



**American
Red Cross**

Scientific Advisory Council

**American Red Cross
Scientific Advisory Council
Scientific Review**

WATER RESCUE EQUIPMENT FOR THE LAY RESPONDER

Questions to be addressed:

Assisting a drowning victim: Evaluation of effective water rescue equipment for a lay-responder

- What is the most effective piece of rescue equipment for a lay-responder/bystander to throw a person in trouble in water?
- What are the most accurate and buoyant types of rescue devices for a lay-person/bystander to use for aiding a drowning person?
- What is the best type of rescue device for a drowning person to hold on to that a lay-person/bystander could use to help a person in trouble in water?
- What is the best type of rescue equipment for a lay person/bystander to use to help rescue a person in water quickly and at a great distance (i.e. accuracy, buoyancy, distance, ability for someone to grab hold)?

Introduction/Overview:

The World Health Organization (2014) reported that in 2011, an estimated 359,000 people died from drowning, making it a major public health problem worldwide. Globally the issue of drowning is one that affects all economies and regions. In the United States, the Centers for Disease Control (2012) reported that from 2005-2009, there was an average of 3,533 fatal unintentional drowning (non-boating related) annually in the United States, about ten deaths per day. Although the death rate from unintentional drowning for persons aged 0-19 years of age has decreased, drowning still remains the leading cause of death from unintentional injuries among children aged 1-4, with most cases occurring in swimming pools. In addition drowning disproportionately affects children and minority populations (CDC, 2014; Nasrullah, Muazzam, 2011, Irwin, Irwin, Ryan, and Drayer, 2011; Waller and Norwood, 2009; Irwin, Irwin, Ryan, and Drayer, 2009; Gilchrist, Sacks, Branche, 2000). It has been said it “takes a community to raise a

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

child”; hence this review of the literature investigates the “altruistic” desire of the everyday hero to take steps and efforts decrease rescuer-victim drowning deaths. A study by Pearn & Franklin (2012) suggests that “rescue altruism” creates a sense of personal courage, in both trained aquatic lifesaving professionals and laypersons/bystanders, that ignores a “degree of risk” when helping a person in trouble in water. Hence, since a layperson/bystander can be affected by an aquatic rescue at anytime, this review investigates the scholarly literature to discover what piece of rescue equipment is the most effective for a lay responder to throw to a person in need of aquatic rescue but to identify rescue techniques that will minimize the risk for the rescuers and increase the survival chances of the victims.

Literature related to drowning prevention and the importance of lifeguard supervision, ability, rescue skills and preparation, are abundant within the literature. However, studies have shown that needless drowning has occurred because laypersons/bystanders lack knowledge of how to execute simple rescue skills. Laypersons/bystanders make a critical difference in the survival of person in trouble in water (Szpilman, Løfgren, Webber, Quan, Bierens, Morizot-Leite, & Langendorfer 2013; Moran & Stanley, 2013; Pearn, & Franklin, 2012; Moran, Quan, Franklin, & Bennett, 2011; Franklin, & Pearn, 2011; Venema, Groothoff & Joost, 2010; Pearn & Franklin, 2009; Michniewicz, Walczuk, & Rostkowska, 2008; Wiesner, 2001; Webber, 2008).

There is a paucity of literature that addresses the “altruistic” efforts of layresponders/bystanders decision to respond to person in need of help in water. A review of the Dutch drowning rescue organization showed that rescuers were willing to put their lives at risk to save a drowning victim, even if unrelated to that victim. However, this report came from the country with almost 2 centuries of a drowning prevention society that lauded such efforts and was the first country to create a public program for drowning response (Venema, Groothoof,

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

Bierens, 2010)). A recent descriptive study from Bangladesh showed that children who had been taught how to conduct a swimsafe rescue frequently attempted rescues of younger children drowning (Mecrow, Rahman, Linnan, Scarr, Mashreky, Talab, Rahman, 2014). However, though the program focused on “noncontact rescue and water safety techniques” (i.e. reach by pole, reach by hand, throw rescue) (Mecrow, et al., 2014 p 1.) in the majority of cases the rescuer had to enter the water. This study failed to describe if any of the rescuers died in the process.

