

# Proceedings

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**American  
Red Cross**

Scientific  
Advisory Council



# The Scientific Advisory Council

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The American Red Cross Scientific Advisory Council is a 50+ member, voluntary committee of healthcare, public health, aquatics, preparedness, public safety and educational professionals that establishes and assures the scientific basis for Red Cross programs, products and public guidance. The Council advises the Red Cross to ensure programs are fully current with the latest science, address current needs and are prepared for future changes. Members of this independent panel are nationally recognized experts with sub-specialties in such diverse fields as emergency medicine, first aid, resuscitation, pediatrics, cardiology, occupational health, sports medicine, school health, EMS response, aquatics, disaster health and emergency preparedness.

The Council members are organized into the following five groups:



**Aquatics Sub-Council**



**First Aid Sub-Council**



**Preparedness and Disaster Health Sub-Council**



**Resuscitation Sub-Council**



**Education Sub-Council**

**David Markenson, MD, MBA, FCCM, FAAP, FACEP, FACHE** is Co-Chair Chief Medical Officer (CMO) of the Scientific Advisory Council

**Eunice (Nici) Singletary, MD, FACEP** is Co-Chair Volunteer of the Scientific Advisory Council

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## Aquatics Sub-Council

The Aquatics Sub-Council reviews ways to help keep people safe around water, including lifeguarding techniques; swimming instruction; causes, recognition and prevention of water emergencies; rescue, resuscitation and transport.

### **Peter G. Wernicki, MD, FAAOS**

Aquatics Sub-Council Chair  
Associate Clinical Professor in Orthopedic Surgery  
at the University of Florida Medical School;  
Medical Advisor of the U.S. Lifesaving Association;  
Past Chair and member of the International Life  
Saving Federation's Medical Committee

### **William Dominic Ramos, PhD, MS**

Aquatics Sub-Council Vice Chair  
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### **Angela K. Beale-Tawfeeq, PhD**

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University; Director of Education and Research,  
Diversity in Aquatics; Licensed Training Provider/  
Youth Development Mentor, End Needless Drowning

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Mentorship and Swim Organization, Inc., President

### **Kevin M. Ryan, MD**

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### **Andrew Schmidt, DO, MPH**

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Medicine, University of Florida College of Medicine

### **Leslie K. White, BRec**

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Department of Community Services-  
St. John's, Newfoundland & Labrador, Canada

### **Senior Advisor**

#### **Linda Quan, MD, FAAP**

Pediatric Emergency Physician at Seattle Children's  
Hospital; Professor Emerita of Pediatrics at the  
University of Washington School of Medicine

### **Ad-hoc members**

#### **Austin R. Anderson, PhD**

Associate Professor, Department of Kinesiology  
and Sport, University of Southern Indiana

#### **Teresa (Terri) Lees, MS**

Aquatic Specialist and Licensed Massage  
Therapist, self-employed

## Roy Fielding Dedication in Canada

The Canadian Red Cross recognized our friend and colleague, Roy Fielding, a 50-year volunteer for the American Red Cross who passed away unexpectedly on May 15, 2020:

“The CRC would like to gratefully acknowledge the invaluable contributions of ‘The Pool Professor’ Roy Fielding (1951-2020) to the aquatics industry. His enormous impact in the lifeguarding field includes the development of the Lifeguard Rescue Reporting System, and he will be remembered fondly by all who knew him.”

## Aquatics Centennial Campaign

The Aquatics Centennial Campaign was created in 2014 in recognition of 100 years of Red Cross water safety education. Through partnerships with Licensed Training Providers across the country, the Campaign makes learn-to-swim and water safety programs available, accessible and affordable in communities that have historically struggled with high drowning rates.

At the start of 2020, 58 providers in 25 states were set to provide programming through this Campaign. However, due to COVID-19 related restrictions, only 32 providers were able to deliver programming of any kind.

As of December 31, 2020, through Licensed Training Provider partners the Aquatics Centennial Campaign has:

- Delivered 103,399 sets of lessons (which translates to 827,192 individual lessons) to children and adults.
- Developed 2,132 future lifeguards through Junior Lifeguarding.
- Trained 2,178 lifeguards, water safety instructors and lifeguard managers.

- Equipped 17,492 parents and caregivers with water safety knowledge and skills. 774 parents and caregivers also received focused pediatric CPR/AED training, often resulting in certification.

In spite of the extended closures, our providers still felt an enormous responsibility to educate their communities about drowning prevention, a critical element of the Aquatics Centennial Campaign. In response, the Red Cross rapidly refreshed existing resources and developed new ones to support our Centennial Campaign programs and other aquatics providers in their efforts to virtually engage and educate their communities about drowning prevention.

For example, we shared our WHALE Tale lessons directly to families through a new section of our website: [redcross.org/watersafetyforkids](https://redcross.org/watersafetyforkids). Since the launch of this page in late April, 12,904 people have entered our website directly through this URL. Visitors to our water safety pages spend on average a substantial seven minutes per visit.

We also released several free online courses: Water Safety for Parents and Caregivers (available in English and Spanish); Becoming a Water Safety Ambassador; and Orientation to Swim Lessons for Parents and Caregivers, which includes a section on what changes to expect in swim lessons due to the pandemic. As of December 31, 2020, 12,620 people have successfully completed these new online courses.

Other examples of these efforts include Spanish translations for water safety handouts and infographics; closed captioning for Longfellow WHALE Tales lessons; the creation of short educational videos featuring works of the Scientific Advisory Council on topics related to drowning prevention; and the development of Water Watcher information that includes a do-it-yourself Water Watcher on Duty card.

## Scientific Review

### Ventilations for Cardiac Arrest Victims due to Drowning

**Lead Reviewer:** Andrew Schmidt, DO, MPH

**Other Worksheet Authors:** Roy Fielding, MS, LGIT, WSIT; Lynn Boyle, MSN, RN; Andrew MacPherson, MD; John R. Fitz-Clarke, MD, PhD (ad hoc)

#### Questions

When a person experiences cardiac arrest due to drowning, is there evidence that ventilations prior to chest compressions are more effective than chest compressions followed by ventilations?

In drowning-related cardiac arrest, current recommendations are for two ventilations. Is there evidence that any other number of ventilations, or ratio other than 30:2 for one-person CPR, is more effective?

#### Discussion and Findings

A literature search identified four studies out of 185 initial results that looked at these questions. Three supported the use of early ventilations in the CPR pathway, while the fourth found no difference between traditional and compression-only CPR. All analyses had limitations and further research is necessary going forward.

In an observational study of 93 patients who underwent CPR after submersion in swimming pools, four were reported to regain consciousness with ventilations alone. However, the total cohort consisted of all ages and there were no details on the four. A second observational study demonstrated that bystander ventilations were correlated with improved outcome. A shortcoming in this instance was that the outcome was survival to hospital arrival when neurologically favorable survival to discharge is the most significant concern. A third observational study looked at primarily older people (80% over 65), a population unlike most drowning cohorts

(who are primarily young children). No difference in outcome between traditional and compression-only CPR was detected in this population.

In the fourth study, Outcome of Conventional Bystander Cardiopulmonary Resuscitation in Cardiac Arrest Following Drowning, by Joshua M. Tobin, MD, et al, 2020, researchers used the CARES (Cardiac Arrest Registry to Enhance Survival) database to correlate type of CPR with outcomes. They found that CPR with ventilations improved neurologic outcomes for people aged five to fifteen years, supporting the use of ventilation in the CPR pathway. A critical limitation is that the current CARES database does not include drowning-specific data. This will change in the near future and the research team plans to revisit and re-analyze the CARES database once drowning-specific data are incorporated.

Since cardiac arrest due to drowning is obviously a difficult subject to follow in scientific trials and significant knowledge gaps persist, researchers also consulted an expert in this field, John R. Fitz-Clarke, MD, PhD, of Dalhousie University in Nova Scotia, Canada. Using a physiologic computer monitor, he evaluates the correct number of breaths to optimize oxygenation during CPR using bag-valve-mask (BVM) and mouth-to-mouth rescue ventilation. The physiologic modeling data suggests a range of two to five breaths depending on the means of delivery of positive pressure ventilations.

Discussion followed, with concern expressed about the inclusion of expert opinion in addition to empirical scientific data. Based on the low quality and volume of evidence currently available, new recommendations for the sequence and ratios of compressions and breaths specific to drowning cannot be made at this time. However, it is the opinion of the authors of this review that early ventilations are an important aspect of the resuscitation of a drowning victim and the sequencing of CPR should reflect this.

The Sub-Council concluded that ventilations play a critical role in the treatment of drowning victims and recommended that the Red Cross consider allowing for the option of five initial breaths with mouth to mouth/mask ventilations in the training of lifeguards.

**Recommendations: Standards**

None.

**Recommendations: Guidelines**

None.

**Recommendations: Options**

Lifeguard training may include the option to replace the two initial rescue breaths in CPR with five initial rescue breaths if performing mouth to mouth/mask.

**Advisory:**

**Plain Language Scientific Foundation:** There is insufficient data to recommend changes to current CPR guidelines for drowning patients. It is the opinion of these authors that given the role of hypoxemia in morbidity and mortality, ventilations should be a priority of treatment, especially for professional rescuers. In regard to the training of lifeguards, based on physiologic modeling and case reports of positive patient response to initial breaths, and given the fact that initial resuscitation provided by lifeguards commonly occurs before other equipment arrives, the option should be presented to provide five breaths before initiating CPR.

**Plain Language Overview of Recommendation:**

Based on the quality and volume of current data, new recommendations for the sequence and ratio of compressions and breaths specific to drowning cannot be made at this time. Training of professional rescuers as well as lay rescuers who may encounter drowning patients should continue to highlight the importance of early ventilations in the treatment of these patients.

**Implications for Red Cross Programs and Materials**

Evidence from this review suggests the need for practical and specific changes to certain Red Cross programs and materials:

- Courses and Materials: Possible inclusion of the option for five initial ventilations in the Red Cross Lifeguarding course.
- Public Messaging and Apps: No change of messaging for non-professional rescuers.

