



Western Cape
Government



Western Cape Strategic Framework for
Drowning Prevention and Water Safety



FOREWORD

Drowning is an under acknowledged, yet preventable, public health issue. It is particularly distressing that drowning disproportionately affects our youngest and most vulnerable citizens, both here in the Western Cape and further afield. In addition to the devastating loss of life in fatal drowning incidents, the long term financial and social consequences of non-fatal drowning incidents significantly impact the individuals, families and communities of the Western Cape that experience these events.

There is therefore a need for a robust, evidence-led drowning prevention strategy for the Western Cape Province. In countries as diverse as Australia and Bangladesh, strategic and evidence-led drowning prevention programs have resulted in innovative interventions that successfully reduce death and injury by drowning. Collaborative partnerships between community stakeholders, policy makers and the research community have been key to the success of these prevention efforts.

The Western Cape Government, together with the many water safety stakeholders in the province, has recognised the burden of drowning within the province and sought to coordinate prevention efforts and address the gaps in drowning prevention responses. The South African Medical Research Council and University of South Africa's Violence, Injury and Peace Research Unit was tasked with quantifying the drowning burden within the Western Cape, and harnessing the expertise of passionate water safety stakeholders within local government structures, civil society organisations, and the academic community to identify priority drowning prevention responses. With time, the development of the Western Cape Drowning Prevention and Water Safety Strategy will be a success story for the value of partnerships in addressing challenges facing our communities and farms.

This Framework identifies seven strategic objectives aimed at reducing death and disability by drowning in the Western Cape. These objectives, and the information presented in this Framework, will guide local authorities and civil society organisations in the strategic implementation of drowning prevention efforts that fall within their communities and scope of practice.

A handwritten signature in black ink, appearing to read 'Anton Bredell'. The signature is stylized and written over a horizontal line.

Minister Anton Bredell

Ministry of Local Government, Environmental Affairs and Development Planning

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Front Cover: Waves for Change. Photographer: Nic Bothma

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ACRONYMS

DRM	Disaster Risk Management
EMS	Emergency Medical Services
FPS	Forensic Pathology Services
ILS	International Lifesaving Federation
LSA	Lifesaving South Africa
NSRI	National Sea Rescue Institute
RLSSA	Royal Life Saving Society Australia
SA	South Africa
SAMRC	South African Medical Research Council
UCT	University of Cape Town
UNISA	University of South Africa
VIPRU	Violence, Injury and Peace Research Unit
WC	Western Cape
WCDMC	Western Cape Disaster Management Centre
WHO	World Health Organization
NDOH	National Department of Health

GLOSSARY

Term	Definition
Drowning	Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid, with outcomes classified as death, morbidity and no morbidity (WHO, 2017a).
Fatal drowning	Fatal drowning is classified as death as a result of drowning (WHO, 2014).
Non-fatal drowning	Non-fatal drowning occurs when an individual is rescued from drowning and the process of drowning is stopped (Szpilman, Joost, Bierens, Handley, & Orłowski, 2012).
Immersion	Immersion is when an individual's upper airway is above the surface of water (Bierens, Lunette, Tipton & Warner, 2016).
Submersion	Submersion occurs when an individual's airway goes under the surface of liquid (Szpilman et al., 2012).
Water rescue	Water rescue is considered a submersion or immersion event that does not result in respiratory impairment (Bierens et al., 2016; van Beeck, Branche, Szpilman, Modell, & Bierens, 2005).
Water safety	The concept of water safety includes four aspects, that is, comprehensive water skills; insight into general and local conditions; an attitude of respect for the elements and for human frailty and human error; as well as the skill to make accurate judgements in risky circumstances (Kjendie, Stallman, & Olstad, 2011).
Injury	An injury refers to "the physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance - or else the result of the lack of one or more vital elements such as oxygen" (Baker, O'neill, Ginsburg & Li, 1992, p.4). Injuries are usually categorised into two broad groups: intentional or unintentional injuries (de Ramirez, Hyder, Herbert, & Stevens, 2012; Schopper, Lormand, & Waxweiler, 2006).

Term	Definition
Intentional injury	Intentional injuries refer to injuries in which there are clear plans to cause harm to oneself or to others (de Ramirez et al., 2012). Intentional injuries can further be grouped according to the individuals involved in the situation (Schopper et al., 2006). That is, self-inflicted violence, such as suicide or self-mutilation; interpersonal violence, such as fatal or non-fatal injuries perpetrated by one person towards another (e.g. homicide); as well as collective violence, such as war or gang violence (Schopper et al., 2006).
Unintentional injury	An injury is considered unintentional when there is no predetermined plan to cause harm (de Ramirez et al., 2012). Unintentional injuries are usually derived from external causes and are subdivided according to the manner in which an injury occurs, the most frequently used subgroups being road traffic injuries, falls, burns, scalds, drowning, poisonings as well as stabs or cuts (de Ramirez et al., 2012; Schopper et al., 2006).
Injury prevention	Injury prevention is understood as particular interventions or actions that serve to prevent the occurrence of an injury or violent incident by reducing the likelihood of it occurring or by making it almost impossible to occur. Injury control is defined as actions that are targeted at minimising injuries or the negative outcomes that result from injuries (WHO, 2010).
Primary, secondary and tertiary prevention	Injury prevention interventions may be viewed in terms of three levels of action: <ul style="list-style-type: none"> • Primary prevention attempts to prevent injury. This level of prevention targets the pre-injury phase. • Secondary prevention refers to the immediate response upon occurrence of an injury or minimising the severity of the injury. • Tertiary prevention refers to minimising occurrence and severity of disability post injury (Taneja, van Beeck & Brenner, 2008).
Policy document	A policy refers to “a written document that provides the basis for action to be taken jointly by the government and its non-governmental partners (Schopper et al., 2006). The intention of such a document is to raise awareness and create mutual understanding about a situation (based on analysis of problems, trends, causes and potential solutions); to articulate ethical and other principles that should justify and guide action; to generate a consensus vision on the actions to be undertaken; to provide a framework for action; to define institutional responsibilities and mechanisms of coordination; and to engage a variety of partners” (Schopper et al., 2006, p.4). In terms of an injury-related policy prevention document, the key values and aims, urgent actions and processes for averting injuries; as well as minimising their health-related repercussions should be outlined.

Term	Definition
Strategic framework	The term strategy is highly related to policy. A strategy outlines the key “directions and actions required to accomplish the objectives set out in the policy document” (Schopper et al., 2006, p.5).
Morbidity	Morbidity is “any departure, subjective or objective, from a state of physiological or psychological well-being” (Porta, 2014, p. 189).
Mortality	Mortality indicates the occurrence of death in a population (Butchart, Phinney, Check & Villaveces, 2004).



OPENING NOTE TO THE READER

This Western Cape Drowning Prevention and Water Safety Strategy has been developed to support the prioritisation of programmes that will help prevent drowning and promote water safety in the Western Cape. The Framework is a strategic endeavour to change key environmental, social and behavioural factors that contribute to the causation of drowning. The Strategic Framework highlights evidence-led recommendations for the Western Cape Local Government Department to recommend operational plans that utilise proven drowning prevention interventions. The Framework draws on the public health and disaster risk perspectives, which have been successfully applied across settings to integrate the efforts of multiple sectors in the implementation of evidence-led drowning injury prevention strategies.

