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AUCKLAND BEACH-GOERS SWIMMING BEHAVIOURS AND PERCEPTIONS OF THEIR RISK OF DROWNING

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Conflict of interest statement

All members of the research team involved in the present project and production of the Final Report are employed by universities or organisations that they are affiliated with.

They declare no conflict of interests to this research project.

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Executive Summary

A cross sectional study of Auckland's beach-goers was conducted between January and February 2006. A sample of 3371 adults completed at a range of Auckland beaches. Overall, the study achieved an 87.8% response rate; 56% were female, 46% were aged between 15 – 19 years and 56.5% of the sample was European, 10.4% were Maori, 12.3% were Pacific Island and 4.7% Asian and 19% were from "other" ethnic groups. Overall, more males were sampled on west-coast beaches whereas more females were sampled on east-coast beaches. The self-complete questionnaire assessed beach swimming frequency, swimming behaviours and perceptions of risk of drowning. The following key findings emerged from the analysis of the data.

The aim of the study as to ascertain beachgoers' perceptions of drowning risk in terms of the severity of the risk, their vulnerability to risk of drowning, the efficacy of preventive measures and their ability to deal with the risk of drowning

- Participants in the youngest age group (15–30 years) and New Zealand European participants were more likely than older age groups to report that they swim often at the beach compared to Pacific and Asian peoples.
- Among those sampled in the study, the youngest age group (15–30 years) and males were more likely than older age groups to report a high level of swim competency (as defined by self-reported swim distance ability). Asian participants reported low swim competency.
- Within the study sample, the groups most at likely to report risky swimming behaviours were those in the youngest age group (15–30 years) and males.
- Of the total sample population, males were more likely to report that they had experienced a life-threatening incident while swimming in the past compared to females.
- Similarly, adults in the middle age category (30–49 years) were slightly more likely to report having had a life-threatening experience in the past when swimming.
- Over half the sample (61.3%) reported higher tendency towards over-estimation of risk and 38.7% of the sample reported a tendency towards under-estimation of risk.

- Risk perceptions were assessed using the constructs within Protection Motivation Theory. This theory proposes that self-protective behaviours are contingent on four factors:
 1. The perceived severity of the event (severity);
 2. The perceived probability or vulnerability towards drowning (vulnerability);
 3. The efficacy of preventive action (response efficacy); and
 4. Perceived self-efficacy of carrying out the preventive behaviours (self-efficacy).
- Males, younger people and Maori reported higher levels of perceived self-efficacy (belief in ability to manage risk situation) in beach-swimming situations.
- Females, older adults and Asian participants reported higher perceptions of vulnerability when swimming at a beach.
- Females and older aged adults reported higher levels of response efficacy.
- Females, older aged adults and Asian participants reported higher levels of perceived severity of the consequences of experiencing a life-threatening incident while swimming at a beach.
- Females, older aged adults and Asian participants also reported higher levels of concern about the likelihood of drowning while swimming at a beach.

In view of these key findings, the following recommendations are suggested.

- Water safety education programmes need to:
 - Address the likelihood of underestimation of risk and overestimation of ability as central components in educational interventions; and
 - Address the unique risk perceptions and behaviours among the high-risk groups, including young people in general and males specifically.
- Media campaigns targeting high-risk groups need to focus on the dangers of underestimation of risk, and overestimation of ability as a key message.
- The Drowning Prevention Strategy (2005) needs to focus collaborative efforts of the water safety sector on changing notions of drowning risk through health promotion initiatives disseminated in schools and the wider community.

- Broad and accessible dissemination of research findings to inform water-safety policy, health promotion practitioners and research sectors.
- The present survey serves as valuable baseline information for the Auckland region. Further research should continue to monitor trends in water-safety behaviours and perceptions of risk over time.

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1. Introduction

Drowning as a consequence of aquatic activity is a significant cause of unintentional death among New Zealanders. On average 130 people drown each year at a rate double that of our nearest neighbour, Australia (Langley, Warner, Smith & Wright, 2001). In addition, New Zealand Health Information Service (NZHIS) and Accident Compensation Corporation (ACC) data indicates that about 650 people are hospitalised each year for water-related injuries, and water-related entitlement claims cost the country more than \$17 million in 2003-2004 (ACC Injury Statistics, 2004). Surf Lifesaving rescue statistics indicate the potential for even greater loss of life with more than 2,000 people rescued from the surf in 2004-2005 (Surf Life Saving New Zealand [SLSNZ], 2005).

The circumstances surrounding drowning incidents in New Zealand are well reported in national databases (for example, Drownbase™ administered by Water Safety New Zealand [WSNZ]) and have been subject to a range of systematic analysis including the recent review of drowning, near drowning and other water related injuries by Chalmers, McNoe & Stephenson (2004). On the basis of retrospective evidence of drowning incidents from 1908-1994, Langley, Warner, Smith and Wright (2001) concluded that the high rate of unintentional drowning in New Zealand might lie in the high exposure to water and the high participation rates in aquatic activity. However, without knowing what New Zealanders know, think and do with regards to their safety in and around water, the reasons why so many people get into difficulty in water remains speculative.

The recently released Drowning Prevention Strategy (ACC, 2005) has recognized that enhancing our knowledge of water safety through New Zealand-specific research is critical to “understanding more about the causes of drowning and water-related injury; and assessing the interventions that are most effective in preventing injury and drowning” (p.23, 2005). In the case of recreational drowning, which accounted for 44% of all drowning fatalities in New Zealand between 1990 and 1999 (Chalmers et al., 2005), little is known about what people bring to their recreational activity in terms of their beliefs and practice of water safety. To improve our understanding of why people drown and what were the factors that contributed to the incident, more information is required on the role that water safety knowledge, beliefs and behaviours play in mediating drowning risk. Such information will contribute substantially to the development of effective primary prevention initiatives that enable people to enjoy aquatic activity without

compromising their safety. Moreover, it will assist in identifying high-risk groups within the community and make explicit their perceptions of drowning risk, their beliefs about safety in water, and their practice of water safety in the aquatic environment.

Although comprehensive evidence has recently been presented on the water safety beliefs and behaviours of New Zealand youth (Moran, 2006), young adults (Gulliver & Begg, 2005), and on alcohol and boating (Smith, Coggan, Koelmeyer, et al., 1999), little is known about the water safety behaviours and perceptions of drowning risk of the general population of New Zealand's beach-going public. International research has demonstrated the high prevalence of at-risk behaviours in relation to high-risk activities such as swimming alone (Smith & Brenner, 1995), boating (Logan, Sacks, Branche, Ryan, & Bender, 1999; Howland, Hingson, Mangione, Bell, & Bak, 1996), and alcohol consumption during aquatic activity (Orlowski, 1989; Smith, Keyl et al., 2001).

In addition, evidence suggests that specific population groups are more at risk than others. In New Zealand, Chalmers et al. (2004) have identified males, children aged 0-4 years, those aged 15-44 years and Maori as being high-risk demographic groups. Between 1989 and 1998, four of every five drowning fatalities (79%) were males and most drowning-related deaths occurred among those aged 15-44 years. Overseas studies have also identified youth and males as being especially at-risk of drowning. For example, lack of knowledge and experience among youth were strongly associated with increased boating fatalities (Molberg, Hopkins, Paulson & Gunn, 1993). Other studies have shown that youth are not aware of the dangers of swimming in rivers or lakes (Bennett, Quan, & Williams, 2002) or of the dangers of mixing alcohol with aquatic activity (Orlowski, 1987, 1989). Others have speculated that a primary cause for high drowning mortality among males and youth is their propensity to underestimate the risks associated with aquatic activities and overestimate their ability to cope with that risk (Baker, O'Neil, Ginsburg & Li, 1992, Howland et al., 1996, Schuman, Rowe, Glazer, & Redding, 1977).

Although there is a broad appreciation of the vulnerability of males and young people in general to risk situations, perceptions of risk of drowning are not well understood. It is likely that pervasive societal attitudes towards risk and protective factors play an important role in the construction and maintenance of risk-related attitudes and behaviours. Moreover, individual beliefs about what constitute a "risk", how to manage the risk and the underlying concerns (or lack of) regarding the risk situation are also currently not well understood (Adams 1995).

Understanding perceptions of risk of drowning presents a unique challenge in risk perception research in that swimming is generally understood to be a pleasurable, recreational activity; albeit not one without risk. Similarly, sun exposure presents an ambiguous risk in that the pleasures and benefits from sun exposure often underplay the potentially adverse consequences of neglecting health protective behaviours (sun-protection). We understand from previous research into outdoor workers' perceptions of risk of developing skin cancer that New Zealand males are typically ambivalent about undertaking sun-protective behaviours; sun exposure is considered an everyday reality, rather than a "risk" (McCool et al., 2006). In addition to our understanding about the propensity of males and younger people to have perceptions of *invulnerability*, evidence suggests that females and older people are more likely to overestimate risk and consequently adopt health protective behaviours. What are these differences based upon, how pervasive are they among other demographic groups and to what extent do beliefs about likelihood, consequence and self-efficacy play a role in predicting those who are most vulnerable to experiencing difficulty while swimming, or drowning.

The relevance of beliefs about risk is especially important in relation to people's perceptions of their swimming ability because such ability is often assumed to be protective in a drowning situation especially among youth and adult populations (Brenner, Saluja & Smith, 2003). However, one particular problem in identifying the protective value of swimming competency is the difficulty of assessing such skill and its relevance to the drowning situation (Brenner, Moran, Stallman, Gilchrist & McVan, 2005). In addition, self-estimation of swimming ability, often used in studies on water safety (for example, the New Zealand Youth Water Safety Survey, Moran, 2003) may not accurately express true ability (Robertson, 1992, Howland et al., 1996). New Zealand differences between male and female estimates of swimming ability, whether real or imagined, have been found adolescent boys and girls (Moran, 2006) and young male and female adults (Gulliver & Begg, 2005) but little is known about how adults perceive their swimming ability.

Some evidence suggests that, in addition to overestimating ability to cope with the risks associated with aquatic recreation, males and youth underestimate the potential dangers inherent in activity in an aquatic environment. Moran (2006) found that significantly more young males than females estimated less risk to their personal safety across a range of aquatic scenarios that contained varying potential for danger. Furthermore, the tendency for males to underestimate risks was evidenced in even the most potentially life-threatening situations. By

assessing drowning risk perceptions across a broader age, it may be possible to identify which population groups are most vulnerable to underestimating personal risk of drowning at the beach – a fundamental step in working towards changing risky behaviours (Millstein & Halpern-Felsher, 2002) through targeting interventions at those most at risk.

