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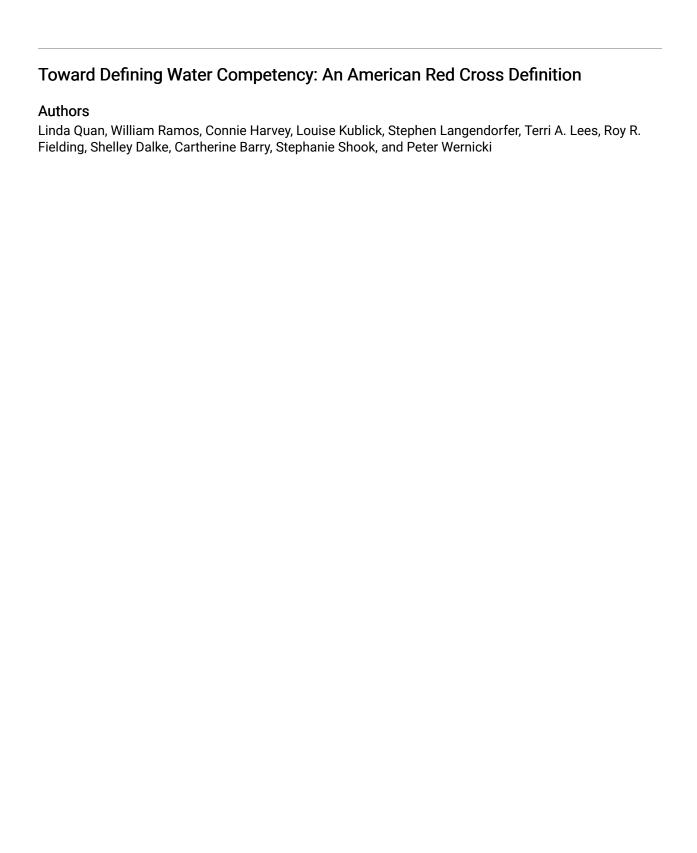Follow this and additional works at: https://scholarworks.bgsu.edu/ijare

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ORIGINAL RESEARCH

Toward Defining Water Competency: An American Red Cross Definition

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Water competency entails more than a perception of just being able to swim and an operational definition of water competency is necessary for learn-to-swim program evaluation and policy development. To devise an operational definition, members of the American Red Cross Scientific Advisory Aquatic subcouncil surveyed nine key national (United States) organizations, 14 international organizations, and 19 other key informants involved with water safety and swimming activities for their requirements for swimming in the "deep end." The most frequently reported variables included (a) distance swum, (b) floating or treading water, (c) entrance into water unassisted, and (d) exit from the water unassisted. The subcouncil proposed that water competency include the following: (1) entry with total submersion; (2) recovery to the surface and float or tread for at least 1 min; (3) turn 360° and orient toward an exit point; (4) level off and move on front and/or on back position for at least 25 yards; and (5) exit from the water. We note that water competency is influenced by conditions of the aquatic environment (e.g., water temperature, movement, depth) into which the person may be introduced, and that skills demonstrated in one aquatic environment may not transfer to another. Our proposed operational definition for water competency provides an initial framework for an expanded version that may be expanded to be used globally.

Keywords: swimming, water competency, swimming and aquatic skills, water safety instruction

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Background

The American Red Cross has promoted lifesaving and water safety by providing swimming lessons and other water safety education for 100 years (American Red Cross, 2014a). Throughout this long history, several fundamental assumptions have governed the Red Cross aquatic curriculum:

- Learning to swim is an important drowning prevention strategy.
- The essence of "being able to swim" commonly means correctly performing swimming strokes such as front crawl or breaststroke.
- The learning process requires progressively-structured instruction.
- Expertise in a wide variety of aquatic skills means that swimmers possess a capacity referred to as "watermanship."

