Defining 'swim and survive' in the context of New Zealand drowning prevention strategies:
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Introduction

The recent review of swim and survive programmes (Isaac, 2012), commissioned by the Accident Compensation Corporation, in conjunction with the Drowning Prevention Council and Sport New Zealand, made recommendations to improve the coordination of 'swim and survive' programmes. The reviewers noted some confusion among stakeholders responsible for delivering water safety education about the varied terminology used to define swimming survival skills and knowledge in the context of drowning prevention. Among its recommendations, the reviewers suggested (Recommendation 7, p.24) that there should be an agreed definition of 'swim and survive' programmes adopted and promoted by all water safety organisations. It is the purpose of this paper to provide a synopsis of current research findings and expert opinion in the international literature and make recommendations regarding the adoption of mutually agreeable terminology that eliminates the "confusion around the language used by different organisations and providers in the water safety education space." (p.24)

International Overview

In 2006, the inaugural World Handbook on Drowning (Bierens, 2006) addressed many issues on the prevention, rescue, and treatment of drowning. In a chapter entitled *Swimming abilities, water safety education and drowning prevention,* Brenner and colleagues (2006) noted that much attention had focussed on the physical skill base for water competency but that cognitive skills (such as the teaching of water safety rules) had received scant attention. They concluded that further research on water competence that included "aquatic motor skills, water safety knowledge, and affective dispositions (*attitudes*)" was required and recommended that "the concept of swimming ability be replaced by the more encompassing notion of water competence with regards to drowning prevention" (p.116).

In 2007, the International Lifesaving Federation (ILS) adopted a Position Statement for Swimming and Water Safety Education (ILS, 2007). This Position Statement noted that *"evidence is rapidly accumulating that a basic level of water safety knowledge, coupled with a basic level of swimming skill (often called survival swimming) is sufficient to prevent most*

drowning episodes. The ILS adopted the broad definition of swimming in a water safety context as being "a person should be able to know how to and actually move in water using any mode of propulsion that maintains head above the water". However, in adopting this broad definition, it noted that further guidance was needed on what is meant by the term "basic level of swimming skill" (since re-titled 'basic aquatic survival skill') that would lead to a person having an improved level of water safety skill.

Debate about the role of swimming skills and knowledge in drowning prevention has intensified in recent years. Presentations at the *World Water Safety Conference* in Porto (2007) and the *World Conference on Drowning Prevention* in Da Nang (2011), highlighted research from the newly established *International Drowning Research Centre* in Bangladesh (2010), and several recently published studies that helped define the relationship between swimming and water survival competence. In low income countries (LMIC's) where exposure to water in daily living abounds and therefore the risk of unintentional immersion is omnipresent, acquisition of survival swimming and associated water survival competencies (18 skills) was shown to cause a reduction in fatal drowning among young children in a large cohort trial in rural Bangladesh (Linnan, Rahman, Rahman, Scarr & Cox, 2011). A case-control study of swim instruction in rural China found a protective effect on drowning among children aged 1–4 years (Yang, Nong, Li, Feng, & Lo, 2007).

Supporting evidence has also been reported in high income countries (HICs). A case-control study in the U.S. found a positive association between swimming skill and drowning prevention in children less than five years of age (Brenner et al., 2009). The study found that those who died were less likely to have had formal lessons compared with matched controls (3% vs. 26%, respectively), although it should be noted that the estimates were imprecise. The results were less compelling in older children, those 5–19 years of age. In high income countries (HIC's), where drowning risk is multifaceted and often associated with recreation and intentional immersion, recent research has focused on real and perceived swimming ability (Moran et al., 2012), risk perception in the context of drowning prevention (McCool et al., 2008, 2009; Moran, 2006), high-risk activities (Moran, 2008, 2011), and high-risk groups (on young adults, Gulliver & Begg, 2006; on adolescents, Moran, 2009, 2010; on Pasifika youth, 2007; on new migrants, Moran & Willcox, 2011).

An International Task Force on Open Water Drowning Prevention (Quan, Bennett, Moran & Bierens, 2012), consisting of 18 experts worldwide, deliberated on the provision of succinct, generic, and universally applicable water safety messages divided into two sections *Care of self* and *Care of others (*availableat:http://www.seattlechildrens.org/classes-community/community-programs/drowning-prevention/open-water-guidelines/). In both categories, the experts agreed that the greatest priority was to *Learn swimming and water*

safety skills but noted that the protective role of swimming skill is not clearly defined and, while supporting the value of swimming lessons to prevent drowning among young children, they concluded that the evidence is weak and further research is required for older children and adults (Moran, Quan, Bennett, & Franklin, 2011).