Red Cross training should include the following content:

- The role of hypoxemia in the morbidity and mortality of drowning patients cannot be overstated.
- There is weak evidence that early ventilations improve outcomes and no evidence that they worsen outcomes.
- Based on physiologic modeling and the importance of early ventilations, application of positive pressure ventilations should be emphasized in lifeguard training and participants should be given the option to initiate resuscitation and CPR with five ventilations when using mouth to mouth/mask.

**Communication and Distribution of Information**

Key background to explain importance: Early ventilations in the treatment of drowning cardiac arrest patients improves outcome. Ventilations should be part of the CPR sequence for drowning.

Key changes: Lifeguards trained in the use of mouth to mouth/mask should consider initiating CPR with five ventilations with mouth to mouth/mask.

Reasons this is better than past practice: There is some evidence that focusing on initial ventilations may better optimize oxygenation and lead to improved outcomes.



People affected by change in practice: Instructors and students in Red Cross Lifeguarding courses.

### **Council Action**

The Council unanimously approved the revised recommendations.

## **Triennial Review**

### **Sun Safety**

**Reviewers:** Bridget McKinney, MS and William Ramos, PhD

**Original Reviewer:** Peter G. Wernicki, MD

### **Question**

What are the most effective ways to protect the skin from sun radiation linked to skin cancer?

### **Discussion and Findings**

Because the Red Cross teaches so many water safety courses, it has an opportunity to make recommendations about sun safety in a swimming environment, as well as a responsibility to provide guidance to its instructors.

A literature search identified 222 articles on sun safety published in the last five years, with reviewers including five in their final qualitative synthesis. While the awareness of skin cancer is growing, the practice of preventive behaviors remains relatively low in the U.S. Studies suggest that aquatics-based skin cancer prevention programs can have a beneficial impact in promoting protective measures, particularly in outdoor recreation settings such as swimming pools. Video education may also be helpful in increasing public awareness. Going forward, scientists need to examine the long-term impact of these interventions and evaluate strategies for the diffusion of successful program models.

Other research notes that it is important to consider the ingredients in sunscreen. On January 1, 2021, two common sunscreen ingredients were banned in Hawaii due to their negative impact on marine ecosystems. This is likely to become a worldwide trend, particularly in areas that have coral reefs, and scientists are seeking alternative sunscreen compounds.

People of color are at a lower risk of developing skin cancer but when it does occur, the symptoms tend to be harder to recognize and diagnose. Diagnosis of skin cancer in a more advanced state makes it more difficult to treat, and the 5-year melanoma survival rate for Black people in the U.S. is 65% compared with 91% for white (Skin Cancer Foundation, 2014). More research is needed on how to detect and prevent skin cancer in people of color.

Although skin cancer is the most common cancer, the reviewers emphasize that it is also one of the most preventable cancers. The Aquatics Sub-Council continues to recommend the following preventive practices:

### **Recommendations: Standards**

- Reduce exposure to midday sun (10 am to 4 pm).
- Cover as much of the body as feasible when in the sun during those hours with a wide-brimmed hat and clothing made of tightly woven materials or with embedded SPF protection.
- Focus intervention efforts on primary grade children and recreational settings

### **Recommendations: Guidelines**

- On exposed skin, use sunscreen with an SPF of at least 15 and UVA protection of at least three stars in adequate amounts. Reapply sunscreen frequently. Use of sunscreen should not encourage longer exposure to the sun, especially for intermittent exposure of the type associated with summer recreational activities.

### **Recommendations: Options**

None.

### **Council Action**

The Council voted unanimously to reaffirm the prior recommendations.

## **Triennial Review**

### **Swim Goggles**

**Reviewers:** Stephen J. Langendorfer, PhD and Angela K. Beale-Tawfeeq, PhD

### **Questions**

Should participants be allowed to use swim goggles while participating in Red Cross Lifeguarding courses?

Should participants use swim goggles in instructional swimming and water safety courses?

### **Discussion and Findings**

In the previous review, the question of the safe and appropriate use of swim goggles during lifeguard training was examined. In the current Triennial Review, reflecting the fact that wearing swim goggles has become virtually universal among instructional, recreational and competitive swimmers in the 21st century, the Sub-Council expanded the question to include safety and appropriateness of swim goggles in swimming and water safety classes.

Despite an extensive and expanded literature search to address this broader question, the reviewers found no additional relevant evidence-based studies published between 2016 and 2020. As a result, they do not suggest any revision to the original lifeguarding question or the corollary about the safety and appropriateness of swim goggle use in swimming and water safety classes.

Current recommendations are based on the same ophthalmologic evidence-based research as the original findings: The potential for serious eye injury is increased when a swim participant wearing goggles

is submerged to a depth of five feet or more and cannot equalize pressure through the nose (Butler, 2012).

### **Recommendations**

- During lifeguard training, swim goggle use should be restricted to the prerequisite 300-yard swim and non-contact surface swimming practice activities. Swim goggles should not be used for submerging below five feet or *during evaluative criterion course activities*.
- Similarly, the Sub-Council offers the logic-based suggestion that because most drowning situations occur to individuals who do not plan to swim, swim goggles should not be used *during evaluative instructional swimming and water safety activities to demonstrate water competence or during diving or submersion activities*.
- Goggles can be used for introductory and practice activities in swimming and water safety classes, but until adequate research is completed comparing water competence performance with and without goggles, it is important that Water Safety Instructors assure themselves that swimmers can satisfactorily complete important criterion water competency skills (e.g., safe water entry/exit, breath control, flotation, movement on front or back, change of position and orientation) with and *without* goggles during potential drowning incidents.

### **Council Action**

The Council reaffirmed the prior recommendations unanimously along with their expanded application to swimmers in instructional classes.

## **Triennial Review**

### **Assisting Drowning Victims: Effective Water Rescue Equipment for Lay Responders**

**Lead Reviewer:** Angela K. Beale-Tawfeeq, PhD

**Other Reviewers:** Stephen J. Langendorfer, PhD and Leslie K. White, BRec

**Original Reviewers:** Angela K. Beale-Tawfeeq, PhD and Stephen J. Langendorfer, PhD

### Questions

What evidence exists supporting the most effective type of aquatic rescue equipment for laypersons/bystanders to use to rescue a drowning person?

To thoroughly analyze the main question, the reviewers also posed three sub-questions: Is there evidence for the most accurate and buoyant types of devices for lay rescuers to use? Is there evidence identifying which equipment works best for quick rescues by lay rescuers? Is there evidence about which equipment can be grasped most easily by drowning victims?

### Discussion and Findings

There is a limited body of research regarding the most effective equipment for a lay responder to use when assisting a victim in an aquatic environment, and a comprehensive examination of recent scientific literature identified no additional evidence since the completion of the previous review in January 2018. Rescue tubes, ring buoys and throw lines have all been proposed, albeit without empirical evidence, as the most “advantageous” types of rescue equipment due to their associated accuracy, buoyancy, distance they can be thrown, and ease with which the drowning victim may be able to grab hold. However, which specific device is most effective, safe and easily learned remains unknown, and experts acknowledge that the use of each device may have advantages and disadvantages. Future empirical studies and comparisons are clearly needed.

In the meantime, it remains the consensus of expert opinion that teaching laypersons rescue skills should become an integral part of all swimming and water safety classes in an effort to reduce the drowning rates of both victims and rescuers and increase safer and more effective bystander intervention skills. Additionally, targeted research

interventions are needed to address this need in multiple aquatic environments (e.g., high-risk aquatic activities such as kayaking, white water rafting and jet skiing). The development of public access water safety programs, such as current Red Cross water safety programming messages (“reach and throw, don’t go”), can also significantly aid in decreasing drowning deaths annually.

### Recommendations: Standards

None.

### Recommendations: Guidelines

None.

### Recommendations: Options

- Rescue equipment such as rescue tubes, ring buoys and throw lines can be effectively used by laypersons/ bystanders to rescue a drowning person. However, there is a limited body of research regarding the most effective type of water rescue equipment and the evidence of positive outcomes is mostly anecdotal.

### Council Action

The Council reaffirmed the prior recommendations unanimously with the added qualification that there is insufficient research comparing or recommending the use of one type of equipment over another.

## Triennial Review

### Swim Attire and Lifejacket Use

**Lead Reviewer:** Stephen J. Langendorfer, PhD

**Other Reviewers:** Angela K. Beale-Tawfeeq, PhD and Leslie K. White, BRec

**Original Reviewers:** Angela K. Beale-Tawfeeq, PhD; Linda Quan, MD; Roy Fielding, MS, LGIT, WSIT

### Question

What are the recommended best practices and policies on swim attire and lifejacket use in aquatic facilities?

## Discussion and Findings

The review process for this question focused primarily on editing and expanding the original text of the January 2018 Triennial Review to make it clearer and more comprehensible to lay readers and aquatics professionals alike. In addition, the Sub-Council looked at two new publications related to swim attire and lifejackets (i.e., personal flotation devices or PFDs):

- In one (Beale-Tawfeeq, et al, 2020), researchers dealt directly with lifejacket, clothing and diaper use as they related to drowning prevention, viewed through a lens of social justice, equity and inclusion to make sure that aquatic facilities' policies met the needs of the diverse high-risk groups that used them.
- In the second, investigators explored elements of water competence including basic competence elements when swimmers wore clothing and PFDs.

## Answer

The Sub-Council's review process was intended to inform policy recommendations and best practices while recognizing the importance of increasing access to aquatic facilities, enhancing safety and respecting the needs of groups that are diverse in terms of race, age, ability and religious beliefs. Numerous obstacles to the provision of effective swimming programs in culturally, linguistically and ethnically diverse communities include but are not limited to barriers to access, lack of familiarity, cost and fear of learning to swim.

While facility needs and community context may differ, the Red Cross sets forth the following national recommendations to guide policy and best practices in swim attire and personal flotation device use:

- Post height and age requirements appropriate to each aquatic facility as part of facility regulations.