As a result of these and other unchallenged and untested assumptions, progressively more challenging water safety skills and swimming strokes typically are taught at each successive level of swimming lessons. It has been implicitly assumed that to acquire swimming strokes and water safety skills at advanced levels of proficiency (a.k.a., achieve watermanship) learn-to-swim students should complete most, if not all, levels/courses in the Red Cross swimming and water safety program. For example, by successfully completing the 2012 American Red Cross Learn-to-Swim Level 4, a swimmer could be expected to jump in feet first, swim 25 yards, turn, and float/tread water for 1 min (American Red Cross, 2009). Data from the American Red Cross Field Operations Consolidated Information System on the number of people who signed up for Levels 1–6 in the Learn-to-Swim program showed that the number of students who enrolled in Level 4 classes was consistently much lower than the number who took Level 1 classes. Moreover, this ratio has slowly decreased. In 2000, the ratio of Level 4 to Level 1 students was .68; in 2012, it was .58. With fewer students currently enrolling in Learn-to-Swim Level 4, one might conclude that most students do not acquire all of the recommended swim skills to an adequate degree of proficiency to save themselves during an unexpected submersion (American Red Cross, 2009). Certainly most cannot to achieve watermanship.

Over the century of Red Cross Learn-to-Swim programs, the unstated purpose of swim lessons appears to gradually have shifted from preventing drowning toward performing swim strokes to allow students to pursue both recreational and competitive activities as well as to build their skills to become lifeguards or Water Safety instructors. Swim lessons focused less on water safety or drowning prevention skills and increasingly on learning six common swimming strokes. Currently, the primary focus of Learn-to-Swim is on the four competitive swimming strokes to the point where the front crawl stroke is allowed to be called "freestyle," a type of competitive event, not an actual swimming stroke. Safety skills with a primary focus on drowning prevention such as back and survival floating, treading water, and resting strokes, such as sidestroke and elementary backstroke, consistently have been part of the national curriculum. The importance placed on them as primary water safety skills has lessened, thus diminishing attention to the role of swimming drowning prevention.

Recently several authors have criticized the "drift" in the purpose of swim lessons toward emphasizing competitive swimming stroke development. They

called on aquatic professionals to focus on the importance of achieving "water competence" (Langendorfer, 2011; Langendorfer & Bruya, 1995) and to stress that a primary goal of swim lessons ought to be drowning prevention (Stallman, Junge, & Blixt, 2008). Langendorfer and Bruya (1995) originally equated water competence with broad proficiency in aquatic skills, termed "watermanship." More recently Langendorfer (2011) argued that water competence ought to represent states of aquatic proficiency that reduce risk of drowning and increase capability to perform tasks successfully across aquatic environments. Stallman et al. (2008) argued eloquently for a goal-oriented learn-to-swim framework organized around the causes of drowning and focused on developing water competence. In 2009, the American Red Cross emphasized to instructors and program coordinators that back floating, treading water, breath control, and getting in and out of the pool safely were for the purpose of preventing drowning as well as building foundational swimming skills. Furthermore, water safety topics, such as learning to call 9–1–1 and knowing water safety rules, were reemphasized as a required part of the curriculum and included on the checklist of key skills (American Red Cross, 2009).

At many pools and beach swim facilities in the United States, to swim in the deep end, children are required to demonstrate a certain level of swimming proficiency usually by covering a specified distance, occasionally demonstrating a specific stroke or style. Similarly, in Norway, as part of the required school curriculum, students are required to perform a 200 m swim test (Stallman, et al., 2008). Many swim facilities have developed their own swim tests which include skills assumed to be needed by swimmers to be safe in deep water with little to no regard for the accuracy or consistency of such tests. The 2012 American Red Cross Lifeguarding Manual addressed the complexity of the accuracy (i.e., validity) issue by providing an example of a swim test:

> Swim tests can be used to determine if a person has the minimum level of swimming ability required to participate safely in activities, such as swimming in deep water, riding a slide that empties into deep water or jumping off a diving board into deep water. There is no single set of swim-test criteria that best meets the needs of all facilities or organizations, nor is the following information intended to set a standard. (American Red Cross, 2012)

Need for a Standardized Definition of Water Competency

To emphasize the skills that are key to drowning prevention rather than maintain a more traditional focus on styles of swimming strokes and covering distance, we believed the American Red Cross needed to describe a standardized definition of water competency for educational, water safety, and research reasons.