Risk perceptions are widely accepted to be a fundamental element within models of health attitudes and behaviours (Millstein & Halpern-Felsher, 2002. Rogers, 1975) underpins the present study as a sound conceptual framework within which to analyse adult perceptions of drowning risk. This theory proposes that self-protective behaviours are contingent on four factors; the perceived severity of the event (near-drowning, or drowning); the perceived probability or vulnerability towards drowning; the efficacy of preventive action, and perceived self-efficacy of carrying out the preventive behaviours (McClendon & Prentice Dunn, 2001). The majority of risk perception research relies upon the use of risk cognition measures as a way of identifying determinants of protective – or risky behaviours. Cameron (2003) suggests that in order to change behaviours, it is necessary to identify and target the dimensions of risk (concern) that are most likely to impact on behaviour change. By identifying how beachgoers perceive the risks of swimming and their capacity to deal with potential danger, as well as identifying those most at risk, this present study will provide clear direction to water safety educators whose task is to reduce dangerous aquatic practices through attitude and behaviour change.

2. The Aims and Objectives of the Study

2.1 Aims

The primary aim of this study is to provide evidence-based information on beach-goers perceptions of risk of drowning and their water safety behaviours at Auckland's beaches. This information might then be used to further inform the development and implementation of drowning prevention initiatives related to the national Drowning Prevention Strategy (ACC, 2005) by addressing gaps in current understanding about how New Zealanders relate to, conceptualise and experience their beaches as places of both pleasure and danger. The secondary aim is to make recommendations on how the key findings may be implemented in the future drowning prevention initiatives and suggest further research that may build on this baseline study.

2.2 Objectives

The specific objectives of the study were fivefold. They were:

1. To provide baseline information on the nature and extent of risk exposure to drowning among Auckland adult beachgoers;
2. To ascertain perceptions of swimming ability among Auckland adult beachgoers;
3. To provide information on beachgoers' previous experience of an aquatic life-threatening experience;
4. To provide information on the water safety beliefs and behaviours of adult beachgoers; and
5. To ascertain beachgoers' perceptions of drowning risk in terms of the severity of the risk, their vulnerability to risk of drowning, the efficacy of preventive measures and their ability to deal with the risk of drowning.

3. Method

3.1 Design

A cross-sectional survey of people who use public beaches throughout the greater Auckland region was conducted during the 2006 late summer period. Participants were invited to complete a brief, self-complete questionnaire which included the following socio-demographic and risk perception measures: age, gender, ethnic group, exposure to risk (frequency of swimming), swimming ability, past swimming risk behaviours, perceptions of risk of drowning, and past safe water practices (e.g. swimming between the flags).

3.2 Sample

A range of Auckland west-coast and east-coast beaches were purposively sampled to generate a sample of the Auckland beach-going population. In total, eight beaches were selected, four east-coast (Long Bay, Takapuna, Mission Bay, Maraetai) and four west-coast (Muriwai, Bethells, Piha and Karekare). The beaches were selected because of their popularity for aquatic recreation in the Auckland region. These beaches were selected at the point of contract negotiation. The sample population included all persons considered to be over the age of 16 years, who were on the beach (shore) at the time the research assistants were conducting the field work. People who were unable to comprehend written English were excluded from the study or declined to participate. Data on the approximate number of the people on the beach and reasons for declining to participate were not systematically collected. Subjective assessments documented by each research assistant suggest the main reason for decline included: surveys are an intrusion into private time, lack of English language skills and poor timing (i.e. beach-goers just leaving the beach). Research assistants arrived at each beach between 11 am and 12 pm each weekend day and stayed until at least 2pm. The sample is therefore did not include people who frequent the beach on week days or outside of “peak” hours.

3.3 Measures

The questionnaire consisted of 16 questions that provided information on: exposure to beach swimming, perception of swimming ability, past beach swimming behaviour, past life-threatening experience while swimming, perceived likelihood of drowning (see Appendix 1). A series of items were developed to assess the relative salience of protection motivation theory as predictive of risk perceptions and risk protective behaviours. Four primary constructs were assessed in the questionnaire (see questions 3-6, Appendix 1):

1. Perceived severity of the threatened event (experiencing difficulty while swimming or drowning)
2. Perceived vulnerability to the likelihood of experiencing difficulty while swimming at the beach, or drowning.
3. Perceived efficacy of the risk prevention options
4. Perceived self-efficacy; the extent to which one feel able to undertake the recommended prevention behaviours.

Socio-demographic variables included gender, age, ethnic group and education level.

3.4 Procedures

A team of research field workers visited a range of Auckland beaches in pair between January and February 2006. Over the nine days of data collection surveys were collected from adults over the ages of 16 years who were on at the beach on the day of the survey. Interviewers were trained to approach people on the beach and to invite them to participate in an anonymous survey of beach-goers perceptions of risk of drowning. All interviewers wore Auckland University identification badges and if asked, identified themselves as working as research assistants for the University of Auckland Injury Prevention Research Centre Water Safety Project.

Participation in the survey was voluntary and anonymous. Privacy and confidentiality of participants was unable to be assured due to the public setting in which the survey was conducted (on beaches), and this was stated in the Participant Information Sheet (attached). Participants were each offered a packet of Lifesavers sweets as a token of appreciation after completing the questionnaire. Research assistants were trained to address any issues that might arise from completing the questionnaire. Overall, the questionnaire was well received, with few participants requiring any clarification or assistance on any items. Questionnaires were collected from participants shortly following completion and later stored in a locked file before being entered into an SPSS data file by the IPRC data analyst and centre administrator.

3.5 Data analysis

Data from the completed questionnaires were entered into SPSS version 12.0. Descriptive statistics such as frequencies, proportions and means were used to report on the socio-demographic differences in beach-goers past behaviours and risk perceptions. Frequency tables and bar-graphs were generated for the items and measures in the questionnaire. Generalised linear mixed models were used to investigate predictors of risk perception outcomes. Age, sex and ethnic group was included in the models. For binary outcomes, non-parametric tests (chi-square) were used to analyse group differences. These analyses included data from all participants in the study. Missing data will be investigated to inform the interpretation of the results.

4. Key Findings

4.1 Demographics of Auckland's Beach-going Population

Of a total sample of 4237 people approached, 3371 people completed the questionnaire, resulting in an 87.8% response rate. The sample represents adults who were at a range of Auckland beaches during the months of January and February 2006 (table 1). The study sample therefore included people who attended an Auckland public beach between mid-January and mid-February 2006.

Table 1.

Sample demographic characteristics		
	Frequency (n)	Percent (%)
Sex		
<i>Male</i>	1441	46.6
<i>Female</i>	1891	56.1
Age levels (20-29 years median)		
15 – 29 years	1576	46.6
30 -49	1385	41.1
50 +	373	11.1
Ethnic Group		
<i>European</i>	1830	56.4
<i>Maori</i>	352	10.4
<i>Pacific Island</i>	408	12.3
<i>Asian</i>	157	4.7
<i>Other</i>	657	19.5
Total sample (87.8% response rate; decline = 466)	3371	100

Overall, the sample reflects the populations who frequent Auckland’s most popular swimming beaches in the late summer. Table 1 shows that the sample consisted of slightly more females than males, a larger population of participants from the younger age categories and a higher than expected “other ethnic group” category (based on census information) which may reflect the increase in visitors to the Auckland region, and in particular, Auckland beaches, during the summer period. The majority of the sample was New Zealand European, with the next largest ethnic group represented being people from “other” ethnic groups, followed by Pacific Island, Maori and Asian peoples. The latter two groups were slightly under-representative of Maori and Asian peoples resident in the Auckland region.

Table 2 shows the eight beach locations from which the sample was derived. Almost equal proportions of the survey respondents were interviewed on either a west coast (48.9) or east coast beach (51.2%).

Table 2.

Total beach sample (east and west coast beaches)		
	Frequency (n)	Percent (%)
East Coast	1726	51.2
<i>Long Bay</i>	516	15.3
<i>Takapuna</i>	314	9.3
<i>Mission Bay</i>	253	7.5
<i>Maraetai</i>	643	19.1
West Coast	1645	48.9
<i>Piha</i>	275	8.2
<i>Muriwai</i>	1064	31.6
<i>Bethels</i>	54	1.6
<i>Karekare</i>	252	7.5
Total	3371	100.0

West coast beaches in the Auckland region are renowned for strong surf and greater likelihood of rips. East coast beaches are typically more flat-water beaches. Differences between socio-demographic groups were observed for beach location (i.e. swimming at either a west-coast or east-coast beach) (table 3).

Table 3.

West coast versus east coast swimming				
	East coast		West coast	
	n	(%)	n	(%)
Age				
<i>15-29 years</i>	768	(45.1)	802	(49.4)
<i>30-49 years</i>	715	(42.0)	670	(41.2)
<i>50+ years</i>	220	(12.9)	153	(9.4)
Sex				
<i>Male</i>	693	(40.6)	748	(46.0)
<i>Female</i>	1012	(59.4)	879	(54.0)
Ethnic Group				
<i>New Zealand European</i>	929	(49.5)	1008	(63.5)
<i>Maori</i>	231	(13.9)	121	(7.6)
<i>Pacific</i>	206	(12.4)	45	(2.8)
<i>Asian</i>	70	(4.2)	87	(5.5)
<i>Other</i>	331	(19.9)	326	(20.5)

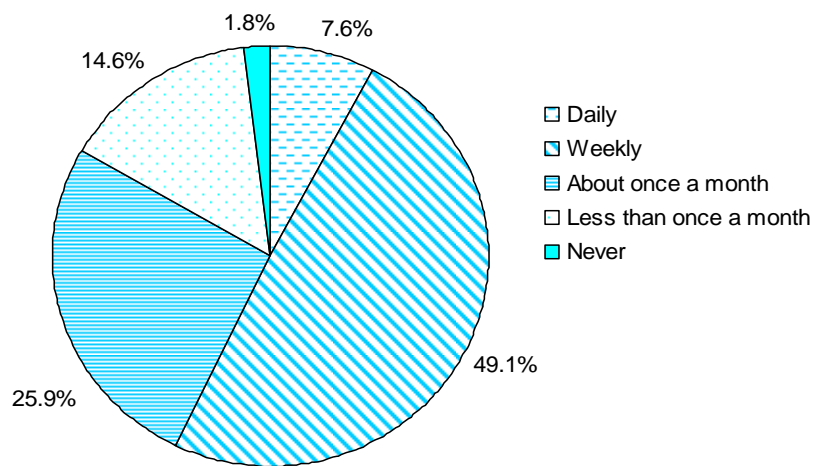
Table 3 shows that:

