

USLSC process participants and attendees were selected in an effort to assure a sound, unbiased process with multidisciplinary expertise and broad representation, and to allow for open evaluation, critique, and consensus. Participant organizations included both not-for-profit national professional/scientific associations and governmental agencies relevant to the field. Various levels of participation (eg, participant organizations, observing organizations, individual participants) were identified based on criteria for each, and invited to participate by the coalition. The roles and responsibilities assigned to each level of participation are listed below.

In addition, a Web site with e-mail contact address (info@lifeguardstandards.org) was established that listed the selection criteria and allowed other organizations to inquire about participation if the organization believed it met the criteria. In this case, the coalition requested the following information: 1) contact information, 2) a description of the organization, 3) relevance of the individual or organization/representative to the project, and 4) potential or real conflicts of interest. Members of the media were also invited to participate via this Web site.

Participants and Responsibilities

Sponsoring Organizations	Chairs
American Red Cross	David Markenson, MD Chair of the American Red Cross Advisory Council on First Aid and Safety
United States Lifesaving Association	Peter Wernicki, MD Medical Advisor, United States Lifesaving Association and Member, International Life Saving Federation Medical Committee
YMCA of the USA	Gerald E. DeMers, PhD Chair, Kinesiology Department, California Polytechnic State University

Sponsoring Organizations	Representatives
American Red Cross	Roy Fielding Stephen Langendorfer, PhD Francesco A. Pia, PhD
United States Lifesaving Association	B. Chris Brewster Peter Chambers, PhD, DO Peter Davis
YMCA of the USA	Ralph L. Johnson, PhD Terri Lees Laura J. Slane
Participant Organizations	Representatives
American Academy of Pediatrics	Linda Quan, MD
American Association for Physical Activity and Recreation	Tomas A. Leclerc, MS
American Camp Association	Rhonda Mickelson
American College of Emergency Physicians	Andrew Butterfass, MD, FACEP
American Heart Association	William (Bill) Hammill
American Public Health Association	Greg Finlayson
Boy Scouts of America	David Bell Keith Christopher Frank C. Reigelman
International Life Saving Federation	Dr. Steve Beerman
National Intramural-Recreational Sports Association	Carrie Tupper
National Park Service	Philip Selleck
National Recreation and Park Association	Farhad Madani
US Coast Guard	ASTCS Clay Hill
USA Swimming	Sue Nelson
Funding Organization	
National Swimming Pool Foundation	Tom Lachocki
Observing Government Agency	Representatives
Centers for Disease Control and Prevention/National Center for Injury Prevention and Control	Julie Gilchrist, MD
National Institutes of Health/National Heart, Lung, and Blood Institute	George Sopko, MD
Observing Organizations	Representatives
American Heart Association	Mary Fran Hazinski
American Red Cross	Don Vardell
Canadian Lifesaving Society	Perry Smith
Canadian Red Cross	Michele Mercier
Starfish Aquatics International	Lake White
Sponsoring Organizations	Support Staff
American Red Cross	Jean Erdtmann Connie Harvey Lindsay Oaksmith
YMCA of the USA	Mike Espino Kay Smiley Kelly Fischbein (Volunteer)

Level of Participation	Roles and Responsibilities
Sponsoring Organizations/Co-Chairs	<ul style="list-style-type: none"> • Fulfill roles through appointment of a co-chair and additional representatives • Establish process • Chair the meetings • Serve as editors for final products • Participate in voting and evidence review
Participant Organizations	<ul style="list-style-type: none"> • Fulfills roles through appointment of a representative • Attend all meetings • Participate and complete evidence reviews assigned • Vote on recommendations • Review final publications
Individual Participants While most participants functioned as representatives of various organizations, in rare cases, certain individuals were invited to participate if they were a recognized national or international expert in the field, and/or possessed a unique knowledge base needed for one or more questions to be reviewed.	<ul style="list-style-type: none"> • Attends meetings related to their area of expertise • Assist with evidence reviews • Does not participate in voting • Review relevant sections of final publications
Observing Government Agencies While many government agencies were invited to be participating organizations, in certain cases the agency wished to observe rather than to participate.	<ul style="list-style-type: none"> • Fulfills roles through appointment of representative • May attend meetings at their discretion and expense • May review final publications • Does not vote on recommendations
Observing Organizations (nongovernment) Certain organizations that have an interest in the field, but who may not meet the criteria for a participant organization, may wish to only observe or may have a real or perceived conflict of interest of such a nature that serving as a participant organization would create either a real or perceived bias to the process.	<ul style="list-style-type: none"> • Fulfills roles through appointment of representative • May attend meetings at their discretion and expense • May participate in meetings after disclosing any conflicts of interest • May review final publications • Does not vote on recommendations

Scope of the Process and Key Terms

The following general categories were covered, with specific questions in each listed below:

Prevention and Vigilance

1. What evidence is there to support the effectiveness of scanning techniques in identifying patrons in need of assistance?
2. What evidence is there that has identified external factors that positively influence vigilance among lifeguards?
3. What are effective strategies to avoid inattentive blindness?
4. What visual and behavioral cues are useful for identifying high-risk patrons?

5. How long should a lifeguard be assigned to continually watch the water before interruption of duty?

Rescue and Standards of a Lifeguard

1. Is there evidence to support recommending a minimum physical competence level for lifeguards to be met and maintained?
2. Is there evidence to support recommending a minimum age for lifeguards?
3. Is there evidence to support recommending a minimum hearing standard for lifeguards?
4. Is there evidence to support recommending a minimum vision standard for lifeguards?
5. Is there evidence to support recommending use of equipment during aquatic rescues for lifeguards?