Educational

For educational purposes we need to objectively understand when a swimmer is really a swimmer. Parents ought to know when their child has acquired sufficient skill to be competent in a variety of aquatic settings or when the child still needs to continue swim lessons. The very low proportion of children who advance to

Level 4 in American Red Cross Learn-to-Swim programs suggests that parents are unaware that children need to acquire more than just the most basic swimming skills to reduce their risk of drowning. In addition, programs and agencies that offer water-related activities or field trips to children or other clients need to know if its participants have achieved an adequate level of proficiency to be safe during the activities.

Reliability

Although open water settings, larger pools, and water parks obviously require slightly different skills and levels of proficiency for safe participation, it seems logical that most swimming facilities identify consistent standards to allow entrance to water events such as slides or diving boards, especially in deep water areas. Development of a common and consistent level of proficiency could be beneficial regardless of the organization or facility sponsoring a learn-to-swim program. So-called swim tests ought to be able to be administered consistently by most aquatic professionals.

In addition, aquatic programs that seek to evaluate their teaching programs could evaluate "products," including swimming/water competency if a common working definition were in place. Prospective students or clients ought to be able to assess a program's efficacy. If a consistent standard definition was uniformly adopted, measures such as pass rates or time to competency could be examined to evaluate different teachers and different teaching approaches as well as accommodate groups of students with special needs and challenges.

Water Safety

For public health and *surveillance* purposes, knowing what percent of the population can swim (i.e., who are water competent in a standard swimming pool) may be an important safety measure. A recent study that evaluated swimming history in young children showed an association between having participated in swimming lessons and a decreased risk of drowning death (Brenner, Taneja, Haynie, Trumble, Qian, et al., 2009). Following this landmark study, the American Academy of Pediatrics (AAP) changed its prohibition of "organized swim lessons for children under 5 years of age to a recommendation favoring swimming lessons for young children" (AAP, 2010). Consequently, the injury prevention community has begun to more strongly espouse swimming lessons as a drowning prevention tactic for young children (Moreno, Furtner, & Rivara, 2009). Another study from China showed that children who had swim lessons also had a decreased drowning death risk (Yang, Nong, Li, Feng, & Lo, 2007). While limited evidence supports the protective role of swimming lessons or swimming skill among adolescents or adults, promotion of swimming skills continues among these age groups (Petrass, Blitvich, McElroy, Harvey, & Moran, 2012).

Other important public health questions about swimming/water competency remain unaddressed and unanswered. These include accurately assessing the percentage of persons by age group who can swim and the percentage of nonswimmers who are at a higher risk for drowning, across various community, racial, or ethnic groups. Recent surveys conducted at pools and at beaches in the United States and in New Zealand showed marked variability in reported swimming lessons and swim-

ming skill among families and children of diverse racial and ethnic backgrounds and incomes (Irwin, Irwin, Ryan, & Drayer, 2009; McCool, Moran, Ameratunga, & Robinson, 2008) while drowning studies show these same populations have disproportionately high fatal drowning rates (Gilchrist & Parker, 2014; Ma, Nie, Xu, Song, Guo, & Zhang, 2010). We need to ascertain whether increasing the percentage of persons displaying water competency among these minority communities, particularly in high risk communities, decrease drowning deaths. Currently, limited evidence demonstrates or refutes whether swim lessons oriented toward achieving water competency are an effective public health prevention measure against drowning or whether they are superior to traditional stroke-oriented lessons.