The Framework highlights the most common water bodies where drowning occurs and the populations most at risk in the Western Cape. While the Framework targets the prevention of risk factors specific to these priority groups and settings, it also emphasises the promotion of supportive institutional factors. The Strategic Framework focuses on the prevention of fatal and non-fatal drowning as well as the promotion of water safety. The Framework requires the formation of strong collaborations between provincial departments and other external stakeholders. It provides a framework for partners in the water safety and drowning prevention sector to collaborate on common service delivery activities to achieve the areas for action listed in the Framework.

The following objectives have been identified:

- 1. Establish provincial information strategies and systems based on existing platforms,**
- 2. Strengthen advocacy and enforcement of priority policy measures,**
- 3. Promote multi-sectoral partnerships and water safety collaborations,**
- 4. Strengthen institutional prevention capacity,**
- 5. Strengthen public and specialised education and community awareness,**
- 6. Develop priority barrier interventions, and**
- 7. Develop priority infrastructural interventions.**

This Strategic Framework offers a platform from which Departments can implement priority drowning prevention and water safety promotion programmes. The Framework specifies strategic objectives, each with recommended strategies. Specific injury prevention implementation plans will be developed separately by departments or partner agencies, and integrated into existing plans. Some of these interventions are already in place across various departments and have therefore been incorporated as part of this integrated strategy.

THE STRATEGIC FRAMEWORK

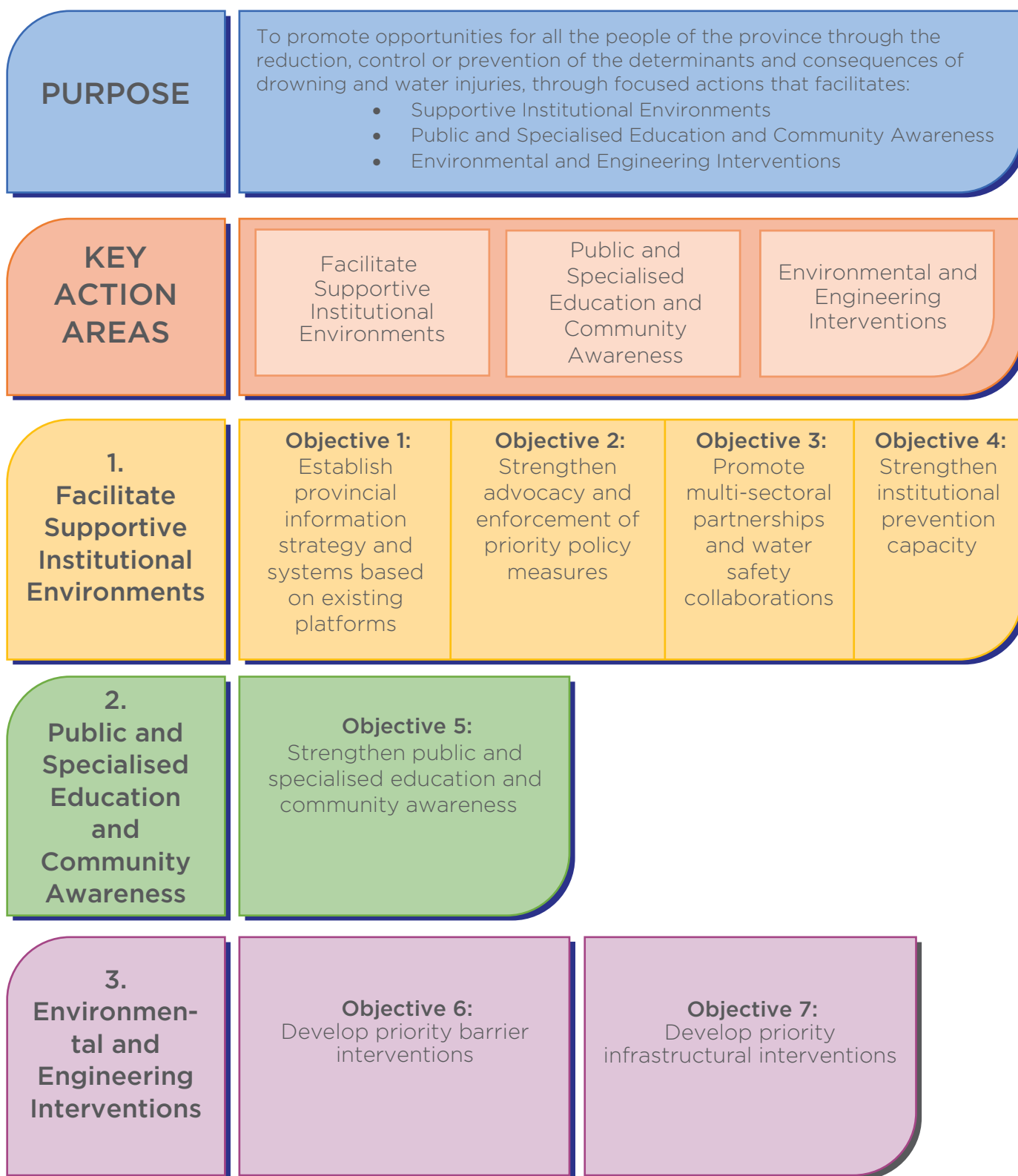


Figure 1.1. The strategic framework

1

MAGNITUDE AND THE EXTENT OF DROWNING

Drowning is the process of experiencing respiratory impairment from submersion (i.e. when an individual's airway is below the surface of liquid) or immersion (i.e. when an individual's upper airway is above the surface of water) in a liquid medium (Bierens et al., 2016; Hooper & Hockings, 2011; Szpilman, et al., 2012). Whether or not the victim survives from this ordeal, he or she has been involved in a drowning incident. The drowning process begins with respiratory impairment as a person submerses below the surface of liquid, this is followed by breath-holding, panic, swallowing of water, aspiration and triggers the reflux response, i.e. coughing (Hooper & Hockings, 2011; Szpilman et al., 2012). In some cases, laryngospasm occurs, an upper airway reflex, which inhibits the entrance of liquid into the lungs (Bierens et al., 2016). When laryngospasm occurs, it is rapidly terminated by the onset of brain hypoxia (i.e. the lack of oxygen to the brain).

If the person is rescued at any time, the process of drowning is interrupted, and the incident is then termed a non-fatal drowning (Szpilman et al., 2012). According to Hooper and Hockings (2011), survivors aspirate less than 3-4ml/kg fluid, which is often contaminated with sand, mud, vomit or other debris. If the person is not rescued, aspiration of water continues and hypoxemia leads to loss of consciousness and apnea, which is followed by the sequence of cardiac rhythm deterioration, which is a fast heartrate (tachycardia) followed by a slow heart rate (bradycardia), resulting in a pulseless electrical activity and finally asystole (i.e. the functioning of the heart stops). If the person dies at any time as a result of drowning, this is termed a fatal drowning.

The whole drowning process from submersion/immersion to cardiac arrest, usually occurs in seconds to a few minutes, however, drowning in ice water may prolong this process for up to an hour (Tipton & Golden, 2011). In some cases, if the person is rescued immediately after submersion or immersion, and respiratory impairment is not evident, this is known as a rescue and not a drowning.

Van Beeck et al. (2005) highlighted that the following terms should be avoided when referring to a drowning incident: 'near-drowning', 'dry or wet drowning', 'secondary drowning', 'active and passive drowning', and 'delayed onset of respiratory distress'. These terms have been identified as confusing, may pose difficulties when used in empirical research and may lead to an underrepresentation of the issue of drowning (van Beeck & Branche, 2014). Therefore, the use of the terms 'fatal' and 'non-fatal' drowning has been recommended and the outcomes of a drowning incident should be categorised as 'death', 'morbidity' and 'no morbidity' (van Beeck & Branche, 2014).