- Require patrons to pass a water competency swim test to identify proficiency/competency (e.g., the Red Cross Swimming Competency Test).
- Maintain adult caregiver supervision for those wearing US Coast Guard-approved PFDs (e.g., children in lifejackets must be within an arm's length of a parent or guardian).
- Use USCG-approved PFDs even in shallow water (five feet or less).
- Appropriately fit PFDs to each individual (with size ranges inclusive of infants, children, youth, individuals with disabilities and adults).
- Exclude non-USCG approved PFDs from aquatic venues.
- Promote use of layered swim diapers or diapers with tight-fitting rubber pants to prevent fecal contamination.
- Focus on sanitation safety (e.g., all patrons must shower prior to entry and all swim attire or clothing must be free of debris and unsoiled).
- Clothing worn for modesty/religious/cultural/medical purposes (e.g., Islamic, Hindu, Jewish, full cover swimwear, hijab swimwear and burkini swimwear) should be considered appropriate swim attire and allowed in shallow water (five feet or less), and in deep water after passing a swimming competency assessment while wearing that clothing.
- Access to and sponsorship of swimming lessons in all communities is perceived as an important health and lifestyle benefit and should be supported.

Going forward, the Aquatics Sub-Council will continue to monitor current literature that may impact policy related to swim attire and PFDs.

## Council Action

The Council voted unanimously to reaffirm the expanded answers from the prior review.

## CDC-Funded Drowning Prevention Grant

The Red Cross has received a \$101,000 grant funded by the Centers for Disease Control and Prevention (CDC) through the National Network of Public Health Institutes (NNPHI) to study drowning prevention. The current grant period is through July 31, 2021 with the likelihood of extension as needed, particularly due to COVID-19. The Red Cross has the primary responsibility for all aspects of research design, data collection, reporting, etc.

Scientific Advisory Council members involved are Dr. William Ramos, overall research director; Dr. Stephen Langendorfer, research design and execution; Dr. Peter Wernicki, oversight and guidance; Bridget McKinney, reviewer and “connection maker”; and Dr. Angela Beale-Tawfee for Diversity in Aquatics connections. Other Red Cross staff involved are Connie Harvey as project manager and Stephanie Shook as reviewer. NNPHI is providing technical assistance throughout, including development of research tools. The CDC provides “technical monitoring” to ensure its goals are being addressed and the Institutional Review Board (IRB) is managed through Indiana University.

### Phase 1: Written Surveys of Parents/Caregivers and Red Cross Training Providers

Research Question: What perceived barriers exist to accessing swim lessons and water safety education?

Researchers are creating and deploying three written surveys for:

- (1A) Parents/Caregivers/Guardians of youth 1 to 19 years of age
- (1B) Youth 13 to 19 years

- (2) Red Cross Aquatics Training Providers (Centennial and non-Centennial providers)

The surveys will oversample populations disproportionately impacted by drowning, including members of diverse racial and ethnic groups and underserved communities. This question is of special interest to the CDC. Data collection is to be completed by March 2021 and the report by June 2021.

### Phase 2: In-Water Evaluation of Water Competency Behaviors for 1 to 4 Year Olds

Research Question: What is the baseline developmentally appropriate practice for water competency behaviors involving no support from instructor/parent or flotation device for youth ages 1 to 4?

COVID-19 permitting, research methods will include:

- Additional Water Safety Instructor (WSI) training for “tweaked” Red Cross Parent and Child Aquatics (PCA) and Preschool Aquatics (PSA) curriculum.
- In-person evaluation of progress of 1- to 4-year-olds in select PCA and PSA classes.

Data collection is to be completed by July 2021 and the report by September 2021. The goal is to evaluate if the Red Cross swim program can have higher expectations for skills that 1- to 4-year-olds can achieve that may act as a buffering effect against drowning.

## Personal Flotation Device (PFD) Development Work

The Aquatics Sub-Council is exploring the potential for developing a Lifejacket/Learn-to-Swim device.

Issues:

- The US Coast Guard is the approval authority for standards for lifejackets/personal flotation devices but their responsibility and authority are related to boating.

- The Red Cross — and essentially every other national drowning prevention organization — recommends lifejacket use while swimming for young children and non-swimmers.
- The Coast Guard does not evaluate lifejackets for use while swimming.
- Current PFDs provide buoyancy but they put wearers in a body position that is counter to swimming.

The Sub-Council is taking or has taken the following actions:

- Is working with an external vendor, eLifeguard.com, on proposed design.
- Is evaluating risks and liability issues with Red Cross Risk Management and the Office of General Counsel and is working on recommendations for mitigation.
- Has conducted a small market survey of providers for input on features and price points.

Next Step:

- Submit a business case to Training Service leadership for “go/no go.”

### **2020 Water Safety/Competency Survey**

Goal: To update heavily cited statistics and graphics about water safety and competency used in:

- Red Cross website/courses
- Red Cross media and social media
- External media and partner organizations
- Presentations

To achieve this goal, the Sub-Council conducted an omnibus survey in February 2020 that included:

- Questions from a previous 2014 survey for comparison
- New questions on safety actions and emergency response

The survey yielded findings that could be used in multiple ways to support and advance Red Cross water safety work. In 2020, the intent was to:

- Update existing graphics
- Integrate new findings into spring and summer water safety press releases and/or blogs and beyond

The priorities shifted during the early days of the COVID-19 pandemic, which coincided with the start of the typical aquatics season. In 2020, the use of the findings was limited to:

- Updating the most heavily used graphics, translating them into Spanish and posting to the Red Cross website
- Creating a Red Cross-branded “Water Watcher on Duty” card

In 2021, the Aquatics Sub-Council will revisit the results to author and/or support sharing findings related but not limited to:

- Comparison of the results from 2014 to 2020
- Reasons why people don’t learn to swim
- Many people have personal experiences with drowning
- Many people don’t know what to do in an emergency
- Guidance on steps to take in an aquatic emergency (connecting to Chain of Drowning Survival)
- Mixed results in safety actions around the water
- Guidance on safety actions around water (connecting to Circle of Drowning Prevention)

## Other Activities

- **Consumer Product Safety Commission (CPSC)**  
**Data Review:** The Aquatics Sub-Council is currently reviewing a large amount of data received from the CPSC on drownings. We anticipate a future publication and input into Red Cross programs from this analysis.
- **Water Safety USA:** The Red Cross continues to be a leading participant in this group of nonprofit and governmental organizations, which are committed to enhancing water safety messaging in the United States. The emphasis of the 2021 message is that “Lifejackets Save Lives.” More people need to learn when and how to properly wear lifejackets to prevent tragic and unnecessary drownings. Numerous members of the Aquatics Sub-Council and staff are also providing leadership in developing a “United States National Water Safety Action Plan.”
- **Water Safety Education Bills and Plan:** Members of the Aquatics Sub-Council continue to work with various states to provide mandatory water safety education in schools throughout the country using Red Cross materials.
- **Longfellow’s WHALE Tales:** The Red Cross is expanding the educational uses of this series of online videos that teach young children about water safety. WHALE Tales lessons are shared directly to families through a new section of our website ([redcross.org/watersafetyforkids](https://redcross.org/watersafetyforkids)) and closed captioning has been added.

## Publications

Recent publications from the Aquatics Sub-Council include the following:

- Beale-Tawfeeq, Angela, et al. Promoting equity, social justice, and saving lives with life jacket and clothing policies. *Int J Environ Res Public Health*; 2020 Sep 4.

- Ryan, Kevin M., et al. Impact of prehospital airway interventions on outcome in cardiac arrest following drowning: A study from the CARES Surveillance Group. *Resuscitation*; 2021 Jan 19.
- Tobin, J.M., et al. Outcome of conventional cardiopulmonary resuscitation in cardiac arrest following drowning. *Prehosp Disaster Med*; 2020 Jan 24.

## Future Work

The Aquatics Sub-Council sought and received Council approval for five Triennial Reviews:

- Water temperature for Red Cross aquatics programs
- Eating before swimming
- Hypoxic blackout and hyperventilation
- Autism and drowning
- Safe aquatics outings



## First Aid Sub-Council

The First Aid Sub-Council's range of study is broad, including care at every stage of emergency, from providing self-care to laypersons providing care on the roadside, in the wilderness, in a shelter; everything up to the care provided by Emergency Medical Services or at a hospital. Sub-Council members serve on a variety of international scientific bodies including the International Liaison Committee on Resuscitation (ILCOR) First Aid Task Force and as authors of the joint American Red Cross/American Heart Association (AHA) First Aid Guidelines Update and International Federation of the Red Cross (IFRC) First Aid Guidelines.

The First Aid Sub-Council membership includes a research interest subgroup that identifies gaps in scientific evidence for first aid, and designs and implements research studies to address those gaps.

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### Science Consensus on the Control of Life-Threatening Bleeding

**Authors:** Matthew J. Levy, DO; S. Robert Seitz, MEd, RN; Craig Goolsby, MD; Nathan P. Charlton, MD

#### Question

Based on the available science and expert opinion, what is the optimal sequence of actions for the control of life-threatening bleeding?

#### Discussion and Findings

A life-threatening bleed is identified by volume and flow. In terms of volume, it may mean there is half a soda can's worth of blood on the ground or pooling on a surface. Continuous flow can appear as spurting blood from a wound, blood-soaked clothing or failure of bleeding to stop with direct pressure. Bleeding like this may occur in cases such as the loss of a limb due to an accident or explosive device. It may be accompanied by altered mental status such as confusion or unconsciousness.

To formulate a Consensus on Science document regarding the sequence of actions for the control of life-threatening bleeding, the reviewers examined evidence from four publications of the Scientific Advisory Council: Hemostatic Agents Triennial Review (2019); Stop the Bleed Equipment SAC Answer (2018); Tourniquets Triennial Review (2018); and Pediatric Tourniquets (2019). They also took into account acknowledged expert opinion in the field to develop the following series of guidelines.

