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**Proceedings of the Lifesaving Foundation's 2010
Research Conference & Ireland Medal Ceremony
Dublin, Ireland, 2010**



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The philosophy of the Lifesaving Foundation is, as illustrated by the following story; the importance of individual people and their safety (adapted from 'The Star Thrower' by Loren Eiseley 1907-1977):

Early one morning, while walking along the ocean shore, a man came upon a stretch of beach covered with hundreds of starfish. Also on the beach was a young woman. The man watched as she picked up the starfish one at a time and put them gently back into the waves. "What are you doing?" he asked. The woman explained. "The tide has washed the starfish onto the beach, and they cannot return to the sea by themselves. They are dying from the relentless sun beating down." The man gazed in wonder as she again and again moved a starfish from the sand into the water. At last he spoke: "There are too many! How can you think that what you are doing can possibly make a difference?" Once again she bent down and picked up another starfish. As the starfish was released into the cool safety of the water, she simply replied, "It made a difference to that one".

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Preface

Dear lifesaving colleagues,

It is our great pleasure to welcome you to the "*Proceedings of the Lifesaving Foundation's 2010 Research Conference and Ireland Medal Ceremony*" of the **Lifesaving Foundation**. For several years a group of dedicated people from Ireland, United Kingdom, Norway, Greece, Australia and South Africa have been brought together to share their knowledge and experiences on swimming, drowning prevention, rescue and treatment.

The Lifesaving Foundation was established in 2003 (as The Irish Lifesaving Foundation) aiming to reduce drowning deaths worldwide. To meet this aim, it has undertaken the support of a number of diverse, international, cross cultural initiatives. These are considerably ambitious in comparison to its limited resources and membership. We consider this to be a "Low Resources-High Impact" organization.

This annual conference has as one of its primary goals, to bridge the gap between practice and theory. Within the lifesaving community, there is a huge wealth of experience and wisdom. There is however still a limited amount of evidence based data. We also see that practice is very diverse in its nature, suggesting that we have a long way to go to reach consensus on prevention, rescue and treatment. By gathering practitioners with a wealth of experience and exposing them to perhaps a more critical form of thinking, we hope to tap the resources of the practitioners and to translate some of what is still experiential to something more experimental. The practitioners need the researchers to put evidence in a more reliable and valid form. The researchers need the practitioners to guide them to the most critical hypotheses so much in need of testing.

We hope that this modest effort to bring together water safety related scholarship and professional knowledge and experience will be helpful to you and your colleagues. Moreover, we hope that we might see you in one of our forthcoming annual conferences either as presenter or delegate.

With lifesaving greetings,

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The Lifesaving Foundation – Past, Present and Future

John Connolly

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Abstract

The Lifesaving Foundation is an independent charity devoted to saving lives from drowning, worldwide. It funds school / youth organization based water safety education in the developing world and promotes research into lifesaving topics. Membership is open to any interested person irrespective of where they live in the world. This short communication provides an outline of the history of *The Lifesaving Foundation*, an overview of its projects and an insight into its future plans.

Key words: lifesaving, lifeguarding, water safety, drowning.

Overview

Undertaken Projects

The Lifesaving Foundation, previously the Irish Lifesaving Foundation, grew out of an RLSS Ireland millennium lifeguard training project in Kenya. Since its incorporation as a charity in 2003 the Foundation has expanded its activities and in the period 2003-2010 has provided €150,000 in funding and equipment to small lifesaving groups in Africa and Asia. Direct funding for schools / youth based water safety education and lifeguard training has been given to organizations in South Africa, Lesotho, Kenya, Uganda, Gambia, Sri Lanka, India and Tanzania. Over 400 unemployed young swimmers have been trained for lifeguard positions in Africa and Asia. Equipment has also been provided to organizations in Antigua, Barbados, Botswana, Gambia, India, Kenya, Lesotho, Mauritius, Mozambique, Seychelles, St. Lucia, Uganda, Zambia and Zimbabwe. All of the money spent has been donated or raised by Foundation members.

Ireland Medal

The Ireland Medal was introduced in 2003 to promote an awareness and recognition of excellence in lifesaving in Ireland and by Irish persons or persons of Irish descent worldwide. Ireland Medals have been awarded to An Garda Síochána (Ireland's Police Service), Admiral Frank Golden RN, Australian Professor John Pearn, Garda Commissioner Eamonn Doherty RIP, Foyle Search and Rescue (N. Ireland), Australian Chief Justice Terence Higgins, Dublin Fire Brigade and Mrs. Patricia Wilcox.

Research

In 2008 the Foundation established a Research Group of experienced lifesaving academics to promote indigenous lifesaving research into the causes of drowning in the developing world. In Ireland, the Foundation has conducted research projects in three areas; why swimmers drown, suicide by drowning, and water safety on foreign holidays.

Membership

The Foundation is a fully independent charity with an international membership currently based in five countries. Members fall into two main categories; persons with no previous lifesaving background who just want to help reduce the high level of drowning deaths worldwide, and others who are highly qualified and experienced lifesavers (many with academic backgrounds) who provide the charity with a high level of expertise in all areas of water rescue.

Summary

The story of Foundation proves that, with clear objectives and firm determination, it is possible for small organizations to make a significant contribution to saving lives from drowning.

Acknowledgements

The Foundation acknowledges the significant contribution made by John Long (former Secretary General of the RLSS Commonwealth).

Swimming Ability, Perceived Competence and Perceived Risk among Young Adults

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Why do swimmers get into trouble? Do they over estimate their ability, underestimate the risk, both? University physical education students (n=81) completed a questionnaire and performed seven practical swimming tests. The questionnaire covered the perception of ability, the perception of difficulty in open water and the perception of risk. Gender differences were tested by the Mann-Whitney U test. The women out performed the men on 4 of 7 practical tests. There were few gender differences in perceived competence. The women were highly confident about floating in open water while the men were certain they could not do the same. The men predicted 100% success on surface diving to the bottom of the pool (4 m) while the women were less certain (88%). On 5 scenarios depicting risk, there were no gender differences.

Key words: swimming ability, perceived competence, perceived risk, swimming, water safety.

Aquatic safety experts generally believe that water safety education must include knowledge, attitude, judgment and skill. One of the most important elements for people is the knowledge of their personal limits. The 'deadly duo' of over estimating one's ability and under estimating the risk (in any given specific situation) can have fatal consequences. For example, in New Zealand, a country that is well known for its aquatic recreational opportunities (McCool, Moran, Ameratunga & Robinsen, 2009), swimming is the activity most often engaged in prior to a drowning episode (Brenner, Moran, Stallman, Gilchrist, & McVan, 2005). Similarly, in Norway, a considerable majority of drowning episodes are related to small boat use and alcohol is often involved (Norwegian Peoples Aid, 2007).

Although to be able to swim is undoubtedly vital for survival, it has, however been speculated, that increasing the swimming competency of any society may in fact increase exposure to risk (Baker, O'Neil, Ginsburg, & Li, 1992). It is thus doubly important in any water safety - drowning prevention effort, to insist that the teaching of swimming include more than only skills. Risk assessment needs to be a routine affair for persons frequently engaging in aquatic recreation. This cannot be a general kind of orientation but must address real local conditions.

It is also well known that in other daily pursuits, men frequently are greater risk takers than women. An excellent example of this is the dramatic

over representation of men among traffic injuries and among those penalized for reckless driving and driving while intoxicated (Safe Traffic, 2008). Studies in New Zealand have identified men as greater risk takers in aquatic activity than women (McCool et al, 2008; 2009; Moran, 2008). There appears to be little available information on the relationship between real aquatic competency and perceived competency. Therefore, the aims of this study were to assess the swimming ability of university students, to assess their perceptions of swimming ability and risk, and to compare their real and perceived competency. In particular, this study will present the Norwegian findings of a larger international project, titled “*Can You Swim?*”

Method

Participants

A convenience sampling method (Patton, 1990) was used to select eighty one university physical education students for the study. The participants were first year students.

Instruments

A questionnaire consisting of 20 items was used and covered three issues. First, the questions covered the perception of swimming ability (i.e. “can you swim > 50, 100, 200, 300m?” etc) (Table 2).. Second, the questions assessed the perception of whether or not the same skills could be accomplished in open water. Finally, the questions assessed the perception of risk in five specific scenarios. The practical tests consisted of seven essential skills (Table 1).

Procedure

Testing was conducted in the first days of the school year, before the participants were exposed to swimming instruction. They first answered the questionnaire which required less than 30 min. The participants were also asked to rank their perception of risk as; no risk, slight risk, high risk, extreme risk, on five descriptive risk scenarios which were water related (e.g., capsize in canoe, well off shore; caught in rip current at unpatrolled surf beach; chased toy into deep end of pool; fell in deep river fully clothed; swept off isolated rocks while fishing). The data were analyzed using SPSS 16. Gender differences were calculated for all parameters by the Mann-Whitney U test.

Table 1: Practical Tests and Criteria for Success.

Test	Criteria
Distance swim (25m pool)	>2, >4, >8, >12, >16, lengths, non-stop
Floating in deep water	cannot float, <2min, <4min, <6min, <10min, <15min, >15min
Swim on the back	4 pt scale, poor to excellent form
Dive into deep water	4 pt scale, poor to excellent form
Swim under water	>10, >15, >20 or 25m
Surface dive to 4m depth	Failed and 4 point scale, poor to excellent form
Rescue towing	25m with mannequin, did not finish and 4 point scale, poor to excellent

Table 2: Perceived Competence.

Question	Scoring scale
How do you rate your swimming ability?	very weak, weak, aver., good, very good
How many lengths (25m pool) can you swim?	>2, >4, >8, >12, >16 lengths
How do you feel about doing this in open water?	very difficult, difficult, easy, very easy
Can you stay afloat in deep water without support?	no, <2, <4, <6, <10, <15, >15min
How do you feel about doing this in open water?	very difficult, difficult, easy, very easy
Can you swim 100m non-stop on your back?	yes, no
How do you feel about doing this in open water?	very difficult, difficult, easy, very easy
Can you dive into the deep end of the pool?	yes, no
How do you feel about doing this?	very difficult, difficult, easy, very easy
Can you swim underwater along the length of the pool?	>10, >15, >20, 25m
How do you feel about doing this?	very difficult, difficult, easy, very easy
Can you surface dive to the bottom of the pool (4m)?	yes, no
How do you feel about doing this?	very difficult, difficult, easy, very easy
Can you rescue someone in deep water?	yes, no
How do you feel about doing this?	very difficult, difficult, easy, very easy

Results

Women out performed the men significantly on four of seven tests, with a fifth showing close to significant superiority for the women (Table 3).

Regarding perceived competence, both the men (87.2%) and the women (76.5%) rated themselves as average to good swimmers. Although the difference was not significant, the practical tests (item 2, can swim > 400m) showed that the women (100%) were, in fact, slightly better than the men (97.9%).

On the next 14 questions, only two showed a significant gender difference. The women were highly confident about floating in deep water (93.7%) while the men (only 36.2%) were convinced that they could not do this. This was in accordance with reality as 91.5% of the men failed to float at all, while only 73.5% of the women failed. The second question showing gender difference was regarding surface diving to the bottom of the pool. One hundred percent (100%) of the men predicted they would do this while 88.2% of the women predicted success. The practical test did not confirm the prediction. Among the men, 95.7% managed the surface dive but 97.1% of the women managed it. Although the difference appears to be small, it was never the less, statistically significant.

The perceived risk of drowning as indicated by ranking risk from 1-4 on five water related scenarios, showed no differences between the men and the women. In general, only one of the five scenarios elicited reports of high perceived risk.

Table 3: Results of practical tests by gender.

Practical Test	Criteria	Male		Female		Total		p
		N	%	n	%	n	%	
Distance swim	< 8 lengths	1	2.1	0	0	1	1.2	0.40
	8 - 16 lengths	46	97.9	34	100	80	98.8	
Float	Cannot	43	91.5	25	73.5	68	84.0	0.03
	< 4min	0	0	1	2.9	1	1.2	
	< 8min	4	8.5	8	23.5	12	14.8	
Swim on back	Poor form	22	47.8	12	35.3	34	42.5	0.09
	Satisfactory form	16	34.8	10	29.4	26	32.5	
	Good form	8	17.4	10	29.4	18	22.5	
	Excellent form	0	0	2	5.9	2	2.5	
Dive into deep	Poor form	9	19.1	3	8.8	12	14.8	0.03
	Satisfactory form	24	51.1	13	38.2	37	45.7	
	Good form	14	29.8	17	50.0	31	38.3	
	Excellent form	0	0	1	2.9	1	1.2	
Under water	> 10m	7	15.2	6	18.2	13	16.5	0.48
	> 15m	8	17.4	6	18.2	14	17.7	
	> 20m	7	15.2	7	21.2	14	17.7	
	25m	24	52.2	14	42.4	38	48.1	
Surface dive	Poor form	2	4.3	1	2.9	3	3.7	0.001
	Satisfactory form	31	66.0	10	9.4	41	50.6	
	Good form	13	27.7	18	52.9	31	38.3	
	Excellent form	1	2.1	5	14.7	6	7.4	
Rescue tow	Did not finish	1	2.1	1	2.9	2	2.5	0.0001
	Poor form	6	12.8	0	0	6	7.4	
	Satisfactory form	27	57.4	10	29.4	37	45.7	
	Good form	11	23.4	11	32.4	22	27.2	
	Excellent form	2	4.3	12	35.3	14	17.3	

Discussion

The three aims of this study were to assess the swimming ability of university students, to assess their perceptions of swimming ability and risk, and to compare their real and perceived competency. In particular, this study will present the Norwegian findings of a larger international project, titled "*Can You Swim?*" Several results arose that need therefore to be discussed below.

The first interesting finding was that the women out performed the men so clearly and unexpectedly. Of educational significance is the fact that despite significant gender differences on real competence, both men and women performed relatively poorly on floating in deep water, swimming on the back, both surface diving and swimming under water as well as on the rescue tow. All of these skills have a real survival value and need to be addressed. Regarding floating, Stallman (1999) showed that with a full

inspiration, all women and almost all men (i.e. >90%), have the capacity to float. Those who failed to live up to their anatomical capacity, clearly lacked only confidence. When discussing confidence skills, it has often been stated that there are no objective measures of confidence in the water. When an individual has the proven (measured) anatomical capacity to float and fails to do so, there can be no better 'objective' test of confidence. Among these male and female participants, a full 84% failed to float in deep water. A total of 42%, nearly half of the participants, swam poorly on the back in spite of ranking themselves as average to good swimmers. Over half of the total surface dived with only satisfactory or poor form and one third (34.2%) could not swim > 15m under water. This should be a cause for alarm when dealing with university students who have been through compulsory swimming instruction in primary school.

Seven of the questions about perceived ability were followed by the question, 'how do you feel about doing this?' or 'how do you feel about doing this in open water?' Using only one of the open water questions as an example; 43.2% of the total rated themselves as good to excellent swimmers and 65% said they were able to swim > 400m. However, 64.2% answered that they could do the same in open water as in the pool only with difficulty or with great difficulty.

In much of the world, swimming instruction can be held outdoors for only a small part of the year. Even where this would be practical, outdoor pools are often used. The consequences of this are that an increasing number of people have learned to swim in a pool. In some parts of the world, swimming in open water is simply too dangerous because of the threat of predators and/or microbes. However it is well known that drowning occurs primarily in open water. Those who do not survive an aquatic episode have usually failed to make the transfer from the learning atmosphere to the recreational or working atmosphere. The participants in this study had previously demonstrated that they could swim, in a physical entrance test which all applicants to the school must perform. This would suggest that they are above average compared to their age mates. This can only mean that the general public would have performed more poorly.

Possible biases may have affected the results. The sample was small. Also, there is always a tendency for respondents on a questionnaire, to answer as they believe the researchers wish.

Conclusions

This study shows that women performed significantly better than men on four (5) of seven skills but both performed poorly on several critical skills; this is of concern. Also, it appeared that on two of the seven skills the participants were not able to accurately predict their level of competence. Contrary to expectations, there were no gender differences in perception of risk. Lastly, while almost half of men and women reported that they were good to very good swimmers, they performed only from mediocre to poor on five of seven tests. Furthermore, while performing at only a moderate to poor level, they

reported high risk on only one of the five risk scenarios. In addition, it was found that they were reasonably good at predicting their competence on specific skills but unable to assess their general level of competence or to relate it to their level of performance on specific skills. Their perception of what is a good swimmer was skewed.

References

- Baker, S.P., O'Neil, B., Ginsburg, M.J., & Li, G. (1992). *The Injury Fact Book*. N.Y., USA: Oxford University Press.
- Brenner, R.A., Moran, K., Stallman, R.K., Gilchrist, J., & McVan J.T. (2005). Swimming ability, water safety education and drowning prevention. In: Bierens J. (ed). *Handbook of drowning* (pp. 112-116). Heidelberg: Springer.
- McCool, J.P., Ameratunga, S., Moran, K., & Robinsen E. (2009). Taking a risk perception approach to beach swimming safety. *International Journal of Behavioral Medicine*, 16(4), 360-366.
- McCool, J.P., Moran, K., Ameratunga, S., Robinsen, E. (2008). New Zealand beach goers' swimming behaviors, swimming abilities and perception of drowning risk. *International Journal of Aquatic Research and Education*, 2(1), 7-15.
- Moran, K. (2008). Will they sink or swim? New Zealand youth water safety knowledge and skills. *International Journal of Aquatic Research and Education*, 2(2), 114-127.
- Norwegian Peoples Aid (2007). *Annual drowning statistics for Norway*, Oslo: Author.
- Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods* (2nd ed.). Newbury Park: Sage.
- Quan, L., Cummings, P. (2003). Characteristics of drowning by different age groups. *Injury Prevention*, 9(2), 163-166.
- Safe Traffic (2008). *Traffic statistics for Norway*. Oslo: Author.
- Stallman, R.K. (1998). A comparison of functional buoyancy among African and European children and youth. In Amusa, E. (ed). *Proceedings of Nairobi Congress 1996* (pp. 112-115). Gabarone, Botswana. The African Association of Health, Physical Education, Dance and Recreation.

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Movement Economy in Breaststroke Swimming: A Survival Perspective

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Abstract

When adopting a head up position in breaststroke the center of gravity is displaced backward, farther from the center of buoyancy. This causes a tendency for the legs to sink, increasing the angle of the body with the horizontal plane and concurrently, resistance. Increased resistance theoretically reduces survival possibilities. The purpose of this study was to quantify the difference in energy expenditure for breaststroke with the head held constantly above the surface and for breaststroke performed with normal breathing. Classic Douglas bag respirometry was used. During submaximal swimming, the volume of oxygen uptake was significantly higher when swimming with the face constantly above the surface than with normal breathing. Both pulse rate and blood lactate levels were also significantly higher when swimming "head up".