1.1 GLOBAL AND SOUTH AFRICAN DROWNING MORTALITY AND MORBIDITY

Mortality

Drowning is a serious and neglected public health threat, annually claiming the lives of 360 000 people worldwide, making it the world's third leading cause of unintentional injury mortality (WHO, 2017a). In 2015, injuries caused an estimated 9% of mortality worldwide with drowning in turn accounting for 7% of all injury deaths (WHO, 2017a). Low- and middle-income countries (LMICs) are particularly affected by drowning, accounting for over 90% of unintentional drowning deaths (WHO, 2017a). It has been reported that high-income countries (HICs) have an average standardised drowning death rate of 1.2 per 100 000 population (Moutafi & Petridou, 2014). In 2003, Peden and Mcgee (2003) reported that the WHO African region has the highest drowning-related mortality rate worldwide, at 13.1 per 100 000 population. In 2012, it was estimated that the WHO African Region explained 20% of global drowning mortality rates (WHO, 2014). In South Africa, drowning mortality was reported to be the fifth leading cause of unintentional death, with 1690 deaths reported in 2009 (Matzopoulos et al., 2015) and 1411 deaths in 2015 (Statistics South Africa (Stats SA), 2017).

A recent systematic review conducted by Saunders, Sewduth and Naidoo (2018) suggests that the drowning mortality rate within South Africa (SA) is stable at 3.0 per 100 000 population. Despite the steady fatal drowning rate within SA, fatal drowning continues to contribute significantly to unintentional deaths. The situation among children in SA is particularly concerning. Fatal drowning among the childhood population is high, particularly for those below the age of 15, with children below the age of five especially vulnerable to fatal drowning (Saunders et al., 2018).

The recent estimated drowning mortality rate for South Africa may, however, be considerably underestimated (Martin, 2014). Official data gathering methods for drowning exclude drowning mortality resulting from floods and water transport circumstances (WHO, 2014). Furthermore, inadequate data gathering systems, the likelihood of some drowning deaths failing to be reported, and the burial of drowning victims for cultural purposes may further prevent a comprehensive understanding of the issue of drowning within South Africa (WHO, 2014).

Morbidity

The incidence of non-fatal drowning is often underestimated, as the reporting of non-fatal drowning is less standardised compared to fatal drowning (Felton, Myers, Liu, & Davis, 2015; Taneja et al., 2008). Typically, drowning events are reported only when they have resulted in death or significant disability (Taneja et al., 2008). Nevertheless, international studies have provided estimates from hospital data regarding the number of cases of non-fatal drowning. Researchers have estimated that for each fatality, there are between one to four non-fatal drowning events requiring hospitalisation (Meyer, Theodorou, & Berg, 2006). A study conducted in Queensland, Australia between the period of 2002 and 2008, reported a ratio of fatal and non-fatal drowning events at 1:10, and for non-fatal events, the ratio of hospital admission to non-admission was 1.7:1 (Wallis, Watt, Franklin, Nixon, & Kimble, 2015). In rural Bangladesh, the incidence of non-fatal drowning over a six month period was reported as 318.4 per 100 000 per population (Rahman et al., 2017).

Despite limitations in the reporting of non-fatal drownings, these events may have serious long-term consequences due

to hypoxia and subsequent brain damage (Felton et al., 2015). The organs which are mainly affected by drowning accidents include the brain, lungs and the kidneys (Suominen & Vähätalo, 2012). Long-term outcomes of the drowning survivor depend largely on the severity of the initial ischemic brain insult (i.e. the lack of blood flow to the brain), the effectiveness of immediate resuscitation with subsequent transfer to the emergency department, and on the post-resuscitation management in the intensive care unit (Howard, Holmes, & Koutroumanidis, 2011).

Individual and Family Consequences of Fatal and Non-fatal Drowning

Drowning has a profound and long lasting impact on families and communities. This can be estimated in terms of potential years of productive life lost and valued years of potential life lost (Taneja et al., 2008). Both these measures estimate the loss of productivity as a result of premature death before the common retirement age of 65 years (Taneja et al., 2008). Globally, approximately 1.3 million disability-adjusted life years (DALYS) were lost due to premature death or disability from drowning in 2004, demonstrating the social and economic effect of drowning morbidity (Peden & Mcgee, 2003). Lam (2005) indicated that drowning is positioned second, after motor vehicle traffic injuries, among all causes of injury, for both potential years of productive life lost and valued years of potential life lost.

There is a paucity of research describing the prognostic outcomes of non-fatal drowning incidents in Africa and, more specifically, within South Africa (Joanknecht, Argent, van Dijk, & van As, 2015). Taneja et al. (2008) confirmed that little is known about the functional outcomes of an individual who has endured a non-fatal drowning incident. Nevertheless, a number of South African studies have reported that, at an individual level, non-fatal drowning can result in severe neurological damage (Edwards, 2015; Joanknecht et al., 2015; Kibel, Nagel, Myers, & Cywes, 1990). With specific reference to children, Suominen and Vahatalo (2012) explained that neurological examinations may reveal no damage to the brain at the time of discharge but long-term neurological difficulties may become evident only during a child's school-going years with reading, comprehension and fine motor skill difficulties. Children who are neurologically affected by a non-fatal drowning incident present substantial financial, emotional and personal costs to the family and society (Christensen, Jansen, & Perkin, 1997).

Families can be severely affected by the negative health outcomes resulting from a non-fatal drowning incident. Psycho-social consequences are experienced, not only by those who have suffered a non-fatal drowning, but psychological consequences are also experienced by siblings, parents and caregivers (Taneja et al., 2008). Medical difficulties, for example, brain damage or disability, that result from a non-fatal drowning, may cause further challenges in the form of factors such as care and financial costs for families (WHO, 2017b). Disability-adjusted life years (DALYs) lost as a result of drowning differs widely. Children younger than 15 years from LMICs in the WHO Western Pacific Region are found to have high estimates of DALYs, where drowning is the cause of 4% of DALYs (Taneja et al., 2008).

Economic Losses

Injury is considered to be a major health issue in developing countries, yet studies have neglected and perhaps underestimated the economic impact of unintentional injury (Mock, Gloyd, Adjei, Acheampong, & Gish, 2003). Despite the scarcity of accurate and comparable data, non-fatal drownings result in substantial economic losses to victims, the family of victims and more broadly, the nation (WHO, 2014). These losses stem from a number of factors including

treatment-related expenses, such as rehabilitation; costs due to drowning-related investigations; and lowered or lost productivity in terms of income for those who die or become disabled due to injury as well as for their family members who often take time off from work to take care of the injured individual (WHO, 2014).

Despite the limited data, several international studies have revealed the significant impact drowning has on the economy. For instance in the USA, coastal drowning alone accounts for US\$273 million each year in direct and indirect costs (WHO, 2017a). In Australia and Canada, the total annual cost of drowning injury amounts to US\$85.5 million and US\$173 million respectively (WHO, 2017a). Furthermore, research has indicated that although the majority of individuals who have endured a non-fatal drowning are discharged from hospital on the same day or after one night's hospital stay, there are cases that require intensive treatment over an extended period of time (Corso et al., 2006; Meerding, Mulder, & van Beeck, 2006). The cost of intensive treatment for individuals suffering severe consequences, such as brain damage due to a non-fatal drowning, is reported to be a total of US\$ 100 000, if not more (Taneja et al., 2008). With regards to LMICs, the economic impact of drowning is said to be greater than that reported in the US as families are often dependant on the income of economically active individuals, such as that of older children who have been involved in a drowning incident (Peden & McGee, 2003). Furthermore, drowning has the capacity to place strain on national economies in terms of growth in the amount of individuals claiming disability compensation in contexts where health care financing and social support programmes may be restricted (Davoudi-Kiakalayeh, Dalal, Yousefzade-Chabok, Jansson, & Mohammadi, 2011).