- Overall, males were more likely to swim at a west coast beach compared to females
- Younger aged participants were more likely to swim at a west coast beach compared to participants from other age groups
- Older age groups were more likely to swim at east coast beaches
- New Zealand/European and Pacific participants were more likely to report swimming at west coast beaches

4.2 Frequency of Beach Swimming

Self-reported frequency of swimming at the beach was assessed as a measure of risk exposure, based on the assumption that the more time you spend at the beach, the more likely you will encounter a life-threatening situation while swimming. To determine participant's self-reported exposure to swimming at the beach, participants were asked "how often do you swim at the beach (any beach) during the summer months" (table 4). Overall, the key findings were:

Figure 1. Frequency of swimming at the beach



When frequency of swimming at a beach was analysed by gender, age group and ethnicity, marked differences were evident among the sample population. Table 4 shows that:

- Participants in the youngest age group (15–30 years) were more likely than older age groups to report that they swim *often* at the beach
- New Zealand European participants were more likely than all other ethnic groups to report swimming *often* at the beach.
- Pacific and Asian peoples were the least likely groups to swim *often* at the beach
- There was no significant difference reported between male and female participants in the frequency of beach swimming.

Table 4.

Frequency of swimming at the beach (exposure)

	Never		Sometimes		Often		Total	
	n	(%)	n	(%)	n	(%)	n	(%)
Age								
15-29 years	12	(0.8)	572	(36.5)	983	(62.8)	1567	(100)
30-49 years	21	(1.5)	612	(44.3)	749	(54.2)	1382	(100)
50+ years	26	(7.1)	178	(48.5)	163	(44.4)	367	(100)
Sex								
Male	18	(1.3)	588	(41.0)	830	(57.6)	1436	(100)
Female	40	(2.1)	773	(41.0)	1073	(56.9)	1886	(100)
Ethnic Group								
European	26	(1.4)	673	(36.9)	1122	(61.6)	1821	(100)
Maori	4	(1.1)	145	(41.5)	201	(57.4)	170	(100)
Pacific	9	(3.6)	133	(53.6)	106	(42.8)	248	(100)
Asian	4	(2.6)	108	(69.6)	43	(27.8)	155	(100)
Other	13	(2.0)	264	(40.5)	375	(57.6)	652	(100)

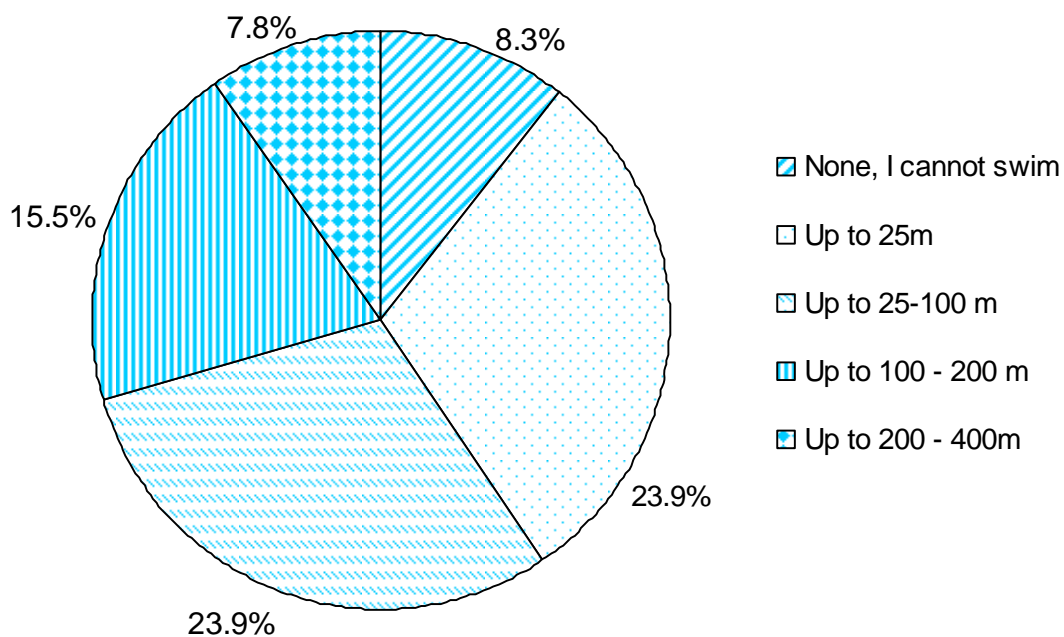
Key Points...

- Overall, more males were sampled on the west coast beach compared to females
- A larger proportion of people from older age groups were more likely to swim at east coast beaches
- Participants in the youngest age group (15–30 years) were more likely than older age groups to report that they swim *often* at the beach
- New Zealand European participants were more likely than all other ethnic groups to report swimming *often* at the beach.
- Pacific and Asian peoples were the least likely groups to swim *often* at the beach

4.3 Swimming Ability

Self-reported swimming ability was assessed across sex, age and ethnic groups using six ability categories ranging from no swimming ability to being able to swim more than 400 m. Question 1 asked respondents to assess their swimming ability thus “How many lengths of a 25 metre swimming pool could you currently swim without stopping or touching the bottom” (figure 2). Figure 2 shows that 8.3% could not swim, 23.9% could swim up to 25 metres, 23.9% could swim up to 100 metres, 15.5% could swim up to 200 metres and 7.8% reported they could swim up to 400 metres without standing up. Therefore, one quarter (28%) of the total sample reported a moderate to high level of swim competence (swim 400m or more).

Figure 2. Swim ability



When swimming ability was analysed by gender, age and ethnicity, considerable differences were evident among the beachgoers. Table 5 shows these differences in swimming ability expressed in three ability groups - Poor (<25m), Mid (25-200m), Good (>200m).

More than one third (37%) of females compared with one quarter (26%) of males thought that they were poor swimmers, which suggests that many of the general population do not possess

the ability to cope with aquatic dangers such as unintentional submersion. The gender differences in swimming ability found among Auckland's beachgoers confirm those reported in previous studies where females were more likely to estimate poorer swimming ability than males among New Zealand youth (Moran, 2006) and young adults (Gulliver & Begg, 2005). Similar disparities have also been reported in overseas studies where males were more likely to rate themselves as *excellent* or *very good* swimmers (Howland et al., 1997).

Table 5.

Swimming ability by age, sex and ethnic group

	Poor (<25m)		Mid (25-200m)		Good (>200m)		Total	
	n	(%)	n	(%)	n	(%)	n	(%)
Age								
15-29 years	484	(30.9)	640	(40.9)	441	(28.1)	1565	(100)
30-49 years	417	(30.8)	558	(40.8)	401	(29.1)	1376	(100)
50+ years	168	(45.2)	119	(32.0)	85	(29.1)	372	(100)
Sex								
Male	376	(26.2)	573	(39.9)	486	(33.9)	1435	(100)
Female	689	(36.6)	747	(39.7)	446	(23.7)	1882	(100)
Ethnic Group								
NZ European	501	(27.5)	802	(44.0)	521	(28.6)	1824	(100)
Maori	140	(40.1)	143	(41.0)	66	(18.9)	349	(100)
Pacific	147	(59.3)	63	(25.4)	38	(15.3)	248	(100)
Asian	92	(59.7)	33	(21.4)	29	(18.8)	154	(100)
Other	167	(25.4)	241	(36.7)	249	(37.9)	657	(100)

Almost half (45%) of the beachgoers in the 50+years age group considered themselves poor swimmers compared with less than one third (31%) of the two younger age groups. This indication of a substantial percentage of the population having limited swimming ability and that ability decreasing with age is consistent with previous findings in the US where 37% of the population reported being able to swim less than 25 yards (Gilchrist, Sacks, & Branche, 2000).

Only a quarter (28%) of European New Zealanders thought that they were poor swimmers compared with more than half of Pacific (59%) and Asian (60%) peoples. Conversely, almost three quarters of European New Zealanders thought they were moderate/good swimmers compared with less than half of Pacific (41%) or Asian (40%) peoples. These findings are consistent with overseas studies that have reported higher levels of poor swimming ability among ethnic minorities in the US (Gilchrist, Sacks & Branche, 2000; Smith & Brenner, 1995).

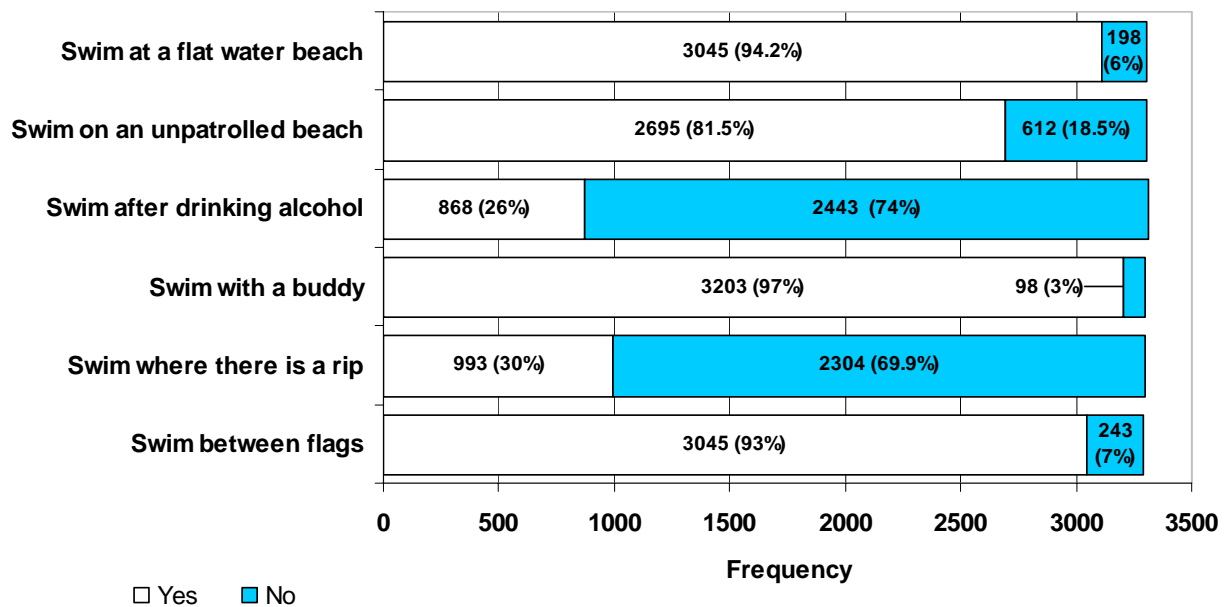
Key Points...