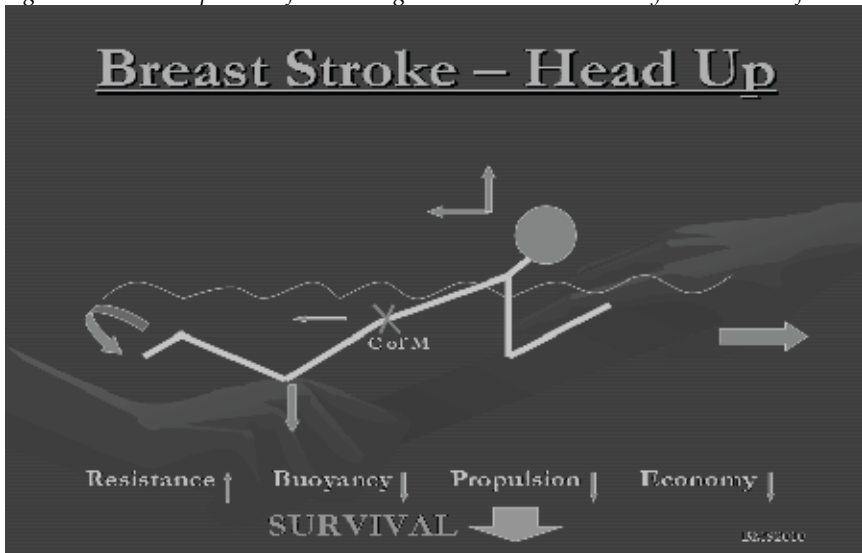
Key words: breaststroke, movement economy, survival.

The goals of swimming instruction are numerous but the preservation of life should be common to all programs. Historically, attempts have been made to justify one swimming technique above others, both as the first to be learned and as the most important one. It is well known that North America has a long tradition of teaching crawl early if not first, and that Europeans generally favor breaststroke. It has been argued that breaststroke is the easiest stroke to swim with the head up for those who prefer not to place the face in the water. While this may in some ways be true, it is irrelevant and in many ways contradicts the goals of water safety.

Swimming educators have long focused on the necessity of breath holding/breath control, buoyancy control, orientation, balance and rotation in the teaching of swimming. The 19th century produced the concept of "watermanship" often described as the all around aquatic movement development needed for survival (Thomas, 1904; Sinclair & Henry, 1893). These same authors also used the expressions "fancy swimming" and "scientific swimming" referring to the ability to move in the water in harmony with the powers of nature rather than trying to overcome them. Lanoe (1963) and Whiting, (1971) define a swimmer as one who can cope with an unexpected submersion. Modern aquatic professionals emphasize a thorough aquatic experience relating the characteristics of the water to our bodies (Skullberg, 1985; Wilke, 2007), and a movement repertoire which permits almost any movement in any direction at any time. This reminds us of the unlimited demands and solutions of the synchronized swimmer or water polo player. Others emphasized that an unlimited number of dangers requires an unlimited number of solutions (Cureton, 1943). Recently the

expression watermanship has been modernized to “aquatic competence” (Langendorfer & Bruya, 1995).

Figure 1: The consequences of swimming with the head continually above the surface.



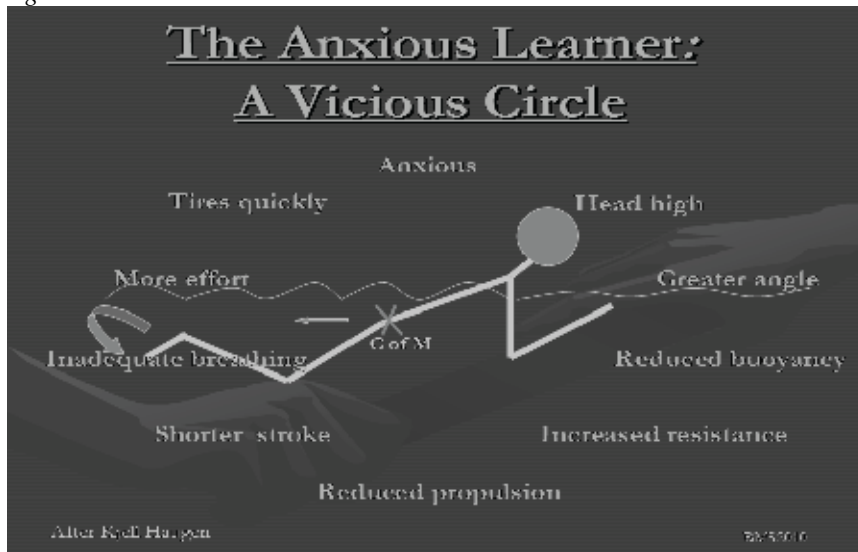
To advocate swimming breaststroke with the head up or to choose breaststroke as the easiest way to swim with the head up for those who do not like the water, is to negate virtually all of the goals of aquatic professionals with regard to water safety - drowning prevention. It is beyond discussion that such persons are more poorly equipped to cope with an involuntary submersion (Stallman, Junge, & Blixt, 2008). While this is common sense, there remains a tendency to argue for breaststroke first for the very reasons cited above.

Before going on, the point must be made that this discussion is not about choosing between front crawl and breaststroke. Both are poorly suited as a first swimming technique. And neither is it a matter of choosing from among the four competitive techniques when so many others are available. However, in the context of this study, the purpose was i) to emphasize the importance of effective breathing and breath control (in any stroke), and ii) to quantify the burden of added resistance when swimming breaststroke with the head continually above the surface, considered in a survival context.

Lastly the point must be made that survival is often a matter of efficiency of movement (or good technique). It has nothing to do with swimming fast, although efficient movement is also faster. At any given velocity, the more efficient the movements, the less energy they will require. The less energy required per unit time or distance, the longer one will be able to continue in any necessary pursuit of survival whether it be to swim or to remain in the same place. This is a point sadly overlooked by many

swimming instructors, who often express the idea that good technique is only important for the competitive swimmer. Most aquatic experts (e.g., Cureton, 1943; Lanoë, 1963; Wilke, 2007; Stallman, Junge, & Blixt, 2008) consider breathing in an optimal way, the most important aspect of efficient technique

Figure 2: *The Vicious Circle.*



Method

While quantifying energy expenditure under the two conditions named above was the primary goal of the study, it was recognized that several factors might influence it. Factors considered possible confounders were: skill level, buoyancy, endurance, drag characteristics and motivation. From 40 volunteers, 20 were selected (12 male, 8 female) to give a broad, representative sample with relation to buoyancy and ankle drag. This would reduce any bias because of these two factors. The subjects were university physical education students, average age 26.1 (range 19.5-35.0).

Buoyancy was determined by hydrostatic weighing as described by Katch, Michael, & Horvath, (1967). As function was of greatest interest, weight at both full inspiration and full expiration was recorded uncorrected for trapped air spaces and residual volume. Body density as determined by Brozek, Grande, Anderson, & Keys, (1963) was calculated but not included in the study. The term functional buoyancy (Stallman, 1971) is used for the uncorrected values. Ankle drag was measured as described by Cureton (1943). The subject adopted a stretched prone position, arms forward and together, with full inspiration. A Salter spring scale registered the weight of the ankles resting on a horizontal rod just below the surface, heels under water. Skill level was defined by a composite of two values: the number of

strokes required to swim 25m (as few as possible) and the fastest time possible for 25m. Twenty five meters was chosen to minimize the influence of endurance and to maximize the influence of technical skill. All trials were repeated 3 times and the best performance was used in the analysis.

Energy cost was measured by classical Douglas Bag respirometry while swimming in a flume. The sub-maximal velocity of 0.5m/s was used for all subjects. If this velocity resulted in unusually high levels of plasma lactate, the subject was eliminated. Given that these were physical education students, few were eliminated for this reason. The subjects swam approximately 10 min. unhindered to reach a steady state. They then immediately entered the flume where they swam for approximately 3 min. with gas collection during the last min. This same operation was repeated twice for each subject. Half of the group was randomly selected to swim first with the head up while the other half swam first with normal breathing. A blood sample to determine plasma lactate levels (La) was taken after each trial.

Lastly, the ability to swim for a longer period of time (simulating a survival situation) was measured by swimming to exhaustion. It was hypothesized that when swimming with the head up, the swimming time to exhaustion would be shorter. Each subject swam to exhaustion on two different occasions. Again, half randomly with head up first and half with normal breathing first. The subject swam easily first for 5 min. Then five min. at 0.5m/s. If the subject was able to continue, the velocity was increased by 10% and they swam for an additional two min. If after these two min. the subject was still swimming, the velocity was again increased by 10%. They swam in military trousers and shirts.

Results

When swimming with the face constantly above the surface, the oxygen uptake (VO_2) expressed in ml/meter was significantly higher than with normal breathing ($p = <0.001$, $N=20$). The average VO_2 with head up was 90.6 ml/m ($s=20.7$, range 64.0 to 140.2). The average with normal breathing was 84.6ml/m ($s= 19.6$, range 59.3 to 132.7). HR during these trials was significantly higher with head up, $\text{HR} = 135$ vs $\text{HR} = 147$ ($p = <0.01$) and La levels were also significantly higher when swimming with the head up, $\text{La} = 3.9$ Mmol/l vs 5.4 Mmol/l.

During swimming to exhaustion there was no significant difference between the two technical variations on swim time, nor on maximum HR. La levels however were significantly higher with head up ($p = < 0.05$). With head up the average was 10.57mM ($s = 1.90$, range 7.35 to 14.39). With normal breathing, 9.37mM ($S = 1.83$, range 6.48 to 12.35, ($p = < 0.05$).

There was no relationship between drag index, skill index, or functional buoyancy and either swim to exhaustion or VO_2 for either technique.

Table 1: Comparison of head up to normal breaststroke breathing technique.

Technique	VO ₂	HR	La
Normal breathing	$\bar{X} = 84.6$ ml/m (SD=19.6, range = 59.3 - 132.7)	$\bar{X} = 135$	$\bar{X} = 3.9$ Mmol/l
Head always up	$\bar{X} = 90.6$ ml/m (SD=20.7, range = 64.0 - 140.2 (p=<0.001)	$\bar{X} = 147$ (p= <0.01)	$\bar{X} = 5.4$ Mmol/l (p=<0.05)

Discussion

All of the physiological variables studied, VO₂, HR, and La, showed significantly higher values when swimming with the head up than with the traditional breaststroke breathing technique. The reduced effort caused by simply mastering normal breathing techniques is sufficient that it may be a determining factor in a life threatening situation. Unfortunately underwater film analysis was not possible in this flume situation. This would have given more information about the causes of the registered differences.

The fact that the HR was lower when putting the face intermittently in the water could be partially explained by the diving reflex (bradycardia) and/or better ventricular filling of the heart in a more horizontal position but it seems reasonable to assume that the primary cause was heavier muscular effort with head up.

It was observed that the subjects were skilful enough that they could minimize the difference between the two technical variations, i.e. when swimming with head up, it was only minimally up. At the same time, the energy cost values were considerably higher than others have reported, indicating that they were not particularly skilful. The use of the gas collection mouth piece made it more difficult to simulate any real need to lift the head higher to breath. The real differences can thus only be greater than we were able to measure. This under evaluation of added energy cost means that the potential problem is even greater than we were able to measure in spite of the significant differences. The lack of significant differences in swimming time to exhaustion is explained by this same phenomenon. Persons with a real aversion to putting the face in the water and lower skill levels would certainly have been more overloaded by always having the head up (it would have been even higher). It is also possible that the results would have been different at a different velocity. Neither functional buoyancy (floating capacity), ankle drag (floating angle) nor skill seemed to affect the results. They were not related to VO₂, HR or La, thus the differences observed are most likely caused by a real increase in swimming body angle and increased resistance.

Conclusion

Significantly less energy is used when swimming breaststroke with the normal breathing pattern than with the head always up. This seems to justify the emphasis on mastering breathing techniques which most aquatic professionals would support. This is one example of how improved technique can have a real effect on potential survival in a life threatening situation.

References

- Brozek, J., Grande, F., Anderson, J., & Keys, A. (1963). Densitometric analysis of body composition: Revision of some quantitative assumptions. *Annals of the New York Academy of Science*, 110, 96-108.
- Cureton, T.K. (1943). *Warfare Aquatics*. Champaign, IL, USA: Stipes Publishing.
- Katch, F.M., Michael, E.D., & Horvath, S.M. (1967). Estimation of body volume in assessment of body composition by underwater weighing: description of a simple method. *Journal of Applied Physiology*, 23, 811-813.
- Langendorfer, S.J. & Bruya, L.D. (1995). *Aquatic Readiness*. Champaign, IL, USA: Human Kinetics.
- Lanoe, F. (1963). *Drownproofing*. Englewood Cliffs, USA: Prentiss - Hall.
- Sinclair, A., & Henry, H. (1893). *Swimming*. London: Longmans.
- Skullberg, A. (1985). *Man and Water*. Norway: Norwegian Maritime Directory.
- Stallman, R.K. (1971). *The relationship of body density and selected anthropometric measures to the acquisition of beginning swimming skills*. Unpublished PhD thesis. University of Illinois, Champaign, IL.
- Stallman, R.K., 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(4), 372-382.
- Thomas, R. (1904). *Swimming*. London: Sampson, Low, Marston.
- Whiting, H.T.A. (1971). *The persistent non-swimmer*. London: Museum Press.
- Wilke, K. (2007). *Schwimmen Lernen: Aachen*. Germany: Meyer & Meyer Vorlag.

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Progression in Teaching Beginning Swimming: Rank Order by Degree of Difficulty

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Abstract

“Teach first things first”! But what comes first? Where do we start? Also, children are different and no progression will suit all. It should be possible to agree on content and find a progression that suits a majority. Children 5-6 years of age (n=146) received 18 hrs of instruction, in small groups. A theoretical progression of 19 skills was created from the international literature, examining course content of leading educational organizations. A single head instructor coordinated all teaching. Evaluation of progress and recording of criterion success on the 19 skills was overseen by the same head instructor. The number of children succeeding on each skill was deemed a reflection of the degree of difficulty. The actual rank order of skills derived from these learners was correlated to the theoretical rank order using Spearman’s rank order correlation. Rho proved to be 0.97. Among other results, all (paired) skills on the front proved easier than the corresponding skill on the back. Arguments are presented to defend retaining the theoretical rank order as well as arguments for adjusting the rank order. When individualizing teaching, there seems to be an optimal progression for each child, albeit slightly different from one child to another. It was surmised that degree of difficulty may not be the only criterion to be used when creating a progression.

Key words: learn to swim, progression, rank order, degree of difficulty

There remains disagreement among experts and organizations as to both content and ranking of skills by degree of difficulty in teaching beginning swimming. If we attempt to “teach first things first” we must consider several factors. Before organizing skills according to degree of difficulty, we must first consider what skills to include. As stated above, there is as of 2010, no broad agreement. Traditionally however, such general statements as the following have been broadly accepted:

- Swimming has a clear survival value (Junge, 1984).
- Learning swimming should be part of the general education for everyone (Langendorfer & Bruya, 1995).
- The teaching of swimming should produce independence/self dependence in the water.
- The aim of swimming lessons is to prevent drowning.
- The ability to swim is reflected in how far one can go in the water.
- The control of breathing is the key to water safety (American Red Cross, 1951; Lanoe, 1963).

- A person who can swim can cope with an unexpected submersion in the water (Whiting, 1971).

We could go on with such statements; there are many. They may indeed be necessary as aims for organized teaching and would be difficult to disagree with. They have become platitudes and will not take us to the next step.

There does appear to be a trend among researchers and educational organizations linking content in learn to swim with the causes of drowning (Stallman, Junge, & Blixt, 2008). The issue remains complex because of the discussion (among others) of the use of flotation devices. Inherent in this discussion is the philosophy one uses, i.e. how do we define swimming, how do we think of swimming. Those who perceive swimming to be the use of the arms and legs to propel ones self forward may believe that the use of flotation devices allows earlier attention to the learning of propelling movements. Those who believe swimming to be much more than only propulsion are normally in no hurry to start these "correct swimming movements". There is increased agreement on breath control, buoyancy control, gliding and postural control and stroking skills. Also, all around development (watermanship) has enjoyed revitalization with the concepts of "aquatic readiness" and "water competence" (Langendorfer & Bruya, 1995).

The aims of this study were a) to create a theoretical progression of skills by implied degree of difficulty and b) to evaluate the rank order of these skills against the actual rank order as demonstrated by the achievement of selected learners.

Method

A progression of 19 skills was created by synthesizing the progressions of several well established national organizations, according to implied degree of difficulty. These skills were categorized as follows:

- a. Breath holding, breathing, breath control and submersion
- b. Floating, buoyancy control, postural control
- c. Gliding, posture and position control, feeling motion and resistance
- d. Propulsive skills, feeling grip (resistance on propulsive surfaces)

Included in each of these categories, often as supplementary or intermediate goals and teaching exercises, were skills of orientation, balance and rotation.

Pre-school children, aged 5 & 6 years were selected from 13 kindergartens. Inclusion criteria were a) minimum height 1.15m, b) previous experience in kindergarten, c) could not swim 5m. Of the 146 children who started the program, 116 met the 4th criterion of a minimum of 50% participation and were included in the analysis for degree of difficulty.

The instructional period consisted of 18 hours, some groups meeting once per week, others twice per week. The data for these two groups were pooled when subsequent analysis showed no difference in learning progress. Instruction was given in small groups with 6-8 children and no more than 3 groups in the pool simultaneously. A single head instructor controlled all teaching and especially the recording of successful completion of each test

criterion skill. The actual rank order of skills by degree of difficulty as shown by these learners progress was deemed reflected in the number of children who succeeded on each skill. The theoretical rank order of skills was compared to the actual rank order using Spearman's rank order correlation.

Results

Table 1 shows the theoretical rank order of skills in column one. Column 3 shows the actual rank order as reflected in the total number of children (in parentheses) who mastered each skill. The rank correlation between these two progressions was $Rho = 0.97$, indicating a very strong relationship. While the difference appears to be minimal, there were in fact 7 of the 19 skills which differ in rank order from the theoretical progression. The first example of deviation is found already in steps 1-3 where submerging the head and holding the breath for 10 sec. seems to be more difficult than both rhythmic breathing and jump and submerge. The next notable deviation was that it appears that front glide was easier and front kick glide was at least as easy as float on the back. Rolling from front to back and vice versa was more difficult than both front glide and back glide.

Table 1: Theoretical and Actual Rank Order.

Progressive Skills & Criterion	Theoretical Rank Order	Actual Order N
1. Head under water, 10 sec	1	3 (97)
2. Rhythmic breathing, 10 reps	2	1.5 (102)
3. Jump to head under water	3	1.5 (102)
4. Float on front, 15 sec	4	4 (90)
5. Float on back, 15 sec	5	6.5 (64)
6. Roll front to back and vice versa	6	9 (60)
7. Front glide, 5 m	7	5 (79)
8. Back glide, 5 m	8	8 (61)
9. Kick glide (front or back), 5 m	9	6.5 (64)
10. Front kick glide, 10 m	10	10 (50)
11. Back kick glide, 10 m	11	12 (34)
12. Jump and float up (front & back)	12	11 (36)
13. Beginning armstroke on front 10 m	13	13 (29)
14. Beginning armstroke on back 10 m	14	14.5 (26)
15. Beginning swim on front with rhythmic breathing 10m	15	14.5 (26)
16. Beginning swim on back with rhythmic breathing 10 m	16	16 (24)
17. Change direction, L & R, Front & Back	17	17 (23)
18. Rest in deep water (Fr & bk, minimal movement. 30sec	18	18.5 (17)
19. Combined test (Jump, 12.5fr; rest 30sec; turn, 12.5 back	19	18.5 (17)

In every case where the skills are paired front and back (Numbers. 4 & 5, 7 & 8, 10 & 11, 13 & 14, 15 & 16) executing the skill on the front was easier than the same skill on the back.