1.2 MANDATE, RATIONALE AND CONTEXT

Successful drowning prevention efforts implemented in HICs may not necessarily be relevant in LMICs, such as SA (WHO, 2014). Prevention strategies in high-income contexts have generally focused on recreational locations as opposed to the settings in which drowning usually occurs in LMICS (WHO, 2014). The prevention responses to drowning in the Western Cape appear to be characterised by insufficient collaboration between drowning prevention organisations; inadequate information or surveillance systems to record data related to fatal and non-fatal drownings; limited local research capacity related to the epidemiology of drowning and evidence-led prevention strategies; insufficient resource allocation; and inadequate monitoring of existing interventions. Furthermore, given the lack of recognition of drowning as a public health priority in the Western Cape, it has not received the requisite attention, as other leading causes of mortality and morbidity may have received. As a result, not all affected municipalities make provision for drowning-risk reduction in their planning and budgeting processes (Linnan et al., 2012). There is also a lack of water safety and drowning prevention data and literature for SA (Matthew et al., 2017). Finally, drowning prevention and the promotion of water safety appears to not be a priority of government, policy makers and those responsible for implementation as time, funding and resources are allocated to what are considered more pressing social issues.

The Western Cape Department of Local Government: Directorate-Disaster Operations has therefore commissioned the SAMRC-UNISA Violence, Injury and Peace Research Unit (VIPRU) to develop a Strategic Framework for Drowning Prevention and Water Safety in the Western Cape. The major focus of this initiative is to identify priority drowning risks, high-risk activities, equipment, and the population and communities most affected. This Framework will highlight the

evidence-based prevention responses that are currently being implemented and others that may be considered appropriate for the prevention of drowning in the province. The main deliverable of this project is a comprehensive, evidence-based strategy for drowning prevention and water safety in the Western Cape.

1.3 HOW THE STRATEGIC FRAMEWORK WAS DEVELOPED

The development of this Strategy involved the following (Figure 1.2):

1. A desk review: this included review of existing related policy or strategy documentation such as the “Integrated Strategy Framework for the Prevention of Violence and Injuries in South Africa” developed by VIPRU for the National Department of Health (NDOH) in 2012; research literature on the epidemiology of drowning, drowning prevention and water safety in the Western Cape, in South Africa, and further afield; and initial strategic documentation developed by colleagues in the water safety sector (Robertson, n.d).
2. Multiple stakeholder consultations with provincial government departments and national or provincial non-government agencies involved in drowning prevention and water safety programmes in the province.
3. A situational analysis of key international and local research findings and stakeholder accounts of priority prevention groups and communities, risk activities, situations and environments, and proposals for priority prevention in the Western Cape.
4. The desk review and sectoral consultations served as the basis for the key output of the project, which is the submission to the Department of Local Government of a strategy for drowning prevention and water safety in the Western Cape.

	Scope and Focus	Outcomes and Recommendations	STRATEGIC FRAMEWORK
Desktop Review	<ul style="list-style-type: none"> • Magnitude of drowning • Risk and protective factors • Consequences of drowning • Evidence led prevention Interventions 	<ul style="list-style-type: none"> • Magnitude: 1700 drownings SA (2009) • Risk factors: Alcohol use, supervision, water body access • Consequences: Community and family • Prevention Interventions: Learn to Swim programmes. 	
Situational Analysis	<ul style="list-style-type: none"> • Identification of gaps in drowning prevention • Analysing FPS and NSRI data to identify magnitude of drowning 	<ul style="list-style-type: none"> • Magnitude: 3.25 per 100 000 population; about 200/year in WC • Males (81.2%) Females (18.5%) 	
Stakeholder Consultations	<ul style="list-style-type: none"> • 13 Expert opinions • Priority areas for Strategic Framework • What works • Service delivery gaps and priorities 	<ul style="list-style-type: none"> • Priority Framework areas: Education, Enforcement, Environmental • What works: Evidence - led programmes • Service delivery gaps: Laws and Policies, Information systems. 	

Figure 1.2 The development of the Western Cape Drowning Prevention and Water Safety Strategy.

2

FATAL DROWNING EPIDEMIOLOGY IN THE WESTERN CAPE

The 2014 Global Report on Drowning (WHO, 2014) published by the World Health Organization identifies drowning as a vastly neglected public health issue requiring evidence driven and targeted prevention strategies. Evidence-led decision making is more likely to result in effective interventions and is vital in resource constrained settings such as South Africa. The aim of this chapter is, therefore, to describe the epidemiology of fatal drowning in the Western Cape Province of South Africa in order to inform the drowning prevention strategies of stakeholders within this sector.

The fatal drowning data presented in this chapter were sourced, with approval, from the Western Cape Government: Department of Health, Forensic Pathology Services. This data set includes all fatal drowning incidents recorded within the Western Cape vital registration system between 1 January 2010 and 30 June 2017. Ethical approval for use of the data was obtained from the University of Cape Town Human Research Ethics Committee (HREC 590/2017). Corresponding population data and population growth estimates for the Western Cape were obtained from the Census 2011 Municipal Report, Western Cape, Report no. 03-01-49 (Statistics SA, 2012), issued by Statistics South Africa, and were used to calculate crude drowning mortality rates per 100 000 population. Given that the purpose of this report is to identify groups at higher risk of fatal drowning within the Western Cape, and not to directly compare with global mortality rates, age-standardised mortality rates were not calculated. Where appropriate, descriptive data is presented as proportions or means plus/minus the standard deviation.

2.1 BURDEN OF FATAL DROWNING IN THE WESTERN CAPE

In the 7,5 years between 2010 and mid-2017, there were 1473 fatal drowning incidents in the Western Cape, equating to an average of 199 3 12 fatal drowning incidents annually. Excluding the incomplete 2017 data, this results in a crude mortality rate of 3,25 per 100 000 population. This is similar to national drowning mortality estimates of approximately 3,0 per 100 000 population (Saunders et al., 2018). The crude drowning mortality rate has not changed significantly over the seven years investigated (Figure 2.1).

“This results in a crude mortality rate of 3,25 per 100 000 population”