Moreover, there is limited research identifying the best rescue equipment to use for a person in need of help in water. What exists are expert agencies and opinions that identify the need to promote safe rescue knowledge, techniques, and effective bystander rescue equipment (Szpilman, Løfgren, Webber, Quan, Bierens, Morizot-Leite, & Langendorfer 2013; Moran & Stanley, 2013; Pearn, & Franklin, 2012; Moran, Quan, Franklin, & Bennett, 2011; Franklin, & Pearn, 2011; Venema, Groothoff & Joost, 2010; Pearn & Franklin, 2009; Michniewicz, Walczuk, & Rostkowska, 2008; Wiesner, 2001; Webber, 2008).

Review Process and Literature Search Performed

Databases

Databases searched included PubMed, SportDiscus, Physical Education Index, Articles First, First Search, CINAHL Plus with Full Text, Show all ERIC, Health Sourc-Consumer Edition, Health Source: Nursing/ Academic Edition, MasterFILE Premier, Google Web Search, references from reviewed articles

Websites

http://www.wcdp2013.org/uploads/media/Prevention8_4_130_Public_Rescue-Equipment_MartinOSullivan.pdf
<http://www.iws.ie/emergency-situations/guidelines-for-the-erection-and-usage-of-ringbuoys.320.html>

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

<http://www.iws.ie/fileupload/Leaflets/Ringbuoy%20-%20how%20to%20use%20a%20ringbuoy.jpg>
<http://www.popularmechanics.co.za/features/when-the-first-responder-is-you/>
<http://faculty.deanza.edu/donahumary/Howtorescueadrowningvictimusingareachingassistorashepherd'scrook>
<http://www.livescience.com/6866-people-drown.html>
http://www.sobrasa.org/new_sobrasa/arquivos/WCDP_2013/Drowning_chain_all_presentations_all.pdf
<http://instructorcorner.org/welcome/>
faculty.deanza.edu/.../Howtorescueadrowningvictimusin
<http://www.watersafe.org.nz/default.asp>
<http://www.aquaticsafetygroup.com/pdf/markelaquaticriskmgmtguide.pdf>
<http://paddling.about.com/od/safetyprecautions/ht/Throw-Bag-Whitewater-Rescue.htm>
<http://survival.about.com/od/13/a/How-To-Rescue-A-Swimmer-With-A-Throw-Bag.htm>
<http://familydoctormag.com/first-aid-and-safety/1311-how-to-save-someone-whos-drowning>
https://www.pediatriccareonline.org/pco/ub/view/Point-of-Care-Quick-Reference/397252/all/Drowning_and_Near_Drowning?q=%22life%20preserver%22
familydoctormag.com/.../1311-how-to-save-someone-whos-drowning-qr
www.swimmersdaily.com/.../simple-step-by-step-guide-on-how-to-save-s..
<http://lifeguardgdynia.pl/html/bojka.html>,

Scientific Foundation:

Little to no published scientific literature identified the most effective piece of rescue equipment for a lay person/bystander to throw to a person in trouble in the water. However, several studies identify and provide viable recommendations addressing effective rescue equipment that a lay person/bystander can effectively use, or be trained to use. Franklin and Pearn (2011; 2012) revealed the reality that a lay person/bystander will respond to a person who is in trouble in water. They recommended equipping rescuers with the “tools for heroic acts”. (Pearn and Franklin, 2009). or 2) Throw performed with a buoy or any floating object. “talk, reach, throw, wade, row, and tow”, “reach and throw don’t go” (i.e. reaching assists)(Royal Life Saving Society Australia, 2006; American Red Cross, 2014).