Lastly, when considering the proportional success on the above named paired skills, the most dramatic was that 84% learned to float on the front first and later on the back. The apparent relative ease of the prone position

diminished in the following paired skills systematically and was virtually nonexistent by 15 & 16, beginning swim on the front and back (10 m).

Discussion

The Rho of 0.97 suggests that there may be no statistical need to alter the theoretical rank order. Such a high Rho must however, be taken cautiously. One of the variables was fixed in ascending order. Other confounding factors may have influenced the results. The deviations described also invite discussion regarding possible adjustments for pedagogical reasons. Extremely interesting arguments for and against can be made. There may be several factors which should be debated in this instance.

First and most important, children are so different that no progression will suit all. Using the example of floating, the theoretical rank order proved to be correct for 84% of the children tested. It was not correct for the remaining 16%. For these children it was entirely normal to learn to float on the back first. For them, the rank order was in fact, adjusted by these children themselves. They showed the way. Thus, while less frequent, this development is by no means abnormal. The consequence of this situation is simply that the instructor would be well advised to start with front float but immediately when some have difficulty, suspect that they may belong to the 16% and give back float a try.

The second factor is the concept of building blocks or aquatic readiness (Langendorfer & Bruya, 1995). Here the first 3 skills and their relationship to both 4 & 5, as well as the remaining paired skills may best exemplify this concept. Item 1 appeared to be more difficult than both 2 and 3. It may be that the difficulty lies not in the relaxed submerging but in the 10 sec. criterion. If breath holding for 10 sec or even longer may in some ways be a prerequisite for what comes later, perhaps one needs simply to spend more time on this item until it is more thoroughly mastered, before proceeding. It is entirely possible that both rhythmic breathing and jump and submerge would have reached a higher level had more time been spent on breath holding. Also to master floating on the front for 15 sec. one has a good start if making sure that 10 sec. along the way is easily manageable. Note that several of the following paired skills are also dependent on breath holding/breath control. We might also speculate that the apparent difficulty with back float was in some way connected with the level of competence attained on the first four items. When the instructor is faced with a learner who struggles a bit with front or back float, it may not be the relationship between these two that is the problem but insufficient mastery of the first three skills. The same could be said for rolling from front to back and vice versa (nr. 6). Finally, when both front and back glide were easier than rolling over, it can be assumed that training on the glide also improved those factors upon which rolling depends. The question then is simply, should one dwell a bit longer on front and back float, present them in greater variety or delay rolling from front to back until after gliding has been mastered?

The third factor which presents the opportunity for reflection is the concept of balanced progress. Skills are normally acquired in an overlapping fashion. It is recommended to work on several skills at a time. This also allows greater flexibility for the learners to find their own way, their own correct progression. If we were to strictly follow the rank order as shown by the subjects in this study, we would move from front float to front glide and to front kick glide, all of which appeared to be easier than back float. An argument in favor of this might be that they are sufficiently related that they invite transfer of learning and that this order would be easily understood by learners. If we followed such a course, we would then do the same on the back. A counter argument might be that if one could stop the clock in a learners progress, we might ask, "at this point in time, what combination of skills would make our learner most safe?" One answer might be that having some similar degree of proficiency on both back and front, at any given time, has a specific survival value.

Conclusions

It is possible to find the optimal progression for any learner. Since learners differ considerably, the instructor must be prepared for individualization. This is most easily done if the learners themselves are involved in certain decision making. When working on several related skills or skills of similar difficulty at the same time, the child will show the way. It is also well known that participation is greater when the child is involved in deciding. It is not a burden to cater to such individualization. It may in fact, make our job easier, by increasing motivation and by helping each individual child find their own optimal progression. Finally, other factors than simply degree of difficulty may be important in constructing a progression.

References

- American Red Cross (1951). *ARC Water Safety: Information brochure*. Washington D.C., USA:
- Junge, M. (1984). *Teaching Beginning Swimming*, Unpublished MSc. Thesis. Norwegian School of Sport Science, Oslo.
- Langendorfer, S.J., & Bruya, L.D. (1995). *Aquatic Readiness*. Champaign, IL, USA: Human Kinetics.
- Lanoe, F. (1963). *Drownproofing*. Englewood Cliffs, NJ, USA: Prentis-Hall.
- Stallman, R.K., 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(4), 372-382.
- Whiting, H.T.A. (1971). *The Persistent Non-Swimmer*. London, UK: Museum Press.

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The Construct Validity of a Traditional 25m Test of Swimming Competence

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Abstract

A universal definition of the ability to swim has yet to be agreed upon. Some believe that “how far” one swims is the most important criterion. The number of meters is controversial. Some use a traditional definition of from 25m to 200m, often as the only criterion of “can swim”. In fact, this is not the point. A conceptual model emphasizes broader competence. The result of this model is a combined test including more than only distance. This combined test was used as the criterion to test the construct validity of a traditional test. When these two tests were compared they were found to be very different, thus measuring different qualities. Among children already declared able to swim by the traditional test, only 5.7% satisfied the conditions of the conceptual test. It was concluded that the traditional test was not a valid measure of the ability to swim.

Key words: evaluation, swimming competence, validity, distance test

Learn to swim programs remain dramatically different in their content and in the manner in which the learner’s progress is evaluated, in other words, by which criteria a child is judged “able to swim”. There is fortunately, growing agreement among researchers and educators on the importance of a) breath holding, breath control, b) floating, buoyancy control, c) gliding and postural control, and d) stroking and directional control, as well as orientation, balance and rotation (Stallman, et al, 2008). These are seen as essential, core elements. There remain however, many ideas about how and what a child should learn. The less experienced person (school teacher who is not a swimming instructor, parent, significant other) is more prone to fall prey to misconceptions. In a recent Scandinavian questionnaire investigation, it was revealed that almost every primary school head master had her/his own definition (Norwegian Directory of Education, 2008).

There also remains a traditional notion that the number of meters achieved is the only or most important criterion for defining the ability to swim. This is especially true among parents but sadly, remains common also among certain swimming instructors. A common complaint is that “we don’t have enough time”. The result is often a single selected stroke and a pre-determined distance (Directory of Education, Norway, 2008). The notion that some form of all around development is more important than simply a certain number of meters seems to have escaped closer scrutiny. A number of well known and respected national agencies (e.g. The American Red Cross, The German Life Saving Association, etc.) have long emphasized all-around development as essential in drowning prevention. The concepts of

“watermanship” or “aquatic competence” are well known (Sinclair & Henry, 1893, Langendorfer & Bruya 1995). Both Cureton (1943) and the USA Navy (1943), emphasized that drowning can take many forms, and that these are unpredictable. Therefore, many solutions (all-around development) are necessary to solve many possible life threatening situations.

When considering the ultimate negative outcome of an aquatic “episode” (death by drowning) it is clear that a variety of skills is required to cope with the wide variety of possible situations in which an unsuspecting person might find themselves – in the water. It surely is obvious then that, one stroke or one distance is not sufficient. Unfortunately, some still appear to believe it is. And the discussion goes on, 25m, 100m, 200m? And of course, whatever conclusions one reaches about skills, we also tend to neglect knowledge, attitude and judgment.

The motive for this study was thus to examine the idea that it is not *how far* but *how* one swims that really matters. The aim of this study is thus, to examine the construct validity of a 25m test of swimming competence by comparing it with a criterion combined test, maintaining the same overall distance on both. It was also assumed that the same results would appear if a different distance had been chosen. For example, that a traditional test of 200m with single stroke is not the same as a 200m combined test with the same pattern as the shorter combined test.

Method

From among 200 primary school children, age 9 and 10 years, taught in a single school term, 70 succeeded in the local traditional test of negotiating 25m with no other criteria. These 70 were declared “able to swim”, awarded a pin and the parents were notified that their child could swim. These children (N=70) constituted the subjects of this study. By performing a second test, within 3 days of the first, they served as their own controls.

The criterion “combined test” consisted of: a) jump or dive into deep water (3m), level off, b) swim 12.5 m in the prone position c) turn 180 degrees, d) roll over e) rest for 30 sec with minimal movement, f) swim back to the starting point in the supine position. Diving was awarded two points, jump one point and 0 for those who refused both jump and dive. Each of the other elements was awarded two points. The maximum possible score was thus 12 points. The total distance was the same for both tests but the criterion test was obviously more comprehensive, included a more balanced skill profile.

The children were motivated by being offered a second, new award. No mention was made of the second test being a test of swimming ability nor was it implied that the first test was anything other than what they had believed it to be. To any direct question, the second test was simply referred to as a “new” test, and new award; swim or swim better.

The children were tested by their own teacher to avoid bias by altering the atmosphere. The observers who evaluated the performance were known to the children. The children were tested four at a time and each of two observers was assigned to two children. The same observers evaluated all of

the subjects. Pilot testing was conducted to train the observers. Discussions were held to ensure that both observers used the same criteria. A head instructor coordinated all evaluation and made the final decision in any case not obvious in its outcome. Each element was scored and the total score was recorded.

The results were tabulated by frequency distribution and both the number and percent of subjects succeeding on each element was recorded. The total scores were also recorded.

The criterion test was the result of a construct, i.e. a conceptual construction based on the logical arguments cited above. If these two tests gave similar results, the traditional test would be accepted as having construct validity. If the two tests differed they would be considered to measure different qualities and the traditional test would be considered not to have construct validity.

Results

Table 1 shows the results by element. The results clearly show that all but the one element reproduced also on the first test, were not mastered by many of the children.

Table 1: Success by element on the combined criterion test.

Test Item	Number (n = 70)	%
1. Dive	16	23
Jump	36	51
Start in water	18	26
2. Swim 12.5m prone	70	100
3. Change direction 180°	63	90
4. Roll over	40	57
5. Stop & rest 30 sec.	4	5.7
6. Swim 12.5m supine	36	51

As would be expected, 100% of the children who had already swum 25m on the front, succeeded in swimming 12.5m on the front. However from that point on, fewer managed the other elements. Twenty six percent refused to either jump or dive into deep water, asking to start in the water. Ten percent did not manage to change direction. Forty three percent were unable to roll over. Forty nine percent were unable to swim on the back. And lowest of all, only 5.7% managed to stop and rest, even for only 30 seconds. The range of total scores was from 4 to 12. Only four of these pupils scored 11 or 12 points, i.e. by the criterion test, could swim.

Discussion

The real issues here are, how do we evaluate whether a child can swim or not, and can a simple distance test serve the need to evaluate. To return to the idea that it is *how* one swims rather than *how far*, we must forsake traditional ideas

of any given distance. Some insist on 25m, some on 200m, others are somewhere in between. It can be remembered that the Scouting movement has long operated with a 200yd (ca 180m) minimum before permitting boating activities (Scout Handbook, 1956). Several national life saving organizations also have a tradition of focusing on 200m or 200 yds. In some cases, no other criteria are used. Can it be that one who can swim 200m but not 201m, can swim? How safe is this person? How are they prepared for the many possible scenarios one might be victim to in an involuntary submersion?

The results of this study show clearly that the two tests considered, measure different qualities. Being able to swim 25m non-stop on the front does not automatically give one the ability to swim on the back, turn, roll over, stop and rest or jump or dive into the water. (if an emergency required one to swim on the back or to stop and rest (gather ones wits, catch the breath, settle down, re-orient oneself) as it might well do, these subjects would be in serious difficulty. They are clearly, not as safe as they might have been if they had mastered the criterion test. Consider the statistic cited by Golden and Tipton (2002), that > 40% of drownings in the UK happen within 3m of safety. The logically matching scenario would require the victim to turn around and make their way back to safety. Cold shock also first described clearly by these same authors, operating within seconds of submersion and dramatically raising the respiration rate, reducing air exchange and raising the HR, requires clearly the quality of being able to stop, rest, take stock, catch the breath, etc. It remains a mystery to us that the ability to stop and rest is so often ignored or underestimated.

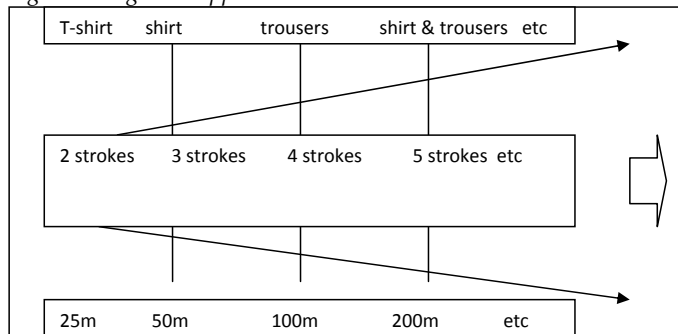
To accommodate the desire to keep some semblance of distance as a useful skill (attitude?), it is only logical to suggest that the criterion combined test examined in this study, can easily be expanded to greater distance while retaining the same pattern. An example might be a total of 100m (50 + 50) with a 60 sec. rest and perhaps a more demanding way to fall into the water, or 200m (100 + 100) with a 3 min rest. Clothing could (and should) be added to increase the challenge. Stallman, et al (2008) introduced the idea that "Can Swim" is not a sharp demarcation from "Cannot Swim" but rather a zone in which we can describe can swim at a minimal level and progressively at higher levels. Can and Can Better (Figure 1).

In Northern Europe there exists a certain feeling about swimming on the back, insisting for example that in a 200m test, only 50 need be on the back. This is to denigrate the value of a life preserving skill. And often no other criteria are used. The combined test approach presented here as a construct, is a balanced one.

To focus on any distance is to avoid the issue. It is not a question of how far or which stroke. The child who is relaxed in the water and uses their natural buoyancy, is able to control breathing, is able to stop and rest, is safer at 25m than the child who can swim 100m but does so only non-stop and with great effort. The first named child can swim 25, stop and rest, swim 25 more, etc and soon accumulates a greater distance than her/his counterpart. Those

who focus on distance only, see only the result and lose sight of the process. Here the reader is reminded that a common attitude among less experienced instructors is that technique is not important, most children never become competitive swimmers. The real issue however is that economy of effort is often a matter of life and death. Technique in fact, when we consider saving energy by more efficient movement, not overcoming the powers of nature but working in harmony with them, is the most valuable of survival skills.

Figure 1: A graded approach to "Can Swim".



There can be little doubt that the ability to swim 200m indoors in a warm quiet pool, is no guarantee that one can swim the same distance outdoors, in colder and restless, open water, and perhaps fully clothed. But at whatever distance one arrests the learners progress, in a laboratory slice of life to be examined under the microscope, the pattern of versatility should be retained. Each element would then be increased to a higher level of challenge.

Conclusion

The distance test of 25m, with no other criteria, measures different qualities than the slightly more comprehensive combined criterion test. If we accept the construct validity of the criterion test, the traditional test is necessarily judged not to have construct validity.

References

- Aviation Training Division, (1943). *Swimming*. The United States Navy. United States Naval Institute, Annapolis.
- Cureton, T.K. (1943). *Warfare Aquatics*. Champaign, IL, USA: Stipes Publisher.
- Directory of Education (2008). *The Teaching of Swimming and Life Saving. Support Materials for Teachers and Instructors in the Primary School*. Oslo, Norway: Ministry of Education.
- Golden, F. & Tipton, M. (2002). *The Essentials of Sea Survival*. Champaign, IL, USA: Human Kinetics.
- Hines, F. (ed) (1978). *The Scout Handbook*. New York, USA: Boy Scouts of America.
- Hurt, H.W. (ed) (1910). *Handbook for Boys*. New York, USA: Boy Scouts of America.

- Langendorfer, S.J. & Bruya, L.D. (1995). *Aquatic Readiness*. Champaign, IL, USA: Human Kinetics.
- Sinclair, A. & Henry, W. (1893). *Swimming*. London: Longmans.
- Stallman, R.K., 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(4), 372-382.

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School Swimming - a Team Effort: An Intervention Study

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A variety of factors affect learning. The importance of the total environment is typically under estimated. Parents and teachers often “send” or “take” children to lessons and then ignore both process and progress. However, involvement of significant others to the children and youth in question can positively affect motivation, and help to create a culture of ambitious goals, the joy of mastery and the wisdom of water safety. Appealing to a team spirit regarding a vital matter of life and death and a commitment to drowning prevention, can also create a community culture of aspiration. The aim of this study was to create an intervention involving children, parents, teachers and school and to test its effectiveness.

Method

The intervention consisted of parent and teacher meetings with the Coordinator of Swimming for Lillehammer School District. Topics discussed were a) using tub, sink, shower, etc, at home i.e. ‘homework’ b) introducing swimming as a conversational topic at home and in the classroom, and c) how to assist children with goal setting. Implementation of these activities was carried out by parents and teachers for an entire school year. Periodic seminar meetings were placed in the school system’s regular planning days for teachers (normally a full or half day every month). In essence, this was a form of instructor training designed to involve these significant others and to impart a sense of responsibility and ‘ownership’. The Coordinator of Swimming was also involved in a similar way during Parent - Teacher meetings. The sense of ownership developed by the active teachers assisted them in transferring this zeal to the parents. As the year progressed, the teachers assumed more responsibility for involving the parents. Approximately one year later, children exposed to the intervention were compared to children not exposed. The data were analyzed using SPSS (16). The differences were quantified by use of the Mann - Whitney U test.

Results

A simple test instrument focused on confidence skills (breath holding on land, face under water, breath holding with head submerged, open eyes, retrieve an object from the bottom in chest deep water, float 6-8 sec.), showed that children who had been exposed to the intervention in Grade 2, not only possessed greater readiness at the onset of Grade 4 but achieved more during their 4th year. The instrument used at the end of the 4th year consisted of a 200 meter combined test (Roll into deep water, swim 100m on front, rest 3 min, swim 100m on the back, exit the pool appropriately). Not only did these children report for their first lessons in Grade 4 at a higher level than the control group but at a higher level than at the conclusion of their swimming activities in Grade 2. This difference indicates that the experimental group also achieved more during their 3rd year of school despite the absence of formal school swimming lessons. That is they achieved more than the controls

from June of their 2nd yr (school finish) to August of their 4th yr (school start), approximately 14 months. At the conclusion of the 4th year, the more advanced instrument showed that the experimental group was significantly better than the controls. The Mann - Whitney U value was 478.5 and the p - value, 0.001.