Langendorfer (2011) has added to the mix by suggesting that "swimming skill or competence (sometimes inaccurately called swimming ability) is not a capacity possessed in any static or permanent way by any individual." (p. 237). He further suggests that "swimming" or water competence is an emergent and potentially transient systemic behaviour, mediated by interactive relationships among a person's individual characteristics, their perceived goal at any point in time, and the environment context environment." More recently, Langendorfer (2013) has elaborated on this complexity by suggesting that

> "It is widely recognized that the highly competent pool swimmer is not necessarily equally competent in open water or in heavy surf or in cold water. Nor is one's competency static over time. Developmentally, competency normally increases during childhood into adulthood whereupon it gradually decreases as one's personal and physiological capacities decline." (Langendorfer, 2013 p. 190)

In other words, swimming survival competencies are parts of a very dynamic construct that vary according to the individual (e.g. risk perception, skills and knowledge), the task (e.g. swimming, floating, diving) and the environment (e.g. open/closed, flat/surf, still/currents, hot/cold).

Water safety education and drowning prevention

On the basis of the research evidence and expert opinion presented above, and the conclusions of the Isaac Report, it is opportune and timely for the New Zealand drowning prevention community to collectively define (and continuously refine) what is meant by 'swim and survive' in the context of water safety education, especially as it relates to schools.

The national Drowning Prevention Strategy (2005-2015) provided a succinct statement of the problem confronting New Zealand. The report recognised the critical contribution that water safety attitudes, beliefs, and behaviours play in reducing drowning risk (Accident Compensation Corporation [ACC], 2005). It suggests that if the aim of the Strategy is to enable people to safely enjoy water-related activities and environments, **water safety knowledge, attitudes and behaviours** (authors bold for emphasis) must become an important part of all aspects of water-related activity.

As a starting point, it is proposed that the foundations of water safety education are based on the concept of **water competence**. It is strongly recommended that this term replace

such labels as **swimming ability**, **swimming skill,** and **swim and survive**. Langendorfer (2013) has noted the tendency to describe a person's capability in the water environment as that person's *swimming ability.* He suggests that while it is a frequently and easily recognized term, it is also wrong because "by definition, *ability* is any attribute or behaviour which is very consistent and generally resistant to change, while a *skill* refers to a capacity that can be modified or learned, usually as a product of practice or other experience." (Langendorfer 2013, p. 190) He goes on to suggest that *water competence* transcends both *ability* and *skill* and that the problem with those terms is that they are viewed as a possession of the individual performer, whether resistant to change or not.

   Water competence is defined here as the sum of all personal aquatic movements that help prevent drowning, as well as the associated water safety knowledge, attitudes, and behaviours that facilitate safety in, on, and around water. It is proposed that this more inclusive term replace the concept of **'swim and survive'** with its currently limiting inference that swim = safe.

Guiding Principles

Based on the research findings of Stallman (2008, 2010, 2011) and others (Moran, 2006; Moran et al., 2012), it is suggested that the following guiding principles inform the acquisition of water competence in the context of drowning prevention.

Students will:

1. Be equally at home, at ease and equally efficient on the back and on the front.
2. Be equally at home, at ease and equally efficient under water as at the surface.
3. Possess an all-around knowledge of water safety to inform safe decision-making in, on, and around water.
4. Recognise, uphold, and encourage positive water safety attitudes and behaviours of self and others.

Teachers and instructors will:

1. Embrace the more inclusive teaching construct that the notion of water competence affords.
2. Recognise that water competence is part of an educational process involving lifelong learning rather than a finite end product relating to skill acquisition alone.
3. Sequentially develop water competence in recognition of the varied dynamical constraints that influence risk of drowning (such as swimming in open water).
4. Recognise and adapt teaching pedagogy to meet the needs of culturally and linguistically diverse learners (such as new migrants).

5. Recognise and adapt teaching pedagogy to meet the needs of differently abled learners (such as mentally and physically challenged students).

6. Recognise, and take advantage of, opportunities in cross-curriculum study (such as literacy and numeracy) to promote water competence.

7. Seek and promote programmes that provide specific water safety skills and knowledge (such as surf safety, river safety, boating safety).

8. Link water competencies with other aquatics education in the curriculum (such as surfing, yachting, snorkelling, fishing).

9. Integrate water competence into EOTC camps, field trips, and other off-site school co- and extra-curricular activities.

Operational Definitions:

Based on the research findings of Stallman and colleagues (2008, 2009, 2011), movement qualities considered essential to the development of practical water competence include: orientation (e.g. reaction to sudden immersion), breath and buoyancy control (eg, breath control in floating), postural control (e.g. body horizontal/vertical positions), positional control (e.g. change position to meet demands), rotational control (e.g. rolling from front to back), propulsion control (e.g. varying swim strokes to meet demands), co-ordination (e.g. co-ordinating breathing and arm action), and agility (e.g. avoiding dangerous currents).