A variety of rescue equipment was identified as effective for reach or throw (i.e. ring buoy, rescue tube, rescue canister, rescue lines and ball, throw lines or life buoys, reaching and extension assists and rescue techniques with poles and noodles, and a shepherd’s crook). Rescue

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

tube, ring buoy, throw line, and rescue line were cited as the most “advantageous” types of rescue equipment due to their associated accuracy, buoyancy, distance they could be thrown, and ease with which the rescuee could grab hold (O’Sullivan, 2013; Szpilman, Løfgren, Webber, Quan, Bierens, Morizot-Leite, & Langendorfer 2013; Moran & Stanley, 2013; Pearn, & Franklin, 2012; Moran, Quan, Franklin, & Bennett, 2011; Franklin, & Pearn, 2011; Venema, Groothoff & Joost, 2010; Pern & Franklin, 2009; Michniewicz, Walczuk, & Rostkowska, 2008; Webber, 2008; Wiesner, 2001). Their use, specifically, throwing a lifeline or lifebuoy, should be a lifesaving skill taught to lay-responders/bystanders. Most recently, findings of Rescue Commission of International Life Saving (European Region) identified a link between the use of ringbuoys (i.e. lifebuoy, life ring, or life belt) by a lay-responders/bystanders and the lives saved as significant and effective among persons in need of aquatic rescue (O’Sullivan, 2013).

Summary: The presence of layperson/bystander, when a victim is in need of an aquatic rescue, can? save lives. Moreover, many laypersons/bystanders are willing to take responsibility to rescue a drowning victim in spite of significant dangers. How a bystander most effectively and safely achieves a rescue while staying out of the water, is unclear. Limited data suggests that bystanders need psychomotor preparation, i.e. training, to use rescue devices. General consensus supports use of equipment using a rescue device. However, what specific rescue device is most effective, safe and easily learned is not known. Experts and agencies acknowledge that the use of any individual rescue device has advantages and disadvantages with.

Overall Recommendation:

Although there is limited research which shows that rescue equipment such as throw ropes, ring buoys, and throw lines can be effectively used by bystanders, what is known is that bystanders rescue and resuscitation of drowning victims seems to contribute to positive outcomes

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

(O’Sullivan, 2015; Pearn & Franklin, 2009). Teaching layperson/bystander rescue skills should become apart of water safety classes and guidelines in efforts to reduce the drowning rate and increase safer and more effective bystander intervention skills. Additionally Targeting Interventions are needed to help address shortcoming, especially in high-risk aquatic activities (i.e. kayaking, white water rafting; jet skiing). Through the inclusion with current American Red Cross water Safety programming the development of public-access water safety programs to teach rescue techniques without placing the rescuer at risk (i.e. reach and throw don’t go, techniques) annually a significant number of lives could be saved

Recommendations and Strength (using table below):

Standards: None

Guidelines: None

Options: There is limited research which shows that rescue equipment such as throw ropes, ring buoys, and throw lines can be effectively used by bystanders, there is no research recommending or comparing the use of one type of equipment over another.

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

Author(s)	Full Citation	Summary of Article (provide a brief summary of what the article adds to	Level of Evidence (Using table below)
<p>Michniewicz, R., Walczuk, T., Rostkowska, E.</p>	<p>Michniewicz, R., Walczuk, T., Rostkowska, E. (2008). An assessment of the effectiveness of various variants of water rescue. <i>Kinesiology</i>, 40(1):96-106.</p>	<p>Effective performance of a rescue in water without equipment was negligible, placing both the life guard and victim at risk.</p> <p>The use of equipment (i.e. rescue canister) significantly reduced the risk of loss of lifeguard's and victim's lives was confirmed.</p> <p>The rescue canister selected for this study was identified as one of many useful types of rescue equipment (i.e. rescue tube, ring buoy, rescue line)</p>	<p>3a</p>
<p>Wiesner, W.</p>	<p>Wiesner, W. (2001). <i>Bojka ratunkowa – uniwersalny środek pływacki</i>. Materiał wygłoszony na Konferencji Naukowej w Srebrnej Górze. [A rescue buoy – a universal swimming apparatus. A paper read at the Scientific Conference in Srebrna Góra. In Polish.] /on-line/. Retrieved June 14, 2013 from: http://lifeguardgdynia.pl/html/bojka.html</p>	<p>There are advantages and disadvantages with the use of any individual rescue device,</p> <p>There is a specified time needed to swim and tow a victim with the use of individual rescue devices (i.e. rescue tube, ring buoy, rescue canister, safety line on a winch, rescue line and ball) over a distance of 20 meters,</p> <p>the use of a rescue tube, ring buoy, and a line on a winch were identified as advantageous? For what, in what way?- shorter tow times?.</p> <p>Suggestion for changes being made in lifeguard training which could lead to participants learning to use a variety of rescue equipment so that they can select a rescue device suitable for them.</p>	<p>3a</p>