#### Red Cross/AHA 2020 Guidelines

1. For individuals with life-threatening external bleeding, direct manual pressure should be applied to achieve initial bleeding cessation for wounds not amenable to a manufactured tourniquet or when a manufactured tourniquet is not immediately available.

2. If a hemostatic dressing is available, it can be useful as adjunctive therapy to direct manual pressure for the treatment of life-threatening external bleeding.
3. A manufactured tourniquet should be used as first-line therapy for life-threatening extremity bleeding and should be placed as soon as possible after the injury.
4. If a manufactured tourniquet is not immediately available or if a properly applied manufactured tourniquet fails to stop bleeding, direct manual pressure, with the use of a hemostatic dressing if available, should be used to treat life-threatening extremity bleeding.
5. If a manufactured tourniquet and direct manual pressure with or without the use of a hemostatic dressing fails to stop life-threatening bleeding, a first aid provider trained in the use of an improvised tourniquet may consider using one.
6. Once bleeding has been controlled, it may be reasonable to apply a pressure dressing to maintain bleeding cessation.
7. Mechanical pressure, such as pressure bandages or devices, might be considered in some situations when direct manual pressure is not feasible.
8. The use of indirect manual pressure (e.g., pressure points) is not recommended for the treatment of life-threatening external bleeding.

These guidelines have been combined for simplicity (Singletary 2020). Reviewers caution that this is a Consensus on Science document and is not intended for training purposes. Going forward, the information may be translated into a simpler set of instructions for lay providers.

#### Council Action

The Council approved the recommendations unanimously.

## Triennial Review

### Honeybee Stinger Removal

**Reviewer:** Amita Sudhir, MD

**Original Reviewers:** Nathan P. Charlton, MD and Tod Schimelpfenig, WEMT

#### Question

What is the safest and most effective method of honeybee stinger removal?

#### Discussion and Findings

A literature search identified no new data to update existing recommendations and the only new article was associated with the First Aid Sub-Council's 2018 review: "Methods of Honeybee Stinger Removal: A Systematic Review of the Literature" (Lee, et al, 2020) in *Cureus*. The best available evidence continues to suggest that it is the rapidity of stinger removal rather than the method that makes the biggest difference in local reaction. This stands in contrast to former recommendations that the stinger be scraped out with a dull-edged object. Given the time required to locate such an object and indications that grasping the stinger does not cause greater envenomation, the reviewers concluded that it is best to remove the stinger as quickly as possible and by whatever means possible, which most commonly entails grasping it and pulling it out.

Honeybee stings involving the eyes are more serious and require a different approach. Articles found about honeybee stinger removal following ocular stings all involved hospital settings. The reviewers caution that the removal of an embedded stinger from the cornea is not within the scope of a lay provider and ocular injuries should be referred to a healthcare provider.

Discussion followed and the Council voted to move the recommendation from a guideline to a standard. In the absence of new data, which reviewers deem unlikely as none has been published since 1996, it was determined that the issue would be revisited in three years and subsequently retired.

#### Recommendation: Standards

Following envenomation by a honeybee, a stinging apparatus that remains embedded in the skin should be removed as quickly as possible.

#### Recommendations: Guidelines

None.

#### Recommendations: Options

It is suggested that the stinger apparatus be removed by grasping and pulling the apparatus out rather than scraping it out.

Note: Ocular stings should be referred to a healthcare provider.

#### Council Action

The Council approved the revised recommendations unanimously.

## Triennial Review

### Number of Bleeding Control Kits in Public Places

**Reviewers:** Nathan P. Charlton, MD and Craig Goolsby, MD

**Original Reviewers:** Craig Goolsby, MD and Nathan P. Charlton, MD

#### Question

How many bleeding control kits should be available in public places in case of intentional mass casualty events?

#### Discussion and Findings

In response to the increasing frequency and severity of intentional mass casualty incidents, it is critical that public sites be equipped with a sufficient number of bleeding control kits to treat victims. Extensive evidence from battlefield experience demonstrates the value of rapid point-of-injury bleeding control.

At its January 2018 meeting, the Council agreed that it was reasonable for public venues to prepare supplies to treat approximately 20 people for bleeding injuries due to an attack. Drawing on information about



casualty number and type from various databases, reviewers multiplied the maximum number of victims usually seen in an attack (51) by the average percentage of severely injured individuals (40%) to reach that number.

An updated search of databases including PubMed, Embase, CINAHL, the Health Policy Reference Center and the Global Terrorism Database identified no additional evidence. The only new article included in this review is the publication associated with the First Aid Sub-Council's 2018 review (Goolsby, et al, 2019).

In the absence of any new evidence, the Sub-Council made a slight change in wording (for clarity) to the existing recommendation and reaffirmed it.

### Recommendations

It is reasonable for public venues with 50 or more people to prepare supplies to treat approximately 20 people for bleeding injuries during an intentional mass casualty incident. This should be considered the *minimum* adequate number. Larger public sites should consider additional supplies, as well as how to distribute the supplies effectively.

This analysis considered intentional mass casualty events including active shooter events, intentional vehicle attacks (IVAs), stabbings and blast attacks.

### Council Action

The Council approved the revised recommendations unanimously.

## Triennial Review

### Aspirin for Non-Traumatic Chest Discomfort

**Reviewers:** Amy Kule, MD and Nathan P. Charlton, MD

### Question

Should first aid providers administer aspirin to an individual for non-traumatic chest discomfort?

### Discussion and Findings

While no new evidence has been published since the First Aid Sub-Council's previous Triennial Review in January 2018, the overwhelming consensus of existing evidence and expert opinion is that for those without an allergy aspirin is safe, and it is the expert opinion of this Task Force that a single dose of aspirin for non-traumatic chest discomfort causes little harm. The 2020 ILCOR CoSTR and Systematic Review similarly states: "For adults with nontraumatic chest pain, we suggest the early administration of aspirin in the first aid setting as compared with the late, in-hospital administration of aspirin (weak recommendation, very low-certainty evidence)."

In subsequent discussion Council members noted that other studies also demonstrate an absence of evidence of harm and many people already take 81-mg or "baby aspirin" on a daily basis to help manage cardiovascular risk. An amendment was proposed to add an option regarding the type of aspirin recommended. While there is no evidence of the superiority of one type of aspirin over another, the preponderance of expert opinion is that baby aspirin is the first preference and, in its absence, regular or enteric-coated aspirin. Whatever type of aspirin is used, it must be chewed. This amendment carried with one vote in dissent and the Council voted to approve the recommendations as amended.

### Recommendation: Standards

None.

### Recommendations: Guidelines

- While awaiting the arrival of emergency services, first aid providers may encourage alert adults experiencing non-traumatic chest discomfort to chew and swallow aspirin unless the person experiencing pain has a known aspirin allergy or has been advised by a healthcare provider not to take aspirin.

- If there is any uncertainty that aspirin should be taken, it is reasonable to wait for the arrival of EMS.
- The recommended dose of aspirin is two to four 81-mg tablets (162–324 mg) or one 325-mg tablet (coated or non-enteric-coated). The aspirin should be chewed. Note: Four chewable 81-mg tablets or one 325-mg non-enteric-coated tablet should be included in first aid kits for use in case of acute chest pain.

### **Recommendations: Options**

Regarding the type of aspirin taken, expert opinion and best practices suggest that chewed 81-mg tablets are the first preference. In their absence, regular, non-enteric-coated aspirin or an enteric-coated tablet may be taken but must be chewed.

### **Council Action**

There were two Council votes. In the first, the Council voted on an amendment to add an option to the recommendations. The amendment carried with one dissent. In the second vote, the Council unanimously approved the recommendations as amended.

## **Triennial Review**

### **Storage Media for Dental Avulsion**

**Reviewers:** Morgan Hillier, MD and Aaron M. Orkin, MD

**Original reviewers:** Adelita G. Cantu, PhD, RN and Justin Carlson, MD

### **Question**

What is the most appropriate storage media for dental avulsion?

### **Discussion and Findings**

This question has evolved over time from an original inquiry into storage media vs replantation. The 2020 ILCOR CoSTR with SR identified new evidence that led reviewers to reframe the question to focus primarily on storage media. While immediate replantation of an avulsed tooth is known to afford the greatest chance

for survival of an avulsed tooth, the replantation of an avulsed permanent tooth is, for many reasons, considered to be beyond the scope of a lay first aid provider. This could potentially result in damage to or infection of the tooth socket.

Instead, the focus should be on the immediate transportation of the injured person to a dental or healthcare professional capable of replanting the tooth, with the avulsed tooth stored in a manner that will prolong viability of periodontal ligament cells. Following avulsion of an adult tooth, it is important to store the tooth in a medium that keeps the tooth moist and does not harm it. While a variety of solutions have been used to store avulsed teeth, the literature supports the use of Hanks' Balanced Salt Solution (HBSS), oral rehydration solutions (ORS), propolis and cling film. In many areas, HBSS, ORS and cling film appear to be more readily available than other media. In addition, it has been demonstrated that tap water can harm the periodontal ligament cells.

The Council agreed that the agents HBSS, ORS and cling film should be the preferred media for storing an avulsed primary tooth and that the affected person should be transported to a dental or healthcare professional capable of replanting the tooth as soon as possible. If none of the preferred media are available, cow's milk or saliva, outside of the mouth, can be used as alternatives. After extensive discussion the Council agreed on the following revised guidelines.

### **Recommendation: Standards**

When first aid providers are presented with an avulsed tooth, the priority is to quickly transfer the patient and the avulsed tooth to a healthcare professional capable of replanting the tooth. Expert opinion indicates that this should occur within 30 minutes.