Resuscitation, First Aid, and Education

1. Are there unique aspects for establishing and maintaining upper airway management in the drowning process resuscitation?
 - a. For in-water resuscitation, are there unique aspects of establishing and maintaining upper airway management and safe, effective, and feasible rescue breathing in the drowning process resuscitation?
2. Is there any evidence that there are safe, effective, and feasible positioning, maintaining and extrication techniques in maintaining peripheral neurologic function or outcome of a cervical spinal injury?
 - a. What are the relative risks and benefits of spinal injury management in the water?
3. Can resuscitation skills needed for the victim of the drowning process be acquired through online learning?
4. Is suction safe, effective, and feasible in the drowning process resuscitation?
5. Is oxygen safe, effective, and feasible in the drowning process resuscitation?

Key Components

The following criteria were set for the key components of the process:

- Evidence-based
- Thorough, detailed, collaborative, and unbiased
- International in scope
- Involve individuals who will both implement the guidelines and work using the guidelines
- Include many opportunities for input throughout the process

Steps

The multistep development process was validated, using evidence-based guidelines, and included the following:

- Investigation of the history of safety and rescue protocols currently in existence
- Establishing definition for key terms in this field
- Defining the scope of the process and the questions to be addressed
- Developing a hypothesis and/or scientific question for each area to be addressed
- Reviewing the available evidence using a validated and standardized approach. In most cases, at least two experts reviewed each topic, rating the level and quality of evidence using a standardized evidence evaluation process to develop a “worksheet” for each topic. The evidence reviewed included but was not limited to:
 - Population-based studies
 - Epidemiologic studies
 - Case-control studies
 - Historic research

- Case studies
- Large observational studies
- Review of past research summaries
- Extrapolations from existing data collected for other purposes
- Presentation and approval by coalition members of the evidence review; each topic was presented, discussed, and critiqued by the assembled experts until a consensus was reached.
- Open comment on proposed guidelines. The draft guidelines are now posted to a public Web site for a comment period. In addition, representatives of organizations that set regulations, standards, or practice guidelines in lifeguarding are given an opportunity to review the science evidence and provide comments for consideration. After the comment period, the received feedback will be reviewed by the experts to determine if the proposed guideline need any modification.
- Publication of guidelines with evidence review
- Public distribution of final guidelines

Conflict of Interest Statement

The USLSC considered conflict of interest (COI) of the utmost importance in maintaining the integrity of the evidence evaluation process. Every effort to resolve any real or perceived COIs during the entire science review process was made. Every participant was asked to complete and update a COI disclosure form, and a COI booklet that included all COI information for every participant was given to all participants.

PROCESS AND METHODOLOGY

Evidence-Based Process

The process conducted represents the most comprehensive review of the lifeguarding literature to date. It fostered collaboration among the multiple disciplines with expertise in or supporting lifeguarding and aquatic rescue. These included not-for profit professional and technical organizations, scientific researchers, and government agencies. The process included key components and specific conflict management procedures.

Meetings of the USLSC were held in Valhalla, New York (December 2006); Charlotte, North Carolina (June 2007); San Luis Obispo, California (December 2007); and Colorado Springs, Colorado (October 2008). During these meetings, questions to be researched were identified, volunteers from participant organizations were recruited to conduct the research (in most cases, two independent researchers per question), evidence was evaluated, and consensus was reached on what the researched evidence supported in answering the questions identified.

The USLSC participants are being asked to review the compiled draft and comments. After a 45-day public comment period, with evidence and draft outcomes posted on the Web, guidelines will be developed.

Scientific Review and Evidence Grading

Table 1. Guideline Definitions for Evidence-Based Statements

Statement	Definition	Implication
Standard	The anticipated benefits of the recommended intervention clearly exceed the harms and the quality of the supporting evidence is excellent. In some clearly identified circumstances, strong recommendation standards may be made when high-quality evidence is impossible to obtain and the anticipated benefits strongly outweigh the harms.	Follow unless a clear and compelling rationale for an alternative approach is present.
Guideline	The anticipated benefits exceed the harms, but the quality of evidence is not as strong. Again, in some clearly identified circumstances, recommendations may be made when high-quality evidence is impossible to obtain, but the anticipated benefits outweigh the harms.	Prudent to follow but remain alert to new information.
Option	Courses that may be taken when either the quality of evidence is suspect, or the level and volume of evidence is small, or carefully performed studies have shown little clear advantage to one approach over another.	Consider in decision-making.
No recommendation	A lack of pertinent evidence; the anticipated balance of benefits and harms is unclear.	Remain alert to new published evidence that clarifies the balance of benefit versus harm.

Table 2. Criteria for Assigning Level of Evidence (LOE)

LOE	Criteria
1a	Population-based studies, randomized prospective studies
1b	Large non-population-based epidemiologic studies, meta-analysis, or small randomized prospective studies
2	<i>Prospective</i> studies, which can include controlled, non-randomized, epidemiologic, cohort or case-control studies
3a	<i>Historic</i> studies, which can include epidemiologic, non-randomized, cohort or case-control studies
3b	<i>Case series</i> : participants are compiled in serial fashion without a control group, convenience sample, epidemiologic studies, observational studies
3c	Mannequin, animal studies, or mechanical model studies
4	Peer-reviewed works that include state-of-the-art articles, review articles, organizational statements or guidelines, editorials, or consensus statements
5	Non-peer-reviewed published opinions, such as textbooks, official organizational publications, guidelines and policy statements, and consensus statements
6	Common practices accepted before evidence-based guidelines or common sense
1-6E	Extrapolations from evidence that is for other purposes, theoretical analyses that are relevant to the question being asked; modifier “E” applied because extrapolated but ranked based on type of study