It is suggested that the following skills and knowledge form the basis of any drowning prevention programme:

- **Swimming** (for speed/distance/time; on front/back; with in-water/out-of-water arm recovery; with/without PFD's; with /without clothes; in calm/rough water; in closed/open water)
- **Stationary skills** (Floating, treading water, PFDs).
- **Orientation skills** (Falling in, underwater, turbid conditions).
- **Submersion skills** (Swimming underwater, surface diving).
- **Entry/Exit skills** (safe entries, jump and dive entries, climbing out exits).
- **Rescue skills** ('talk, reach, throw, wade, row, and tow skills' [RLSSSA]).
- **Water Safety knowledge** (knowledge of: safety rules around a range of aquatic activities; weather and water conditions; water dangers and hazards; ways of assisting others via first aid, CPR; lifeguards, coastguards and supervision of self and others; use of PFDs/lifejackets; effects of alcohol/drugs in water; hypothermia and cold; safe decision-making and self-management in the aquatic environment).

Ways of assessing water competence

Swimming is a form of locomotion that contains two essential elements: flotation, to permit breathing and propulsion, to provide mobility (Hogg, Kilpatrick & Ruddock, 1983). Swimming competency is often described in terms of distance swum, but, even then, various distances have been used to assess competency. A recent survey of international organisations reported that, of the 41 respondents, most (63%) used distance swimming though the distances used varied greatly (L. Quan, personal correspondence, March 2013). Many water safety initiatives establish arbitrary distances from 25 m to 200 m to identify 'can swim' status. This is problematic because of the developmental (e.g. age, maturity, physical capacity) and dynamical constraints (e.g. open water, distance, speed, cold etc.) that mediate swimming performance in a drowning prevention context. Furthermore, as noted by Brenner and colleagues in the *World Handbook on Drowning* (Bierens, 2006), "swimming skills per se are but one aspect of a wider field of human aquatic endeavour that has been identifies as water competence and traditionally referred to as watermanship" (p.114). To embrace the more inclusive nature of water competence defined above, it is recommended that a framework of water competencies and ways of measuring those competencies be developed in line with recent research (see below)

Ways of assessing water competencies

Based on the findings of Stallman et al. (2008) and Moran et al. (2012), it is recommended that the following elements form the basis of any sequentially developed assessment of practical water competence:

- Able to jump, dive, roll, fall into deep water and regain the surface.
- Able to level off into a swimming position.
- Able to swim at least 2 strokes, at least one on the front and one on the back.
- Able to breathe in a relaxed and efficient manner and integrated into the stroke in question in an efficient manner, promoting movement economy.
- Able to roll from the front to the back and back to front.
- Able to turn to the left and right on both the back and the front.
- Able to perform a simple surface dive and swim simply and comfortably under water.
- Able to stop and rest in deep water with minimal movement.
- Able to exit the water easily and safely from the most appropriate point.
- Able to do all of the above while clothed and in open water.

Ways of assessing water safety knowledge

Based on the findings of Moran and colleagues (2011a, 2011b, 2011c, 2010, 2008, 2007. 2006), it is recommended that the following elements form the basis of any sequentially developed assessment of the cognitive knowledge underpinning water competence:

- Knowledge of water safety rules for closed environments (pools, spa pools).
- Knowledge of water safety rules for open water environments (beaches, rivers, lakes).
- Knowledge of water movement hazards (e.g. currents, rips, waves).
- Knowledge of underwater hazards (e.g. sandbars, rocks, artificial hazards).
- Knowledge of climatic hazards (e.g. cold, wind, sun).
- Knowledge of decision-making processes (e.g. safety of self, safety of others).
- Knowledge of ways to assist others (calling for help, non-contact assistance, first aid).

Note:

a) **The elements outlined above are indicative of the competencies that contribute water competency base of a 'watersafe' New Zealander, the list is not intended to be prescriptive but forms a foundation upon which other elements may be developed.**

b) **Many current programmes incorporate many of the above in context-specific activities and should be an integral part of that water competency base.**

Final Comment

Drowning is a significant, complex, and multifaceted phenomenon, which has at its heart, the way in which humans interact with their aquatic environment (Moran, 2009). Given the accessibility of aquatic environments and an aquatically-oriented lifestyle, it is not surprising that water safety education has long been a prominent feature of New Zealanders education for life. (Moran, 2010a) It is also not surprising that education interventions have developed based on axioms, anecdotes, and perceived wisdom given the promotion of water safety by well-intentioned government/non-government agencies, individuals and organisations all intent on reducing death by drowning. Furthermore, New Zealand is not alone in its quest for consistency in defining the nature and content of water safety education. Internationally, many drowning prevention proponents are grappling with the lack of consistency in definition and nomenclature associated with 'swimming' and 'surviving'. The Isaac Report (2012) has provided the 'wet sector' with the opportunity to be at the forefront of change. To be constrained by simplistic solutions (e.g. swim = safe) to a complex social issue will be to the detriment of present and future water safety education. Mutual agreement as to what competencies form the basis of that education is a critical first step in establishing the water safety education of future generations, it is too important to be left to chance.

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