We also need to determine the best ways for health and water safety policies to address drowning prevention and water safety in populations or communities at high risk for drowning. Should there be national and/or international goals for achieving swimming/water competency? Of note, *EuroSafe*, the European Safety Alliance for Children, has developed a national scorecard for water safety which includes scores for policy establishing priorities in swimming. *Eurosafe* reported that 19 of 31 European nations reported having a policy that makes water safety education (including swimming lessons) a compulsory part of the school curriculum (Vincenten, 2012).

Presently, epidemiological surveillance data of swimming /water competency are collected within several settings. In a typical drowning death investigation, an estimate of the drowned person's swimming skill proficiency is sought from family or friends; this usually gets reported as "he was a poor/good swimmer." Neither the validity nor the reliability of these terms, as reported by family members or friends, has ever been determined or reported, especially because there is no existing standard definition of what it means to be a swimmer.

The Bangladesh experience provides the strongest evidenced-based support for the preventative nature of swimming lessons on drowning. After a series of water competency training programs among children that included teaching them to swim 25 yds/m, float for 30 s, submerge the face and blowing bubbles, and other nonswimming related interventions, drowning rates decreased in the pediatric population who had participated in these programs (Mecrow, Rahman, Linnan, Scarr, Mashreky, Talab, & Rahman, 2014; Rahman, Bose, Linnan, Rahman, Mashreky, Haaland, & Finkelstein, 2012).

Research

For *research* purposes, water competency should be assessed for reasons other than descriptive surveillance purposes. First, research evidence is needed to validate which aspects of water competency currently being taught, when acquired, are truly effective in decreasing drowning risk. Creating a clear definition for water competency and what it means "to be a swimmer" will establish the construct by which valid and reliable outcome measures (i.e., swim tests) can be determined (Petrass, et al., 2012). Once adequate measures of water competency can be provided, they can be used to evaluate swimming proficiency as well as the most efficacious ways to teach swimming and water competence as drowning prevention strategies. The need to acquire and maintain swimming/water competency in a variety of aquatic environments (e.g., in waves and surf; Kjendlie, Pedersen, Thoresen, Setlo, Moran,

& Stallman, 2013) and under various task conditions (e.g., clothed; Moran, 2014) also should be studied and replicated.

Tasks and Environmental Contexts Associated With Water Competence

Performance of any swimming skill is very much defined by its task and environmental contexts. While most contemporary swimming programs are pool-based, most fatal drownings in the United States and the rest of the world occur in open waters such as lakes, rivers, and oceans. The highly controlled settings of most swimming pools differ greatly from open water settings. Open waters differ in factors such as water temperature and clarity, currents, wave action, and presence of aquatic flora and fauna. Open water settings also lack the closely-controlled structure of pools that enable easier surveillance, rest, and rescue. Many people who have learned to swim in the controlled environment of a pool may be unfamiliar with and unprepared for open water conditions.

These differences in context may explain why drowning studies report that as many as half of those who died were "good swimmers" or at least able to swim. Some countries (e.g., Norway, Switzerland) and regions of low- or medium- income countries (LMIC) address this by conducting all or part of their swimming lessons in their own specific types of open waters (e.g., fjords, rivers). The unfamiliarity factor may also explain why many countries (e.g., northern countries like the UK, Ireland, Norway, Sweden, and Finland with cold open waters year round) report that their residents' drowning fatality risks are higher while out of the country (Guse, Cortes, Hargarten, & Hennes, 2007; Cornall, Howie, Mughal, Sumner, Dunstan, Kemp, & Sibert, 2005; Garssen, Hoogenboezem, & Bierens, 2008). Concomitantly, countries with popular beach destinations, such as Australia and New Zealand, report that international visitors are overrepresented in their drowning statistics (Morgan, Ozanne-Smith, & Triggs, 2008). Furthermore, simply being out of one's own setting may be a risk factor; in Iran and China, tourists or immigrants within their own countries are at higher risk for drowning (Saberi Anary, Sheikhazadi, & Ghadyani, 2010; Wang, Smith, Stallones, & Xiang, 2010).