### Recommendations: Guidelines

- If an avulsed permanent tooth cannot be immediately replanted, place the tooth in Hanks' Balanced Salt Solution or in oral rehydration salt solutions or wrap the tooth in cling film to prevent dehydration and improve the likelihood of successful replantation by a dental or healthcare professional capable of replanting the tooth, which should be done as soon as possible.
- If an avulsed permanent tooth cannot be immediately replanted and neither Hanks' Balanced Salt Solution nor oral rehydration salt solutions nor cling film are available, storage of the tooth in cow's milk or saliva may be considered. (Do not store the tooth in the mouth due to the risk of aspiration or accidental swallowing.)
- An avulsed permanent tooth should not be stored in tap water.

### Recommendations: Options

None.

### Council Action

The Council approved the revised recommendations unanimously.

## Triennial Review

### First Aid Kit Contents

**Reviewers:** Adelita Cantu, PhD, RN and David Berry, PhD

**Original reviewers:** David Berry, PhD and Jeffrey Pellegrino, PhD, MD

### Question

What are the proper contents of a personal first aid kit?

### Discussion and Findings

A literature search indicates that the five leading causes of unintentional, nonfatal injuries are falling; being struck by or against an object; overexertion; a motor vehicle accident; and cutting or piercing. In recent years, nonfatal drug and polydrug overdoses have also been on the rise. From 2016 to 2017, emergency

department visit rates increased for every type of drug except benzodiazepines. Polydrug overdoses co-involving opioids and amphetamines increased from 2018 to 2019, and opioids were substantially co-involved with cocaine (23.6%), amphetamine (17.1%) and benzodiazepine (18.7%) overdoses in 2019.

Reviewers also examined the first aid kit recommendations made by other organizations including the American National Standards Institute (ANSI), which introduced two classes of first aid kits in 2015. Class A kits contain supplies designed to treat the most common types of workplace injuries, while Class B kits include a broader range and quantity of supplies to deal with more complex injuries or high-risk environments.

Taking all these factors into account, the First Aid Sub-Council recommended changes and clarifications to the recommended contents of a first aid kit, the most significant being the addition of items to address the increasing number of opioid-related overdoses.

### Recommendation: Standards

None.

### Recommendations: Guidelines

Because of the high probability of specific injuries and illnesses, a first aid kit should include the following emergency items based on a trauma or illness to a specific individual:

- Latex-free gloves (nitrile) x 2 pair
- Supplies to control bleeding (sterile 4" x 4" gauze pads) x 8
- Supplies to secure dressing (2", 3" or 4" x 4-yd. roller bandages) x 4
- Adhesive tape (3/8" x 2.5 yd.) x 1
- Triangular bandages x 2

- Latex-free adhesive bandages x 3 apiece
  - 1" x 3"
  - 3/4" x 3"
  - Large fingertip
  - Knuckle
- Topical wound gel or ointment (1/32 oz. [0.9 g] application) x 10
- Compact, moldable splinting device with securing mechanism (e.g., roller bandage, elastic bandage, triangular bandage, tape) x 1
- Plastic bag (1 qt. and/or 1 gal.) for application of ice: water x 4 and/or instant cold packs x 2
- Low-dose aspirin (81-mg x 4) or non-enteric-coated adult aspirin (325-mg x 1), chewable
- Oral glucose tablet (minimum of 20 g) x 1
- Saline solution (minimum 1 oz.) x 1
- Utility shears/scissors (7") x 1
- Alcohol-based hand sanitizer (1 oz.) x 1
- Splinter forceps/tweezers x 1
- Latex-free face shield x 1
- First aid guidebook x 1

### **Recommendations: Options**

The following items are optional in a first aid kit. The addition of the first five items in the following list would allow organizations to meet the 2015 recommendations for a Class A first aid kit:

- Antiseptic towelette (0.14 fl. oz. [0.5 g] application) x 10

- Trauma pad (5" x 9") x 2
- Topical antibiotic (0.14 fl. oz. [0.5 g] application) x 10
- Eye covering with means of attachment (2 x 9 sq. in.) x 1
- Burn dressing (4" x 4") x 1
- Tourniquet (manufactured windless) x 1
- Protective eyewear
- Protective facemask
- Naloxone (nasal or injection) minimum 1 dose, recommended 2 doses
- Hemostatic agent x 1
- Epinephrine autoinjector x minimum 1, recommended 2 doses

Note: Public care environments such as schools or day camps may experience delayed access to emergency care and therefore consider epinephrine autoinjectors based on perceived need.

### **Council Action**

The Council approved the revised recommendations unanimously.

### **Task Force Discussion: Diversity and Inclusion**

The First Aid Sub-Council recognizes the important role that diversity, equity and inclusion play in the scientific community. To support these values, members believe that concrete strategies must be put into place to address the barriers that face members of diverse racial and ethnic groups and underserved communities as they attempt to engage in first aid science and training. Likewise, it is critical to explore how science applies in our diverse world and ensure that evidence-based publications reflect diversity and inclusion and reject any suggestion of bias.



## First Aid Sub-Council (continued)

To achieve these goals, the Sub-Council proposed the formation of a Diversity and Inclusion Task Force. This team would explore opportunities for inclusion in first aid science and practice; develop a plan for inclusive first aid review projects; assess triennial reviews for inclusion or bias in the science (see COCHRANE PROGRESS Framework); and adopt the PROGRESS-Plus framework into all reviews.

A robust discussion followed in which broad support was expressed for the proposal and it was noted that similar values, needs and strategies are applicable to all Sub-Councils. For example, the Aquatics Sub-Council has a longstanding commitment to working with the organization Diversity in Aquatics to reduce the risk of unintentional drowning deaths in underserved communities through water safety education.

David Markenson, MD, Co-Chair Chief Medical Officer (CMO) of the Council, noted that the Red Cross as a whole is looking at the science aspects of diversity and inclusion and, given the common interest of all Sub-Councils in these issues, the Council would create a new entity: The Diversity and Inclusion Sub-Council. Going forward the First Aid Sub-Council will start a pilot program and members of all Sub-Councils are invited to join in the formation of the new Sub-Council to develop cross-disciplinary programs; establish new practices such as incorporating diversity and inclusion education into training courses and changing the methodology of reviews to regularly check for bias; and generally defining the breadth and scope of the new Sub-Council's work and mission.

### Publications

Recent publications from the First Aid Sub-Council include the following:

- Pellegrino, J.L., Charlton, N.P., Carlson, J.N., Flores, G.E., Goolsby, C.A., Hoover, A.V., Kule, A., Magid, D.J., Orkin, A.M., Singletary, E.M., Slater, T.M. & Swain,

J.M. 2020 American Heart Association and American Red Cross focused update for first aid. *Circulation*: <https://doi.org/10.1161/CIR.0000000000000900>

- Pellegrino, J.L., Charlton, N.P. & Goolsby, C. (2020) "Stop the Bleed" Education Assessment Tool (SBEAT): Development and validation. *Cureus*: 12(9), e10567 <https://doi.org/10.7759/cureus.10567>

### Future Work

The First Aid Sub-Council sought and received Council approval to conduct five Triennial Reviews, all to be presented at the June 2021 meeting. Reflecting the heightened concern about breaths in resuscitation due to COVID-19, the Council also proposed and approved a Scientific Review on this topic to be conducted jointly by the First Aid, Resuscitation, Education and Aquatics Sub-Councils:

- **Scientific Review:** What are the best evidence-based practices to minimize the risk of infection in first aid and CPR training? What are the implications for first aid and CPR training for instructors and learners? (Nathan P. Charlton, MD; E.M. Singletary, MD; Edward J. McManus, MD; Joseph W. Rossano, MD; Jeffrey L. Pellegrino, PhD; Peter G. Wernicki, MD)
- **Triennial Reviews:** Cervical spine motion restriction; nuclear incidents and potassium iodide, in collaboration with the Preparedness and Disaster Health Sub-Council; stroke assessment; tourniquet use; and mild TBI assessment





## Preparedness and Disaster Health Sub-Council

The Preparedness and Disaster Health Sub-Council looks for the best ways to prepare for emergencies of every kind, from those that occur in the home to regional disasters, including how to train people to be more resilient after hardship, and how to keep communities whole and businesses operating. As well, the Sub-Council addresses opportunities to provide acute and chronic medical and mental health care under disaster conditions, both for victims and for the emergency staff caring for them. It also routinely answers questions from local chapters and assists with media inquiries on a variety of topics.

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### Community Education: The Prepare Series

The Sub-Council is working closely with the Red Cross to bring evidence-based science to the development of its Prepare Series, significantly increasing their online presence and exploring topics in greater depth in numerous apps, videos and downloads. Many of these are interactive. Detailed advice is offered at no cost to people of varying age groups and abilities on how to prepare for and cope with disasters such as earthquakes, floods, hurricanes, tsunamis, volcanoes, wildfires and winter weather, all while still protecting themselves from COVID-19.

Among the programs that are widely available to advance this community-based series are:

#### Online Preparedness for Older Adults

Older adults are more vulnerable and experience more casualties following a disaster than other age groups, according to research from the Scientific Advisory Council and the American Academy of Nursing. A number of factors combine to render seniors more susceptible, including chronic conditions, reliance on multiple medications, dependence on assistive devices such as walkers, wheelchairs, eyeglasses and hearing aids, the need for caregiver support and living in social isolation.

In response, the Preparedness and Disaster Health Sub-Council has designed a series of coping strategies specifically directed toward this population. For example, before disaster occurs, older adults are advised to sign up for alerts and warnings (the Red Cross Emergency app is available for free download at [redcross.org/apps](https://www.redcross.org/apps)); build a support network of family and friends; keep an up-to-date list of conditions, allergies, medications and dosages, doctors, caregivers, and health insurance cards; ensure access to at least a 30-day supply of medication; locate shelters; and much more.

Detailed instructions about these and other precautionary measures are available for older adults and their families and caregivers to download and read for free online at [www.redcross.org/olderadults](https://www.redcross.org/olderadults) and in Red Cross publications such as “Disaster and Emergency Preparedness for Older Adults: A Practical Guide to Help Plan, Respond and Recover” available at [https://www.redcross.org/content/dam/redcross/get-help/how-to-prepare/Older\\_Adults\\_Disaster\\_Prep\\_Booklet\\_07272020.pdf](https://www.redcross.org/content/dam/redcross/get-help/how-to-prepare/Older_Adults_Disaster_Prep_Booklet_07272020.pdf).