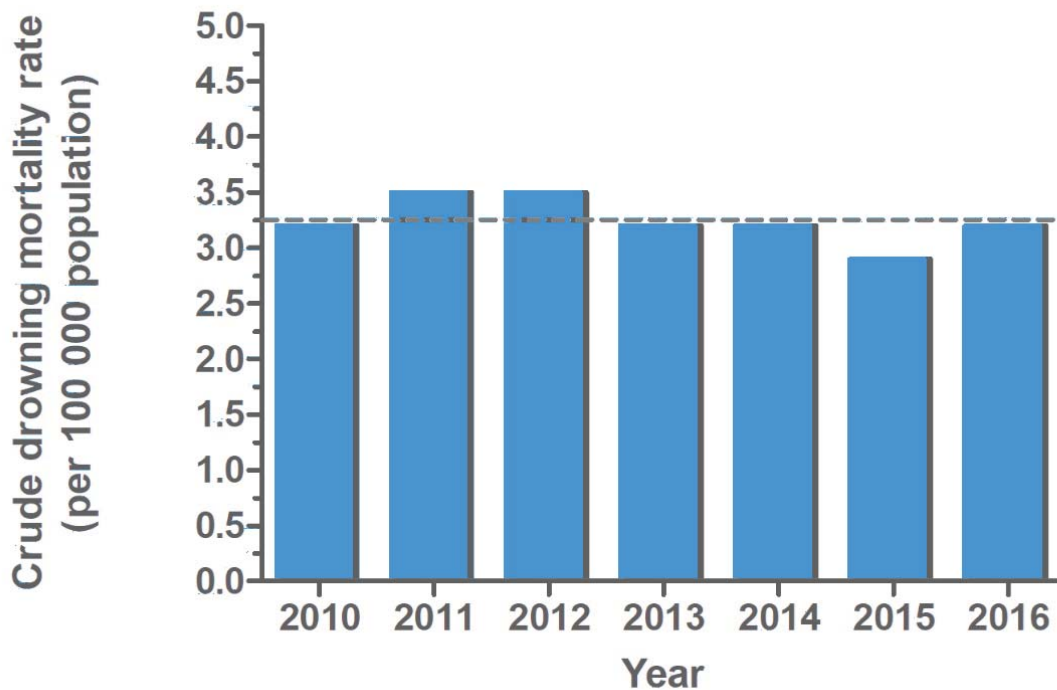


Figure 2.1 Crude drowning mortality rate in the Western Cape, 2010 - 2016

Risk profile of fatal drowning victims in the Western Cape

Fatal drowning incidents occur at a higher rate in males compared to females. The male to female ratio of the Western Cape population is 0,96:1, however 4,4 males die from drowning for every one female that suffers a fatal drowning incident. When normalised to the size of the population, the sex-specific drowning mortality rate for males is four and a half times higher than that for females (Table 2.1). This is consistent with the ratio observed at a national level (Saunders et al., 2018).

“4,4 males die from drowning for every one female”

Table 2.1 Sex-specific drowning mortality rates for the Western Cape (2010-2016)

Sex	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
Male	1196	81,2	5,4
Female	273	18,5	1,2
Unknown	4	0,3	N/A
Total	1473		

The average age of fatal drowning victims in the Western Cape is 27 ± 19 years old. This has remained consistent between 2010 and 2017 (P=0,248). However, there are large variations in the age-specific drowning mortality rates, as well as differences in mortality between males and females, across the lifespan. Table 2.2 shows the breakdown of drowning mortality in both males and females across age categories. Children under the age of 15 years old account for 30,2% of all fatal drowning, with the highest age-specific mortality rate found in children under five years old (4,7 per 100 000 population).

“Children under the age of 15 years old account for 30,2% of all fatal drowning, with the highest age-specific mortality rate found in children under five years old”

Males suffer a higher drowning mortality rate than females in every age category, with the highest disparity in risk in the 15-19 years and 25-34 years age categories. Whilst the highest drowning mortality rates in males occur in the 5-9 years and 25-29 years age groups, males have a high rate of drowning mortality in all age categories under 35 years of age. In females, the highest drowning mortality rate occurs in children under the age of 5 years old, and increases again in older adults.

Table 2.2 Age- and sex- specific drowning mortality rate for the Western Cape

Age category (Years)	Total number	Proportion of total (%)	Mortality rate* (per 100 000 population)			Male: Female Ratio
			All	Males	Females	
0-4	195	13.2	4,7	5,6	3,8	1,5
5-9	134	9.1	4,0	6,6	1,3	5,4
10-14	117	7.9	3,6	5,4	1,8	3,0
15-19	113	7.7	3,2	6,0	0,5	11,6
20-24	142	9.6	3,3	5,7	0,9	6,1
25-29	158	10.7	3,6	6,6	0,5	13,3
30-34	125	8.5	3,5	6,3	0,6	10,4
35-39	93	6.3	2,9	4,8	1,0	4,8
40-44	83	5.6	2,9	5,2	0,5	9,3
45-49	63	4.3	2,5	4,0	1,0	3,4
50-54	72	4.9	3,3	5,7	1,2	4,1
55-59	52	3.5	3,1	5,4	1,1	4,2
60-64	44	3.0	3,4	4,8	2,1	1,9
65-69	20	1.4	2,2	4,4	0,4	9,0
70-74	25	1.7	3,6	5,4	2,3	1,8
75-79	6	0.4	1,4	2,3	0,8	2,0
80-84	8	0.5	3,0	6,2	1,2	3,0
85+	2	0.2	1,0	1,5	0,7	1,0
Unknown	21	1.4	N/A	N/A	N/A	N/A
Total	1473					4,4

* Mortality rates exclude 2017 data.

Two-thirds of fatal drowning incidents occur in the warmer seasons of Spring (September, October, November; 24,7%) and Summer (December, January, February; 42,0%). Just over half (52,3%) of all incidents occur during the five weekdays (Mon-Fri), whereas 47,6% of incidents occur on weekends (Saturday and Sunday) and public holidays

(Figure 2.2). Saturdays (19,1%) and Sundays (21,0%) account for the highest proportion of fatal drownings. It should, however, be noted that 7,5% of fatal drowning incidents occurred on public holidays. Given that there are only twelve (12) public holidays throughout the year, a substantially disproportionate burden of fatal drownings occur on public holidays during the year.

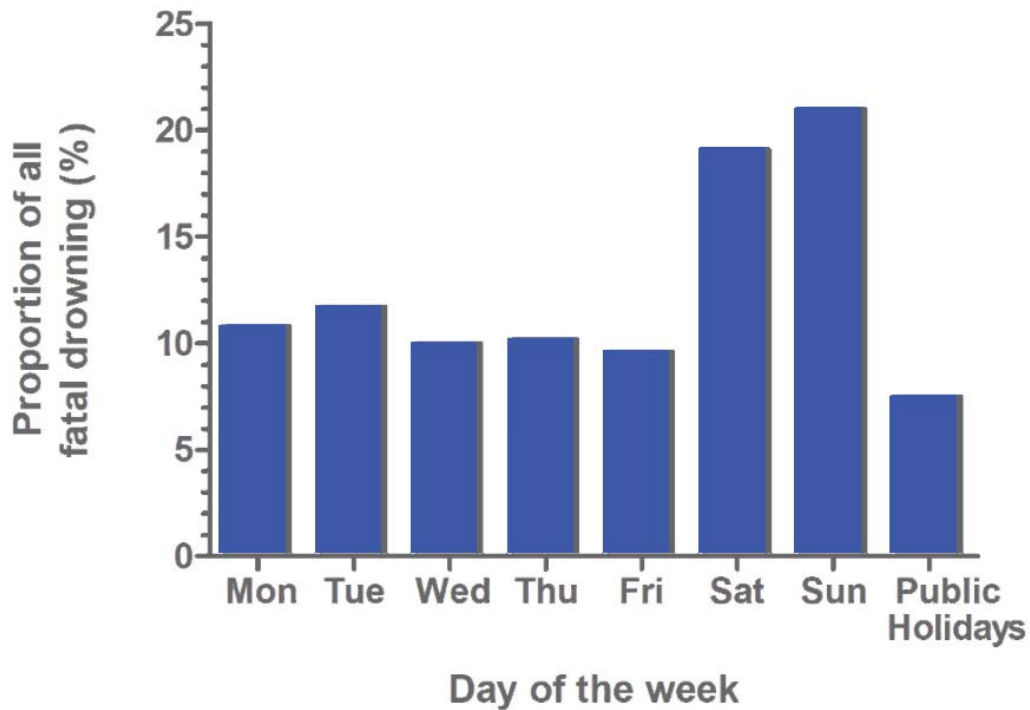


Figure 2.2 Distribution of fatal drowning incidents throughout the week

The majority (82%) of fatal drowning incidents occur between 09h00 and 20h00, with the peak period accounting for 60% of incidents occurring between 12h00 and 19h00 (Figure 2.3). This distribution is similar when comparing between seasons and when comparing weekends with weekdays. However, in winter, the highest proportion of incidents occurs around lunchtime (12h00-13h30), compared to summer where the highest proportion of incidents occurs at approximately 15h00.