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

<p>Szpilman,D., Løfgren, B., Webber,J., Quan,L., Bierens, J., Morizot-Leite,L., Stephen J. Langendorfer</p>	<p>Szpilman,D., Løfgren, B., Webber,J., Quan,L., Bierens, J., Morizot-Leite,L., Stephen J. Langendorfer (2013). Creating a Universal Drowning Chain of Survival:Needs and Evaluation. A panel discussion and brainstorming session.Retrieved May 6, 2014 from http://www.sobrasa.org/new_sobrasa/arquivos/WCDP_2013/Drowning_chain_all_presentations_all.pdf</p>	<p>Identification of “Factors which influence a lay-person’s decision to enter the water to provide help”(i.e. Relationship with victim, Depth of water/distance to victim, swimming and rescue skill of the lay-responder, level of danger associated with the rescue, the consequence of not providing immediate help to the victim, other things)</p> <p>There are two goals, strategic and tactical (strategic = retrieve the victim from the water and tactical = interrupt the drowning process and prevent submersion) that effect a lay person when attempting to helping a drowning victim</p> <p>Most rescuers focus on the strategic goal but a lay responder should focus on following the chain of survival, by calling for help with a focus on the tactical goal, of providing a victim with flotation assistance with rescue equipment (i.e. reach and assists with poles, trees and noodles, shepherd’s crook, and ring buoys.</p>	<p>6</p>
<p>Moran, K., Stanley, T.</p>	<p>Webber, J.B.,(2008). Drowning, the New Zealand way: Prevention, rescue, resucitation. <i>Resuscitation</i>, 81(2):Supplement 96-106.</p>	<p>Experts recommend learning safe ways to assist others and keep others safe</p> <p>Very little data identifies what rescue skills work best or are performed best by non-expert rescuers (i.e. lay-person or bystander).</p> <p>Experts support recommendations of Pearn & Franklin (2009) for bystanders to be aware of safe non contact rescue techniques (i.e. throw lines or life buoys)</p>	<p>3b</p>
<p>Pearn, J.H.,</p>	<p>Pern, J.H., Franklin, R.C.,(2012). The impulse to</p>	<p>Purpose: To dissect and discuss “rescue altruism” and the</p>	<p>3b</p>

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

<p>Franklin, R.C.</p>	<p>rescue": Rescue altruism and the challenge of saving the rescuer. <i>International Journal of Aquatic Research & Education</i>, 6(4) 325-335.</p>	<p>importance for the need of lay-responder/bystander training in basic lifesaving skills to reduce rescuer-victim deaths by drowning.</p> <p>Findings: Results of the study revealed:</p> <ul style="list-style-type: none"> ● "Rescue altruism" creates a sense of personal courage that ignores degree of risk hence increasing the rescuer-victim syndrome. ● Aquatic rescues can impact a bystander at anytime hence the solution is to equip all with the "tools for heroic acts" (Franklin & Pearn, 2011) eliminating fatal risks which can be created by such heroism. 	
-----------------------	---	---	--