#### Youth Preparedness Online

While in-person youth presentations are currently suspended nationwide due to COVID-19, youth preparedness is continuing at a breakneck pace online. Youth Preparedness encourages young people to learn the building blocks of preparedness: Be Informed, Make a Plan, Build a Kit and Get Involved.

Numerous ongoing, evidence-based Red Cross initiatives supported by the Preparedness and Disaster Health Sub-Council are helping young people prepare for and cope with potential disruptions in their lives, including COVID:

- **Prepare with Pedro**

This free youth preparedness program ([www.redcross.org/pedro](https://www.redcross.org/pedro)), developed in partnership with the Federal Emergency Management Agency (FEMA), is designed to teach five- to seven-year-olds and their families how to stay safe during disasters and emergencies. A series of digital storybooks follows Pedro the Penguin as he learns how to cope with home fires, hurricanes, wildfires, power outages and more. The “Prepare with Pedro: Disaster Preparedness Activity Book” is available for free digital download in six different languages ([ready.gov/kids/prepare-pedro](https://ready.gov/kids/prepare-pedro)).

- **The American Red Cross Pillowcase Project**

This free, interactive preparedness program (<https://www.redcross.org/get-help/how-to-prepare-for-emergencies/teaching-kids-about-emergency-preparedness/pillowcase-project.html>) is designed for children ages eight to eleven. The goal is to increase their awareness and understanding of natural hazards. Since its beginning in 2013, the Pillowcase Project has taught over one million children specific skills such as creating an emergency supply kit (in a pillowcase) and personal preparedness, safety and emotional coping skills.

- **Become a Preparedness Champion**

In this video series targeted toward third to fifth grade students, children watch videos and take quizzes to test their knowledge of proper handwashing techniques, emergency coping skills and home fire safety tips to protect all members of the household.

### **Be Red Cross Ready**

The Red Cross has launched its “Be Red Cross Ready” preparedness classes virtually to encourage communities to be prepared and plan for any type of emergency. Free virtual classes are designed to meet the needs of a wide variety of audiences and communities. Information includes how to build an emergency kit, make an emergency plan with family, and learn what to do before, during and after disasters of all kinds, including the COVID-19 pandemic.

Practical advice includes:

- Assemble an emergency preparedness kit.
- Create a household evacuation plan that includes your pets.
- Stay informed about your community’s risk and response plans.

- Ensure each family member knows how to get back in touch if you are separated during an emergency.
- Download the Red Cross emergency app for iPhone or Android.

### **Other Activities**

- **Home Fire Campaign:** The American Red Cross Home Fire Campaign is a federally funded program that provides fire safety education and installs lifesaving smoke detectors through its *Sound the Alarm* (#EndHomeFires) initiative. While smoke detector installation in homes was temporarily suspended due to COVID-19, since its launch in 2014 this Red Cross Flagship Program has partnered with local fire departments and community groups to install over two million smoke detectors and save more than 800 lives. Free tools and resources are available to the public to learn more about fire safety online at <https://www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/fire/prevent-home-fire.html>. The National Opinion Research Center (NORC) at the University of Chicago regularly documents the program’s success in areas such as targeting and assisting at-risk communities.
- **Addressing Social Disparities:** The Sub-Council continues to investigate actionable ways to improve outreach and effectiveness. Members are in the process of reviewing all relevant evidence-based literature for insight into how to better understand and more effectively address social disparities. This current research builds on an earlier scoping study that identified numerous disparities — including race, ethnicity, socioeconomic status, age and access to care — that can have a substantial negative impact on Red Cross preparedness and disaster planning.



### Publications

Recent publications from the Preparedness and Disaster Health Sub-Council include the following:

- *Closing the Gaps: Advancing Disaster Preparedness, Response and Recovery for Older Adults*. 2020 January. The Preparedness and Disaster Health Sub-Council and the American Academy of Nursing (AAN). Available at: <https://www.redcross.org/content/dam/redcross/training-services/scientific-advisory-council/253901-03%20BRCC-Older%20Adults%20Whitepaper%20FINAL%201.23.2020.pdf>
- *Disaster and Emergency Preparedness for Older Adults: A Practical Guide to Help Plan, Respond and Recover*. 2020 June. The Preparedness and Disaster Health Sub-Council. Available at: [https://www.redcross.org/content/dam/redcross/get-help/how-to-prepare/Older\\_Adults\\_Disaster\\_Prep\\_Booklet\\_07272020.pdf](https://www.redcross.org/content/dam/redcross/get-help/how-to-prepare/Older_Adults_Disaster_Prep_Booklet_07272020.pdf)
- *Disaster Preparedness: For Seniors by Seniors*. 2020. The Greater Rochester Chapter of the American Red Cross and the Homeland Security Institute at Monroe Community College. Available at: [https://www.redcross.org/content/dam/redcross/atg/PDF\\_s/Preparedness\\_\\_\\_Disaster\\_Recovery/Disaster\\_Preparedness/Disaster\\_Preparedness\\_for\\_Srs-English.revised\\_7-09.pdf](https://www.redcross.org/content/dam/redcross/atg/PDF_s/Preparedness___Disaster_Recovery/Disaster_Preparedness/Disaster_Preparedness_for_Srs-English.revised_7-09.pdf)

The “Closing the Gaps” paper cited above has also been retooled for the Canadian context.

### Future Work

The Preparedness and Disaster Health Sub-Council sought and received Council approval to extend the production of one Q&A.

- **SAC Q&A:** Are there scientifically validated best practices for protecting the mental health of disaster and first responders following a traumatic event? (Lead: Lauren M. Sauer, MS)

The Sub-Council continues to work on a White Paper detailing actionable ways to address social disparities. Additionally, members are exploring ways to expand their Sub-Council’s role in SAC preparedness and to provide ongoing support to the Red Cross, synchronizing protective action messages and evidence across the organization.



## Resuscitation Sub-Council

The Resuscitation Sub-Council evaluates science related to cardiopulmonary resuscitation (CPR), choking, basic life support in children and adults, advanced cardiac life support, pediatric advanced life support, and the optimized use of automated external defibrillators (AEDs).

### **Joseph W. Rossano, MD**

Resuscitation Sub-Council Chair

*Chief, Division of Cardiology/Co-Executive Director, the Cardiac Center/Jennifer Terker Endowed Chair in Pediatric Cardiology/Professor of Pediatrics at the Children's Hospital of Philadelphia and the Perelman School of Medicine at the University of Pennsylvania*

### **Michael G. Millin, MD, MPH, FACEP**

Resuscitation Sub-Council Vice Chair

*Associate Professor of Emergency Medicine, Johns Hopkins University School of Medicine; Medical Director of the Maryland and Mid-Atlantic Wilderness Rescue Squad; Medical Director and Co-Founder of Austere Medical Professionals; Immediate past Medical Director for the Prince George's County Fire/ Emergency Medical Services (EMS) Department*

### **Bruce J. Barnhart, MSN, RN, CEP**

*Senior Program Manager, Arizona Emergency Medical Research Center, University of Arizona*

### **Lynn Boyle, MSN, RN, CCRN**

*Nurse Manager-Pediatric Intensive Care Unit (PICU), The Children's Hospital of Philadelphia*

### **Richard N. Bradley, MD**

*Professor of Emergency Medicine and Chief of the Division of Emergency Services and Disaster Medicine at McGovern Medical School, University of Texas Health Science Center, Houston, Retired*

### **Meredith Gibbons, MSN, CPNP**

*Pediatric Nurse Practitioner, Columbia University Medical Center*

### **Wendell E. Jones, MD, MBA, CPE, FACP**

*Chief Medical Officer, Veterans Integrated Service Network 17; Assistant Professor, Internal Medicine, University of Texas Southwestern*

### **Andrew MacPherson, MD, CCFP-E, FCFP**

*Emergency, Trauma and EM Physician, Clinical Professor, Department of Emergency Medicine, University of British Columbia; Canadian Red Cross*

### **Bryan F. McNally, MD, MPH**

*Professor, Emergency Medicine, Emory University School of Medicine, Atlanta; Executive Director, Cardiac Arrest Registry to Enhance Survival (CARES); Associate Medical Director, Air Life Georgia*

### **Ira Nemeth, MD**

*Medical Director of Ben Taub Emergency Department, Senior Faculty, Baylor College of Medicine*

### **Joshua M. Tobin, MD**

*Adjunct Clinical Associate Professor, Department of Anesthesiology, Stanford University Medical Center; Captain, Medical Corps, US Navy*

### **Bryan M. White, Lt Col, USAF, MC MD, FACC, FASE, RPVI**

*DHA Life Support Medical Director; CMIO/ISC Chair - 99th MDG; MTN/DHA J-7 LSSAC; DHA CVCC Chair; AF Cardiology Consultant, Nellis AFB, NV*

### **Lynn White, MS, FAEMS**

*National Director of Research and Evidence Based Practice, Global Medical Response*



### ILCOR Reviews

The Resuscitation Sub-Council joined with the Aquatics Sub-Council to examine the last six months of ILCOR (International Liaison Committee on Resuscitation) reviews, as pertinent studies were all related to drowning. ILCOR's methodology is rigorous and it is committed to a continuous evidence-evaluation process. Topics that ILCOR explored in depth were:

- Airway management in drowning
- Automated external defibrillator use in drowning
- Criteria for discharge in drowning
- Extracorporeal membrane oxygenation (ECMO) in drowning
- In-water resuscitation in drowning
- Mechanical ventilation in drowning
- Pre-hospital oxygenation in drowning
- Resuscitation on a boat following drowning

The Sub-Councils concluded that all current Red Cross programs and teachings are already up to date with the latest science and evidence available, consistent with ILCOR's findings. There are no changes or modifications needed to present programs in CPR, First Aid, Water Safety and Lifeguarding.