Method

Given the limited available data, members of the American Red Cross Scientific Advisory Aquatics subcouncil sought to define the key components of water competency based on current reported practices. While developing the definition, the subcouncil recognized the limited evidence for its definition and designation of each component.

Participants

The Aquatics Subcouncil of the American Red Cross Scientific Advisory Council conducted an informal written survey of selected U.S. national agencies which offered aquatic programs (e.g., Y of the USA, Boy Scouts) and international agencies/organizations (e.g., all 50 International Life Saving Federation organizations)

as well as selected aquatic experts involved with varied water activities. Responses were received from 14 international organizations representing 4 continents, 9 U.S. national organizations, and 19 key informants (local organizations and individual aquatic experts) (Table 1).

Table 1   List of Organizations and Key Personnel Who Responded to Survey of Swim Tests

International Organizations	National Organizations, United States	Key Informants: Local Organizations and Individual Aquatic Experts
• International Life Saving Federation	• American Camping Association	• Redwoods Group
• Australia Royal Life Saving Society	• American Canoeing Association	• N. Carolina East Bay
• Bangladesh ILS	• American Red Cross	• Marion Diehl Recreation Center
• Barbados ILS	• Boy Scouts of America	• Pleasant Hill Recreation
• Iranian ILS	• Life Saving Resources	• Terra Linda Community Center
• Irish Water Safety	• National Outdoor Leadership School	• City of Newark
• Switzerland ILS	• Outward Bound	• Prestonwood Country Club
• UK Royal Life Saving Society	• United States Lifesaving Association	• Seattle Parks Department
• Life Saving South Africa Swimming and Safety Regulations	• Y of USA	• Si View Park
• Romania ILS		• Snohomish County Parks Department
• Ireland Lifesaving Federation		• Robert Stallman, PhD, Norwegian School of Sport Sciences and Can You Swim study group
• Switzerland River		• Stephen Langendorfer, PhD, Bowling Green State University
• Spanish ILS		• Ruth Brenner
		• John Pearn, MD, and R. Nixon
		• Kevin Moran, PhD, University of Auckland and Can You Swim study group
		• Bridgewater College Pool
		• Bay Area Public Pools Operators Association
		• Barton College
		• City of Wilson Pools

Swim Test Survey

The survey requested the respondents to identify existing requirements for swimming in deep water in their settings. We evaluated their definitions for common components. The most common components included in the reported deep water swim tests were:

- Distance swims—(distances ranged from 10–75 yds/m, most commonly 25 yds/m) ($n = 25$)
- Floating/ treading water—(time ranged from 10–300 s, most commonly 30–60 s) ($n = 20$)
- Perform swim strokes—(e.g., swim on front or back) ($n = 13$)
- Entry and/or exit skills—(e.g., some required jumping in) ($n = 12$)
- Duration swimming—(times ranged from 1–5 min) ($n = 5$)
- Swimwear—(e.g., required to do in street clothes or with PFD) ($n = 5$)
- Breath control skills—(e.g., required face submersion) ($n = 5$)
- Demonstrate rescue techniques—(e.g., reach or throw rescues) ($n = 4$)
- Perform under different water conditions—(e.g., river vs. pool) ($n = 2$)

These commonly identified components formed the template for the ARC's subcouncil definition. The subcouncil sought a standardized definition of water competency that addresses the specific minimum skills needed for water safety and survival. Moreover, the subcouncil recognized that each skill component should be learned and practiced in the water environment in which they would be needed.

American Red Cross Proposed Definition for Water Competency

The purpose was to establish a general operational definition for water competency that identifies specific skills and includes the concept that water competency consists of factors that are dependent on the aquatic environment and environmental conditions to which they are applied.