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

		<ul style="list-style-type: none"> • There should be a public-access water safety programs to teach rescue techniques without placing the rescuer at risk (i.e. reach and throw, don't go techniques) • Basic Line-Throwing skills were identified as an important skill in the context of this study. <p>18-year critical incident population study identified 103 victims who drowned while attempting a rescue. (In Australia) In 74% of cases, the primary "victim" (rescuer) survived; 50% of rescuers were visitors not familiar with the water hazard; 67% of the drowned rescuers were related to the primary victim. None were professionally trained in aquatic rescue.</p> <p>Rescue altruism is composed of (a) an ethos based on the Good Samaritan or Golden Rule ethic; (b) a subjective identity of the rescuer with the victim, intensified</p>	
--	--	--	--

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

		<p>by a perceived duty-of-care relationship; (c) perception of risk in which the potential of rescue-resuscitation success is greater than zero; and (d) personal courage that ignores degree of risk.</p> <p>The unmet challenge therefore is to ensure all members of the public are equipped with lifesaving drills and skills to ensure their safety and those in their care.</p> <p>As the need to effect an aquatic rescue can confront a bystander at any time, and as many so confronted will act altruistically, the solution is to equip all with the "tools for heroic acts" (Franklin & Pearn, 2011). Such will reduce the risk of rescuer deaths and increase the likelihood of saving the primary victim. Specialist swimming and body-contact rescue skills are the province of professional lifesavers and lifeguards. By contrast, in the context of the general public (i.e., those who are involved in opportunistic bystander aquatic rescues), the basic paradigm of public-access water safety is to teach rescue techniques without placing the rescuer at risk—if at all possible by noncontact outreach, a fundamental principal involved in all international "Aqua Codes" (Franklin & Pearn, 2011; Pearn & Franklin, 2009).</p> <p>The teaching of basic line-throwing skills is important in this context.</p> <p>It has been shown that only 20% of untrained adults can throw a</p>	
--	--	--	--

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

		<p>line within two meters of a target at a first attempt.</p> <p>In the heat of the moment, 20% do not secure the end of the flung rope.</p> <p>Trained children can affect a 10 meter accurate throw and pull a potential victim to safety with a median lapsed time of 23 s (Pearn & Franklin, 2009).</p>	
Webber, J.B.	<p>Pern, J.H., Franklin, R.C.,(2009). “Flinging the squaler” Lifeline rescues for drowning prevention. <i>International Journal of Aquatic Research & Education</i>, 3(3) 315-321.</p>	<p>Effective performance of a rescue in water without equipment was negligible, placing both the life guard and victim at risk.</p> <p>The use of equipment (i.e. rescue canister) significantly reduces the risk of loss of lifeguard’s and victim’s lives were confirmed.</p> <p>The rescue canister selected for this study was identified as one of many useful types of rescue equipment (i.e. rescue tube, ring buoy, rescue line, Wiesner (2001))</p>	2b
Venema, A.M., Groothoff, J.W., Joost, J.L.M.	<p>Moran, K., Stanley, T., (2013). Readiness to Rescue: Bystander perceptions of their capacity to respond in a drowning emergency. <i>International Journal of Aquatic Research & Education</i>, 7(4) 290-300.</p>	<p>Bystander rescue and resuscitation of drowning victims seems to contribute to a positive outcome. Bystanders are prepared to take responsibility to rescue a drowning victim in spite of significant dangers. The interventions of bystanders assistance occurs in dangerous situations. Some recent studies have concluded that drowning victims have a good chance of survival when bystander resuscitation has already been started before the arrival of the emergency medical services (EMS). Outcome is poor if rescue or resuscitation is</p>	3b