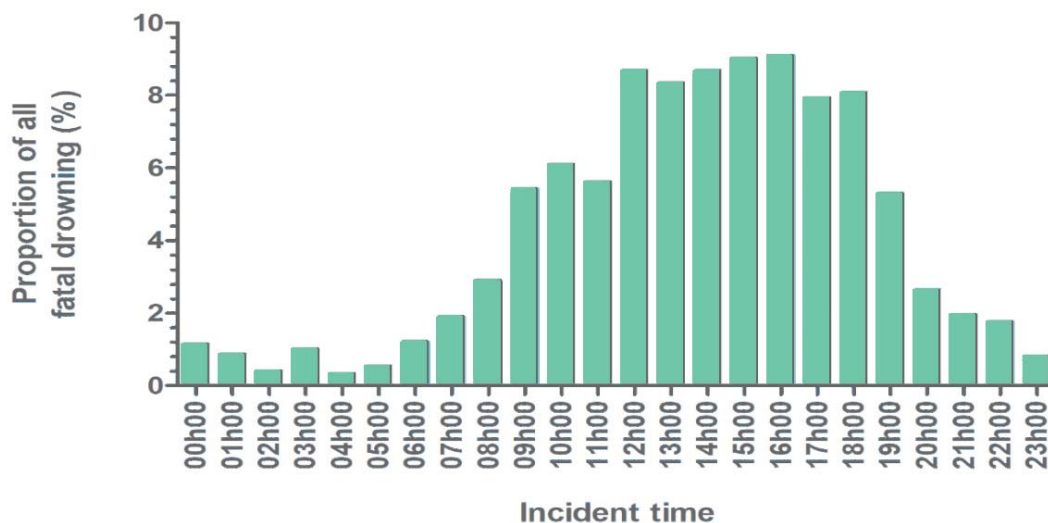


Figure 2.3 Distribution of fatal drowning incidents by time of day

Location of fatal drowning incidents in the Western Cape

The three bodies of water that account for the highest proportions of fatal drowning incidents are

1. the ocean,
2. ponds, dams and lakes, and
3. rivers and canals.

Together these account for three-quarters of all fatal drowning incidents in the Western Cape (Table 2.3).

Table 2.3 Distribution of fatal drowning incidents by body of water

Body of water	Total number	Proportion of total (%)	Mean age ± standard deviation (Years)
Ocean*	399	27,1	34 ± 17
Ponds, dams and lakes	381	25,9	26 ± 18
Rivers and canals	337	22,9	31 ± 18
Swimming Pools	182	12,4	18 ± 20
Fresh Water	79	5,4	16 ± 20
Bath	53	3,6	18 ± 25
Lagoon	32	2,2	28 ± 17
Storage Tank	10	0,7	9 ± 15
Total	1473		

* Including harbours and tidal pools

When examining the average age of drowning victims by body of water, it is clear that there are differences in the location of drowning incidents in different age categories. In general, larger, open bodies of water are more likely to claim adult drowning victims whereas swimming pools and sources of water closer to the home are more likely to claim younger drowning victims. In order to better understand the factors contributing to child drowning, Table 2.4 indicates the distribution of drowning by body of water for children under the age of 15 years old. Younger children below the age of five years old are more likely to drown in and around the home in locations such as swimming pools, fresh water and baths, whereas older children are more likely to drown in larger, open bodies of water.

Table 2.4 Distribution in children under 15 years

Body of water	Total number	Proportion of total (%): 0-4 years	Proportion of total (%): 5-14 years
Ponds, dams and lakes	133	15,4	41,0
Swimming Pools	101	33,8	13,9
Rivers and canals	73	10,8	20,7
Fresh Water	49	18,5	5,2
Ocean*	42	1,5	15,5
Bath	33	16,4	0,4
Lagoon	8	N/A	3,2
Storage Tank	7	3,6	N/A
Total	446	195	251

* Including harbours and tidal pools

Geographical location of fatal drowning incidents in the Western Cape

The distribution of drowning mortality varies throughout the twenty-five (25) Western Cape municipalities (Table 2.5). When considering appropriate drowning prevention strategies for the Western Cape, it is important to consider both absolute and relative measures of drowning mortality. Crude drowning mortality rates allow for the identification of municipalities where the drowning burden is high relative to population size, but absolute measures of mortality are important for identifying municipalities in which drowning risk reduction efforts will have the largest impact on the provincial drowning burden.

Table 2.5 Drowning mortality rates and absolute number of fatal drowning incidents by Western Cape municipality, 2010-2017.

Municipality	Total number	Proportion of total (%)	Crude mortality rate* (per 100 000 population)
City of Cape Town Metropolitan Municipality	496	33,7	1,7
Matzikama Local Municipality	91	6,2	17,7
Drakenstein Local Municipality	88	6,0	4,7
George Local Municipality	86	5,8	5,7
Overstrand Local Municipality	84	5,7	12,7
Langeberg Local Municipality	59	4,0	7,6
Breede Valley Local Municipality	58	3,9	4,6
Witzenberg Local Municipality	55	3,7	5,9
Cederberg Local Municipality	54	3,7	13,3
Mossel Bay Local Municipality	50	3,4	6,9
Theewaterskloof Local Municipality	48	3,3	5,6
Saldanha Bay Local Municipality	43	2,9	5,6
Stellenbosch Local Municipality	38	2,6	3,0
Oudtshoorn Local Municipality	33	2,2	4,7
Swartland Local Municipality	33	2,2	3,3
Knysna Local Municipality	30	2,0	5,9
Bergrivier Local Municipality	28	1,9	6,2
Bitou Local Municipality	24	1,6	5,8
Swellendam Local Municipality	22	1,5	8,4
Hessequa Local Municipality	22	1,5	5,5
Beaufort West Local Municipality	10	0,7	2,5
Cape Agulhas Local Municipality	9	0,6	3,7
Kannaland Local Municipality	8	0,5	4,6
Prince Albert Local Municipality	3	0,2	2,0
Laingsburg Local Municipality	1	0,1	1,7

The top five municipalities in terms of absolute drowning mortality numbers account for 57% of drowning in the Western Cape Province (Table 2.5). The City of Cape Town Metropolitan Municipality is the highest of these accounting for 33,7% (n=496) of all fatal drowning incidents in the Western Cape. It should however be noted that this municipality serves the greatest population of the Western Cape province and therefore has one of the lowest crude mortality rates relative to population size (1,7 per 100 000 population). The next highest contributors in absolute terms are the Matzikama Local Municipality, Drakenstein Local Municipality, George Local Municipality and the Overstrand Local Municipality. When considered relative to population size, the five municipalities with the highest crude drowning mortality rates are Matzikama Local Municipality (17,7 per 100 000 population), Cedarberg Local Municipality (13,3 per 100 000 population), Overstrand Local Municipality (12,7 per 100 000 population), Swellendam Local Municipality (8,4 per 100 000 population) and Langeberg Local Municipality (7,6 per 100 000 population). It should be noted that 19 of the 25 Western Cape municipalities have a drowning mortality rate higher than the provincial rate of 3,25 per 100 000 population. A detailed breakdown of drowning fatalities in these eight municipalities is provided in the Appendix.