Discussion

The effort involved in creating a team approach to school swimming, raising awareness and involving parents and teachers, was well worth the effort. By the end of Grade 2, the children in the experimental group were very comfortable in the water and the rapid progress in Grade 4 demonstrated that a careful and exacting, sometimes slower early approach pays off later. The most fundamental skills are the most important and haste in acquiring stroking movements is counterproductive. A typical situation is that swimming is left to a later date, an older age. It is commonly believed that because children are more receptive to group communication and direction as 8-10 yr. olds and because they have matured sufficiently in motor development, it is easier to teach them to swim. The proponents of this kind of thinking have searched for an 'optimal age' to learn to swim (believing that it exists) and have even suggested that age is perhaps from 8-10 years. These are the same people who consider swimming to be something one does with the arms and the legs and are less concerned with the most fundamental breathing and buoyancy skills which are the very foundation upon which propulsive skills can later be built. They also seem unaware that a skeptical attitude to the water can only increase with time, making the older child more risk prone and making learning more difficult. The only 'optimal age' is "the earlier the better" (given continuous access to the water). At the end of Grade 4 the experimental group was significantly better at the 0.05 level of confidence than the controls.

Conclusions

Children exposed to the intervention performed significantly better than those not exposed, not only during the period of the intervention (one year) but for the entire following year. They also continued at an advanced level and remained at a considerably higher level than the controls.

References

- Langendorfer, S.J., Bruya, L.D. (1995). *Aquatic Readiness*. Champaign, IL, USA: Human Kinetics.
- Stallman, R.K., 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(4), 372-382.
- Brenner, R.A., Moran, K., Stallman, R.K., Gilchrist, J., & McVan J.T. (2005). Swimming ability, water safety education and drowning prevention. In J. Bierens (ed.) *Handbook of Drowning* (112-116). Germany: Springer.

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Movement Patterns in Free Water Play after Swimming Teaching with Flotation Aids

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The aim of this study was to investigate the movement patterns in children during free play in a swimming school setting. It was hypothesized that children being taught using flotation vests would be less likely to surface dive, jump and dive during free play. In this study ten lessons were observed using a video camera during 10-minutes free play at the end of a “learn to swim” session. Each subject had either undergone 10 lessons using a flotation vest (n=11) or without (n=13). The results showed that the flotation aid group (FLOAT) had significantly fewer surface dives ($p=0.006$, using a two sample t-test) compared to the control group (CON) and that FLOAT asked for flotation toys significantly more than CON ($p=0.03$). Furthermore a non-statistically significant trend was evident in parameters of breathing and diving skills, water entry skills, and distance moved on land and in water, all pointing to FLOAT participants being more likely to do less vertically oriented movements. It is concluded that children learning to swim using flotation aids have a stronger tendency to move more horizontally during free play, and not choosing vertical axis movements (jumping and surface diving), compared to children being taught without the flotation vest.

Applications of the 4W Model of Drowning for Prevention, Rescue and Treatment, Research and Education

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Previous research has been published about the 4W model of drowning and its four constituent variables (Avramidis, Butterly & Llewellyn, 2007; 2009a; 2009b; 2009c; 2009d; Avramidis, McKenna, Long, Butterly, & Llewellyn, 2010). We presently summarize and suggest applications of the model for the general public, aquatic safety professionals, injury epidemiologists and policy makers. The method consisted of a major literature review of quantitative research that was undertaken to identify potential risk factors of drowning, a qualitative content analysis that was used to analyze publicly available drowning incident videos ($n = 41$, $M = 345.0$ secs, $SD = 2.8$), and a semi-structured interview of 34 individuals who were involved in drowning incidents (30 males age 16–65 years, $M = 28.4$, $SD = 11.3$; 4 female age 19–65 years, $M = 37.5$, $SD = 19.5$). Results confirm that the model has numerous applications in terms of prevention, rescue, treatment, research and education. In terms of prevention and education, it is suggested that water safety organizations should establish new testing criteria for qualifying pool and beach lifeguards (e.g. “100 m run–50 m swim–100 m run” for open water, “50 m run–20 m swim–50 m run” for pool/water parks and “early approach” criteria). In addition, emphasis needs to be given during training on the 3 dimensions that constitute each drowning problem (i.e. width, length and height or depth). Moreover, this stresses the need, from an educational point of view, for better public awareness regarding water safety prevention in people who engage not only in aquatic activities but also in non-aquatics in or around the water, for them to know how to swim and be able to survive in an aquatic emergency. In terms of rescue and treatment, consideration of the 3 dimensions that synthesize the rescue and its implications for the outcome of the rescue and the first aid treatment will help lifeguards and lifesavers to be faster, more effective and able to avoid potential problems that might delay their attempt. Finally, in terms of research, the 3 dimensions of the model reveal that the numerous “hidden” drowning incidents that contemporary injury epidemiology classifies under different codes, should count as “drownings” for better describing the real mortality rates. By doing this, the increased rate of the drowning figure will act as a positive force that will positively influence decision making, research funding, public awareness and lifeguard preparedness. Collectively, the 4W model has a wide range of lifesaving related applications.

References

- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2007). The 4W Model of Drowning. *International Journal of Aquatic Research and Education*, 1(3), 221-230.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009a). Drowning Incident Rescuer Characteristics: Encoding the First Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(1), 66-82.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009b). Who Drowns? Encoding the Second Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(3), 224-235.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009c). Where do People Drown? Encoding the Third Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(3), 236-254.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009d). Under What Circumstances Do People Drown? Encoding the Fourth Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(4), 406-421.
- Avramidis, S., McKenna, J., Long, J., Butterly, R. & Llewellyn, D. (2010). Crucial Findings from the 4W Model of Drowning for Practical and Teaching Applications. In P-L. Kjendlie, R.K. Stallman, & J. Cabri, (Eds.), *Proceedings of the 11th International Symposium for Biomechanics and Medicine in Swimming 2010* (pp. 354-356). Oslo: Norwegian School of Sport Sciences.

Merging the Haddon Matrix and the 4W Model for developing a Drowning Prevention, Rescue and Treatment Framework

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Few models and theories have been applied internationally in relation to drowning prevention (e.g., Pia, 1970; 1984; Griffiths, 2000; Connolly, 2004). The aim of this study was to suggest a framework for developing drowning prevention, rescue and treatment interventions by merging the Haddon Matrix (Haddon, 1980) and the 4W model of drowning (Avramidis, 2009; Avramidis, Butterly & Llewellyn, 2007; 2009a; 2009b; 2009c; 2009d; Avramidis, McKenna, Long, Butterly, & Llewellyn, 2010). A 4x3-cell matrix was developed. The horizontal axis consisted of the variables that determine the outcome of a drowning incident (i.e., rescuer, casualty, place and circumstances of occurrence), while the vertical axis comprised three time frames related to drowning (i.e. pre-event, in-event, post-event). In addition, the frequencies of the 4W model sub variables were incorporated in the matrix to offer meaningful and practical examples of how this matrix could work.

Table 1 depicts the suggested framework for developing drowning prevention, rescue and treatment interventions. Results confirm that rescuers and other professional teams (e.g. amateur lifesavers, professional lifeguards, aquatic facility operators) as well as those engaged in activities in or around the water (including people who may potentially become drowning victims) may be safer when applying the suggested framework to themselves, the place of occurrence and the circumstances of their aquatic activity (e.g. rescue and recreational/professional respectively). Given that the role of a lifeguard is mainly preventive and that successful prevention will reduce the need for rescue and treatment, the proposed framework may play a vital role in accident prevention and safety promotion (pre-event). In addition, water safety educators can emphasize the in-event issues to prepare aquatic professionals and the general public to handle an aquatic emergency situation. Finally, post-event issues can not only help to generate feedback regarding all the variables involved in a drowning episode, but can also enable successful delivery of treatment (Avramidis & McKenna, 2010). Combinations of theories and models, like the one suggested here, may lead to innovative ways of understanding and intervention in terms of drowning prevention, rescue and treatment. Therefore, future research should focus on how to optimize the merger of existing and new lifesaving and water safety related theories and models with others from the core sciences such as physiology, psychology, pedagogy, sociology, and biomechanics (see Langendorfer, 2007; Stallman & Kjendlie, 2008).

Table 1: Framework for Drowning Prevention based on the Haddon Matrix and the 4W model of drowning (n=75).

	Pre-event	In-event	Post-event
Rescuer	Mostly male (63, 00%); Mostly aged between 20-30 years (54, 7.5%); Level of visual acuity (26, 34.7%); Alertness (51, 68%); Physically fit (34, 45%); Capacity to detect the victim (75, 100%); Previous lifeguard or lifesaving experience (42, 56%); Expertise (21, 28%); Recent formal lifesaving training (39, 52%); Knowledge of the dangers related to bathers (29, 39%); Adequate number of lifeguards and surveillance (19, 25%); Visible appearance and clothing (10, 13%).	Ability to perform risk assessment (26, 35%); Noise affecting lifeguard scanning (3, 4%); Recognize various signals indicating a drowning (22, 29%); Fast response (bystander actions can create delays; 24, 32%); Swimming speed (40, 53%); Knowledge of the dangers related to lifeguards (10, 13%).	Debrief the rescue team (9, 12%); Re-evaluate written operating procedures (4, 5%); Practice effective strategies (12, 16%).
Casualty	Mostly males (56, 75%); Mostly aged between 16-40 years old (39, 52%); Overconfident; Unfamiliar with water (19, 25%); Mostly non-resident of the aquatic area (19, 25%); First visit to the aquatic area (25, 33%).	Mostly non-swimmers (16, 21%) and multiple victims (28, 37%); Availability/use of personal flotation device (14, 19%); Enter the water fully clothed (35, 47%); Breached law (3, 4%).	Identify effective treatment (e.g. basic and advanced life support, 10, 13%).
Place of occurrence	Sloping ground (18, 24%); Distance from safety support (75, 100%); Water depth allows immersion or submersion (49, 65%); Absence of obvious safety regulations (32, 43%); Poor performing safety devices (6, 8%); Rough environmental conditions (e.g. flood 3, 4%; raining 3, 4%; waves 11, 15%; currents 8, 11%; off shore winds 4, 5%); All types of aquatic environments but mostly at sea (52, 69%).	Availability of preventive measures (31, 41%); Deploy dysfunctional safety devices (4, 5%).	Provide visible, influential warning signs about drowning risk (8, 11%); Detail how to assess the durability of safety devices (6, 8%); Highlight effective preventive measures (9, 12%).
Circumstances of occurrence	In day light (61, 81%); More often summer (29, 39%); Absence, or poor quality of rescue (23, 31%) and personal protective equipment (7, 9%).	Mostly rescued with a swim-and-tow method; (27, 36%) Risk-taking behaviour (11, 15%); Influence of others (3, 4%); Local noise masks events (3, 4%); Extreme water temperature (11, 15%); Mostly while swimming (52, 69%); Mostly in the presence of others (34, 45%).	Provide functional equipment and information of how to use it best (8, 11%); Water safety education that discourages risk-taking (1, 1%).

Adapted from Haddon, 1980; Avramidis, 2009.

References

- Avramidis, S. (2009). *The 4W Model of Drowning for Lifesaving of Non-Aquatic and Swimming Activities*. PhD thesis. Leeds Metropolitan University.
- Avramidis, S., & McKenna, (2010) Framework for Drowning Prevention based on the Haddon Matrix. In P-L. Kjendlie, R.K. Stallman, & J. Cabri, (Eds.), *Proceedings of the 11th International Symposium for Biomechanics and Medicine in Swimming 2010* (p. 128). Oslo: Norwegian School of Sport Sciences.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2007). The 4W Model of Drowning. *International Journal of Aquatic Research and Education*, 1(3), 221-230.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009a). Drowning Incident Rescuer Characteristics: Encoding the First Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(1), 66-82.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009b). Who Drowns? Encoding the Second Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(3), 224-235.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009c). Where do People Drown? Encoding the Third Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(3), 236-254.
- Avramidis, S., Butterly, R., & Llewellyn, D.J. (2009d). Under What Circumstances Do People Drown? Encoding the Fourth Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(4), 406-421.
- Avramidis, S., McKenna, J., Long, J., Butterly, R. & Llewellyn, D. (2010). Crucial Findings from the 4W Model of Drowning for Practical and Teaching Applications. In P-L. Kjendlie, R.K. Stallman, & J. Cabri, (Eds.), *Proceedings of the 11th International Symposium for Biomechanics and Medicine in Swimming 2010* (pp. 354-356). Oslo: Norwegian School of Sport Sciences.
- Connolly, J. (2004). C-Zones the Connolly Framework. In S. Avramidis, E. Avramidou & J. Tritaki (Eds.) *1st International Lifeguard Congress* (p. 12). Piraeus: European Lifeguard Academy.
- Griffiths, T. (2000, March). Five-minute scan. *Aquatics International*, 12.
- Haddon, W. (1980). Advances in the epidemiology of injuries as a basis for public policy. *Public Health Reports*, 95(5), 411-421.
- Langendorfer, J.S. (2007). Getting into the swim. *International Journal of Aquatic Research and Education*, 1(1), 1-5.
- Pia, F. (1984). The RID factor as a cause of Drowning. *Parks & Recreation*, 19, 52- 55; 67.
- Pia, F. (Director) (1970). *On Drowning: a Training Aid* [Motion picture]. USA: Water Safety Films Inc.
- Stallman, R., & Kjendlie, P-L. (2008). A proposed framework for developing a plan for research in lifesaving and water safety. *International Journal of Aquatic Research and Education*, 2(1), 78-84.

Breaking Cultural Barriers to Asian Women Swimming

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Abstract

This educational study aims to assess how cultural barriers to women learning to swim can be overcome and to assess the social, cultural and economic benefits of teaching women and teenage girls to swim. The "Sri Lanka Women's Swimming Project" operated for a 5-year period, delivering swimming lessons to Sri Lanka women (n=1700, age: 13-72 years old). Results confirmed that this swimming project provided several crucial cultural, social, and economic benefits to those participating. Overall, it is suggested that this on-going project could serve as a sound model for further expansion.

Key words: swimming, drowning, drowning prevention, water safety.

In Asia, contact with water depends on a person's age, location of residence, socio-economic background and gender. More specifically, in rural and coastal Asia, male and female children play together freely in their younger years and, if suitably safe shallow water is part of their environmental play area, they may, by imitation and experiment, learn to swim. However, once puberty approaches, girls are drawn apart, to socialize away from boys and develop modesty in both demeanor and dress. Culture and couture thus become major obstacles to women learning to swim. It is only in the cities, where the wealthy and educated have access to schools where swimming is part of the school ethos or are keen members of sports clubs with swimming facilities, that girls will routinely learn to swim. In the poorer rural, coastal and even city environments, females will be chaperoned, wash whilst clothed at the well or communal washing place and will be indoctrinated to avoid areas of open or deep water as places of danger.

The problem of limited opportunities to learn to swim is compounded in the places where eastern culture meets western culture. In hotels and tourist resorts, the way in which many tourists dress, or rather undress, often appears rather wanton to local sensibilities. Indeed, the relaxed social behavior at such swimming pool locations actually tends to harden local male cultural diktats against their own women wearing such modern, revealing, fashionable swimwear. Paradoxically, local men often home in on female tourists in the same predatory way that tourist males home in on local girls in revealing swimwear; neither approach, of course, does much to advance the cause of making women safer in water.

Taken together, the above problems lead to a number of serious consequences for drowning prevention. The majority of Asian women have

little or no experience of entering a large body of water (e.g. sea, lagoon, river, water tank or swimming pool) and are thus not suitably dressed for efficient learning-to-swim. Tight, wrap-around dresses hinder agility and, almost without exception, when presented with a drowning crisis, women are unable either to rescue a child in difficulty in the water or to save themselves from drowning. In many remote rural and coastal areas, local drowning deaths do not even appear in national statistics; this is because these areas have the lowest density of hospitals per head of population and statistics usually only include the drowning deaths recorded in hospitals (Connolly, 2008).

These consequences raise a number of questions. Is there any way to change the attitudes of people about how to dress in water? How can they learn to swim and cope with an unexpected drowning episode? What impact would a swimming program bring to a local population?

Answering these questions is meaningful for several reasons. It would demonstrate that people can easily learn vital new skills for their survival in moments of aquatic crises through an organized project. It would also show that learning to swim improves mental health and physical fitness. Finally, it would allow an assessment of whether swimming teaching could generate new employment opportunities for those excelling in the lessons and seeking to help others. Therefore, the aim of this study is to assess how cultural barriers to women learning to swim could be overcome and to evaluate the social, cultural and economic benefits that teaching women and teenage girls to swim would bring.

Method

Participants

A criterion sampling method (Patton, 1990) was used to select adult females (n=1700, age: 13-72 years old) as the target for swimming training. Adult women were chosen because they constitute the largest non-swimming group in the community and, as mothers and grandmothers, were most likely not to be committed to jobs that take them away from home and the child environment. Also, women were the most available group to take part in the training and then pass the acquired knowledge directly to their own children at no cost. Similarly, teenage girls were added because they are future mothers. On the other hand, teaching children directly was excluded because that would introduce an immediate delay of at least a decade before any of them would be old enough to become swimming teachers to pass on their swimming skills. Moreover, teaching children to swim first would potentially exclude at least three complete generations of older girls and women from learning to swim and it is to those very adults that children would look for rescue and water safety guidance in their growing years. A typical example was the loss experienced by a mother during the tsunami flood; she was faced with the awful choice of which daughter's hair to let go of as the current became too fierce for her to hold onto both. Had the girl she let go of been able simply to float away, she might still be alive today. Yet, even now, this simple ability to float continues to be absent in most of the population at large

and people drown every day as a result. If these levels of loss of life were due to disease, there would be an outcry over it as a public health issue. Drowning, however, does not yet get the attention it deserves.

Instruction

A qualified swimming teacher from the Swimming Teachers' Association, UK taught the female participants in various swimming pools located in Sri Lanka. These areas were Ahangama, Habaraduwa, Matara, Mirissa, Thalaramba and Weligama, and the provincial capital, Galle. This community-based project was named "Sri Lanka Women's Swimming Project" (SLWSP, 2011). The time frame of the study of this project covers the period February 2005 to December 2010.

Procedure

Teaching those participating in the swimming program required two measures and the application of two principles. The first measure was to provide a secure teaching environment; usually this was a small swimming pool at a privately owned residence, either rented or loaned on a philanthropic basis. The second measure was to offer the women and girls appropriate swimwear. Initial instruction was one-to-one, in the water with the teacher, and then, as women gained confidence, they could be taught in pairs and then in small groups of like ability. These pupils typically participated in swimming classes for a period of two months, initially coming for an hour every day for a week, then half hourly once per week. The driving force was to give people the maximum prospect of extended survival upon immersion in water in the shortest instructional time possible. "In terms of content, the principle teaching method included breath control, buoyancy control, postural control (gliding) and propulsive control (stroking), in that specific order (Stallman, Blixt & Junge, 2008; Laughlin & Delves, 1996).