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

		<p>delayed.1–7 Unfortunately, little data on what exactly happens during the rescue and resuscitation of drowning victims by bystanders is available. This information is important to provide input in training courses aimed at the rescue and resuscitation of drowning victims.</p>	
<p>Moran, K., Quan, L., Franklin, R., Bennett</p>	<p>Venema, A.M., Groothoff, J.W., Joost, J.L.M. (2010). The role of bystanders during rescue and resuscitation of drowning victims. <i>Resuscitation</i>, 81(4) 434-439.</p>	<p>Experts recommend learning safe ways to assist others and keep others safe There is a paucity of data that identifies what rescue skills work best or are performed best by non-expert rescuers (i.e. lay-person or bystander). Experts support recommendations of Pearn & Franklin (2009) for bystanders to be aware of safe non contact rescue techniques (i.e. throw lines or life buoys)</p>	2b
<p>Pearn, J.H., Franklin, R.C</p>	<p>Moran, K., Quan, L., Franklin, R., Bennett (2011). Where the evidence and expert opinion meet: A review of open-water recreational safety messages. <i>International Journal of Aquatic Research & Education</i>, 5(3) 251-270.</p>	<p>the simple skill of throwing a lifeline or lifebuoy should be a lifesaving skill taught to lay-responders/bystanders to decrease needless drowning. It takes a medium time of 35sec for an untrained bystander to throw a lifeline. 20% of lay-responders/bystanders can throw a line within 2m of the target at a first attempt. Trained children can affect a 10m accurate throw and pull a potential victim to safety with a medium elapsed time of 23sec.</p>	
<p>Franklin, R.C., Pearn, J.H. Add year</p>	<p>Franklin, R.C., Pern, J.H. (2011). Drowning for love: the aquatic victim-instead-of-rescuer syndrome: drowning fatalities involving those attempting to rescue a</p>	<p>Parents and guardians instinctively will go to aid a drowning child. In this study male parents or partner of a first degree relative (i.e. lay-person or bystander) would be the first to respond. The rescuer often</p>	3b

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

	<p>child. <i>Journal of Paediatrics and Child Health</i> 47, p. 44-47</p>	<p>drowns. This condition is defined as aquatic victim-instead-of-rescuer (AVIR) syndrome. Parent empowerment of personal life saving skills is a practical way to eliminate/reduce the double tragedy drowning syndrome (AVIR)</p> <p>Having basic non-contact rescue skills is a secondary prevention which would be beneficial, hence increase education that increases acquisition of aquatic rescue skills.</p> <p>AVIR syndrome could be reduced if more awareness can be brought to the risks which cause AVIR syndrome (i.e. unfamiliar water hazards; the sea; tourists or oversea visitors)</p> <p>Parents should have basic life saving skills of non-contact rescue (i.e. throwing a life line)</p> <p>Experts support recommendations of Pearn & Franklin (2009) for bystanders to be aware of safe non contact rescue techniques (i.e. throw lines or life buoys)</p>	
<p>Mecrow, S., Rahman, A., Linnan, M., Scarr, J., Mashreky, R., Talab, A., Rahman, A.K.,</p>	<p>Mecrow, S., Rahman, A., Linnan, M., Scarr, J., Mashreky, R., Talab, A., Rahman, A.K., (2014). Children reporting rescuing other children in rural Banladesh: A descriptive study. <i>Injury Prevention</i> published first online March 31, 3014 as 10.1136/injuryprev-2013-041015. Retrieved October 27, 2014 from http://injuryprevention.bmj.com/</p>	<p>In Bangladesh, children report frequent drowning rescues of younger children in rural areas Whether trained in the Swim Safe program or a natural swimmer, all rescuers entered the water. Swimming rescues where the rescuer had to swim to reach the victim accounted for about half of all in water rescues. There was no difference in swimming rescues between the trained SwimSafe graduates and natural swimmers. Cultural and Socioeconomic Implications and drowning environments play a huge role in Water Safety and education in high income countries and low to middle income countries. HIC</p>	<p>3a</p>