### CARES (Cardiac Arrest Registry to Enhance Survival) Update

The CARES Program Update was presented by Bryan F. McNally, MD, MPH, a member of the Resuscitation Sub-Council and the Executive Director of CARES. Dr. McNally reviewed the CARES program's Mission and Vision Statements, Goals and Asks, 2021 Footprint, National and State Data Sharing Projects and more.

**CARES Mission Statement:** To help communities determine standardized outcome measures for out-of-hospital cardiac arrest (OHCA) allowing for quality improvement efforts and benchmarking capability to improve care and increase survival.

**CARES Vision Statement:** To become the standard out-of-hospital cardiac arrest registry for the United States allowing for uniform data collection and quality improvement in each state and nationally.

#### Goals:

- Expand CARES to all 50 states
- Improve survival for witnessed cardiac arrest by 50% in five years (2021-2025)

#### Asks:

- Public/private financing to advance these goals
- Uniform CMS (Centers for Medicare & Medicaid) reimbursement for EMS (Emergency Medical Services) OHCA regardless of transportation decision and incentivize reporting with payment

#### CARES 2021 Footprint

Despite the challenge of COVID-19 from 2019 to 2020, the CARES 2021 Footprint grew by 20% to:

- 152 million catchment area
- 46% of US population covered
- More than 1800 EMS agencies
- More than 2200 hospitals
- 27 state-based registries
- 50 additional communities in 13 states

#### COVID-19 Impact

CARES data demonstrates that the COVID-19 pandemic dramatically eroded recent survival gains for

out-of-hospital cardiac arrest in the U.S. There was a significant spike in the overall number of OHCA's and, even in communities with low COVID-19 impact, there were changes in resuscitation practices.

### **CARES and Drowning**

Historically, there has been a lack of quality data around drowning, a leading cause of preventable death. In 2018, members of the Aquatics Sub-Council requested assistance in addressing the absence of national drowning resuscitation data. CARES has now added eight drowning elements to its data collection program to help improve national surveillance and understanding of drowning events to develop effective prevention strategies to save lives.

### **CARES National Data Sharing Projects**

Aggregating data about out-of-hospital cardiac arrests from more than 1800 EMS agencies and 2200 hospitals, CARES has generated a wide and extensive variety of National and State Data Sharing Projects:

- OHCA in the US during the COVID-19 pandemic
- MMWR-HP (Morbidity and Mortality Weekly Report-Healthy People) 2020 outcomes
- CARES-CDC-Medicare linkage
- Association of sex/gender with OHCA characteristics, hospital interventions and survival outcomes
- Relationship between field ROSC (return of spontaneous circulation) and rate of field termination
- Analysis of cooling after non-shockable OHCA
- OHCA and STEMI (ST-elevated myocardial infarction) predictive risk model
- Loss of labor productivity following adult OHCA
- Public health impact of drug-related OHCA

- Left heart catheterization trends
- Predictive modeling of elderly OHCA survivors to guide clinical care and facilitate effective communication
- Comparison of OHCA characteristics by urban/rural status
- Association of ambient air pollution with risk of OHCA
- Disparities in TTM (targeted temperature management) following OHCA
- Pediatric studies:
  - Conventional vs compression-only CPR
  - Airway management after OHCA
  - Risk of cardiac arrest in children by race and ethnicity

### **CARES State Data Sharing Projects**

- Michigan
  - Enhancing pre-hospital outcomes for cardiac arrest
  - Association of hands-only CPR knowledge and bCPR (bystander CPR) rates
  - Evaluating post-arrest hospital care for resuscitated patients
  - Bystander CPR and survival rates in Southeastern Michigan
  - Intraosseous route of drug administration associated with lower survival in OHCA
- North Carolina
  - Time intervals and survival outcomes after OHCA in North Carolina



- Care and outcomes of urban and non-urban OHCA patients
- Association of variations in care and survival outcomes after out-of-hospital cardiac arrest across counties in North Carolina
- Comparisons of emergency systems of care, socioeconomic characteristics and racial distribution and their relations to outcomes after cardiac arrest (NC and WA and Denmark)

### Pennsylvania

- Association of community characteristics with bCPR provision

### Texas

- Community variations in out-of-hospital cardiac arrest care and outcomes in Texas
- Disparities in out-of-hospital cardiac arrest care and outcomes in Texas
- A standardized template for evaluating telecommunicator cardiopulmonary resuscitation in pediatric OHCA

### NIH-Funded CARES Studies

- **University of Michigan:** “Enhancing Pre-Hospital Outcomes for Cardiac Arrest (EPOC)”
- **Duke University:** “Regional Approaches to Cardiovascular Emergencies – Cardiac ARreSt (RACE-CARS)”
- **Mt. Sinai School of Medicine:** “CARES-Medicare Machine Learning Modeling”

### Publications

Recent publications from the Resuscitation Sub-Council include the following:

- Chan, Paul S., et al. Outcomes for out-of-hospital cardiac arrest in the United States during the coronavirus disease 2019 pandemic. *JAMA Cardiology*; 2020 Nov 14.
- Ryan, Kevin M., et al. Impact of prehospital airway interventions on outcome in cardiac arrest following drowning: A study from the CARES Surveillance Group. *Resuscitation*; 2021 Jan 19.
- Tobin, J.M., et al. Outcome of conventional cardiopulmonary resuscitation in cardiac arrest following drowning. *Prehosp Disaster Med*; 2020 Jan 24.

### Future Work

The Resuscitation Sub-Council sought and received Council approval to extend work on two Scientific Reviews:

- **Scientific Review:** What are the guidelines for termination of resuscitation in the field and how do we make decisions about transport for people with out-of-hospital cardiac arrest? (Lead: Bruce J. Barnhart, MSN, RN, CEP)
- **Scientific Review:** In cases of sudden cardiac arrest, what is the proper placement and use of an automated external defibrillator (AED)? (Lead: Andrew MacPherson, MD)





## Education Sub-Council

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The Education Sub-Council works to engage members of every other Sub-Council in identifying effective methods for teaching skills and procedures to individuals and populations. We also seek the best ways to instill or build in people the confidence and desire to step forward and use those competencies to help people in need.

**Jeffrey L. Pellegrino, PhD, MPH, EMT-B/FF, EMS-I**

Education Sub-Council Chair

*Assistant Professor of Emergency Management & Homeland Security, University of Akron; EMS-Instructor and EMT/Firefighter for the City of Hudson*

**Nicholas Asselin, DO, MS**

Education Sub-Council Vice Chair

*Assistant Professor of Emergency Medicine, Clinician Educator, Alpert Medical School of Brown University; Operations Coordinator, LifePACT Critical Care Transport*

**Rita V. Burke, PhD, MPH**

*Assistant Professor of Clinical Preventive Medicine, Department of Preventive Medicine, Keck School of Medicine, University of Southern California*

**Brian Miller, MS, MEd, MEd, CHES**

*Program Director, Health Sciences Chair, Institutional Review Board, Cadaver Anatomy Lab Technician, Murphy Deming College of Health Sciences, Mary Baldwin University*

**Gamze Ozogul, PhD**

*Associate Professor, Instructional Systems and Technology Department, School of Education, Indiana University*

**CDR Thomas E. Sather, EdD, MS, MSS, CAsP, MSC, USN**

*Branch Chief, Training Operations, Defense Health Agency Life Support Training Manager, Assistant Professor, Uniformed Services University of the Health Sciences Education and Training, Military Medical Treatment Facility Operations Division, J-7 Education and Training Directorate, Defense Health Agency (DHA)*



### Scientific Review

#### Pre-Synchronous Learning in BLS for Lay Public Learners

**Reviewers:** Gamze Ozogul, PhD; CDR Thomas Sather, EdD; Jeffrey L. Pellegrino, PhD, MPH

#### Question

Does online pre-synchronous experience enhance the learning experience and learning outcomes of lay public learners seeking Basic Life Support (BLS) certification compared to only face-to-face (f2f) or only online learning experiences?

#### Discussion and Findings

A literature search of PubMed and Embase identified 515 potentially relevant articles published between 2010 and 2020. Through a rigorous screening process, eight studies were determined to be pertinent to the final qualitative synthesis.

“Pre-synchronous” learning consists of introducing and educating students in subjects that they will later learn more about or use in face-to-face learning. Before students enter a classroom, they are given a computer module or materials in a different modality to study. They are accountable for learning this material to progress into the synchronous session, which may include team-based or skill-based learning activities. The “blended learning” concept best exemplifies this, where online learning modules must be completed and a subsequent face-to-face training with an instructor builds on the knowledge.

The reviewers summarized the results of the various key studies:

- In one study, blended learning of CPR was not shown to be inferior to knowledge attained solely through instructor-led training.

- In another, Basic Life Support with blended learning was determined to be more effective than BLS without pre-learning.
- In a third, pre-learning was effective in teaching simple processes. However, given that CPR skills are complicated (compression rate, compression depth, hand placement, allowing chest recoil), CPR training and practice and just-in-time feedback with an instructor were still necessary.
- Blended learning offers significant cost benefits.

There were certain limitations in the studies. All first aid courses were originally included but evidence only existed in BLS, which is a limitation. Additionally, distinctions were not made between novice and experienced CPR learners; longitudinal results of pre-learning were not reported; theoretical and motivational differences between lay responders and professionals in their approach to pre-learning were not explored; and data is still needed on an optimal time frame between a pre-course and a face-to-face course on the same topic. Future research will examine in greater detail how a sequential approach to pre-learning, a face-to-face course and a booster course would optimally improve skills and knowledge.

#### Recommendations: Standards

None.

#### Recommendations: Guidelines

The Red Cross should strategically implement pre-course learning for lay responders.

#### Recommendations: Options

None.

#### Council Action

In a unanimous vote, the Council concluded that pre-synchronous engagement of lay responders should be included as an educational modality to improve knowledge components of Basic Life Support courses.