- The youngest age group (15–30 years) was more likely than older age groups to report a high level of swim competency
- Males were more likely than females to report a higher level of swim competency
- European, Maori and beachgoers who self-identified as of other ethnicities reported a higher level of swim competency than Asian, Pacific Island peoples

4.4 Past Swimming Behaviours

Beach-goers were asked about their self-reported at-risk swimming behaviours in the past year in a question that included six at-risk behaviours and required participants to respond using four frequency categories *never*, *sometimes*, *often* and *always*. The majority of beach-goers reported *safe* past swimming behaviours with two thirds (69%) of beachgoers *never* swimming where there was a rip, almost one half (45%) *always* swimming between the patrol flags and three quarters (74%) *never* swimming after drinking alcohol. However, many beachgoers reported that they had swum outside the patrol flags (53%), had swum where there was a rip (30%), had swum after consuming alcohol (26%) or had swum at an unpatrolled beach (80%). Furthermore, a minority of participants reported that they *never* swam between the flags (7%), *never* swam with a buddy (3%) and had *never* swum at a flat-water beach (6%). The majority of beachgoers surveyed (81%) also reported that they had swum at unpatrolled beaches in the past year (figure 3). The figure below combines “sometimes often and always” as yes and never as no.

Figure 3. Beach swimming behaviours



Further analyses were conducted to assess the socio-demographic differences across responses were apparent across all past swimming behaviour items.

Swim between the flags (see Appendix 1, table 9)

- Males were more likely to report that they *never* swim between the flags compared to females.
- Furthermore, the youngest age group was more likely to report that they *never* swim between the flags.

Swim where there is a rip (see Appendix 1, table 10)

- Males were more likely than females to have swum where there was a rip.
- Younger participants (15–30 years) were more likely than older aged participants to report they have swum where there was a rip.
- Asian participants were also more likely to report having swum where there was a rip compared to participants from all other ethnic groups.

Swim with a buddy (see Appendix 1, table 11)

- Males were less likely than females to report that they *always* swim with a buddy.
- However, participants from the youngest age group were also more likely to report that they swim with a buddy compared to older age groups.
- Maori and Pacific Island participants were more likely to report having swum with a buddy over the past year compared with participants from other ethnic groups.

Swim after drinking alcohol (see Appendix 1, table 12)

- Males were more likely to report having swum after drinking alcohol compared to females.
- Younger aged participants were more likely that that swam after drinking alcohol in the past year compared to participants from older age groups.

Swim at an unpatrolled beach (See Appendix 1, table 13)

- Males were more likely to swim at an unpatrolled beach compared to females.
- Younger aged participants were more likely to report having swum at an unpatrolled beach in the past year compared to older participants.
- Maori more likely to report having swum at an unpatrolled beach in the past year compared participants from all other ethnic groups.

Swim at a flat water beach (See Appendix 1, table 14)

- Females were more likely than males to report having swum at a flat water beach in the past year.
- Older aged participants were more likely to swim at a flat water beach compared to participants from other ethnic groups.
- Asian participants reported a higher frequency of swimming at a flat-water beach over the past year.

While the frequency of safe behaviour is encouraging, the prevalence of some at-risk behaviours among a substantial minority of beachgoers is disconcerting. That one third (35%) had swum after consuming alcohol, one fifth (21%) had swum where there was a rip and more than half (55%) had swum outside patrol flags at a surf beach suggest that many beachgoers either do not know or choose to ignore well publicised water safety advice. Such findings are consistent with previous New Zealand and overseas studies. Gulliver and Begg (2005) also found that a substantial number of Dunedin young adults had swum at unpatrolled beaches (47%) and had been involved with water-related activities after consuming alcohol (16%). Moran (2006) reported similar proportions of at-risk swimming behaviours among New Zealand youth with more than half (62%) having swum outside patrol flags and almost one quarter (24%) having swum after consuming alcohol.

The higher frequency of at-risk swimming behaviours among males is also consistent with New Zealand (Gulliver & Begg, 2005; Moran 2006). In overseas studies Howland et al., (1996) found a cluster of risky swimming behaviours among American males that included alcohol consumption, swimming without lifeguard supervision or swimming alone. In a recent study in Oklahoma, Levy et al. (2004) found that those who consumed alcohol were 3.5 times more likely to suffer an immersion injury and that the risk was especially high for young adult males. The evidence presented in the present study, and supported in previous studies suggest that risky swimming behaviour is characteristically a problem among young males and that efforts to change their behaviour should not only be persisted with but intensified.

Key Points...

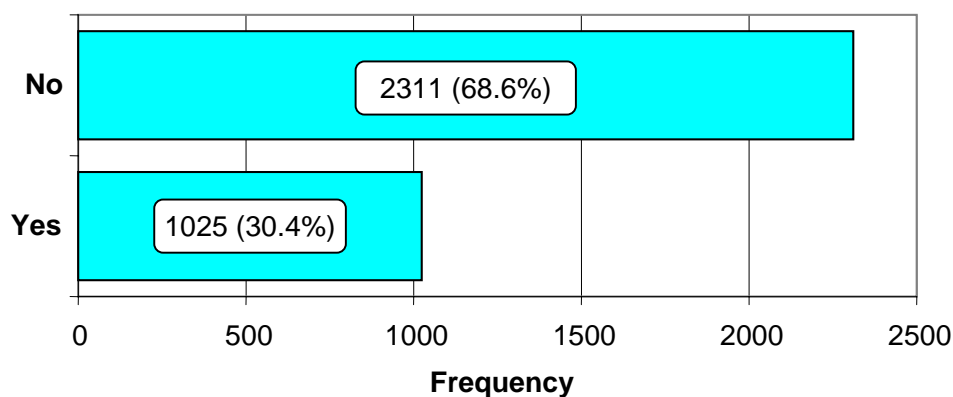
- The youngest age group (15–30 years) was more likely than older age groups to report risky swimming behaviours
- Males were more likely than females to report a risky swim behaviours

4.5. Risk Perceptions

4.5.1 Past life-threatening swimming experience

Participants were asked to report whether they had, in the past, experienced a life-threatening incident while swimming at a beach (table 6). Overall, Figure 4 shows that nearly one third (30%) of beachgoers surveyed reported that they had experienced a life-threatening incident while swimming in the past.

Figure 4. Have you had a past life-threatening experience while swimming at a beach?



When analysed by gender, Table 6 shows that males were more likely to report that they had experienced a life-threatening incident in the past compared to females (53% v 47%). Adults in the middle age category (30–49 years) were slightly more likely to report having had a life-threatening experience in the past than the younger and older age groups, with the oldest age group least likely to have experienced a life-threatening swimming experience (27% v 30% and 33% respectively).

The extent of reporting of past life-threatening aquatic experience is important because it is likely to be an indication of the true extent of drowning risk in what has been termed the “iceberg phenomenon” of injury incidence where mortality and morbidity statistics represent merely the tip of the injury iceberg (Schuman et al., 1977; Smith & Brenner, 1995). The reporting of such incidents may also be important since it is generally assumed that past experience is an important factor in shaping present (and future) beliefs and behaviours.

Table 6.

Past life-threatening swimming experience

	Yes n %	No n %	Total n %
Age			
<i>15-29 years</i>	469 (30.0)	1095 (70.0)	1564 (100)
<i>30-49 years</i>	451 (32.6)	931 (67.4)	1382 (100)
<i>50+ years</i>	101 (27.2)	270 (72.8)	371 (100)
Sex			
<i>Male</i>	540 (53.0)	895 (38.8)	1435 (100)
<i>Female</i>	478 (47.0)	1410 (61.2)	1888 (100)
Ethnic Group			
<i>New Zealand European</i>	559 (30.7)	1260 (69.3)	1819 (100)
<i>Maori</i>	128 (36.6)	222 (63.4)	350 (100)
<i>Pacific</i>	93 (37.2)	157 (62.8)	250 (100)
<i>Asian</i>	41 (26.3)	115 (73.7)	156 (100)
<i>Other</i>	175 (26.8)	477 (73.2)	652 (100)

These findings are consistent with those of previous studies on 'near misses' in relation to drowning. Gulliver and Begg (2005) found that young adult Dunedin males were more likely to report a previous life-threatening experience than females (37% v 61%). Moran (2006) also found that approximately one third (37%) of youth had experienced a life-threatening incident, although more young females than males (40% v 33%) reported such an experience. Moran also suggested that the experience did not appear to have a strong aversive effect on continued participation in aquatic activity among youth. Maori and Pacific Island peoples reported slightly higher 'near misses' than other ethnic groups, while Asian peoples reported least likelihood of experienced such an event which is consistent with their lesser participation in swimming activity as previously reported.

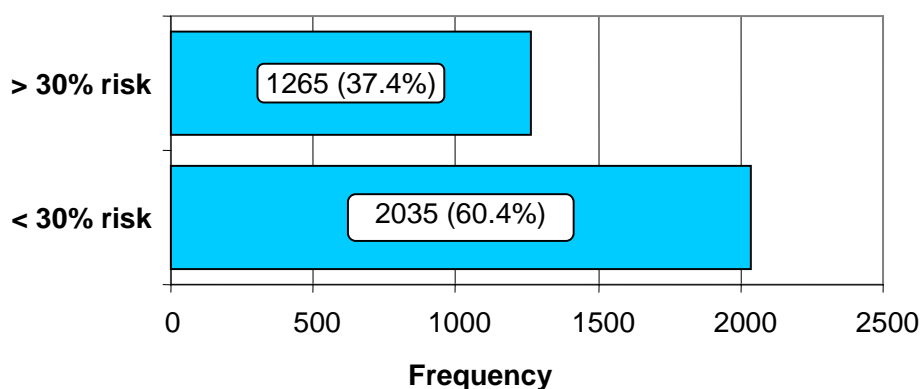
Key Points...