Conceptual definition. We propose that water competency must include proficiency in skills that include the following conceptual water safety categories:

- Entry with total submersion
- Recovery to the surface and remain there for at least one minute using floating or treading
- Change in body orientation allowing repositioning, turning at least 180°, and facing toward an exit direction
- Propulsion including leveling off and moving on front and/or on back position for at least 25 yards/meters
- Exit from the water

Further, we propose that water competency is influenced by conditions of the aquatic environment (e.g., water temperature, clarity, wave and current action, depth, distance) into which the person may be introduced (Kjendlie, et al., 2013). It also is influenced by specific task demands such as what clothing and other equipment an individual may be wearing or using (Moran, 2014). As a consequence of the influence of task and environmental factors on aquatic performance, demonstration of aquatic skills in one aquatic environment (e.g., in a pool) may not transfer to another (e.g., open water, surf). The implications for this awareness are that students should be exposed to different environmental conditions (e.g., colder water, simulated waves) and task demands (e.g., swim clothed).

Limitations.   Our definition was limited because it only addressed psychomotor skill components; it did not address specific knowledge and/or judgment issues that may be critical to water safety and drowning prevention. Further, it may not be equally useful to all populations and settings. Additional research is needed to validate its usefulness in preventing drowning. This definition only applies to the individual in the water; it does not address important skills related to helping others, such as those involved in performing safe rescues. It would make sense to include knowledge/skills for performing a safe rescue. This could lead to creating a cadre of bystander rescuers which could decrease drowning death rates as it has in Bangladesh (Mecrow et al., 2014). Components of safe rescue need to be defined since there is no published evidence supporting what rescue methods are most effective and safest.

Results

Proposed Operational Uses

The American Red Cross's definition of water competency will be used within the organization to: (a) guide the development and revision of its swim programs; (b) promote a focus on safety and drowning prevention; (c) help families and children understand the minimum skills and competencies that should be achieved from swimming lessons; and (d) allow programs to objectively assess their students' progress.

Follow Up Online Survey

As a follow-up to the Petrass, et al. (2012) study to understand the status of water competency in the general U.S. public, the American Red Cross conducted a water safety survey using our definition of water competency. Utilizing the ARC International's Online CARAVAN omnibus survey, a study was conducted in April 2014 among a national sample of 1,024 American adults (http://www.redcross.org/images/MEDIA_CustomProductCatalog/m32740103_Water-Safety-Poll-2014.pdf).

The total sample was balanced to be representative of the US adult population in terms of age, sex, geographic region, race and education. The margin of error for the total sample of 1,024 adults was ±3.1%; the margin of error for the sample of 201 parents was ±6.9%. While 80% of those surveyed said they could swim, only 79% said they could swim 25 yards and only 56% said they could perform all five

basic water competency components. Of the 201 parents of children ages 4–17 years who were surveyed, 47% reported that their children could swim 25 yards and only 39% of their children could perform all five skills. Ironically, although parents felt a minority of their children could demonstrate minimum water competency, 94% of parents of children between ages 4–17 expected that their child would engage in some sort of water activity this summer.

Discussion

Program Revision

The American Red Cross has incorporated the water competency concepts into its 2014 revision of Swimming and Water Safety programs in several important ways (American Red Cross, 2014a). Water competency is defined and explained in chapter 1 of the 2014 Swimming and Water Safety manual. The 2014 revision of the Learn-to-Swim program realigns the progression of swimming and safety skills so that upon successful completion of Learn-to-Swim Level 3, participants are able to demonstrate proficiency in all the components of water competency in a swimming pool. The 2014 Learn-to-Swim program further integrates water competency into the knowledge of safety concepts that students learn. Importantly, the 2014 Learn-to-Swim program has added a specific "Water Competency badge" that is semi-independent of the six Levels. Whenever a Learn-to-Swim student feels she can perform the water competency skills, she can ask to be evaluated at any time, regardless of the level in which she is enrolled.