## Implications for Red Cross Training and Materials

In order for pre-learning to be effective, the Red Cross needs to establish a level of accountability for completion and mastery of pre-course learning prior to in-class learning. To eliminate redundancy, there also needs to be a mechanism by which people can test out of the pre-learning process if they have already mastered those skills and that knowledge. Looking toward the future, there is the potential to link pre-course learning modules with the first aid app to encourage longitudinal use of the materials.

## Publications and Presentations

Recent publications and presentations from the Education Sub-Council include the following:

- Pellegrino, J.L., et al. (2021) First aid education for opioid overdose poisoning: Scoping review. *Cureus*: 13(1): e12454. <https://www.cureus.com/articles/46368-first-aid-education-for-opioid-overdose-poisoning-scoping-review>
- Drennan, I., Geri, G., Brooks, S., Couper, K., Hatanaka, T., Kudenchuk, P., Olasveengen, T., Pellegrino, J.L., Shexnayder, S.M. & Morley, P. Diagnosis of out-of-hospital cardiac arrest by emergency medical dispatch: A diagnostic systematic review. *Resuscitation*: 2020 Nov 27; S0300-9572(20)30583-9. doi: 10.1016/j.resuscitation.2020.11.025
- Pellegrino, J.L., Charlton, N.P., Carlson, J.N., Flores, G.E., Goolsby, C.A., Hoover, A.V., Kule, A., Magid, D.J., Orkin, A.M., Singletary, E.M., Slater, T.M. & Swain, J.M. 2020 American Heart Association and American Red Cross focused update for first aid. *Circulation*: <https://doi.org/10.1161/CIR.0000000000000900>
- Greif, R., Bhanji, F., Bigham, B.L., Bray, J., Breckwoldt, J., Cheng, A., Duff, J.P., Gilfoyle, E., Hsieh, M.J., Iwami, T., Lauridsen, K.G., Lockey, A.S., Ma, M.H.M.,

Monsieurs, K.G., Okamoto, D., Pellegrino, J.L., Yeung, J., Finn, J.C., Baldi, E., Zace, D. Education, implementation, and teams: 2020 International consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Circulation*: 142(16 suppl 1) <https://doi.org/10.1161/CIR.0000000000000896>

- Pellegrino, J.L., Charlton, N.P. & Goolsby, C. (2020) “Stop the Bleed” Education Assessment Tool (SBEAT): Development and validation. *Cureus*: 12(9), e10567 <https://doi.org/10.7759/cureus.10567>
- 2020 Pellegrino, J.L. & Miller, B.: “Disco-ing your CPR Education.” 2020 Survival International Red Cross First Aid, Injury Prevention & Aquatic Education Conference. Virtual/Online 6 Oct 2020
- 2020 Burke, R. & Pellegrino, J.L. “Resilience Tools for Your Community.” 2020 Survival International Red Cross First Aid, Injury Prevention & Aquatic Education Conference. Virtual/Online 6 Oct
- Guest WKYC “Everyday Champion,” 27 Jan 2021
- Highlights of the 2020 Focused Updates to the American Heart Association and American Red Cross Guidelines for First Aid. 21 Oct 2020
- Guest, Spirit of Survival 2020 Interview. Jeffrey L. Pellegrino, Presenter, 22 Sep 2020
- Expert Guest, First Aid in the Time of COVID-19. Red Talk (facebook live), IFRC. 11 Sep 2020
- 2020 International First Aid, Resuscitation, Education Guidelines. (IFRC)

## Future Work

The Education Sub-Council sought and received Council approval to conduct a Scientific Review and a SAC Q&A, the results of which will be presented at meetings in the next six to twelve months:



## Education Sub-Council (continued)

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- **Scientific Review:** What is the best way for lay responders to identify life-threatening bleeding? (Leads: Jeffrey L. Pellegrino, PhD and Amita Sudhir, MD)
- **Q&A:** Social disparities divide communities in terms of resources, access to training, and health outcomes regarding out of hospital cardiac arrests. We want to explore the differences between geographic locations (census tracts) based on economic differences training offered by the Red Cross at the lay responder level. Either as a follow up or together, we seek to understand how COVID-19 has affected this training. Have online and/or blended education options increased access to or decreased participation in community level courses, which may have a long-term impact on community readiness? (Lead: Brian Miller, MS, MEd in a joint inquiry with the Resuscitation Sub-Council)

Researchers will also explore how the Education Sub-Council interacts with other Sub-Councils and investigate potential new microlearning opportunities from an educational perspective within and between learning sessions.

# Operation of the Council

The Council's professional diversity gives it an important advantage: a broad, multidisciplinary foundation for evaluating the scientific evidence for emergency response methods and techniques in emergency procedures, disaster actions, nursing care, water instruction and drowning prevention, and in the educational methods used to teach this information.

In addition to being experts in their own specialties and conducting original research outside of the Red Cross, the Sub-Council members are also knowledgeable in evaluating scientific literature, research methods, study designs and evidence grading, so they can fairly judge the quality and strength of the research they review.

## The Scientific Review Process

Council members continuously monitor their fields of expertise for important developments in emerging science and bring these events to the attention of the Council.

Council action can also begin elsewhere, such as when a new technology or product enters the field, or with an inquiry from a local Red Cross chapter or instructor about how to best handle a particular situation or emergency.

Once a subject merits further investigation, a Sub-Council proceeds on a structured course that may be undertaken in the form of a Scientific Review, a Triennial Review, a Sub-Council Q&A, or an Advisory. A single Sub-Council member is assigned to lead the structured review process, with a second member helping to select the reference materials, former clinical trials, published texts, expert opinion, and other evidence-based sources that will be considered. (If there is disagreement about the choices, the Sub-Council chair will act as arbiter.) The Council also has a rigorous conflict of interest process in place to assure that only scientific evidence is included in the discussions and recommendations.

The Sub-Council discusses this scientific information, summarizing the available quantitative and qualitative evidence on a standardized template designed to ensure rigor and precision, and, when warranted forwards the research and its opinion to the full Council. The final product may include recommendations for a Scientific or Triennial Review (standards, guidelines, or options); Council Answers for a Q&A; or an Advisory.

The full Council hears the recommendations presented by the Sub-Council, and all participating members vote on whether to accept the review, including the proposed recommendations, or to modify or take other action. Each recommendation is assigned a strength, based on an assessment of the current state of scientific and medical research on the subject.

The different strengths are classified as follows:

- **Standards**—Very strong evidence is available from well-designed, prospective, randomized, controlled studies.
- **Guidelines**—Current evidence is somewhat less robust, such as non-randomized cohort studies, case-control studies or retrospective observational studies.
- **Options**—Evidence includes current expert opinion, best practices, etc.

Lastly, the Sub-Council drafts any recommended changes to existing Red Cross materials and programs including suggestions for implementation by the Red Cross. After being issued, recommendations and their assigned strengths come under regular Sub-Council review, and may be updated as new evidence and other scientific advances become available.

An approved recommendation is also made available to the public at large through a variety of news media and on Red Cross websites, free of charge.

## Operation of the Council (continued)

### Council Follow-Up

The Red Cross field organization serves as a resource for the Council, allowing it to quickly augment its scientific and medical expertise with actual data from the field. Many Council members work in the field with the Red Cross and other organizations, gathering firsthand knowledge of what works best under actual emergency conditions.

The Council seeks feedback on the effectiveness of all its recommended techniques after they are issued to the field. A range of follow-up processes includes scrutiny of program feedback from the instructors and students and on-going, proactive reviews. For example:

- **Disaster Health**— Fatality data after disasters including house fires are captured after each event.
- **Aquatics**— Data are collected on rescues by lifeguards not only in the United States but also in Canada.
- **First Aid**— National and international data on injuries and illnesses are reviewed to establish where education is needed. Surveys are conducted in the field to determine how recommended techniques are being taught, if they are clearly understood, and how well the techniques are remembered. This last aspect is very important. For example, these surveys have determined that occasional short refresher courses have a major impact on trainees' recall of course material and proper technique.

Every new recommendation is reviewed and updated three years after being issued, and all recommendations are reviewed in the light of new research such as ILCOR every five years.

### Scientific Advisory Council Recommendations

The Council regularly issues recommendations on establishing the standard in first aid care, resuscitation, aquatics, preparedness and disaster health, and nursing and caregiving. Some of the issues that the Council has advised on include the following:

- Bandage Choice
- Chain of Drowning Survival
- Circle of Drowning Prevention
- Compression-Only CPR
- Control of Life-Threatening Bleeding
- CPR Skill Retention
- Critical Incident Stress Debriefing (CISD)
- Dental Avulsion Management
- Drowning and Lack of Efficacy of Abdominal Thrusts
- First Aid Kit Content
- Hypoglycemia Management
- Hyperthermia
- Infant AED
- Medical Examination Gloves for First Aid Providers
- Lightning and Pool Safety
- Minimum Age for Swimming Lessons
- Spinal Motion Restriction
- Swimming Competency
- Stroke Assessment Tools

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## **American Red Cross Scientific Advisory Council Position Statements**

Position Statements are occasionally issued by ARCSAC Sub-Councils. These statements focus on a topic of concern that is typically related to public health and prevention of injury, illness or death. Statements provide background information on a topic, any supporting evidence to support a position, the ARCSAC position, and information that may help guide future legislation related to the topic.

## **Leadership of the Scientific Advisory Council**

Within the Red Cross organization, the Council is part of the Training Services Division, with the Council Co-Chairs (Co-Chair Chief Medical Officer and Co-Chair Volunteer) reporting directly to the Division President. The purpose of SAC is to serve as an independent scientific and technical advisory group to the American Red Cross.



**American  
Red Cross**

Scientific  
Advisory Council

The American Red Cross Scientific Advisory Council is a panel of nationally recognized experts in emergency medicine, sports medicine, emergency medical services (EMS), emergency preparedness, disaster mobilization and other public health and safety fields. The Council ensures that all Red Cross programs are fully current with the latest science, address current needs, and are prepared for future changes.

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