- Males were significantly more likely to report that they had experienced a life-threatening incident compared to females
- Adults in the middle age category (30–49 years) were slightly more likely to report having had a life-threatening experience in the past
- Maori and Pacific island peoples reported slightly higher 'near misses' than other ethnic groups

4.5.2 Perceived likelihood of drowning

Perceived likelihood of drowning was measured using the following question: "Where would you put yourself of a scale of 0-100 in terms of your likelihood of getting into difficulty while swimming at the beach?" Figure 5 shows that when all responses were summed and split at the median point (30% likelihood of getting into difficulty while swimming), results indicated that 60.4% of beachgoers perceived themselves to be at less than 30 % chance, while 37.4% perceived that they had a greater than 30% chance of getting into difficulty while swimming (figure 5).

Figure 5. Perceived likelihood of getting into difficulty while swimming at the beach



When perceived likelihood of drowning was analysed by gender, age and ethnicity, several differences were found among beachgoers who participated in the survey. Table 7 shows results of the item when assessed by gender, age and ethnic group. Females were more likely than males to perceive greater likelihood of experiencing difficulty while swimming in the future (43% v 33%) suggesting that females were more risk sensitive than males. Younger participants were more likely than the two older age groups participants to perceive they had a higher risk of experiencing difficulty while swimming (43% compared with 33% and 37% respectively) a somewhat surprising result given that young people are often thought to underestimate risk (Millstein & Halpern-Felsher, 2002). Table 7 also shows that Asian participants were more likely than any other ethnic grouping to perceive a higher likelihood of experiencing difficulty while swimming at a beach, a possible reflection of their lack of aquatic activity experience and their poorer self-estimated swimming ability as previously reported.

Table 7

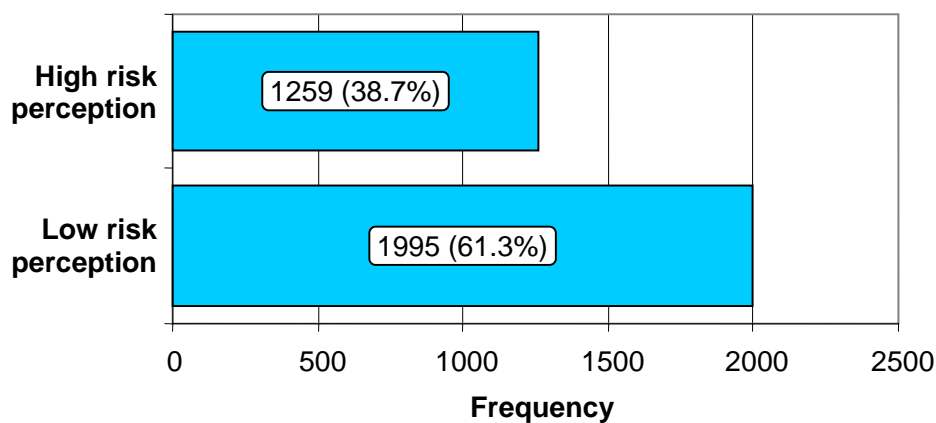
Perceived likelihood of drowning by age level, gender, ethnic group and education level.

	Low risk (< 30% risk)	High risk (> 30 risk)	Total
	n %	n %	n %
Age			
<i>15-29 years</i>	876 (56.9)	663 (43.1)	1539 (100)
<i>30-49 years</i>	918 (66.6)	460 (33.4)	1378 (100)
<i>50 + years</i>	232 (63.4)	134 (36.6)	366 (100)
Sex			
<i>Male</i>	955 (67.0)	467 (32.8)	1422 (100)
<i>Female</i>	1075 (57.5)	793 (42.5)	1868 (100)
Ethnic Group			
<i>NZ European</i>	1232 (68.0)	581 (32.0)	1813 (100)
<i>Maori</i>	185 (53.8)	159 (46.2)	344 (100)
<i>Pacific</i>	101 (41.9)	140 (58.1)	241 (100)
<i>Asian</i>	62 (40.0)	93 (60.0)	155 (100)
<i>Other</i>	396 (61.7)	246 (38.3)	642 (100)

4.5.3 General risk perception

Beachgoers were asked to express their general perceptions of risk by using four response categories ranging from *no risk* to *extreme risk* to five water-safety scenarios of differing danger. A high score for risk perception indicates a higher estimation of the risk associated with each scenario; conversely, a low risk perception score is a lower (or underestimation) of risk. Responses to the four items were summed and dichotomised at the median point to generate low- and high-risk perceptions groups. Results from the analysis of the items across the total sample revealed that 61.3% of the sample had higher risk perceptions (tendency towards over-estimation of risk) and 38.7% of the sample reported lower risk perceptions (tendency towards under-estimation of risk) (figure 6).

Figure 6. General risk perceptions



General perceptions of risk varied considerably among the beach-going population when analysed by sex, age and ethnicity. Table 8 shows that females were more likely than males to perceive the water-safety situations to be risky compared to males (51% v 69%) while oldest aged persons were more likely than the two younger age groups to report the situations as high risk (72% v 61% and 59% respectively). Asian and Pacific Island peoples were also likely to report high risk in the five water-safety scenarios than European, Maori and those of other ethnicities (78% and 69% compared 59%, 54% and 64% respectively).

Table 8.

Risk perceptions (overall) assessed by age level, gender and ethnic group

	High risk perception	Low risk perception	Total
	n %	n %	n %
Age			
<i>15-29 years</i>	892 (58.6)	629 (41.4)	1521 (100)
<i>30-49 years</i>	822 (61.3)	519 (38.7)	1341 (100)
<i>50 + years</i>	259 (71.7)	102 (28.3)	361 (100)
Sex			
<i>Male</i>	713 (51.3)	677 (48.7)	1390 (100)
<i>Female</i>	1265 (68.8)	575 (31.3)	1840 (100)
Ethnic Group			
<i>NZ European</i>	1064 (59.3)	731 (40.7)	1795 (100)
<i>Maori</i>	184 (54.4)	154 (45.6)	338 (100)
<i>Pacific</i>	159 (68.8)	72 (31.2)	231 (100)
<i>Asian</i>	115 (78.2)	32 (21.8)	147 (100)
<i>Other</i>	411 (64.7)	224 (35.3)	635 (100)

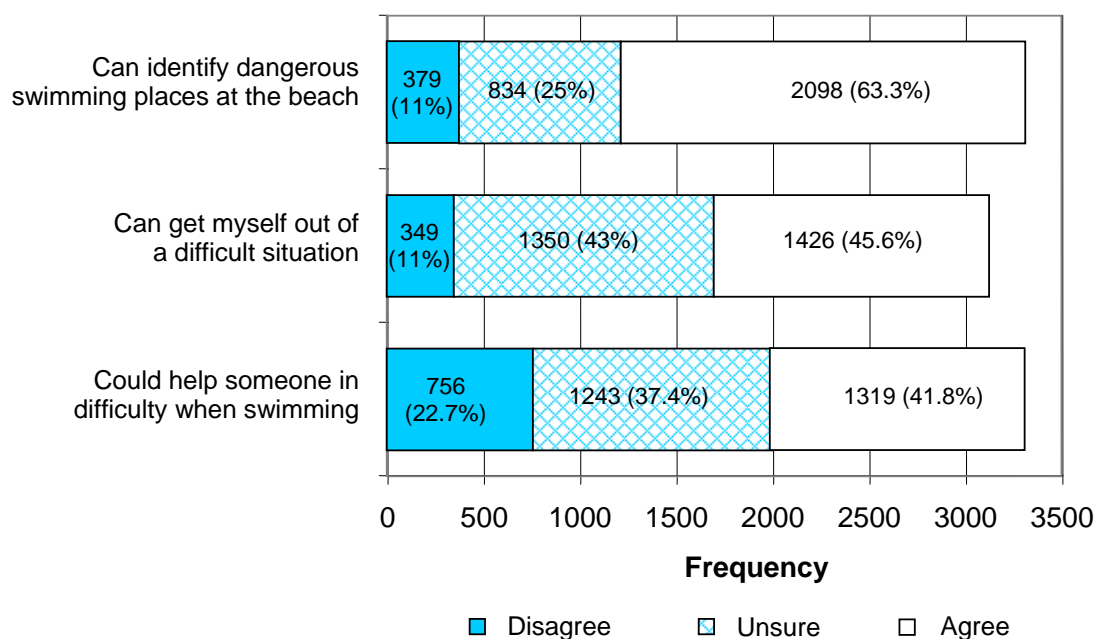
4.5.4 Perceptions of drowning risk (protection motivation theory)

Further analyses were conducted to assess group differences in responses to the different risk perception measures. Four main theoretical constructs were included in the questionnaire included; self-efficacy (e.g. “*I can identify dangerous swimming places at the beach*”), vulnerability (e.g. “*I think other people are at higher risk of drowning than I am*”), severity (e.g. “*If I got caught in a rip it is likely that I would need to be rescued*”), response efficacy (e.g. “*I never swim out of my depth*”). Affect (concern) was also assessed as an additional psychological variable (e.g. “*drowning while swimming at the beach is not a concern to me*”). Results are summarised below (figures 7 -10).

Perceptions of self-efficacy

Results from the self-efficacy items, across the total sample are presented in table 16. Over half of the sample perceived themselves able to identify dangerous swimming places at the beach (62.2%); just under half the sample considered that they could get themselves out of a difficult situation while swimming (42.2) and 39% perceived that they were capable of assisting someone in difficulty swimming at the beach (figure 7).