Related to the 2014 program, the American Red Cross has created a swim app for electronics (http://www.redcross.org/mobile-apps/swim-app). As a key part of the application, water competency is defined and explained as an important program goal. It also provides a mechanism by which to share via social media the Water Competency badge when it is earned. A promotional package has been created for authorized providers that offers the Red Cross Learn-to-Swim program. The package distributes to all facilities a poster that defines and explains the concept of water competency. Finally, at every opportunity, Red Cross media messaging for water safety and drowning prevention includes the definition and explanation of water competency.

Our proposed definition for water competency is intended to encourage further discussion among the aquatic and injury prevention community, to encourage others to explore and expand the concept of water competency, and eventually to lead to the development and widespread acceptance of conceptual and operational definitions for swimming/water competency. Importantly, we hope this definition promotes further research to evaluate the components of water competency and factors that impact them such as those being undertaken by the international Can You Swim? study group (e.g., Kjendlie, et al., 2013; Moran, 2014; Moran, et al., 2012; Petrass, et al., 2012; Stallman, et al., 2008).

References

American Academy of Pediatrics. (2010). Committee on Injury, Violence, and Poison Prevention. Policy statement on prevention of drowning. *Pediatrics, 126,* 1–3.

American Red Cross. (2009). *Swimming and Water Safety*. Yardley, PA: StayWell.

American Red Cross. (2014a). *Swimming and Water Safety Manuel*. Yardley, PA: Krames StayWell.

American Red Cross. (2014b). *Water Safety Instructor's Manuel*. Yardley, PA: Krames StayWell.

American Red Cross. (2012). *Lifeguarding*. Yardley, PA: StayWell.

Brenner, R.A., Taneja, G.S., Haynie, D.L., Trumble, A.C., Qian, C., Klinger, R.M., & Klebanoff, M.A. (2009). Association between swimming lessons and drowning in childhood: A case-control study. *Archives of Pediatrics & Adolescent Medicine, 163,* 203–210. PubMed doi:10.1001/archpediatrics.2008.563

Guse, C.E., Cortes, L.M., Hargarten, S.W., & Hennes, H.M. (2007). Fatal injuries of US citizens abroad. *Journal of Travel Medicine, 14*(5), 279–287. PubMed doi:10.1111/j.1708-8305.2007.00133.x

Cornall, P., Howie, S., Mughal, A., Sumner, V., Dunstan, F., Kemp, A., & Sibert, J. (2005). Drowning of British children abroad. *Child: Care, Health and Development, 31*(5), 611–613. PubMed doi:10.1111/j.1365-2214.2005.00534.x

Garssen, M.J., Hoogenboezem, J., & Bierens, J.J. (2008). Reduction of the drowning risk for young children, but increased risk for children of recently immigrated non-westerners. *Nederlands Tijdschrift voor Geneeskunde, 152*(21), 1216–1220. PubMed

Gilchrist, J., & Parker, E.M. (2014). Racial/ethnic disparities in fatal unintentional drowning among persons aged ≤29 years—United States, 1999–2010. *MMWR. Morbidity and Mortality Weekly Report, 63,* 421–426. PubMed

Position Statement, I.L.S. (2012). *Basic Aquatic Survival Skill (Survival Swimming)* http://www.ilsf.org/sites/ilsf.org/files/filefield/LPS-15%20Basic%20Aquatic%20Survival%20Skill.doc

Irwin, C.C., Irwin, R.L., Ryan, T.D., & Drayer, J. (2009). Urban minority youth swimming (in)ability in the United States and associated demographic characteristics: toward a drowning prevention plan. *Injury Prevention, 15,* 234–239. PubMed

Kjendlie, P-L., Pedersen, T., Thoresen, T., Setlo, T., Moran, K., & Stallman, R. (2013). Can you swim in waves? Children's swimming, floating, and entry skills in calm and simulated unsteady water conditions. *International Journal of Aquatic Research and Education, 7,* 301–313.