Since people do not drown because they cannot swim, but drown because they cannot breathe, the first skills taught were breath control and buoyancy control. This corresponds with Benjamin Franklin's saying: "The turning point in learning to swim is the recognition that the water will hold one up". For most people (all women) the human body naturally floats and all that has to be learned is to relax and balance sufficiently to maintain a face-up position in a star float for effortless, extended periods, and to stand after floating. Interestingly, because so few Asian women had actually been in a large body of still water, and thus had no history of bad water experiences in childhood, they demonstrated complete trust in the instruction to "Relax, look up at the sky and let the water hold you up". As a result, very many achieved a good floating and breathing position in their first lesson and, with a little further instruction on how to kick gently, were propelling themselves at the water surface on their first day. Of course, they had yet to learn how to roll over and how to stand safely up from prone and supine positions. Nevertheless, the spectacle of a declared non-swimmer making a near effortless transit across the water in the first lesson was an incalculable motivator for the rest of the students and set the tone for others to achieve

what they previously considered to be an unattainable skill. Different entries into the water and various floating positions and propulsion methods were then introduced, with the aim of developing an instinctive ability to achieve a survival “float-and-breathe” position, no matter how awkward the entry into the water.

From here, the project moved to Laughlin’s twin concepts of gliding and streamlining. Laughlin’s golden guiding principle is only to expend in a stroke the absolute minimum energy necessary to maintain the momentum of a streamlined glide – the aquatic equivalent of ice-skating. Balance in motion and rolling to breathe whilst presenting the minimum body cross-sectional area to the water by swimming on one’s side like a fish were the next necessary skills to be achieved. Once side-on balance and breathing were mastered, the women progressed to the long slow over-arm strokes of front crawl. The net result was a swimmer who had learned to swim an effortless and gracefully swift front crawl for long distances without tiring and who could relax motionless in a face-up float for long periods. Since 2010, women were only declared “swimmers” when they passed the “Can Swim Safely” standard to float for 10 minutes and swim 100m non-stop (International Federation of Swimming Teachers’ Associations, 2009).

Results and Discussion

This educational study also suggests how cultural barriers to women learning to swim could be overcome and assesses the social, cultural and economic benefits that teaching women and teenage girls to swim brings. These findings of the project are discussed below.

Overcoming Culture and Couture

The project’s effectiveness was challenged by several obstacles. The first was male head-of-household resistance. Second was persuading women that they, personally, needed to learn to swim. Third was to address the question of a suitable attire for swimming and, finally, safe swimming locations had to be found. The drowning deaths in the area, the word-by-mouth reputation of the program, the availability of sportswear and the “women only” privacy that was maintained, all contributed to the success of the project.

In more detail, the fact that 80% of the tsunami casualties were women and children (Oxfam International, 2005) was found to be a great motivator in changing attitudes, as many more men than women had lost spouses in the flood. Next, an initial focus on teaching the female teachers at local village schools injected good reports of positive swimming experiences into the rest of the school and this information percolated down rapidly into the local community. The philanthropy of a major sportswear brand with an in-country factory donating suitable swim-suits helped the women overcome their financial inability to afford such apparel; for modesty, however, the women then almost always added leggings. Finally, in the early stages of the project, the novelty of female-oriented swimming lessons and their reduced state of dress attracted idle predatory male spectators. The problem of unwanted spectators was overcome by moving swimming to locations where

the project had total control of entry to the area surrounding the pool. This was achieved by renting secluded private residential properties with a swimming pool and, in the other cases, by arranging for "Women Only Swimming" at more publicly accessible pools. Only by totally excluding all men from oversight of the swimming area, did the women feel comfortable to come and learn to swim. The lessons themselves were, of course, free.

Social and Cultural Impact

From the security of an all-female environment in a private location in the heart of a rural community, the first social impact was apparent within a week. As soon as the women were able to swim, they wanted to be photographed swimming, as none of their non-swimming neighbors really believed they could. Next, there was a huge and apparent leap in the self-confidence and self esteem of hitherto quite reticent individuals. The women relaxed, chattered and played about in the water, almost as if reverting to the missed years of their childhoods, back to the day that girls were separated from the boys and chaperoning began. With, in some cases, up to 50 years to catch up on, they became quite boisterous, simply enjoying the sheer fun of being safe and confident in water.

Over time an improved level of fitness also became apparent. Previously, the ladies would slowly glide gracefully up the hill to their swimming classes. Now, they positively hurried along, in order to maximize the sheer pleasure of being in the cool water longer. Overriding all visible changes to individual women's attitudes was the emergence of a keen desire to share and pass on their newly acquired experiences to the rest of the community, who now also began to clamor to be included in lessons. The critical path to expansion, however, was the limited number of people available with sufficient supervisory water safety awareness and rescue skills to oversee novice swimmers safely as well as simply teaching and passing on swimming skills.

Economic Impact through new Employment Opportunities

Early identification of individuals with potential teaching talent was made by tasking every woman after their first lesson to bring a friend to the next lesson; the first individual would then teach that new person the last lesson received. Potential teachers were given extra formal training as student swimming teachers to international standards and offering them employment within the project, thus furthering swimming in the community and laying the foundations for early self-sufficiency. The swimming teacher training also included water safety, rescue and cardio-pulmonary resuscitation, CPR, again of immediate benefit to the community. For many rural women, some of whom had left formal schooling at a prematurely early age, this was the first time in their lives that they were able to achieve a formal recognizable qualification and experience a taste of micro-economic independence through an hourly paying job they could fit in around their domestic duties; naturally, their social status and self esteem soared. Finally, the fact that these women could now swim continues to act as an important catalyst in motivating others to follow.

Conclusion

Teaching adult women to swim has accelerated the process of reducing drowning by giving women the skill to pass swimming knowledge on recreationally (rather than commercially), down through the family into the community. In addition, female confidence, self-esteem and a new, by-the-hour micro-economic career which is easy to fit in around their domestic duties, is all of benefit to the whole community. There is greater water safety awareness and the previously feared extensive aquatic environment is now seen as a cooling, healthy, recreational asset. All that remains is to extend the concept, village by village, teaching "Float-and-Breathe" first in order to reduce drowning and make people safe in water. Finally, at the national level, having a greater percentage of the population able to swim opens up the Olympic swimming goal to a whole raft of new talent, as well as directly reducing drowning, currently a cause of death of epidemic proportions in Asia.

References

- Connolly, J. (2008). Lifeguards beware! In S. Avramidis (ed.) *Handbook on safety and lifesaving* (pp. 439-443). Greece: Stamoulis Publisher.
- International Federation of Swimming Teachers' Associations (2009). Conference Decision. UK: Author.
- Laughlin, T., & Delves, J. (1996). *Total Immersion; The Revolutionary Way to Swim*. New York, USA: Fireside Books.
- Oxfam International (2005) *The Tsunami's Impact on Women*. Place: Publisher
- Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods* (2nd ed.). Newbury Park: Sage.
- Sri Lanka Women's Swimming Project (2011). I can swim; Can you? Retrieved on 10 January 2001 from www.icanswimcanyou.com
- Stallman, R.K., Junge, M., & Blixt, T. (2008). Teaching Swimming Based on a Model Derived from the Causes of Drowning. *International Journal of Aquatic Research and Education*, 2(4), 372-382.

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A Model for Raising Water Safety Awareness in a Developing Country: A Case Study from Tanzania

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While it is known that a vast majority of drowning deaths occur in developing countries, accurate surveillance is difficult. The scope of the problem is poorly documented and thus underestimated, especially compared to malaria, HIV, diarrhea, traffic deaths, etc. Given the underestimation of the problem, interventions are not common. The few local initiatives by concerned persons are often effective but only to the very limited extent of their capacity. These and the Tanzanian Life Saving Society, which is young and small, are impotent in the face of the magnitude of the problem. One of the few estimates available has suggested that 5000 persons drown every year only in Lake Victoria (BBC Swahili Radio, 2009). The aim of this project is to suggest a model which might be applied in Tanzania and similarly in other developing countries, to raise water safety awareness and to initiate interventions.

Methods

A survey identified the Scouts as the most well developed youth organization in Tanzania (as in most of Africa). The Scouts have been in Tanzania since 1913, with a nationwide infrastructure and local groups over the entire country. In other countries there may be other high profile organizations which fill a similar role. The YMCA is another logical example, though not well spread in Tanzania (there are only 3-4 local branches). Both of these are naturally concerned with water safety. In Tanzania, the Scouts are highly visible in most local communities. The Tanzanian Life Saving Society (TALISS) has existed for ca 25 years and remains small and is primarily active in Dar es Salaam. A handful of highly competent and energetic persons remain the primary initiative takers. Several local projects have succeeded in Dar es Salaam. In the same survey, the Lions Club, Rotary Club and Kiwanis were identified as well organized and active at both national and local level. These are primarily active in community welfare projects and their membership usually includes businessmen, teachers and other professionals. Initially, discussions between the Tanzanian Scout Association, the Tanzanian Life Saving Society, and the Norwegian Life Saving Society, led to a cooperative project and a curriculum for Water Safety Workshops was created for youth leaders.

Results

In June, 2009, seventeen Scout leaders participated in the first 3 day camp. The camp was staffed by both Scout and TALISS personnel. Basic swimming skills, CPR, non-swimming rescues and how to approach youth with relevant

safety messages were covered. Five other efforts have since succeeded and interest is growing. The latest was a one day Water Safety Workshop held at the International School, Moshi, Kilimanjaro, January 9, 2010. Concurrent with the start of TALISS, three local branches were established. These lacked local impetus and were not active in 2009. In the past 15 months, these three have been revitalized and a plan has been created and local persons approached in five other cities. The primary thrust has been to establish local cooperation between these local branches and the local branch of The Tanzanian Scout Association. This will remain the principle framework of future efforts. Scout leaders have attended the aforementioned workshops/camps from various cities in Tanzania and these are the primary recruiting pool for leadership in future local branches.

Discussion

Other organizations now wish to cooperate in further activities. The 4th of the above mentioned courses also included the Tanzanian Swimming Association. The curriculum is being refined and plans are underway for applications for funding to train Head Instructors who would carry out the course at targeted high risk sites around the country. As a pilot in the town of Moshi, attempts are also being made to involve the local branch of the Lions of Tanzania. This would include local community leaders in the attempts to bring the need for water safety initiatives to the attention of the local community. Other networking possibilities which are being investigated include the corresponding Norwegian organizations. The Norwegian Red Cross and The Norwegian Peoples Aid have a high profile in Tanzania and both are involved in water safety in Norway. The focus on Norway is a random result of the fact that a representative of the Norwegian Life Saving Society has resided in Tanzania for much of the past 15 years. Most developing countries have an active colony of ex-patriots. Where water safety enthusiasts are found among these it will be natural to establish ties between the host country and these person's home countries.

Conclusions

Close investigation of existing organizations and the use of personal contacts is the key ingredient to a net-working which can make such efforts possible. Use of local media is vital in raising public awareness. In Moshi, Jan. 2010, it was also clearly demonstrated that local sponsors can be found to make such initiatives cost effective and affordable. Similar surveys might reveal other organizations with strong infrastructure and networking possibilities, in other countries or different local settings. Personal involvement is the key. Networking can come from unexpected sources and a broad contact surface is of the essence. While progress may be slow, the constant focus on gathering attention and interest will surely produce gains. Aquatic activities are inherently popular and appealing especially to youth. A rewarding experience of our team has been that even adults responded to swimming instruction with "This is easy, I thought it would be impossible for me"!

References

- Vervaecke H. (ed) (2002). ILS World Drowning Report. The International Life Saving Federation. Leuven, Belgium.
- Bierens J. (ed) (2005). *Handbook of Drowning*. Germany: Springer.

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Water Safety and the Environment: A Model for Developing Countries a Case Study from Tanzania

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The Tanzania *Life Saving Society* Swimming Club (TALISS Club) in Dar es Salaam, Tanzania, a member club of the Tanzanian Life Saving Society, practices drowning prevention by offering swimming and water safety lessons. They are keenly aware of the high drowning rate of developing countries including Tanzania, the risk of living along the coast, the lack of safe swimming facilities and the plight of their beaches, both public and private. The aim of this project was thus, to create a model which might be used in other developing countries, and other parts of Tanzania, to a) combine environmental and water safety concerns, b) to address the issue of access to safe swimming areas, c) to address the issue that while many learn to swim in pools, people drown in open water. It was hypothesized that voluntary cleaning of a local public beach could influence public behavior.

Method

Given the risk of living close to the sea, the policy decision has been made to teach swimming in the sea whenever possible. Even in the coastal city of Dar es Salaam, many of the few who swim, learn in a pool. Many who otherwise have easy access to the sea, never learn. Superstition abounds, still! Parents actively discourage children from swimming. Many fear the water themselves. The TALISS swim club is doing something about it. Courses offered in the pool routinely end with several sessions in the sea. Coco Public Beach has long been popular but unsafe because of indiscriminate throwing of trash. TALISS combines these circumstances in the “Clean up Coco Beach” project. Children from the club and their leaders, wearing their club T-shirts, now routinely clean the beach. The conditions were so difficult at the start that the members were forced to wear gloves and shoes.

Results

The club has succeeded in creating its own safe swimming area. Sustainability remains difficult however, as trashing public facilities is endemic. The club routinely cleans first and swims after. While necessarily cleaning each time, the effort required has been noticeably reduced. Beach users report that their behavior has changed. Both the children and adults involved have developed a sense of pride in their efforts, a frustration in the plight of public facilities and the apparent lack of interest of much of the public. They have however, been encouraged by the results and are motivated to increase their efforts.

Discussion

Watching children clean the beach has appeared to raise awareness. Adults have been observed to slowly change their habits. Some approach the children asking who they are and why they clean. A growing number have pledged support to the club and youth sometimes ask to join in the cleaning and even to join the club. The beach has slowly improved. More activity is possible. The activities have become even more enjoyable. A positive circle has evolved. There is however, no guarantee that this will continue and the club is determined to continue their efforts. A final step requires political action. Local authorities have the power to improve the situation if they are convinced of the need. The leadership of the club has made contact with local politicians and a network of contacts has evolved. The challenge is great in a society where other serious problems receive priority.

Conclusions

The TALISS club members in their club T-shirts are highly visible and have clearly influenced public behavior. This kind of collective, voluntary action can change behavior. The general public appears to respect the aims of the club and have begun to see their local coastal environment in a different light. Though patience is required and progress is slow, there is a commitment to continue the fight.

References

- Vervaecke, H. (ed) (2002). *The ILS World Drowning Report*. Leuven, Belgium: The International Life Saving Federation.
- Tanzania Life Saving Society Swimming Club (2009). *Minutes of meeting*. International School of Tanzania, Dar es Salaam

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The Success of Foyle Search and Rescue - Suicide Prevention and Rescue in the City of Derry, Ireland

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Abstract

The suicide by drowning figure in Ireland is twice the accidental drowning figure. Foyle Search and Rescue was established in the City of Derry in 1993 with the primary aim of reducing the 35 annual average number of drowning deaths in the River Foyle as it flows through the city. The organization operates foot patrols between Craigavon Bridge and Foyle Bridge, supplemented with patrol boats on the river, on week-end nights. In the 17 years between 1993 and 2010 the service has saved over 1000 lives, including 134 removed alive from the water, and recovered 84 bodies. Of those rescued by the service only 3 died by suicide afterwards proving that if a suicide attempt is interrupted, and help provided, the majority do not re-attempt afterwards.

Key words: drowning, lifesaving, lifeguarding, water safety.

Suicide drowning is an emerging cause of death in several nations around the world with limited scientific attention paid to it. More precisely, wherever recorded, suicide by drowning is the method of choice for between around 1% in USA and to 25% in Ireland of all suicide deaths (Salib & Agnew, 2005; Connolly, 2007). Despite these statistics, little reliable information is available from many developing countries but the likelihood is that their figures match those from developed countries (Connolly, 2010). For example, Ireland has a serious suicide problem with twice as many persons drowning by suicide than drown accidentally (Connolly, 2007). There appears to be a belief that anyone who deliberately enters water, intending to kill themselves, cannot be rescued or prevented from re-attempting should they be stopped the first time. This has been shown to be false in that the majority of persons who fail in a first suicide attempt do not go on to successfully kill themselves later (Suominen et al., 2004; Kuo, 2005; Connolly, 2010).

This article aims to overview Foyle Search and Rescue, an organization that was founded in response to the high number of suicide by drowning deaths in the River Foyle as it flows through the city. Particularly, we will discuss how the organization was founded, will give an overview of the City of Derry, the River Foyle and its bridges, and will explain the organization's aims, structure, lifesaving actions, bases, lifesaving duty, training, and results in terms of rescue interventions in suicide drowning attempts.

Beginning

Foyle Search and Rescue was founded in the City of Derry, Northern Ireland, in 1993 in response to the high number of suicide by drowning deaths in the River Foyle as it flows through the city. It was triggered by a search for the body of a local man who had entered the river, but this was not a one-off

event. In the previous 18 months inside of Derry City, 25 to 30 individuals had deliberately drowned themselves in the Foyle and in earlier years the number of suicide by drowning deaths had been in the region of 35-40 lives annually, mostly on week-end nights. Derry is an open port city with easy access to the river. A group of concerned citizens came together with the primary aims of stopping suicidal people from entering the river and the rescuing of those in the water. Foyle Search and Rescue came into existence as a community response to an ongoing tragic situation and was registered as a charity in July 1993 devoted to the preservation of life in and around the River Foyle.

Place of Occurrence of the Suicide Drownings and the Rescue Interventions

City of Derry or Londonderry

The City of Derry, or Londonderry as it is also known, is the second largest city in Northern Ireland with a population of about 100,000. The city is divided in two by the River Foyle, with three-quarters of the population living on the west bank or 'Cityside' and one-quarter living on the east bank or 'Waterside'. Up until 1984 Craigavon Bridge was the only bridge over the river inside of the city.

River Foyle

The River Foyle is found in the northwest of Ireland and is the fastest flowing river in Europe for its size (Look Around Ireland, 2010). The Foyle is tidal, fast flowing and cold. It can move at a speed of 15 knots and has many currents and undercurrents. In the winter of 2009 the river iced-up. The river is up to 800 metres wide in places as it winds through the city.

Bridges

Two bridges span the river in Derry, Craigavon Bridge and Foyle Bridge. Craigavon Bridge is a 40 foot high double-decker road bridge and is the older of the two bridges, opened in 1933 (Geograph, 2010). Foyle Bridge is a haunched high level box girder road bridge (45 metres high) opened in 1984, and built high enough to allow large ships pass underneath. This proved to be unnecessary in the long run as the Port of Derry relocated from the city centre to a new port north of the city. The high bridge is subject to closure due to high winds (>50miles per hour) during storms (Structurae, 2011).

The Organization

Aims and Structure

The charity has seven main aims and a formal legal structure. First, it aims to preserve people's lives; second, to train life saving volunteers; third, to provide support and help to families bereaved by suicide; forth, it promotes safety on the River Foyle; fifth it delivers effective education and training programmes to the local community; sixth, it works cross community (Catholic and Protestant) for common goals and finally, seventh, it works cross border (Northern Ireland/Republic of Ireland) for common goals. In

terms of structure, the charity is consists of Trustees, a management committee, an administrator, -coordinators, and team leaders.