Figure 7. Responses to self-efficacy items



Further analysis of frequencies indicated several differences between socio-demographic groups for perceived self-efficacy in dealing with the risk associated with swimming at a beach (see table 16, Appendix 2). Specifically, the following results emerged:

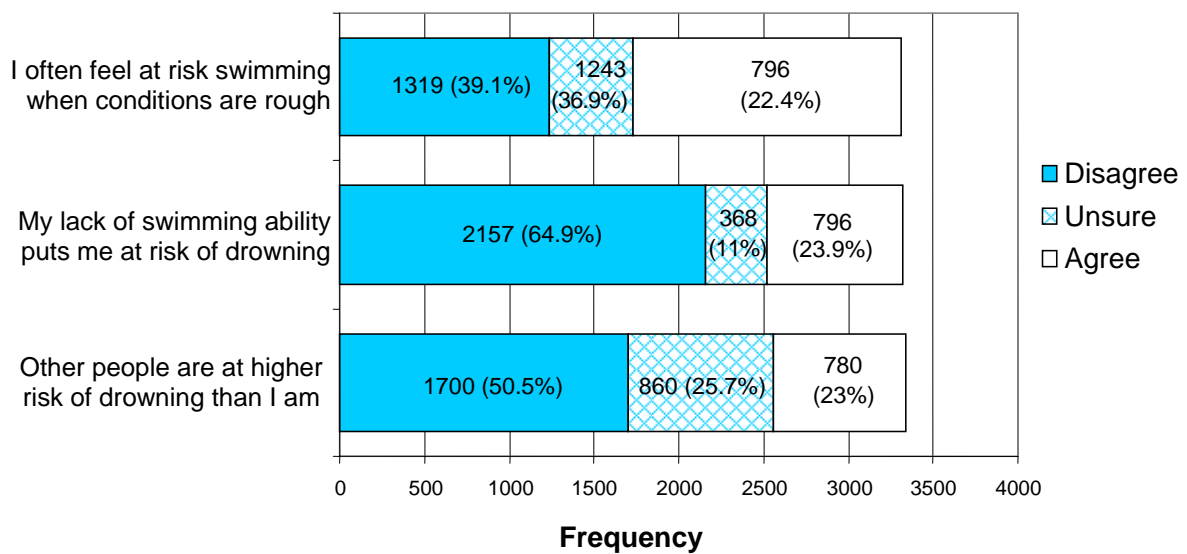
- Males were more likely than females to report higher scores for perceived self-efficacy.
- Participants in the youngest age group reported higher scores for self-efficacy compared to older age groups.

- Maori participants were more likely than participants from all other ethnic groups to report greater perceived severity of risk.
- Participants from the lower and middle education levels were more likely than participants with higher educational attainment, to report higher scores for perceived self-efficacy.

Perceptions of vulnerability

Figure 8 shows participant's perception of vulnerability to experiencing difficulty or drowning while swimming at the beach. One half (51%) of the respondents reported that *other* people were at greater risk of drowning than they were, and less than a quarter (24%) agreed that their lack of swimming ability put them at risk of drowning. This latter response is particularly interesting given that more than half (56%) of the beachgoers surveyed reported that they could not swim more than 100 m. (see Figure 2). More than one third of the beachgoers (36%) disagreed that they felt at greater risk of drowning when conditions were rough.

Figure 8. Responses to perceived vulnerability statements



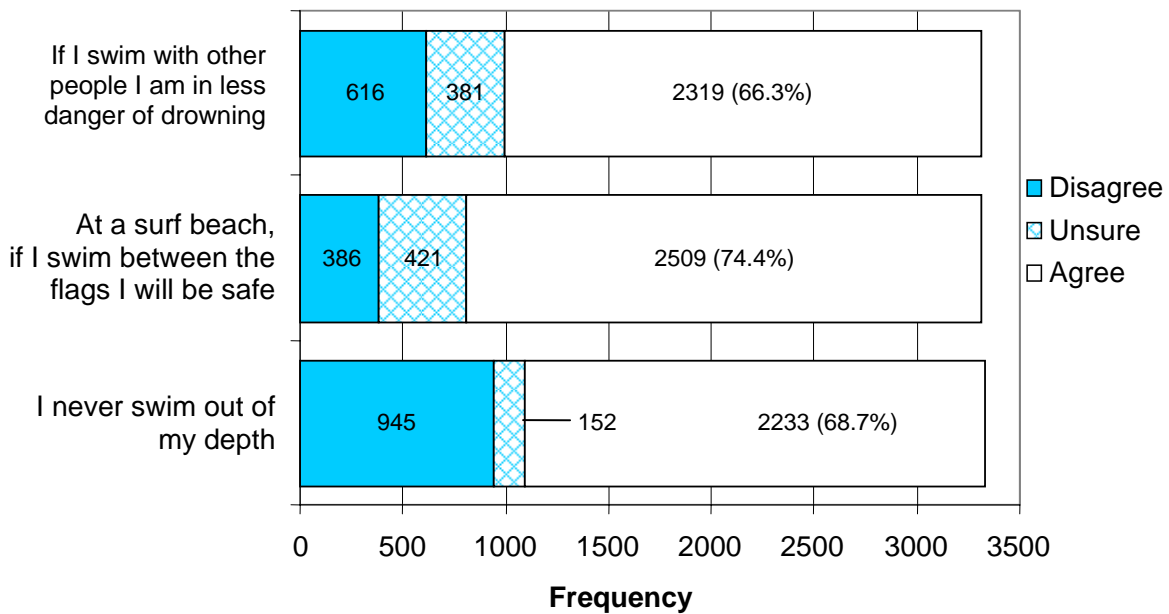
Significant differences in perceived vulnerability to drowning while swimming at a beach was observed for all socio-demographic variables (see table 17, Appendix 2). Among the salient findings:

- Females were more likely to report higher scores for vulnerability compared to males.
- The oldest age group (50+ years) reported higher perceived vulnerability compared to other age groups.
- Asian participants reported higher scores for vulnerability compared to all other ethnic groups.

Perceptions of response efficacy

When beachgoer's perceptions of response efficacy were assessed across the total sample Figure 9 shows that two thirds of the sample reported that they would be safe if they never swim out of their depth (66%), three quarters (74%) of beachgoers surveyed agreed that they would be safe if they swim between the flags at a surf beach. This latter finding is interesting given that the majority (55%) also reported that they had swum outside the patrol flags at a surf beach in the previous year. Two thirds (69%) of participants agreed that if they swim with other people they are in less danger of drowning, although more than two thirds (68%) had swum without a buddy in the previous year.

Figure 9. Responses to response efficacy statements



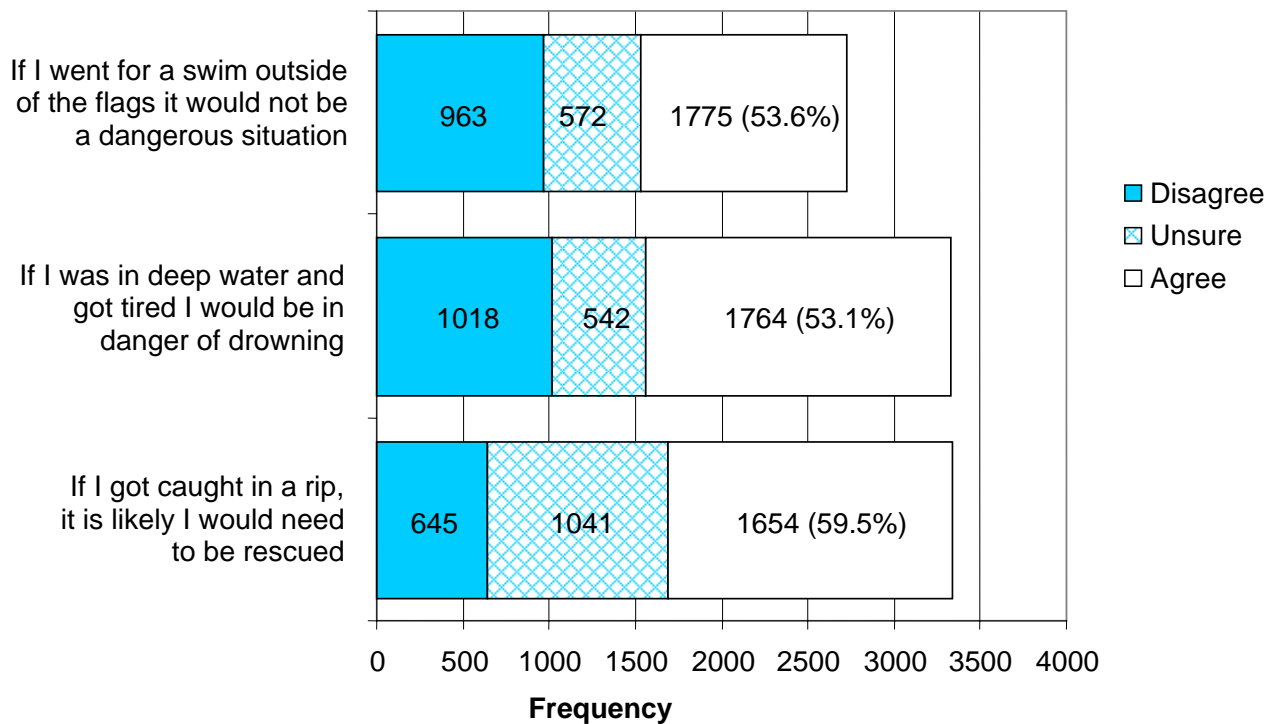
When analysed by gender, significant differences were found between males and females and between the different age groups for perceived response efficacy in beach swimming risk situations (table 18, Appendix 2). No significant differences were observed for ethnicity, although gender and age differences were evident. Specifically, the significant differences observed were:

- Females were more likely than males to report higher scores for response efficacy.
- Participants aged over 50 years were more likely than their younger counterparts to report higher overall scores for response efficacy.

Perceptions of severity of risk

Overall, over half of participants were aware of the severity of risk associated with swimming at the beach; conversely, under half of the sample did not perceive the risks to have severe or serious personal consequences or were unsure about the severity of consequences (figure 10).