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

		<p>have safety legislation, which usually require safety equipment and professional supervision regularly use public swimming areas. This lessens the need for a bystander rescuer to enter the water to conduct a contact rescue. The study suggests that in-water rescue techniques and land-based rescue techniques should be taught to all children as well as added to Swim Safe program</p> <p>AVIR syndrome is present regardless of socioeconomic differences in HIC and LMICs. The study found that children conducted in water rescues that involve contact even if they received training in safer land-based techniques based on the different aquatic environments as compared to HIC aquatic environments and lack of access to water safety equipment (i.e. reach and extension devices) more effective water safety education, risk knowledge and adult supervision are needed.</p>	
<p>O’Sullivan, M.</p>	<p>O’Sullivan, M. (2014). Public Rescue Equipment-The ring buoy as a lifesaver. <i>World Conference on Drowning Prevention</i>. Retrieved on Dec 20, 2014 from http://www.wcdp2013.org/uploads/media/Prevention8_4_130_Public_Rescue-Equipment_MartinOSullivan.pdf</p>	<p>Based on Irish Water Safety Program data gathered over a 7 year period (2006-2012), the use of ring buoys by lay-responders and the numbers of lives saved was significant.</p> <p>Ireland is one of the few countries in Europe where ring buoys were extensively deployed as public rescue equipment.</p> <p>In Ireland ring buoys are accessible on all public beaches 100meters apart. Ring buoys are also placed along riverbanks, lakesides, and marinas.</p> <p>Members of the public (lay-responders) received over 50+ years from the IWS education regarding the proper use of the</p>	<p>3b</p>

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

		ring buoy for saving a person in need of water rescue.	
Evans, W. (2004). Risk Management for your Aquatic Safety Program. Markel Insurance Company. Retrived on May 6, 2014	Evans, W. (2004). Risk Management for your Aquatic Safety Program. Markel Insurance Company. Retrived on May 6, 2014 http://www.aquaticsafetvgroup.com/pdf/markelaquaticriskmgmtguide.pdf	Throw ropes are one of the best pieces of rescue equipment available in remote aquatic environments or on canoe and kayak trips. Used properly, they can extend the reach of rescuers Consistent accuracy with a throw bag takes practice This knowledge is not limited to Whitewater Rivers, but can be applied to pools & remote locations where a rescue tube is not available..."	

(Please fill in the following table for articles that were used to create your recommendations and/or guidelines. For references please us the American Medical Association Manual of Style and please only use abbreviations for journal names as listed in index medicus)

Level of Evidence	Definitions (See manuscript for full details)
Level 1a	<u>Experimental and Population based studies</u> - population based, randomized prospective studies or meta-analyses of multiple higher evidence studies with substantial effects
Level 1b	<u>Smaller Experimental and Epidemiological studies</u> - Large non-population based epidemiological studies or randomized prospective studies with smaller or less significant effects
Level 2a	<u>Prospective Observational Analytical</u> - Controlled, non-randomized, cohort studies
Level 2b	<u>Retrospective/Historical Observational Analytical</u> - non-randomized, cohort or case-control studies
Level 3a	<u>Large Descriptive studies</u> – Cross-section, Ecological, Case series, Case reports
Level 3b	<u>Small Descriptive studies</u> – Cross-section, Ecological, Case series, Case reports
Level 4	<u>Animal studies or mechanical model studies</u>
Level 5	<u>Peer-reviewed Articles</u> - state of the art articles, review articles, organizational statements or guidelines, editorials, or consensus statements
Level 6	<u>Non-peer reviewed published opinions</u> - such as textbook statements, official organizational publications, guidelines and policy statements which are not peer reviewed and consensus statements
Level 7	<u>Rational conjecture</u> (common sense); common practices accepted before evidence-based guidelines

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

Level 1-6E	<u>Extrapolations</u> from existing data collected for other purposes, theoretical analyses which is on-point with question being asked. Modifier E applied because extrapolated but ranked based on type of study.
-------------------	--

American Red Cross Scientific Advisory Council Water Rescue Equipment for the Lay Responder Scientific Review

Attach Any Lists, Tables of List of Recommendations Created As Part of This Review
(Please include any tables, lists of items or procedures and tables which you as part of the review)