Limitations and Conclusions

The data presented here is limited to unintentional fatal drowning incidents in which the body was recovered and an autopsy performed. It is therefore likely that a number of fatal drowning incidents in which the body was not recovered, or the primary cause of death was attributed to other factors, were not included. In addition, there is currently limited information available regarding activity prior to drowning which limits our ability to identify behaviours and activities contributing to drowning risk in the Western Cape.

It is important to note that this data does not reflect changing risk patterns in relation to the current water crisis in the Western Cape. It is hypothesised that there will be changes to recreational behaviour resulting from the closure of many public swimming pools which may further shift the drowning burden towards large, open bodies of water. Furthermore, the increase in informal water storage in and around the home is likely to result in increased risk of drowning in young children over the course of the current crisis.

Notwithstanding the limitations thereof, the data presented here provides a baseline measure of drowning mortality within the Western Cape Province as well as an indication of factors contributing to drowning risk. This baseline measure will allow for provincial and municipal level monitoring and evaluation of drowning prevention interventions over time. The ability to evaluate interventions and make informed decisions is vital in resource limited settings. The identified risk factors largely reflect current understanding of drowning risks associated with periods of peak exposure, for example: increased risk on warm summer afternoons. The disproportionate burden of drowning on public holidays provides key time points for targeted drowning prevention interventions and safety messaging. Many of the risk factors identified here, such as the higher drowning risk in males and young children, are similar to those observed and reported globally (WHO, 2014). The data presented here clearly indicates that the youngest citizens of the Western Cape Province are those most at risk of drowning, a fact that is likely to be exacerbated during the current water crisis as more informal water storage occurs around the homes. However, the data also highlights several neglected risk factors in the fight against drowning: (i) The high proportion of drowning in dams, rivers and canals, (ii) the high rates of fatal drowning in adolescent and young adult men, and to a lesser extent, (iii) the higher than expected rates of drowning in older adults.

These findings also highlight many gaps in the current knowledge base. In particular detailed information describing the activity prior to drowning, and detailed investigation of contributing factors in specific at-risk groups such as young adult men, will allow for more targeted interventions and safety messaging. Most importantly, quantifying and describing non-fatal drowning incidents will allow stakeholders to fully understand the social and economic burden of drowning within the WC and represents a large gap in our current understanding. Ongoing, high quality epidemiological research is vital to providing current and useful data on which stakeholders may base decisions regarding drowning prevention efforts.



3

THE RISK FACTORS FOR DROWNING

The key drivers and risk factors for unintentional drowning injuries range from those that affect the individual to the community and societal level, as seen in Figure 3.1. below. Age, gender, alcohol consumption, medical conditions, access to bodies of water, the lack of adult supervision, and the lack of policies, legislations and regulations have all been identified as risk factors for drowning.

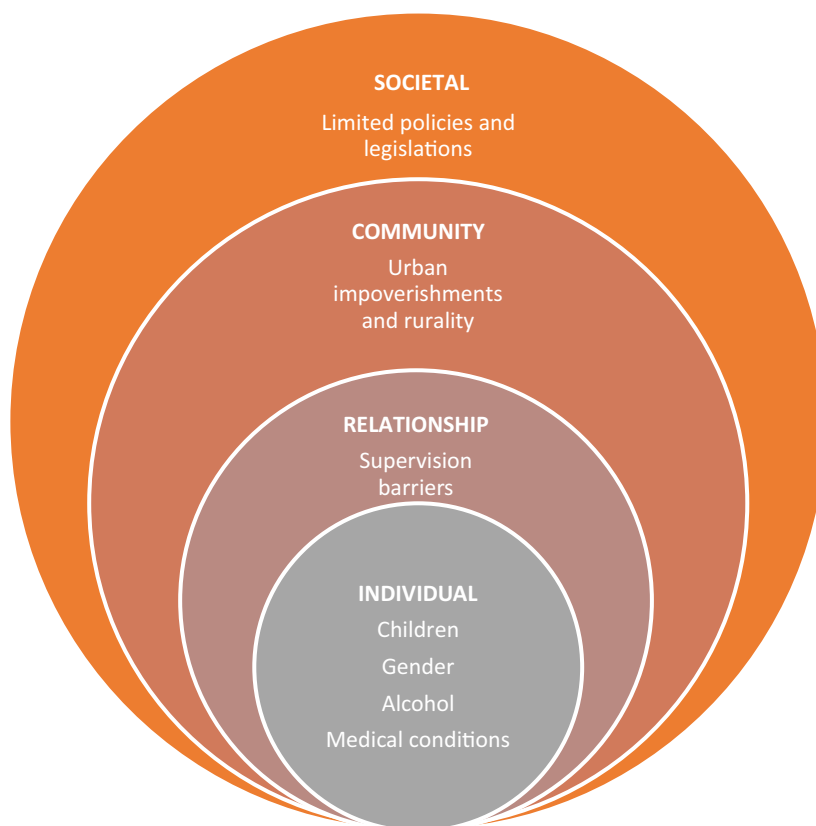


Figure 3.1 Ecological model with the risk factors for drowning.

The public health approach, explained later in this Framework, has drawn on the ecological or systems perspective to understand the multiple risk factors to drowning. This perspective emphasises the importance of considering the complex, often multiple contributors to fatal or non-fatal drowning, typically including the individual, relationship and familial, as well as community and societal levels, and thus allowing for a more holistic understanding of injury (Hosking, Ameratunga, Morton, & Blank, 2011).

Age, Gender, Alcohol and Medical Conditions

There is a range of individual factors that are strongly associated with unintentional drowning injuries; these include specific age groupings, gender, alcohol consumption and underlying medical conditions. Drowning is one of the top 10 leading causes of death for children in every region of the world (Forjuoh, 2017). In the United States of America (USA), drowning is the leading cause of death among young children between the ages of 1 and 14 (Centres for Disease Control and Prevention, 2017). Furthermore, a study conducted in Canada reported that toddlers between the ages of 1 and 4 are at higher risk for drowning compared to the rest of the population (Clemens, Tamim, Rotondi, & Macpherson, 2016).

Similarly, during the period of 2001 till 2005, Donson and van Niekerk (2013) reported the occurrence of unintentional drowning deaths across all ages in five major South African cities as ranging between 1.4 and 2.7 per 100 000 population. According to Swimming South Africa (2010), the majority of drowning cases, i.e. more than 56%, involve children younger than 15 years, making it the second leading cause of injury mortality for children. Moreover, drowning rates are highest among South African children between the ages of 0-4 years, followed by 5-14 years (Burrows, van Niekerk, & Laflamme, 2010; Donson & van Niekerk, 2013; Pretorius & van Niekerk, 2015). Children, especially younger than five years, are deemed especially susceptible to drowning (Dirlik & Bostancioglu, 2015; Donson & van Niekerk, 2013; Joanknecht et al., 2015; Taneja et al., 2008; WHO, 2017b), which is explained by their inquisitiveness, the still developing risk appraisal capacities, and lack of physical coordination that would make them more vulnerable to falling into bodies of water (Hyder et al., 2008).