Lifesaving Actions

The aims of the charity are achieved through seven specific actions. Its shore patrols aim to intercept possible suicides before they enter the river. Boat crews man their rescue boats and remove casualties from the river (Table 1). It organizes search operations looking for missing people believed to be in the river. Lifebelts are inspected on a regular basis and at key sites are alarmed and monitored by CCTV cameras. It offers help to persons considering suicide. Support is provided to the families of those who have died by suicide. Finally members of the organization visit schools and youth organizations speaking about water safety and its work in the community, inviting pupils from local schools to visit the organization’s Prehen base and take part in question-answer sessions.

Bases

FSR has two bases on the riverbank. The first is its principal base upriver at Prehen, which is the organization’s headquarters. The second is a storage base downriver at Gillands. Its headquarters is a modern three-storey custom built structure with a boathouse and radio room in addition to meeting facilities and an all-tidal floating pontoon. Gillands contains a storage building converted into a boathouse and has a slipway launch site for their second boat.

Table 1: Figures for call-outs for the period 1994-2001 (pre-pager) and 2002-2009 (including pager call-out records).

1994 - 2001 (pre-pager)				2002 - 2009 (pager call-out)			
<u>Year</u>	<u>Female</u>	<u>Male</u>	<u>Total</u>	<u>Year</u>	<u>Female</u>	<u>Male</u>	<u>Total</u>
1994	22	44	66	2002	31	42	73
1995	33	119	152	2003	25	50	75
1996	42	59	101	2004	18	55	73
1997	24	31	55	2005	45	38	83
1998	23	28	51	2006	26	44	70
1999	22	23	45	2007	23	80	103
2000	11	15	26	2008	32	59	91
2001	12	21	33	2009	32	90	122
Totals	189	340	529	Totals	232	458	690

Note. Totals between 1994–2009: female 421 (34.5%), male 798 (65.5%) = 1219

Lifesaving Duty

Club members report for duty on Thursday, Friday and Saturday nights between 9.30pm and 3.00am or until a situation resolves itself. Two Emergency Response Teams of 7 volunteers are available, on call-out by pager outside of these times. From a pager going off a team can have a boat on the water in 7 minutes. On duty nights a team of three volunteers patrol

Craigavon Bridge (12 metres high) while a second team patrols the 1.5 mile stretch of riverside between Craigavon Bridge and Foyle Bridge (45 metres high) on foot with a supporting back-up 4 X 4 vehicle and a third team crew the principal rescue boat on patrol in the river. All land crew wear warm high visibility jackets for comfort and safety. At the start of each patrol night a radio check takes place and throughout the night regular contact is made between each team to ensure immediate radio contact should an incident develop. Foot patrols begin by checking all lifebelts on the bridges and riverbank. The headquarters radio room has immediate communication with the police and other emergency services should it be needed. The patrol vehicle will usually make a quick sweep around the patrol area taking in Foyle Bridge and then stop at a location with a clear view of Craigavon Bridge and a good portion of the riverbank.

Training

The charity had 55 volunteer members in 2009, all aged 21 years or older. A new cadet scheme is being introduced in 2010 for youths aged between 14 and 18 years. Training and personal development are important parts of the programme of activities for all volunteers.

Basic training for new members includes client approach, first aid, ASIST programme (a 2 day suicide awareness course), child protection, throw line training and radio training. All members participate in regular throw line, lifebuoy and land based rescue training. Boat crew are trained to Royal Yachting Association Rescue Power Boat standards.

Training in how to approach a person alone on the riverside is very important. Many of those approached are suffering from mental illness, in the middle of a crisis or are very upset after an argument with a loved one. Team members play a crucial post-rescue / post-removal role. Persons talked away from the river are brought back to their Prehen base where they are given refreshments and an opportunity to have an 'informal chat'.

The organization also has a strong social aspect to its work, with a fundraising element sometimes but they primarily provide their members with an opportunity to talk about the stressful aspects of their work. Professional counseling is available to members.

Results

That Foyle Search and Rescue have been remarkably successful is beyond question. In the first 17 years of the charity's existence (i.e. from 1993 - until October 2010), the organization dealt with 1616 incidents and saved over 1000 lives, including 134 persons rescued alive from the water. The service also recovered 84 bodies compared to the expected 500 to 600 bodies over the same period had the service not been established. The 2008 figures are 42 emergency call-outs, 17 Sierra 1's (i.e. a person in the water), 74 Sierra 2's (i.e. a person over the railings) and 7 bodies recovered from the river. In 2009, Foyle Search and Rescue volunteers attended over 126 incidents. On duty nights 77 potential suicides were prevented, four of whom were removed alive from the river by boat. One body was recovered from the Foyle. The

remaining 49 incidents occurred outside of duty nights and were dealt with by the 24 hour Emergency Response Teams, who successfully removed 11 persons from the river.

Despite its prevention interventions, unfortunately a number of people have succeeded in taking their own lives by jumping from the high-level Foyle Bridge. Hitting water after a 45m height is like hitting concrete, with most casualties dying instantly from multiple injuries. Individuals who jump from high bridges have a very low survival rate. Investigations have shown the following death rates; the 67 metre high Golden Gate Bridge (98%), the 65 metre high Gateway Bridge (94%) and the 59 metre high Sydney Harbour Bridge (85%)(Cetin et al., 2001). Foyle Search and Rescue are certain that raising the height of the railing has given them and members of the public time to save a number of lives that would have been lost previously. Likewise the alarming of lifebelt boxes notifying police that a box has been opened and the use of CCTV to prevent lifebelts being vandalized making them unavailable for rescue use has resulted in 12 lives being saved with these lifebelts. Prior to this 32 lifebelts had to be replaced in 2007-2008.

The charity is a member of the local Mental Health Forum and works with The Irish Association of Suicidology. They host a "*Bereaved by Suicide*" support group who hold fortnightly meetings in the headquarters building. They are also part of the City of Derry Emergency Plan and the City Airport Disaster Plan. They also offer a support service to families while searching for the body of a family member providing a contact person and a 24/7 phone contact number.

Summary

Suicide is a very sensitive subject to discuss and the feelings and emotions of the families and friends of casualties must always be taken into account. However we argue that we must continue to talk about it. We have been classed as experts in suicide prevention - in stopping people from entering the Foyle and in rescuing those who do so but we are also experts in removing bodies from the river. For some of us the word prevention may not be the right word as we know we cannot prevent all suicides but we also know that we do make a difference. People who attempt suicide often think that they have no other options but they are wrong. We offer them a cup of tea and a trained ear to listen to them. Often that is all that is needed to stop them from taking their life that night. If we can get them through the first night they have a great chance of surviving. Out of over 800 persons we have dealt with we know of only 3 who subsequently killed themselves. Research and education is needed in the areas of mental health and drug/alcohol use and addiction; eighty percent of the people we deal with have some or a lot of alcohol in their bodies. Prevention is a much better option than rescue. They have formalized and established an effective suicide prevention and rescue strategy. The website of the Foyle Search and Rescue is foylesearchandrescue.org.

References

- Cetin, G., Gunay, Y., Fincanci S.K., & Kulusayin R.O. (2001). Suicides by jumping from Bosphorus Bridge in Istanbul. *Forensic Science International*, 116, 157-162.
- Connolly, J. (2007). Suicide by Drowning in Ireland. Retrieved on 20 December 2011 from www.lifesavingfoundation.ie
- Connolly, J. (in press). Suicide by Drowning is the 21st Century's Rescue Challenge: A Review. In Scarr, J., & Farmer, N. (eds). *World Drowning Prevention Conference 2011*. International Life Saving Federation, The Royal Life Saving Society Australia & The Alliance for Safe Children, Danang, Vietnam. Accepted Abstract.
- Cox, E. (2006). *Suicide: Ireland's Story*. Ireland: Blackwater Press.
- Geograph (2010). Grimshaw Farm, Hoghton. Retrieved on 4 March 2010 from at <http://www.geograph.ie/photo/104661>
- Look Around Ireland (2010). Ireland Rivers. Retrieved on 6 October 2010 from www.lookaroundireland.com/ireland-rivers.htm.
- Kuo, W.H. (2005). Completed Suicide after a Suicide Attempt. *American Journal of Psychiatry*, 162, 633.
- Structurae (2011). Foyle Bridge. Retrieved on 4 March 2011 from <http://en.structurae.de/structures/data/index.cfm?id=s0003955>.
- Suominen, K., Isometsa, E., Suokas, J., Haukka, J., Achte, K., & Lonnqvist, J. (2004). Completed Suicide After a Suicide Attempt: a 37-Year Follow-Up Study. *American Journal of Psychiatry*, 161, 563-564.

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Dublin Fire Brigade's Water Rescue Service: Past, Present and Future

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Abstract

Dublin Fire Brigade (Ireland) operates a marine rescue service alongside of its fire and ambulance services. All water rescue training is carried out by fire fighters on a voluntary basis while the brigade provides first class specialist rescue equipment. The brigade plays a major role in flood situations and dedicated training is undertaken to prepare for such events. In the 10 years from 2000-2010 fire fighters attended over 2000 water related incidents and rescued 322 persons in immediate danger of drowning. All Dublin fire stations have a water rescue capacity with three regionally stations having specialist water rescue tenders.

Key words: lifesaving, lifeguarding, water safety, drowning, suicide.

Dublin Fire Brigade (DFB) in Ireland, in addition to its normal fire fighting duties, responds to various types of aquatic emergencies, such as accidental drowning incidents in the River Liffey, flooding and persons attempting suicide by drowning. To be effective, DFB needs to be appropriately staffed, equipped, and trained. This short report aims to overview the activities of Dublin Fire Brigade's Water Rescue Unit in terms of past, present and future training, achievements, qualifications, and awards.

A Brief Historical Review of Past Activities

DFB was founded in 1862 by Dublin City Council and is funded, controlled, and operated by the city council. In 1898 an emergency ambulance service was added to the fire service and in the 20th century the brigade provided a fire, ambulance and road traffic rescue service to Dublin City and its environs. When fire fighters came across water rescue incidents they responded as best they could, which often involved the best swimmer available removing his protective clothing, tying a rope around himself and entering the water. Thankfully no one died in Dublin but a Manchester Fire Brigade sub officer tragically drowned whilst involved in an ice rescue situation in 1989 which led to the decision to establish a specialist water rescue unit within Dublin Fire Brigade. In the year 2000 a number of fire brigade personnel went to Bala in Wales for an exploratory water rescue training course. Following this course, brigade headquarters staff decided to have a number of personnel trained as Swift Water Rescue Technicians (SRTs) and in 2001 sent 12 fire fighters to Wales where they qualified as SWT Instructors. The brigade then had the staff to develop and deliver its own bespoke courses in the Dublin area. By 2002 all DFB personnel had trained in Water Awareness for self-safety in and around water. This was followed by SWT courses and by the end of 2002 the brigade had 150 fire fighters trained as Swift Water Rescue Technicians. In addition to fire brigade personnel Water Awareness courses

were provided to external organizations who worked alongside fire fighters such as the Civil Defense.

In 2003, twenty four fire fighters were trained by the Irish Navy and Irish Sailing Association (ISA) as Power Boat Coxswains. The association with the ISA continued in 2004 when a number of DFB coxswains were trained as ISA Power Boat Instructors and the DFB Training Centre was accredited as an ISA powerboat training centre. The training centre trained a further 40 coxswains in 2004 and the brigade had 30 coxswains trained as Royal Yachting Association and Communication Regulator Marine Radio Operators. A partnership was formed with the Dublin Docklands Development Authority (DDDA) in 2006 when the DDDA provided the brigade with a permanent mooring for DFB's 6.5 Metre Rescue Rigid Inflatable Boat (RIB) close to the HQ/central fire station (which is located close to the River Liffey). All Dublin Fire Stations carry a water rescue capability with dedicated water rescue tenders based at three stations, HQ (centre), Phibsborough (north) and Dolphins Barn (south). Since 2006 the brigade's water rescue units have rescued approximately 100 persons annually from Dublin's rivers and canals. Unless otherwise requested DFB units confine their activities to the city and harbour areas with RNLI operating a marine rescue service in Dublin Bay.

A Review of the Brigade's Present Activity and Status

Dublin Fire Brigade Key Roles

DFB today plays a number of key roles within the city. It receives and prioritizes 999/112 emergency calls and dispatches appropriate emergency services to where they are needed; operates the command and control service in emergency situations; protects life, property and renders humanitarian service where appropriate; provides emergency medical services to the public; liaises with other emergency and rescue services; and finally, it provides the training necessary to fulfill all of its functions.

Training

In providing training for water rescue the brigade must meet three criteria. It must train and equip fire fighters to a nationally approved standard. The training provided must be appropriate to the required tasks, and all training and equipment must fulfill and support the criteria of reducing the risks, maintaining best practices and uniform approaches. Many DFB fire fighters are also experienced paramedics and trained swift water rescue technicians.

Accreditation

With the above in mind all DFB water rescue training courses are nationally and internationally accredited by several organizations. These are namely the Dublin Fire Brigade Training Centre, the National Fire Protection Association (USA), the Rescue 3 International (USA), the Irish Sailing Association, the Royal Yachting Association, and the Communications Regulator (ComReg). Agreement has been reached among fire services to establish a new national standard, approved by the National Training Authority (FETAC), for the water rescue training of fire fighters throughout Ireland.

Certification

Five water rescue qualifications are awarded to DFB fire fighters. The first is called "Water Awareness" and is a one day course concentrating on personal water safety. Holders of this qualification play a very limited role at water incidents. This is a "no-go" or 'non-go' rescuer award. The second is "First Responder", a three day course dealing with rescue situations in still water or slow moving water situations. Holders of this qualification can be a 'go rescuer' in such situations. The third is "Swift Water Rescue Technician (SRT 1)", a five day course dealing with rescue situations in fast moving water. A lot of time is spent practicing technical skills appropriate for swift water situations. Holders of this qualification are 'go rescuer' in such situations. The fourth is "Swift Water Rescue Technician Advanced (SRT 2)", a five day advanced course for holders of SRT 1 qualifications. Participants practice rescue skills in different types of swift water. The fifth is "Swift Water Rescue Technician Instructor", a ten day course for holders of the SRT 2 qualification, training them as SRT instructors. Finally, the sixth is the "Irish Sailing Association / National Powerboat Handling Award", a five day course trains participants as powerboat helmsmen. In the majority of situations all water rescue training is undertaken on a voluntary basis outside of shift time.

Equipment

To meet its aims and objectives, DFB makes use of several types of rescue equipment. Specifically it has a 6.5 Metre Rescue RIB, a 4.0 metre Avon inflatable rescue craft with a 15 horse power engine, a tender with a 33 metre Turntable Ladder with a depressible cage capable of being lowered over a wall to water level, a Jason's Cradle, two lengths of inflatable pathway (5 metre X 137 centimetres), an airtrack - a catamaran style inflatable walkway which offers enhanced stability on water, mudflats or unstable terrain, inflatable fire hoses which can be connected together to form a long floating boom and a variety of ropes and technical equipment to ensure the safety of fire fighters in water. In addition, personal equipment is provided for all 'go rescuer' fire fighters (e.g. dry suit, thermal protection, personal floatation device, footwear, gloves, safety helmets, latex swim cap, knife, and communication whistle). All fire tenders carry a crew decontamination kit containing hand gel, antiseptic hand and face wipes, anti-bacterial tablets for use in sprays and anti-bacterial shower gel. Once sprayed all equipment and clothing is allowed to dry before being stored for re-use. Dublin Fire Brigade does not have its own helicopter but an on-site incident commander has access to helicopters from three Irish sources, Irish Coast Guard Marine Search and Rescue helicopters, Irish Air Corp helicopters and the Garda (police) helicopter. Which helicopter is used depends on factors such as the incident location, weather, light (day or night) and craft availability.

Human Resources

Dublin Fire Brigade currently maintains a high number of water trained personnel. Particularly it maintains 1000 Water Awareness trained personnel, 150 First Responders, 350 Swift Water Rescue Technicians (SRT 1), 60

Advanced Swift Water Rescue Technicians (SRT 2), 24 Swift Water Rescue Instructors, 70 Rescue Powerboat Coxswains, 12 Rescue Powerboat Instructors.

Rescues

In the 10 years since the Water Rescue Unit was established Dublin Fire Brigade personnel have safely attended over 2000 plus water related incidents in Dublin City and County. Since 2004 the unit has been mobilized over 1500 times. In many incidents those involved were not in an immediate life threatening situation before being removed from the water. Between the years 2006 to 2009, 322 persons were rescued from immediate death from drowning by DFB personnel. A key aspect of the unit's success is their fast response time; six minutes from a HQ central station call-out to having the boat operational on the water.

Flooding

In addition to immediate water rescue situations the fire brigade has a major role to play in flooding in which fire fighters are faced with numerous water hazards (e.g. manholes, chemicals, fuel in water, surface change, electricity, debris, pollution, contaminants, and viral bacterial infection). Moreover, they respond to occupied and unoccupied vehicles in water that pose particular dangers in flood situations (e.g. extremely hazardous environment, unsafe places, unstable environments, unstable or submerged vehicles etc.)

Awards

Dublin Fire Brigade has received awards and honours for its Water Rescue Unit. These include the 2009 Ireland Medal awarded by The Lifesaving Foundation and many personal bravery honours awarded to individual firefighters by Comhairle na Mire Gaile, Ireland's bravery council.

Targeting Aims for the Future

The fire brigade will continue to provide a water rescue service in addition to its fire rescue and paramedic services. The recent purchase of an Aqua-Dock Pontoon System to protect the principal boat from weathering and vandalism is a clear indication of this commitment. A new Irish Water Rescue Flood Technician course is being designed and when finalized will be added to the training currently being provided to fire fighters nationally. Finally contact has been made with Colleges of Technology and universities to have the upgraded training courses accredited as modules for Third Level awards.

Summary

Historically Irish fire fighters have been tasked with the recovery of drowned bodies from water or mud banks. Often they were called to the scene of a drowning in progress and found that they were ill equipped to affect a rescue. Many fire brigades now operate water rescue services alongside of their traditional fire rescue services to deal with such situations. Dublin Fire Brigade's Water Rescue Unit is one of the country's most successful of these, with a very fast response time and the right equipment and training to make a lifesaving difference.

Philosophical Thoughts on the Global Burden of Drowning

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Abstract

Drowning is a serious problem from both a social and health point of view worldwide. Most of the related research undertaken has approached it from the viewpoint of epidemiology, prevention, rescue and treatment. In this short reflection I will discuss some philosophical issues about the phenomenon of drowning. Particularly, I will show how legislation and education are unable to always protect the young and foolish from drowning, how the classical learning curve can be used as graphic means to explain the global drowning situation, and argue that suicide is a serious and neglected piece in the drowning jigsaw.

Key words: drowning, water safety, lifesaving, suicide, lifeguarding.