Figure 10. Responses to perceived severity statements



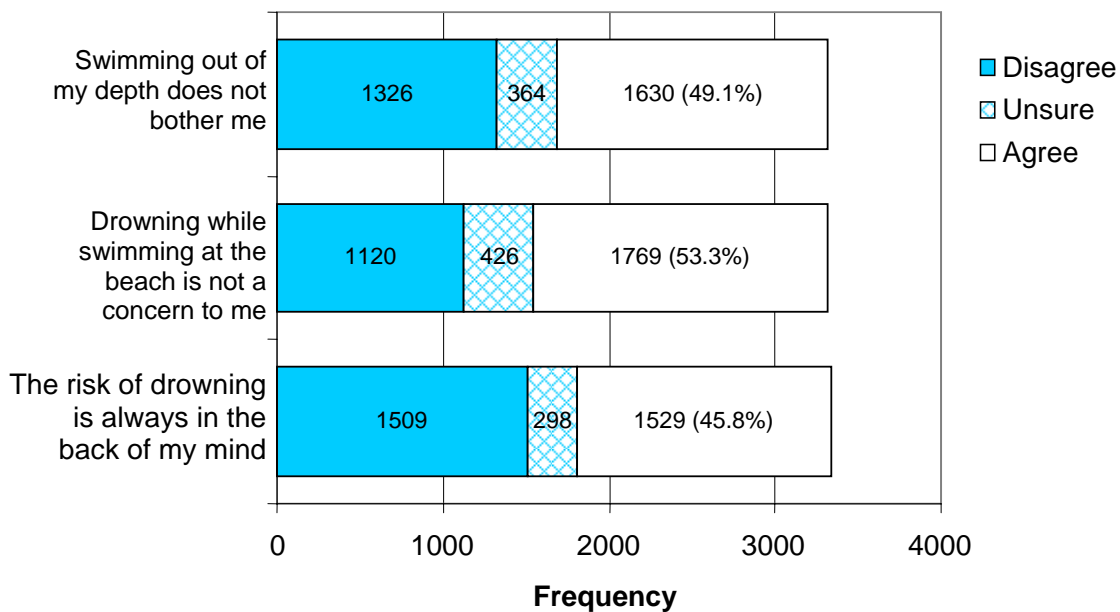
When perceptions of the severity of drowning risk were analysed by gender, age and ethnicity several marked differences among beachgoers perceptions were evident (table 19, Appendix 2). Among the more salient findings were:

- Females were more likely than males to report higher scores for severity of consequences of experiencing difficulty when swimming.
- Participants within the oldest age group (50+ years) were more likely than the younger age groups to report higher scores for severity.
- Asian participants were more likely to report higher overall scores for severity compared to all other ethnic groups.

Perceptions of affect

Overall, around half of the total sample reported being concerned about the risk of drowning associated with swimming at the beach. Conversely, half reported that drowning while swimming was not a concern, while just under half (48.4%) of the total sample did not consider swimming out of their depth bothered them (figure 11).

Figure 11. Affective response to drowning risk statements



Differences in scores for affective responses (e.g. concern, worry) to beach swimming risks were observed for sex, age and ethnicity. Results showed the following between group differences.

- Females were more likely to report greater concern about the risk of drowning compared to male participants.
- Participants in the oldest age category (50+ years) were more likely to report higher scores for affect compared to younger aged participants.
- Asian participants were also more likely to report higher scores for affect than all other ethnic groups.

5. Conclusion

The results of this study and the preceding discussion of key findings suggest that water safety behaviours and perceptions of drowning risk vary considerably within the beach-going population. Moreover, these findings support previous claims that drowning is a complex and multifaceted phenomenon (Quan, 1999) that confronts the complexity of human behaviours within aquatic environments (Moran 2006). Pervasive trends did emerge from the data, consistent with other New Zealand and international research: being young and male is a risk factor for experiencing a life-threatening incident while swimming. Other less expected findings include swimming behaviours reported by Asian peoples, females, and middle-aged adults in regard to swim ability, experiences of past-threatening incidences and perceptions of vulnerability in aquatic situations.

Although results indicate considerable variation in actual “exposure” to risk of drowning through swimming at a beach, our results also describe varying degrees of water safety skills, practices and perceptions. Furthermore, the use of self-reported behaviours and estimates of swimming ability presents some limitations on the validity of research findings. Dependence on self-reporting to determine is inherently subject to recall and social desirability bias, however, cross-sectional data enables a comprehensive introductory explanation of the complexity of drowning risk (Robertson, 1992; Howland et al., 1996). Moreover, individual perceptions of behaviours, that is what people think and believe they do, is an important indicator of actual behaviour in a situation, and as such is very revealing about their knowledge and values regarding behaviour. A significant proportion of the sample (19%) were reported to be from “other” ethnic group, however, it is unclear what proportion of this group were visitors to Auckland during the summer break, or were new residents. This information is important to refine explanations for group differences in water-safety knowledge and behaviours. Further research designed to explore beach-swimming risk perceptions among New Zealand’s visitor and new resident populations is also warranted.

Further limitations of the study are acknowledged and they relate to the sampling. The beaches selected to be included in the study are not representative of Auckland's varied range of recreational beaches, rather they represent a sample of the most popular recreational beaches in Auckland. Accordingly, smaller beaches, that may well attract different social demographic groups, were excluded from the sampling frame. In addition, data was collected on weekend days only, precluding a sample of weekday beach-goers who potentially represent different populations (e.g. possibly young families and older people). In essence, the sample is not a representative sample of Auckland beach-goers, rather a sample of people who went to the beach regularly during the midday weekend time period in late January and February 2006 (table 1). Finally, by virtue of the scope of this report, the research is confined to the self-reported perceptions and knowledge, attitudes and behaviours of beach-goers. The overall strategy to prevent drowning must consider the implications of the findings in addition to other available research and intervention opportunities that examine the context and policy environment.

Findings from this large-scale survey enable, for the first time, a robust and timely description of beach-goers swimming behaviour and perceptions of risk of drowning at the beach. Results from these analyses support previous research that suggests that males and younger aged adults are most likely to neglect undertaking health protective action, in this context, water safety measures. It is uncertain to what extent this finding indicates a lack of knowledge, or reflects a proportionately high level of risk-taking behaviour among these populations. These results suggest that a minority younger aged persons and males are most vulnerable to neglecting water-safety measures such as avoiding swimming where there is a rip and not swimming after drinking alcohol. As expected, these population groups are also over-represented in drowning and near-drowning statistics (Howland et al., 1996).

The results of this study support the importance of assessing psychological constructs as a means of developing a deeper understanding of the role of human beliefs and behaviours in shaping drowning risk. Individual perceptions about their ability to appraise a risk situation, their perception of vulnerability to that risk, their perceived severity of the consequences that may arise from that risk and their beliefs about ways of managing or responding to the risk predict the use of health protective behaviours. Previous research would also support the argument that affect, or more specifically, levels of concern about that risk are also predictive of health protective behaviour (McCool et al., 2006).

The use of protection motivation theory (Rogers, 1975) to explain the nuances of risk perception in relation to water safety appears to have been well founded and offers direction for further research and intervention. Measures of perceived self-efficacy of coping with risk, vulnerability to risk, severity of the risk and perceived efficacy of preventive measures consistently indicated that some groups, notably males and younger beach-goers, perceive risk and their capacity to manage that risk in the aquatic environment differently from others (notably females and older people). Further qualitative research that focuses on individual perceptions within the at-risk groups identified in this study appears warranted.

Group differences in perceptions of risk associated with aquatic behaviours are likely to be critical determinants of risky-swimming behaviour resulting in drowning. The marked differences identified in estimation of risk between male and female and between young and old provides impetus for further in-depth research, via case or focus group study. Specifically, the generalised male tendency towards overestimating ability and underestimating actual risk is most notable, and in the context of the present study, is most concerning. Further research examining risk appraisal using video and on-site analysis of real, rather than imagined, scenarios would be particularly informative, since it would place the risk assessment process in the social context where decision-making about potential harm takes place rather than as part of a hypothetical exercise as was the case with the present study.

In conclusion, the results of this cross-sectional study of Auckland beach-goers swimming behaviours and perceptions of risk reinforce the objectives of the Drowning Prevention Strategy. It is evident from the results and subsequent discussion that further improvements in water safety knowledge can only be realised through continued excellence in research and development and the design and implementation of effective intervention that can influence these characteristics. For research to translate into real progress within water-safety, the implications of this empirical evidence must be widely and accurately disseminated to all involved in water safety. Second, it is important that research findings are used to inform quality water safety education and awareness initiatives that are assessable, and meaningful to providers and consumers.

6. Recommendations

On the basis of the evidence produced in this large-scale, baseline study of beachgoers swimming ability, water safety behaviours and perceptions of drowning risk, the following recommendations are made:

- Water safety education programmes aimed at changing male and youth at-risk behaviour in the aquatic environment need to address the likelihood of underestimation of risk and overestimation of ability as central constructs in educational interventions.
- Media campaign addressing dangers of underestimation of risk, and overestimation of ability and enhancement of response efficacy knowledge and skills in water safety, targeting high-risk groups.
- Focus collaborative efforts within the water safety sector towards challenging and shifting pervasive misconceptions about drowning risk and promoting water-safety knowledge in educational settings and the wider community
- Further studies are required to ascertain the (perceived and actual) protective value of being able to swim as a protection against drowning within the youth and adult population.
- Further research into exploring non-residents understandings of the risk of drowning at New Zealand beaches.
- Distribute findings to relevant organisations within the water-safety sector and make this report available in PDF format in the Drowning Prevention Strategy website.

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Appendix 1. Questionnaire

CODE							
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THE UNIVERSITY OF AUCKLAND
FACULTY OF MEDICAL AND
HEALTH SCIENCES

Swimming safely at the Beach

This questionnaire is designed to gather some information about how you assess your personal risk of drowning when swimming at the beach.

The questions refer to your perceptions of swimming at any beach, not just the one you are on today. Many of the questions ask your views about how you rate your risk of experiencing difficulty in the water. Most questions offer a range of responses, for these questions there are no right or wrong answers - an answer is correct if it is true for you.

Please do not take too long over each question - normally your first answer is best. If you have any queries about the questionnaire please ask the researcher who will be happy to assist you.



1. How many lengths of a 25 metre swimming pool could you **currently** swim without stopping or touching the bottom?

- None, I cannot swim
- Up to 1 length (< 25 m)
- Up to 4 lengths (25-100 m)
- Up to 8 lengths (100-200 m)
- Up to 16 lengths (200-400 m)
- More than 16 lengths (> 400 m)

2. How would you rate the risk to **your life** in the following situations?

	Extreme Risk	High Risk	Slight Risk	No Risk
Tipped upside down in a canoe 100 metres from the shore of a lake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Caught in a rip current at a surf beach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chased inflatable toy into deep water at a local swimming pool	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fell into deep water fully clothed whilst walking along a river bank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swept off isolated rocks by a wave while fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3 In general, how do you rate your water safety skills when swimming at the beach?

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
I can identify dangerous swimming places at the beach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could get myself out of a difficult situation when swimming at the beach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could help someone in difficulty while swimming at the beach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. In general, how do you rate your risk of drowning when swimming at a beach?