Langendorfer, S.J. (2011). Editorial: Considering drowning, drowning prevention, and learn-to-swim. *International Journal of Aquatic Research and Education, 5,* 236–243.

Langendorfer, S.J., & Bruya, L.D. (1995). *Aquatic readiness: Developing water competence in young children*. Champaign, IL: Human Kinetics.

Ma, W.J., Nie, S.P., Xu, H.F., Song, X.L., Guo, Q.Z., & Zhang, Y.R. (2010). An analysis of risk factors of non-fatal drowning among children in rural areas of Guangdong Province, China: A case-control study. *BMC Public Health, 10,* 156. PubMed doi:10.1186/1471-2458-10-156

McCool, J.P., Moran, K., Ameratunga, S., & Robinson, E. (2008). New Zealand beachgoers' swimming behaviors, swimming abilities, and perception of drowning risk. *International Journal of Aquatic Research and Education, 2,* 7–15.

Mecrow, T.S., Rahman, A., Linnan, M., Scarr, J., Mashreky, S.R., Talab, A., & Rahman, A.K. (2014). Children reporting rescuing other children drowning in rural Bangladesh: a descriptive study. *Injury Prevention*. PubMed

Moran, K. (2014). Can you swim in clothes? An exploratory investigation of the effect of clothing on water competency. *International Journal of Aquatic Research and Education, 8,* 338–350. doi:10.1123/ijare.2014-0060

Moran, K., Stallman, R.K., Kjendlie, P., Dahl, D., Blitvich, J.D., Petrass, L.A., . . . Shimon-gata, S. (2012). Can you swim? An exploration of measuring real and perceived water competency. *International Journal of Aquatic Research and Education, 6,* 122–135.

Moreno, M.A., Furtner, F., & Rivara, F.P. (2009). Water safety and **s**wimming lesson**s** for children. *Archives of Pediatrics & Adolescent Medicine, 163,* 288. PubMed doi:10.1001/archpediatrics.2008.572

Morgan, D., Ozanne-Smith, J., & Triggs, T. (2008). Descriptive epidemiology of drowning deaths in a surf beach swimmer and surfer population. *Injury Prevention, 14,* 62–65. PubMed doi:10.1136/ip.2006.013508

Petrass, L.A., Blitvich, J.D., McElroy, G.K., Harvey, J., & Moran, K. (2012). Can you swim? Self-report and actual swimming competence among young adults in Ballarat, Australia. *International Journal of Aquatic Research and Education, 6,* 136–148.

Rahman, F., Bose, S., Linnan, M., Rahman, A., Mashreky, S., Haaland, B., & Finkelstein, E. (2012). Cost effectiveness of an injury and drowning prevention program in Bangladesh. *Pediatrics. 130*, e1621–e1628.

Saberi Anary, S.H., Sheikhazadi, A., & Ghadyani, M.H. (2010). Epidemiology of drowning in Mazandaran province, north of Iran. *The American Journal of Forensic Medicine and Pathology, 31,* 236–242. PubMed doi:10.1097/PAF.0b013e3181e804de

Stallman, R., Junge, M., & Blixt, T. (2008). The teaching of swimming based on a model derived from the causes of Drowning. *International Journal of Aquatic Research and Education, 2,* 372–382.

Vincenten, J. (2012). *Child Safety Report Card Europe*. http://www.childsafetyeurope.org/injurytopics/drowningwatersafety/index.html

Wang, H., Smith, G.A., Stallones, L., & Xiang, H. (2010). Injury-related childhood mortal-ity in migrant households in a southern city of China. *Injury Prevention, 16,* 161–165. PubMed doi:10.1136/ip.2009.023069

Yang, L., Nong, Q-Q., Li, C-L., Feng, Q-M., & Lo, S.K. (2007). Risk factors for childhood drowning in rural regions of a developing country: A case-control study. *Injury Prevention, 13,* 178–182. PubMed doi:10.1136/ip.2006.013409