Injury epidemiology on drowning reveals that water safety professionals are fighting an unwinnable war. More precisely, the thousands of lifesaving teachers around the world, and our predecessors for the last 100 years, have all been fighting a war that we can never hope to win; if by winning we mean to put an end to death by drowning. Some battles have been won at a local or national level (e.g. having swimming incorporated into the school curriculum, increasing the number of lifeguarded bathing areas, etc.) but in the matter of basic numbers we can never reduce the number of drowning deaths to zero. What our predecessors have shown us, however, is that we can dramatically lower the drowning rate, but this is all we can hope to do. For example, in the 1920's the drowning rate in Australia was 8.76 drowning deaths per 100,000 population; by 2007-2008 that rate had been reduced to 1.32 per 100,000 (Franklin, et al., 2010). The best, therefore, that we can hopefully do is to lower the global rate to less than 1 death per 100,000 population, drowning rates achieved by Singapore (0.9), Germany (0.8), St. Lucia (0.7), U.K. (0.6), Malaysia (0.5) and Iran (0.4) (International Life Saving Federation, 2007). This will be an enormous challenge because we can neither educate nor legislate for youth or foolishness.

In response to the issue described above, the aim of this short paper is three-fold. First, it will reflect on how legislation and education are unable to protect the young and foolish from drowning, second it will show how the Learning Curve Graph can be used as means to explain the global drowning problem, and finally it will reveal that suicide is a serious and neglected cause of drowning.

Evidence of Ineffectiveness to Educate and Legislate for Human Foolishness

That education and legislation are unable to protect those who behave foolishly, are supported by examples of aquatic emergencies common in everyday life. For example, an Irish newspaper reported that *“ten people had to be rescued from a boat on the River Shannon in Co Clare late on Friday night while*

two others were plucked from the waters after the heavily laden vessel on which they were partying took on water. ... Rescuers said they found litter, mostly alcohol cans and bottles, in the area around the boat. Most of those on board are understood to have been wearing life jackets however these are thought to have been 'mostly inadequate'. Most were badly fitting or not fastened" (Flynn, 2010, p. 7).

No one died in this episode but it combined four common elements in many drownings; male gender, young age, alcohol consumption and an inappropriate use of lifejackets. Indeed, three out of four persons who drown are males in most places around the world (Avramidis, Butterly & Llewellyn, 2009a). The highest drowning rates are for those aged between 18 and 49 years and around 40% of those who drown are found to have consumed alcohol shortly beforehand (Avramidis, Butterly & Llewellyn, 2009d). In the USA and Canada, where data is available, over 80% of men who drowned while boating were not wearing a lifejacket (Canadian Red Cross, 2010). Irish legislation makes the wearing of lifejackets by all on board small craft compulsory (Department of the Marine, 2005). If you watch boats leaving harbour you will see people wearing lifejackets yet in marine drowning reports it is frequently noted that while lifejackets were present they were not being worn or that they were not suitable for the casualty or were damaged. I offer two Irish tragedies in evidence. The first incident occurred on September 5th 2009 and involved two brothers from Galway fishing at sea in their small boat. A strong gust of wind knocked over their boat throwing both into the sea. The brother wearing a lifejacket survived but the brother without one drowned. (Fallon, 2010). The second incident occurred on Sunday 23rd May 2010 when two 36 year old men drowned off the coast of County Waterford. They had set to sea in a dingy to fish in calm water and somehow had entered the water and drowned. The rescue services found two lifejackets in the bottom of the boat (Dalton, 2010).

Evidence of Ineffectiveness to Educate and Legislate for Youth

Given human foolishness, legislation and education are unable to reduce the high drowning of youth. The number of annual world drowning deaths ranges from 400,000 to 1,000,000 and that children aged 1 to 4 years make up a large portion of these. Drowning among children exceeds 350,000 deaths every year in Asia, or 1000 a day. In Bangladesh drowning kills more people aged 18 years and under than infectious diseases. Although the numbers are lower but no less tragic, drowning continues to be a leading killer of children in high income countries" (Royal Life Saving Society Australia & The Alliance for Safe Children, in press).

The reasons that lead to these highly unfavorable figures among children vary among societies with different socio-economic status. In poor countries, some of the reasons are unprotected natural water sources (Avramidis, Butterly & Llewellyn, 2009b) and the lack of parental supervision. Research indicates that 95% of all childhood drowning deaths occur in Asia, with 50 children drowning daily in Bangladesh. The practice in large families of having older children supervising younger siblings is believed to be a major factor behind such deaths in developing countries (The

Alliance for Safe Children, 2011). On the other hand, in developed countries, natural water sources are often covered over and piped underground, but are replaced with artificial water sources such as pools and ornamental ponds. In America, the State of Florida has over one million private swimming pools and an annual death rate of about 70 accidental child drowning deaths in family or neighbors pools (Lo, Hall, Vander Werf-Hourigan, Vincent, & Pryor, 2010). In Australia government aided water safety awareness has been extensively promoted and safety legislation introduced but still around 16 young children drown at home annually because adults carelessly disable pool safety features (Franklin, et al., 2010).

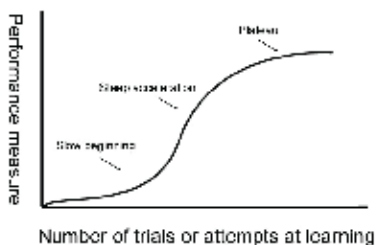
Applying the Learning Curve to the World Drowning Problem

The Learning Curve Graph, originally suggested as a tool for showing how the learning process is achieved, can also be used to explain the burden of drowning (Ritter & Schooler, 2002; Figure 1).

When a new skill is introduced to a learner they start at the bottom of the curve, which is almost flat (showing that a small amount of learning is gained from experience over a long period of time). This is followed by a sharp rise immediately following tuition (as rapid learning takes place). Then it flattens out or plateaus again with a small gain over a long period of time (indicating that once the initial rapid learning has occurred it takes a lot of time and resources to achieve increased learning). On the other hand, lifesaving wise, the developing world (i.e. the third world) is at the bottom of the curve and the developed world (i.e. the first world) is at the top. In other words, the bottom of the water safety learning curve has a drowning rate ranging from about 10-50 drowning deaths per 100,000 population, while the top rate is 1 drowning death per 100,000 population. Moreover, 99% of drowning deaths take place in the developing world but only about 1% of lifesaving money is spent there (TASC 2011). It only takes a relatively small sum of money to lift the bottom group up to the top of the curve. The leaders of the world's major lifesaving organizations are not ignoring the situation in the developing world. Phrases such as 'drowning is a hidden pandemic' are being used but they are shackled by the fact that they are the leaders of national organizations, with constitutions that compel them to focus almost exclusively on their own national drowning problems. For example, Australia has a proud history in drowning prevention, and is the home to two of the world's greatest lifesaving organizations, Royal Life Saving Society Australia and the Surf Life Saving Association of Australia, with active government partnership and funding for drowning prevention. It is reaching out to its neighbors in South East Asia offering them financial and technical support.

Drowning rates seem to bottom out between 0.5 to 1.5 per 100,000 population in the developed world (International Life Saving Federation, 2007). The best that we can hope to achieve therefore is a universal drowning rate of 0.5; this would mean that instead of over 2,000,000 (accidental and non-accidental) drowning deaths annually the figure would drop to about 35,000 deaths, something well worth fighting for.

Figure 1: The Learning Curve.



Note. Based on Ritter & Schooler, 2002.

Suicide is a Neglected Cause of Drowning

Published lifesaving figures worldwide usually exclude suicide by drowning deaths (International Life Saving Federation, 2007). Lifesaving leaders around the world appear to have accepted at face value two false beliefs in regard to suicide. The first is that those attempting to take their own lives cannot be stopped and, furthermore, if they are rescued they will only re-attempt until they succeed. The second false belief is that persons attempting suicide will resist being rescued and therefore add to the life threatening danger associated with any rescue attempt. As a result of these false beliefs, to my knowledge, Ireland is the only country and Irish Water Safety the only national lifesaving organization in the world that regularly publishes drowning statistics that include suicide deaths.

This lack of scholarly reference and epidemiologic calculation of suicide by drowning presents a philosophical oxymoron and an essential negative consequence. The philosophical oxymoron is that when the Victorian founding members of the Royal Life Saving Society devised their motto “whomsoever you see in distress recognize in him a fellow man”, it wasn’t qualified to “whomsoever you see in distress (excluding suicides) ..”. Second, in the developed world, when we exclude pre-teenage drowning deaths, a large portion, possibly as high as half of all drowning deaths, start out as suicide attempts and the majority of those who die are young people in need of professional medical help.

Summary

Because the Australians lead the world in lifesaving, if they choose to change their practices the rest of the lifesaving community around the world will follow. Bob Dylan asked “How many times can a man turn his head and pretend that he just doesn’t see? How many ears must one man have before he can hear people cry? How many deaths will it take ‘till they know that too many people have died?” His answer was ‘blowing in the wind’. My answer is that we must all work together as partners and allies (see Avramidis, 2010) to prevent all drowning deaths, irrespective of cause.

References

- Avramidis, S. (2010). The Lifesaving Declaration. *FEGUI Journal of Lifesaving and First Aid*, 31, 145-146.
- Avramidis, S., Butterly, R. & Llewellyn, D. (2009a). Who Drowns? Encoding the Second Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(3), 224-235.
- Avramidis, S., Butterly, R. & Llewellyn, D. (2009b). Where do People Drown? Encoding the Third Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(3), 236-254.
- Avramidis, S., Butterly, R. & Llewellyn, D. (2009c). Under What Circumstances Do People Drown? Encoding the Fourth Component of the 4W Model. *International Journal of Aquatic Research and Education*, 3(4), 406-421.
- Canadian Red Cross (2010). Lifejackets and Personal Floatation Devices (PFDs). Retrieved on 9 March 2010 from <http://www.redcross.ca/article.asp?id=15198&tid=024>.
- Dalton, D. (2010). Bodies of missing fathers found. Retrieved on 9 March 2010 from <http://www.waterford-news.ie/news/mhcwideygb/>.
- Department of the Marine (2005). Pleasure Craft Personal Flotation Devices and Operation Safety Regulations 2005. Ireland: Author.
- Fallon, J. (2010). Coroner calls for lifejackets to be worn. Accessed 09/03/2010, http://www.irishtimes.com/newspaper/ireland/2010/1210/1224285192361_pf.html
- Flynn, P. (2010, April). Twelve rescued from Shannon after Good Friday party boat prank. *Irish Mail on Sunday*, 7.
- Franklin, R.C., Scarr, J.P., & Pearn, J.H. (2010). Reducing drowning deaths: the continued challenge of immersion fatalities in Australia. *The Medical Journal of Australia*, 192(3), 123-126.
- International Life Saving Federation (2007). World Drowning Report 2007. *International Journal of Aquatic Research and Education* 1(4), 381-397.
- Lo, M., Hall, K., Vander Werf-Hourigan, L., Vincent, B., & Pryor, R. (2010). Correlation of Pool Drowning Deaths With Number of Residential Swimming Pools by County in Florida, 2005 - 2007. *International Journal of Aquatic Research and Education* 4(1), 19-32.
- Ritter, F. E., & Schooler, L. J. (2002). *International Encyclopedia of the Social and Behavioral Sciences*. Amsterdam: Pergamon.
- Royal Life Saving Society Australia & The Alliance for Safe Children (in press). World Conference on Drowning Prevention 2011 Programme & Registration Brochure. Vietnam: Author.
- Royal Life Saving Society Australia (2010). The National Drowning Report 2010. Retrieved on 9 March 2010 from <http://www.royallifesaving.com.au/www/html/157-national-drowning-reports.asp?intSiteID=1>.
- The Alliance for Safe Children (2010). *Drowning - the leading cause of child death after infancy*. Retrieved on 9 March 2010 from <http://www.tasc-gcipf.org/>.

This paper has been adapted from an Ireland Medal 2010 ceremony presentation.

How to Submit a Manuscript to the International Journal of Aquatic Research and Education

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This short report has three specific goals. First, it aims to overview the scope and objectives of the International Journal of Aquatic Research and Education (IJARE). Second, it will try to describe the mission of its Editor. Finally, it will explain briefly how novice researchers can submit an educational article.

IJARE aims to advance the knowledge and practices of aquatic professionals worldwide. It is a peer-reviewed quarterly journal that publishes significant research findings, articulates unique and innovative ideas, challenges current practices and proposed changes, and disseminates information about the latest and best use of equipment and facilities (Human Kinetics Journals, 2010). *IJARE* is now 4 years old (2007-2010). In its 16 issues, it has published 186 scholarly contributions in various forms (Table 1).

Table 1: Published manuscripts in the International Journal of Aquatic Research and Education classified by type and year during the period 2007-2010.

Manuscript type	2007	2008	2009	2010	Total per type of publication
Editorial	4	4	9	8	25
Letter to the editor	1	1	0	2	4
Research	24	19	25	24	92
Educational	7	9	3	3	22
Invited review	2	6	0	0	8
Media review	2	1	3	1	7
Special Section	1	0	2	3	6
Conference abstract	0	0	0	22	22
Total per year	41	40	42	63	186

Note. Taken from International Journal of Aquatic Research and Education, 2007; 2008; Langendorfer, 2009; 2010.

IJARE Editor, Dr Steve Langendorfer, Professor of Kinesiology at Bowling Green State University, USA has repeatedly encouraged manuscript submissions from potential contributors promising to assist their submission in numerous ways. Precisely, he welcomes research and educational articles, letters to the editor, invited reviews, position statements and conference abstracts (Langendorfer, 2007). In each of those submissions, because “re-writing indeed produces good writing” (Langendorfer, 2009a, p. 217), he edits

paragraph by paragraph and line by line, and provides substantial and precise feedback to the author. This work corresponds with two of his quotes, with which he claimed that he is willing to maintain a developmental approach for each submission (Langendorfer, 2007; 2010b) because “the high rate of rejection that is maintained as evidence of quality in some journal rating systems, in some cases it may be evidence of poor or unwilling editing and not a proud mark of quality” (Langendorfer, 2009a, p. 217).

Potential authors of educational manuscripts will benefit by Prof Langendorfer’s preparation/ submission checklist that consists of several steps. First, they need to prepare electronic files for a *main document* containing only the text for all parts of their study and a separate *abstract* file that will be copied and pasted into Manuscript Central (M.C.) text box. Second, they need to prepare a separate *supplemental file* for each table, figure, photo or digital video. Third, they need to omit all *author names* and identifying information from the main document and enter that information separately in MC. Forth, the abstract should be up to 300 words and entered in the indicated text box during the overall submission process by copying and pasting from their original abstract file. Fifth, they need to indicate the appropriate *keywords* within the MC process and not listed them as part of the main document. Sixth, each *table, figure, photo, or digital video* should be submitted as a separate *figure or supplemental file* within MC. In addition, a list of table and list of figure *captions* needs to be submitted as a *supplemental file* in MC so that all tables and figures are correctly identified. Seventh, authors need to use the American Psychological Association format (refer to *Publication Manual*, 6th Edition) for references and citations within the text. Eighth, each section needs to be logically parallel with other sections and each paragraph should have a topic sentence followed by only sentences that refer to a single topic for the paragraph. Ninth, the manuscript should be *outlined*; Roman numerals (I, II, III) will identify major sub-headings and capital letters (A, B, C) will indicate separate paragraphs while numbers (1, 2, 3 etc.) will indicate separate sentences. Tenth, authors need to run their spell- and grammar-checker plus proofread their document several times to be certain that they have eliminated all the errors. Eleventh, the manuscript should be read by someone other than a co-author and provide feedback on its level of readability to a naïve, intelligent person. Finally, authors need to seek assistance from a technical writer to check their English.

In summary, it is concluded that IJARE can be considered as a forum and a force for change in aquatics (see Langendorfer, 2007). Its mission and the quality of editorial work, provide to those willing to publish their non-competitive aquatics scholarly work, a unique destination full of potential. In addition, they will find that their work will not only receive full consideration for publication, but it will also receive respect as IJARE continues to grow in readership and impact.

References

- Human Kinetics Journals (2010). About IJARE. Retrieved on 14 January 2011 from <http://journals.humankinetics.com/about-ijare>
- Langendorfer, J. S. (2007). Getting into the swim. *International Journal of Aquatic Research and Education*, 1(1), 1-5.
- International Journal of Aquatic Research and Education. (2007). Annual indexes, volume 1. *International Journal of Aquatic Research and Education*, 1(4), 402-404.
- International Journal of Aquatic Research and Education. (2008). Annual indexes, volume 2. *International Journal of Aquatic Research and Education*, 2(4), 393-395.
- Langendorfer, J. S. (2009a). In this issue... *International Journal of Aquatic Research and Education*, 3(3), 217-220.
- Langendorfer, J. S. (2009b). Annual indexes, volume 3. *International Journal of Aquatic Research and Education*, 3(4), 00-00.
- Langendorfer, J. S. (2010a). Annual indexes, volume 4. *International Journal of Aquatic Research and Education*, 4(4), 453-456.
- Langendorfer, J. S. (2010b). Applying a developmental perspective to aquatics and swimming. In P-L. Kjendlie, R.K. Stallman, & J. Cabri, (Eds.), *Proceedings of the 40th International Symposium for Biomechanics and Medicine in Swimming 2010* (pp. 20-22). Oslo: Norwegian School of Sport Sciences.

Lifeguarding in Soweto, South Africa: Obstacles, Facilitations and Achievements

Patricia Wilcox

Lifesaving South Africa, South Africa

In this short paper I will reflect on and overview my involvement with lifesaving in Soweto, South Africa that began in about 1990. Particularly, I am going to overview the obstacles I was faced with, the facilitations and the achievements I had in terms of lifeguard training, employment, and water safety.

Obstacles

Teaching lifesaving in Soweto was full of obstacles that had to be overcome. Such obstacles included the lack of road signs and traffic lights, the cultural shock, a shortage of equipment and of money to buy it.

Lack of road signs and traffic lights

Bert Brooklyn was the old "Transvaal" Chief Examiner with responsibility for Soweto. I had recently been appointed a lifesaving examiner and he needed someone to assist with the assessment of candidate lifeguards there. Things were quite volatile in Soweto in the 1980's and early 1990's and travel was not always easy. Road signs had been removed to confuse the security forces and there were no traffic lights. There was no street lighting and general lighting was provided by high security lights.

Home situation

Most residents used candles for lighting and paraffin for cooking. There was no quick cup of tea before heading off to work. Mothers needed to be up about 4.30 to prepare their children for school and then to get themselves to work in Johannesburg and the surrounding towns. Travel was by train or minibus taxi, both crowded and costly because of the distance, between 20 and 50km. So parents were largely absent, arriving home late and therefore were not really in a position to be responsive to their children's needs to take part in sporting activities (financially or personally).

Level of education

The education standard was not great as the apartheid government spent far less per African child than on any other group, textbooks were shared and a lot of learning was by rote. Most potential lifeguard candidates had not even completed high school. The result was that teaching the lifeguarding syllabus was not easy, as literacy, the understanding of new concepts and study skills were generally poor. I had and still have to use open book questions to train the candidates to answer written questions. Oral questioning is another option but it is time consuming and not really a viable solution with groups of candidates. This is an area where I can do with help. The handbook and assessments need to be written to suit candidates where English is their second or third language; language with illustrations using a 'limited number of words' but still conveying the essence of the subject.