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
I think other people are at higher risk of drowning than I am	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My lack of swimming ability puts me at risk of drowning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I often feel at risk swimming when conditions are rough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. What would happen if you got into trouble when swimming at the beach?

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
If I got caught in a rip, it is likely I would need to be rescued	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I was in deep water and got tired I would be in danger of drowning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I went for a swim outside of the flags it would not be a dangerous situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. In general, what do you do to keep yourself safe when swimming at the beach

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
I never swim out of my depth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At a surf beach, if I swim between the flags I will be safe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I swim with other people I am in less danger of drowning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. In general, how do you feel about swimming at the beach?

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
The risk of drowning is always in the back of my mind	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drowning while swimming at the beach is not a concern to me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swimming out of my depth does not bother me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

12. Do you reapply sunscreen after you have been for a swim?

Always Sometimes Never

13. Are you?

Male Female

14. How old are you?

15 - 19 years

20 - 29 years

30 - 39 years

40 - 49 years

50 - 59 years

60 + years

15. Which ethnic group do you identify with most (please tick one)

New Zealand European

New Zealand Maori

Cook Island Maori

Samoan

Tongan

Tokelauan

Niuean

Asian

Other _____

16. What is your highest level of education? (Please tick one box only).

- Some high school, not completed
- School certificate/NCEA 1
- Sixth form certificate, UE, NCEA 2
- University Bursary or Scholarship
- Polytech or technical institute
- University degree
- Trade apprenticeship

Thank you.



Please note: the researcher will collect this questionnaire from you.

Appendix 2. Tables

Table 9.

Socio-demographic characteristics for past swimming behaviour: swim between the flags at a surf beach.

	Never n (%)	Sometimes n (%)	Always n (%)
Age			
15 – 29 years	136 (8.8)	422 (27.3)	990 (64.0)
30 – 49 years	75 (5.5)	208 (15.2)	1083 (79.3)
50+ years	31 (8.8)	33 (9.4)	287 (81.8)
Sex			
Male	122 (8.6)	342 (24.0)	959 (67.4)
Female	118 (6.4)	320 (17.3)	1408 (76.3)
Ethnic Group			
European	98 (5.5)	352 (19.6)	1342 (74.9)
Maori	37 (9.1)	80 (23.5)	230 (67.4)
Pacific	38 (15.4)	58 (23.5)	151 (61.1)
Asian	16 (10.3)	28 (18.1)	111 (71.6)
Other	48 (7.5)	128 (20.0)	465 (72.5)

Table 10.

**Socio-demographic characteristics for past swimming
behaviour: swim where there is a rip.**

	Never n (%)	Sometimes n (%)	Always n (%)
Age			
<i>15 – 29 years</i>	997 (64.1)	455 (29.2)	104 (6.7)
<i>30 – 49 years</i>	1013 (74.0)	305 (22.3)	50 (3.7)
<i>50+ years</i>	280 (79.5)	66 (18.8)	6 (1.7)
Sex			
<i>Male</i>	858 (60.3)	462 (32.5)	102 (7.2)
<i>Female</i>	1440 (77.5)	364 (19.6)	55 (3.0)
Ethnic Group			
<i>European</i>	1338 (74.5)	412 (22.9)	47 (2.6)
<i>Maori</i>	247 (71.6)	83 (24.1)	15 (4.3)
<i>Pacific</i>	188 (75.8)	38 (15.3)	22 (8.9)
<i>Asian</i>	86 (56.2)	45 (29.4)	22 (14.4)
<i>Other</i>	371 (57.7)	224 (34.8)	48 (7.5)

Table 11.

**Socio-demographic characteristics for past swimming
behaviour: swim with a buddy**

	Never n (%)	Sometimes n (%)	Always n (%)
Age			
<i>15 – 29 years</i>	38 (2.40)	267 (17.2)	1247 (80.3)
<i>30 – 49 years</i>	43 (3.1)	339 (24.6)	994 (72.2)
<i>50+ years</i>	16 (4.5)	87 (24.7)	249 (70.7)
Sex			
<i>Male</i>	55 (3.9)	391 (27.40)	979 (68.7)
<i>Female</i>	40 (2.2)	304 (16.4)	1515 (81.5)
Ethnic Group			
<i>European</i>	35 (1.9)	388 (21.5)	137 (76.5)
<i>Maori</i>	3 (.9)	69 (19.9)	275 (79.3)
<i>Pacific</i>	11 (4.5)	48 (19.4)	18.8 (79.1)
<i>Asian</i>	11 (7.1)	34 (22.1)	109 (70.9)
<i>Other</i>	33 (5.2)	136 (21.3)	470 (73.6)

Table 12.

**Socio-demographic characteristics for past
swimming behaviour: swim after drinking alcohol**

	Never n (%)	Sometimes n (%)	Always n (%)
Age			
15 – 29 years	960 (61.6)	450 (28.9)	149 (9.6)
30 – 49 years	1158 (84.1)	198 (14.4)	21 (1.5)
50+ years	306 (86.7)	37 (10.5)	10 (2.8)
Sex			
Male	935 (65.4)	380 (26.6)	114 (8.0)
Female	1499 (80.3)	305 (16.3)	62 (3.3)
Ethnic Group			
European	1347 (74.7)	385 (21.4)	71 (3.9)
Maori	233 (67.0)	78 (22.4)	37 (10.6)
Pacific	183 (73.8)	39 (15.7)	26 (10.5)
Asian	122 (78.7)	22 (14.2)	11 (7.1)
Other	475 (73.6)	141 (21.9)	29 (4.5)

Table 13.

**Socio-demographic characteristics for past swimming behaviour:
swim at an unpatrolled beach**

	Never n (%)	Sometimes n (%)	Always n (%)
Age			
15 – 29 years	232 (14.9)	763 (48.9)	565 (36.2)
30 – 49 years	271 (19.7)	798 (58.0)	360 (22.3)
50+ years	107 (30.5)	185 (52.7)	59 (16.8)
Sex			
Male	212 (14.9)	775 (54.4)	438 (30.7)
Female	397 (21.3)	970 (52.0)	497 (26.7)
Ethnic Group			
European	261 (14.5)	1028 (57.0)	513 (28.5)
Maori	48 (13.9)	166 (48.0)	132 (38.2)
Pacific	76 (30.6)	104 (41.9)	68 (27.4)
Asian	64 (41.6)	65 (42.2)	25 (16.2)
Other	134 (20.8)	442 (51.6)	178 (27.6)

Table 14.

**Socio-demographic characteristics for past swimming behaviour:
swim at a flat water beach**

	Never n (%)	Sometimes n (%)	Always n (%)
Age			
15 – 29 years	110 (7.1)	774 (49.7)	693 (43.2)
30 – 49 years	65 (4.7)	615 (44.8)	694 (50.5)
50+ years	18 (5.1)	151 (42.9)	183 (52.0)
Sex			
Male	95 (6.7)	701 (49.3)	626 (44.0)
Female	97 (5.2)	841 (45.1)	929 (49.7)
Ethnic Group			
European	83 (4.6)	858 (47.6)	863 (47.8)
Maori	18 (5.3)	173 (49.7)	157 (45.1)
Pacific	32 (13.0)	112 (45.3)	103 (41.7)
Asian	13 (8.4)	63 (40.9)	78 (50.6)
Other	39 (6.1)	291 (45.5)	309 (48.4)

Table 15.

Pearson correlation coefficients for risk perception constructs in model

	Efficacy	Vulnerability	Severity	Response	Affect
Efficacy	-	-.50**	-.36**	-.12**	.37
Vulnerability	-.50**	-	.48**	.17**	-.52**
Severity	-.35**	.48**	-	.22**	-.45**
Response	-.12**	.17**	.22**	-	-.26**
Affect	.37**	-.52**	-.45**	-.26**	-

** Correlation is significant at the 0.01 level

Table 16.**Self efficacy items across total sample**

	Disagree n %	Unsure n %	Agree n %	Total n %
I can identify dangerous swimming places at the beach	379 (11.8)	834 (24.7)	2098 (62.2)	3311 (98.7)
I could get myself out of a difficult situation when swimming at the beach	349 (16.3)	1350 (40.0)	1426 (42.2)	3125 (98.5)
I could help someone in difficulty while swimming at the beach	756 (22.4)	1243 (36.9)	1319 (39.1)	1319 (98.4)

Table 17.**Vulnerability items across total sample**

	Disagree n %	Unsure n %	Agree n %	Total n %
I think other people are at higher risk of drowning than I am	1700 (50.5)	860 (25.5)	780 (23.1)	3340 (99.1)
My lack of swimming ability puts me at risk of drowning	2157 (64)	368 (10.9)	796 (23.6)	3321 (98.5)
I often feel at risk swimming when conditions are rough	1233 (35.3)	493 (14.6)	1586 (47)	3312 (96.9)

Table 18.**Response efficacy items across total sample**

	Disagree n %	Unsure n %	Agree n %	Total n %
I never swim out of my depth	945 (28)	152 (4.5)	2233 (66.3)	3330 (98.8)
At a surf beach, if I swim between the flags I will be safe	386 (11.4)	421 (12.5)	2509 (74.4)	3316 (98.3)
If I swim with other people I am in less danger of drowning	616 (18.3)	381 (11.3)	2319 (68.7)	3316 (98.3)

Table 19.**Perceived severity of consequences of experiencing difficulty while swimming at a beach**

	Disagree n %	Unsure n %	Agree n %	Total n %
If I got caught in a rip, it is likely I would need to be rescued	645 (19.1)	1041 (30.9)	1654 (49.1)	2440 (99.1)
If I was in deep water and got tired I would be in danger of drowning	1018 (30.2)	542 (16.1)	1764 (52.3)	3324 (98.6)
If I went for a swim outside of the flags it would not be a dangerous situation	963 (28.6)	572 (17.0)	1195 (52.7)	2730 (98.3)

Table 20.**Emotional (affect) concerns regarding swimming at the beach**

	Disagree n %	Unsure n %	Agree n %	Total n %
The risk of drowning is always in the back of my mind	1509 (44.8)	298 (8.8)	1529 (45.4)	3336 (99)
Drowning while swimming at the beach is not a concern to me	1120 (33.2)	426 (12.6)	1769 (52.5)	2315 (98.3)
Swimming out of my depth does not bother me	1326 (39.2)	364 (10.8)	1630 (48.4)	3320 (98.4)