Cultural shock

Entering Soweto was fraught with difficulty. One of the lifeguards would meet us outside of the Baragwaneth hospital and travel with us to the pool. This first visit was quite an eye opener for me as I had never been into a 'township' before. Europeans were still discouraged from going into Soweto or any other township, although permits were no longer needed to do so.

Many swimmers made do with oddments of swimming togs, old shorts and T-shirts. Caps, goggles and other gear were not available. The majority of swimmers using the facilities were male and as a result almost no females came forward for training. Girls were usually doing domestic chores at home and there was a reluctance to allow them to go to the pools for their own sakes. Most activities outside the home and church were still mainly the preserve of men, even high school education.

There was a very difficult problem to overcome in black society and it revolved around who was in charge, had we spoken to the right person, whether decisions taken would be carried through.

Lack of resuscitation equipment and storage

Years before; the Royal Life Saving Society (South Africa) had trained the lifeguards and qualified instructors but by this time these instructors had moved on, bar one, Barrett Hatlane. He was trying to keep things going without manuals or CPR manikins. He was an excellent swimming instructor and to this day his legacy of good strokes, particularly breaststroke, prevails. Together, we spent most of the day instructing CPR as the standard was poor and without manuals, answers had been learned by rote but with little understanding. We returned regularly and built up good relationships. Equipment was sourced wherever we could get it but there was nowhere to store it securely locally. Homes were very small and often shared by the extended family so taking lifesaving equipment home was not possible. At one stage we used a grant from the Lotto to buy lockable steel cages to store some equipment at each pool; the move to Ellis Park has solved the problem.

Fears for personal safety

When Bert retired I was left to continue this work. I encountered shock and fears for my safety by most people who became aware of what I was doing. However things were improving gradually with roads and signage and even a set of traffic lights appeared. I travelled into Soweto on my own and by now I knew my way around the township. I have never felt any threat to my safety or any adverse reaction to my presence, but the contrary. On one occasion during a municipal strike we had no venue for an assessment and I was quite desperate as 3 or 4 candidates had presented themselves. After no suitable venue could be found I suggested that we all get into my car and we went to Regina Mundi, the large Catholic Church which had accommodated many political rallies during apartheid. We were given the cry chapel and the candidates were able to observe the stream of tourists passing through. When I realized that none of them had ever been there before, I asked if they would like to join the next tour. They were very enthusiastic and afterwards

remarked that it had taken a white person to show them an important part of their own history and declared that they had had a wonderful day!

Change of focus

Pressure was now being put on sports codes to include black athletes in their teams and Mandy McGregor, who was the provincial lifesaving competition officer, joined me to train youngsters to compete. We had a few opportunities for part time work for these youngsters and soon this became my focus - training lifeguards for job opportunities. I had given up my school teaching post so that I would be able to devote more time to water safety and development projects. I knew my swimming teaching would have to carry me financially as the work in Soweto would be mainly voluntary. I used 3 bases; Jabavu, Meadowlands and Orlando pools to teach at. There was some help from the Lotto lottery, especially for equipment and some courses but mainly I relied on the provincial committee to pay for manuals and exam fees. However, this could not last and in the end I found that I was digging into my own resources and the few small donations I received. I tried to get each candidate to pay something towards the exam fee. My club (Ellis Park) also assisted financially in a small way.

Facilitations

Despite the previously described obstacles faced, while involved in lifesaving activities in Soweto, I was fortunate enough to benefit from several facilitations that assisted my work significantly. These included regular financial support from The Lifesaving Foundation, Ellis Park Lifesaving Club and Andy Lees. Other occasional small donations in cash and in kind were received from swimming teachers and acquaintances.

Financial support from the Lifesaving Foundation

I met John Connolly and Brendan Donohoe at the RLSS Commonwealth Championships in Durban in 2003. We chatted about lifesaving in general during the event and on the next visit to South Africa by Lifesaving Foundation members I took them to Soweto. They were moved by what they found there and before they left the township I had been given Euros for my lifesavers and received a promise of more to come. The Lifesaving Foundation's contribution has been invaluable and with escalating costs I could not have helped as many as I have without it.

New swimming pool training venue

I came to realize that I needed to work smarter rather than harder and after chatting to some of the candidates decided to move the training to Ellis Park Pool. It is a public pool, heated and open 11 months a year. There is a large boardroom available most of the time, ideal for theory sessions. It is also easily accessible by train or taxi. The pool staff is very supportive of my work and most lifeguard candidates receive a free pass into the facility for classes as well as to train. The lifeguard staffs assist candidates with improving their swimming skills when necessary and generally give plenty of encouragement.

Expanding the number of trainees

Through a project to develop swimming skills in young unemployed woman, run by Joburg Metro and Swimming South Africa in Soweto, I got involved with their CPR training. Later I included some of the young women in the lifeguard training project. The last couple of years I have had candidates coming from the East and West Rand and Klerksdorp as there is no lifeguard training available there. Their transport costs are enormous and if there is money available I help out when there is a need. I get no assistance or reduced fees from Lifesaving South Africa or the branch as I am not training volunteer club members or competitors. My focus is on creating job opportunities for young lifeguards.

One challenge I still face is succession planning. I have identified a few candidates to become instructors but usually when they realize that I am basically a volunteer all interest fades. At present I am training a promising young man so I hope that this time I can hold him.

Gauteng Lifesaving is in the process of establishing an Academy and has asked me to run it. I said only if I can still continue with what I am doing with the unemployed youth and they are happy with the arrangement.

Achievements

Since the first day that I was involved with lifesaving activities in Soweto several remarkable things were achieved. There is a regular training programme for lifesaving qualifications at a central venue run for 11 months of the year. Young women are included in the programme. Opportunities for jobs are available outside Soweto for residents of the area. For a number of years youngsters from Soweto had the opportunity to assist with patrolling the Midmar Mile, have been able to find temporary and part-time employment at a number of private aquatic facilities including Sun City. Many of the lifeguards have qualified as Learn-to-Swim teachers and are now involved in the local initiative at Johannesburg municipal pools.

Summary

Soweto has changed a great deal in the 30 years I have known it but for many there is still poverty and unemployment, especially among the young. Poor education and limited opportunities contribute to this. I hope my involvement has had a positive impact on some of their lives. For me it has certainly enriched my life and also given me a better understanding of theirs.

This paper has been adapted from an Ireland Medal 2010 ceremony presentation.

The Work of the Royal Life Saving Society Australia

Terence Higgins

The Royal Life Saving Society - Australia

Drowning is a leading cause of death and a serious social and health problem worldwide, one that needs a multidimensional effort to be overcome. The Royal Life Saving Society Australia (RLSSA) was founded in 1894, with the aim of seriously reducing the national drowning toll. Today over one million Australians annually participate in an RLSSA education program (i.e. one million people learn the skills to save lives). In this short report I will describe the activities of the RLSSA in terms of drowning prevention, rescue and post-rescue treatment. More precisely, I will explain the work of the Society in the areas of education, training, promotion, sport, leadership, risk management, advocacy, and research.

RLSSA believes and works on the basis that everyone can be a lifesaver. Lifesavers are everywhere in the community. They can be teachers, students, mums, dads, fireman, plumbers or accountants. They patrol the houses, streets, workplaces, and parks of the communities in which they live. They don't always wear a uniform but they can and do save lives. RLSSA is dedicated to turning everyday people into everyday community lifesavers. We achieve this through education, training, health promotion, risk management, research, sport and advocacy. We've been doing this for over 100 years. Our programs are well researched and they are available to all.

Training

RLSSA is Australia's largest provider of water safety education through various and numerous programs. These programs are delivered daily in schools, pools and community centres. They are designed to build awareness of dangers in aquatic environments and to arm the community with lifesaving skills used in both prevention and rescue. Some of our key education programs include "Swim and Survive", the "Bronze Medallion", the "Junior Lifeguard Club" and "Infant Aquatics". Increasingly skill and expertise is being used to target groups with special needs. Vietnamese rock fisherman, Remote Indigenous Communities, and Arabic speaking youths are just some of the groups who have benefited from our dedication.

In terms of lifesaving training, RLSSA has been training Australians as lifesavers and lifeguards, from the beginning. While the principles have not changed, people now are trained on how to use these lifesaving skills in a wider range of workplaces and communities. The key training programs include "lifeguarding", "resuscitation", "first aid and emergency care" and "pool operations". These programs are delivered by a professional group of employees and volunteers. They provide focused programs that foster training and skills, which prevent accidents and save lives. Training is the cornerstone of our vision for a safe community. Every year we vocationally

accredit over 120,000 lifesavers (e.g. pool lifeguards, pool managers, swim teachers and first aiders in workplaces across Australia).

In terms of health promotion, RLSSA delivers a series of programs targeting to various groups. The phrase 'Water Safe Communities' best captures our commitment to ensuring that people everywhere are safe from water related incidents and accidents. Increasing awareness and skill acquisition in special needs communities across Australia is not a recent passion. The target groups are remote indigenous communities, rural and regional communities, refugees and recent arrivals, older Australians and children under five years of age.

Historically RLSSA programs have been targeted at saving lives from drowning, achieved by encouraging safe aquatic recreation. Our programs encourage Australians to lead healthy and active lifestyles, giving people the skills and knowledge to do so safely. Among them, our best known health promotion program is Keep Watch, which prevents children from drowning through the promotion of four simple messages (i.e. supervise your child, restrict your child's access to water, familiarise your child with water, and learn resuscitation). In addition, the Society is committed to developing effective strategies for community health issues with an emphasis on promoting safe aquatic recreation.

In addition to education, RLSSA has an established sport participation pathway that provides regular opportunities for lifesavers to compete from community level to elite. The sport of lifesaving tests a lifesaver's skills in rescue, accident prevention and emergency care. A key event is the 'Simulated Emergency', which pits a team of lifesavers against an emergency event staged by a team of judges. Variations of this activity are used in all Royal Life Saving programs. On the other hand, the Athlete, Coach and Officials lifesaving participation pathway includes club and school competition, regional competition, junior and senior provincial/state competition, national and international competition.

Our Aquatic Risk Management program ensures the development of safety guidelines and risk management systems for all aquatic environments. This program is essential in supporting a water safe community. As partners with the Australian Aquatics and Recreation Industry, the RLSSA works to improve industry safety and risk management records. Key aquatic risk management activities include guidelines for safe pool operation, guidelines for safe aquatic environments, swimming pool safety assessments, lifeguarding training systems and management consultancy. The Aquatic Risk Management services are not solely aimed at the managers of large facilities. They are also used to assist home pool owners to maintain child safe backyard swimming pools.

Advocacy

RLSSA has a well developed position on an extensive range of water safety issues facing the Australian community. Society's challenge is to ensure that these issues and its positions are understood and supported by government,

industry, the corporate sector and the community. Every year approximately 270 people drown in Australian waters, a tragic and preventable fact that affects all communities. The Society is working hard to eliminate drowning throughout our community. Through nationally coordinated and locally driven campaigns this figure can be reduced. Along with industry partners, including the Australian Government, we have developed the Australian Water Safety Strategy 2008-11. Titled *Reducing Drowning Deaths by 50% by 2020*, this document outlines our strategy for meeting the challenges ahead. RLSSA programs, products and services are underpinned by research and a commitment to continual improvement. They are constantly evaluated, improved and benchmarked against world's best practice. The Society's research capacity includes drowning and injury related research, program effectiveness and evaluation, management of internal research activities, and partnering in research projects. We work with a range of research partners across universities, industries and the community.

ILS World Conference on Drowning Prevention- Danang, Vietnam 2011

RLSSA will host the International Life Saving Federation's World Conference on Drowning Prevention in Danang, Vietnam between the 10th and 13th of May 2011. Over 350,000 children die from drowning in Asia every year and RLSSA has chosen to take the world to where the problem is, to the frontline in the fight against drowning. A comprehensive set of conference themes have been identified that cater to all those working to reduce the burden of drowning worldwide. These include; Drowning Research, Child Drowning Interventions, Emergency Response and Medical Issues, Advances in Lifesaving, Swimming and Water Safety, Disasters and Climate Change, Regional Perspectives, Lifesaving Sport and Development, Partnerships and Collaborations, and Activities and Occupations

The World Conference on Drowning will be a great place to showcase the wonderful work of Royal Life Saving Society Australia and our significant contribution and leadership in the fight to reduce global drowning.

Summary

The Society has an active network all over Australia. RLSSA branches, members, volunteers, trainers, employees and lifesavers are found in almost all communities. The Society maintains an approach inclusive and non-discriminatory and some of our biggest achievements occur away from large capital cities. Our people are our lifesavers!

This paper has been adapted from an Ireland Medal 2010 ceremony presentation.

A Decision Making Protocol for Aquatic Emergencies

Brendan Donohoe

The Lifesaving Foundation, Ireland

Decision-making is a serious issue in every aquatic emergency. This educational article aims to construct and suggest a protocol that will support lifesavers that operate in the pressured environment of a rescue situation. It also aims to identify the available choices and the questions that should be asked to keep the rescuer safe. A well-constructed protocol may provide the steps to follow, serving as a memory aid that will give the order of rescue actions to be undertaken with minimal exposure to risk. The steps that could constitute the decision-making protocol may be the following: Is there a problem? And is it safe to get involved? Control Breathing; Shout for 'HELP' or/and notify the emergency services; Assessment of Situation (e.g., how many casualties and what is their condition? what can help in rescue? what will make the rescue more difficult? what realistically are the rescuers own abilities? is rescue from the land possible? where can I exit the water if it's necessary to enter? where can I enter the water safely if necessary?); Make a plan producing an order and means of rescue for casualties (e.g., casualty priority, rescue sequence); Tell a reliable person the plan (i.e., emergency services, a bystander); Put the plan into action (i.e., organize available assistance, carry out rescue); Reassess the plan (i.e., as information becomes available, as situation develops); Aftercare of casualties (i.e., by others, by rescuer); When complete (i.e., evaluated actions, performance and reports to stage services).

This paper has been adapted from an Ireland Medal 2010 ceremony presentation.

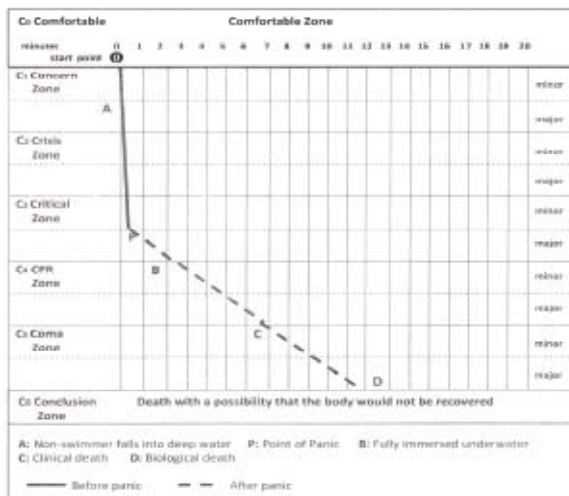
C-Zones: The Connolly Framework

John Connolly

The Lifesaving Foundation, Ireland

Lifesavers often discuss and analyze rescue and drowning incidents. The C Zones Framework was designed to serve as an aid to such discussions (Connolly, 2004; 2008). It is constituted by a number of zones (i.e. C₀ comfortable, C₁ concern, C₂ crisis, C₃ critical, C₄ cardio-pulmonary resuscitation, C₅ coma, and C₆ conclusion) and is simple enough to be easily remembered and quickly drawn on a piece of paper yet sufficiently detailed to be a serious analytical tool. The use of multi-coloured or different style lines permits the comparison of numerous casualty variations and outcomes on the one framework. The standard framework has a 20 minute time limit describing the progress of an incident from its beginning to conclusion, but other versions of the framework are possible by adjusting the timing (Figure 1). Overall, this framework can serve as a teaching aid and useful feedback tool offering a visual overview of rescue options and their potential or likely consequences at various stages in the drowning process. This information can be valuable to lifesavers, lifeguards, professional rescuers, lawyers, expert witnesses, and judges.

Figure 1: Example of the C-Zones: A Non-Swimmer Alone Falls into Deep Water.



References

- Connolly, J. (2004). C-Zones the Connolly Framework. In S. Avramidis, E. Avramidou & J. Tritaki (Eds.) *1st International Lifeguard Congress* (p. 12). Piraeus: European Lifeguard Academy.
- Connolly, J. (2008). C-Zones: The Connolly Framework. In S. Avramidis (ed.) *Handbook on Safety and Lifesaving* (pp. 80–83). Athens: Stamoulis Publisher.



The Lifesaving Foundation is an independent international charity devoted to saving lives from drowning. It does this in a number of ways;

1. Lifesaving Research

The Foundation organises an annual conference in Ireland devoted to promoting research into drowning and lifesaving questions. The conference proceedings are published and are freely available on-line at www.lifesavingfoundation.ie.

2. Suicide by Drowning

The Lifesaving Foundation promotes research into suicide by drowning with a focus on preventing entry to water and the rescue of drowning casualties. The Foundation is working with leading Irish suicide rescue organisations Dublin Fire Brigade Water Rescue Unit and Foyle Search and Rescue in Derry on this tragic matter and has published a number of research papers on suicide by drowning.

3. Water Safety Information

The Lifesaving Foundation identifies areas of risk where specific safety information and advice is needed and produces leaflets for public use. Leaflets produced include Foreign Holiday Water Safety and Survival Floating.

4. Personal Survival

About a half of those who drown can swim yet they cannot save themselves from drowning when they need to. The Foundation is conducting research into what is lacking in swimming instruction programmes that leads to such a tragic situation. The Foundation has published a number of documents (e.g. Float – Don't Swim) in this area and is supporting an international research project with a view to greatly improving this situation.

5. Female Swimming Instruction

Females are not taught to swim for cultural reasons in some parts of the world. The Lifesaving Foundation supports the Women's Swimming Project

in Sri Lanka where mothers are taught to swim in private classes and are then taught how to teach others to swim in local swimming locations. This is a very successful project and is seen as a model that could be adopted elsewhere.

6. Lifeguard Training Project

Since 2005 the Foundation has financially supported the training of young unemployed swimmers as professional lifeguards to meet local safety needs in Africa and Asia. The project is based in Soweto, South Africa. The majority of those trained are in full-time employment as lifeguards.

Lifesaving Foundation Membership

Membership of the Lifesaving Foundation is open to any interested adult or organisation. Organisations must nominate an adult to act as its representative. The 2011 membership fee is €50 or its equivalent value in other currencies. Friend of the Lifesaving Foundation status is also available for a donation of €20 or equivalent.



THE LIFESAVING FOUNDATION
MEMBERSHIP APPLICATION FORM
& Friends of the Foundation

Name _____

Address _____

Tel _____ Mobile _____

E-mail _____

I wish to become a member of The Lifesaving Foundation for the 12 months, commencing 1 July, _____

I enclose the annual membership fee of €50.00 (or the equivalent)

or

I wish to become a “Friend of the Foundation” for the 12 months, commencing 1 July, _____

I enclose the annual friends fee of €20.00 (or the equivalent)

Signed: _____

Date: _____

Membership No.	Expiry	Payment Type

You may also join through our website with payment through PayPal