The higher rates of drowning amongst male children has been reported in both international and national studies (Clemens et al., 2016; Donson & van Niekerk, 2013; Hyder et al., 2008; Richards, 2011), as well as observed in both high and low-income settings (Modell, 2010, Tyler et al., 2017). The vulnerability of male children increases with age, with the proportion of male mortality increasing between infancy and adolescence (Donson, 2007; Pretorius & van Niekerk, 2015). This vulnerability has been considered to be a reflection of temperament and higher activity levels, with male children and adolescents reported to behave more impulsively, overestimate their physical abilities and engage in more risky behaviours (Schwebel & Plumert, 1999).

This gendered pattern continues into adulthood with South African male drowning rates much higher than female drowning. For every female unintentional drowning, approximately four males drowned (Donson & van Niekerk, 2013). Alcohol consumption has been strongly associated with drowning, especially among adolescents and adult men (Morris, du Toit-Prinsloo, & Saayman, 2016). Driscoll, Harrison and Steenkamp (2004) reported that 30% to 70% of swimming and boating fatal drowning victims in the USA had a measurable blood alcohol concentration and 10%-30% of those deaths were specifically attributed to alcohol consumption. Alcohol impairs judgement, vision, balance and movement of both adolescent and adult swimmers, and with child drowning vulnerability, the quality of parental supervision of children near water (International Life Saving Federation [ILS], 2007). In SA, Donson and van Niekerk (2012) reported that 40% of the drowning deaths tested for alcohol were alcohol related, with Cape Town reporting the highest rates of alcohol related unintentional drowning. These cases suggested a high proportion, about a third of cases, that could be considered drunk to very drunk; more than twice as high as similar blood alcohol association tests with unintentional drowning in Australia (ILS, 2007).

Children and adults with a medical condition also suffer an increased likelihood of drowning or submersion injury (Weiss, 2010). Epilepsy or seizure disorders increase the risk of drowning among children and adolescents in all gatherings of water, including baths, swimming pools, dams and other natural bodies of water (Taneja et al., 2008). The relative risk of submersion events and drowning deaths in patients with epilepsy varies. This is based on factors such as age, severity of the illness, degree of exposure to water and the level of supervision (Weiss, 2010). Additionally, autism and other developmental and behaviour disorders have also been found to increase the risk of drowning in children (Richards, 2011).

Supervision Barriers

The lack or lapse of supervision of children provided by the parent or the caregiver have been identified as a significant predictor of child drowning (Petridou, 2005). Weiss (2010) highlighted that drowning is not generally associated with a complete lack of adult supervision but, rather, with a momentary lapse in supervision. A study of 496 deaths of children younger than 14 years conducted in the USA revealed that parents consistently admitted to being distracted by talking to others, reading, eating and talking on the phone, while supervising their child near or in water (Cody, Quraishi, Dastur, & Mickalide, 2004). Adult supervision serves as a vital compensatory mechanism for environmental hazards, therefore, the level and adequacy of supervision reflects, to a significant extent, the parents' understanding of the dangers present (Petridou, 2005). Often caregivers do not realise that their child has fallen into water until it is too late to assist the child (Yang, Nong, Li, Feng, & Lo, 2007). In South Africa, studies have drawn attention to the high demands placed on caregiver competencies which often exceed the sustainable human prevention capacity and efforts required to reduce injury (van Niekerk, Menckel & Laflamme, 2010), including injury due to drowning. Other factors that could potentially be associated with the risk of drowning include a range of personal attributes (including education, mental health and experience) and circumstances of the caregiver (including family structure and dynamics, e.g. the number of children in the household and the number of household members) (Ruiz-Casares, 2009).

Urban Impoverishments and Rurality

Despite a country's economic development, drowning often disproportionately affects those who live in rural settings or in communities with the least resources to adapt to the risks around them (WHO, 2014). Community's socio-economic status has been used to indicate the exposure of children, but also adults, to hazardous environments, such as open bodies of water. In such environments, evidence suggests that limited educational opportunities, associated with poverty, in turn limit a family's safety options and choices, for example to provide the necessary swimming skills for their children (Ruiz-Casares, 2009), and thereby increases the risk of drowning (Taneja et al., 2008; Rahman, Giashuddin, Svanstrom, & Rahman, 2005). Poverty is also associated with more limited access to piped water, especially in LMICs, which necessitates having wells and the higher use of other, often unprotected bodies of water near the home, placing children at an increased risk of drowning. These threats appear exacerbated in rural areas (Tyler et al., 2017). Swimming South Africa (2010) has estimated that as much as 60% of drownings in SA occurs in rivers, lakes and dams, a hazard often associated with rural living. The water-related landscape of rural areas usually consists of exposed water containers and wells, usually located in areas close to the home, which are used as a water resource (Tyler et al., 2017). Sewduth (2006) identified that open access to unsafe swimming areas, such as streams, ponds and dams, place

children at a higher risk of drowning and submersion injuries especially during the summer days, as rural areas and informal settlements on the periphery of urban settlements often have no recreational facilities. These open bodies of water may furthermore cause a serious threat during the rainy seasons, as children may need to cross rivers and streams to get to school (Sewduth, 2007).

In urban centres, the highest incidence of drowning occurred in the coastal cities of South Africa, i.e. Cape Town, Durban and Port Elizabeth, with the highest percentage of drowning in the sea recorded in Port Elizabeth (76.4%) (Donson & van Niekerk, 2013). However, of concern across South African cities is unintentional drowning in and around the confines of the home, particularly in swimming pools, baths and buckets (Donson & van Niekerk, 2013). As expected, drownings are most likely to occur during the summer months (December, January and February) in South Africa as this usually drives people to aquatic recreational sites (Donson & van Niekerk, 2013; Morris et al., 2016; Sewduth, 2007). Despite these pockets of information on drowning hazards, from individual to community vulnerability, there is limited water safety and drowning prevention policy and legislation, with Donson and van Niekerk (2013) and Sewduth (2007) highlighting this lack of water safety policies, as an important impediment to the required measures needed to prevent drowning, or control for its consequences.



4

APPROACH, KEY CONCEPTS AND PRINCIPLES

A systems perspective informs this approach to the conceptual basis and guidelines for overarching targets for the Strategic Framework. The systems perspective, which strongly influences many public health policies (e.g. WHO World Report on Violence and Health, 2002), emphasizes the importance of focusing on all levels of a system, including the individual, relationships, community and social components, resulting in a holistic approach to understanding a health or social challenge and an inclusive approach to addressing these. This multi-pronged approach to public health challenges reflects a commitment to addressing issues and change at both the individual and environmental levels, and is premised on an understanding of the 'person-in-context', or a contextualized analysis of personal behaviour.

This approach provides a useful conceptual framework from which to investigate and understand the causes and consequences of unintentional drowning injury through primary prevention programmes, policy interventions and advocacy. The public health approach to drowning injury prevention seeks to improve the health and safety of all individuals by addressing underlying risk factors that increase the likelihood of drowning. For drowning injuries, the public health approach emphasises the reduction or elimination of amenable risk factors that give rise to drowning. This approach translates into a preventive effort that centres on evidence-based decision making. Interventions have been conceptualised according to a range of principles. Interventions may focus on different points along the injury continuum (pre-event, event and post-event), and involve various intervention strategies including environmental, engineering, education, enforcement and evaluation. Taneja et al. (2008) outlines these approaches and strategies as seen in Table 4.1.

A range of interventions have proven to be effective for the prevention of drowning, these include the following:

- Engineering Strategies
- Environmental Strategies
- Educational Strategies
- Enforcement Strategies

4.1 ENGINEERING STRATEGIES

Hazard Removal

Removing a hazard, where possible, is considered the most helpful prevention technique (Taneja et al., 2008). It is recommended that buckets and baths be left empty when not being used, as when containing liquid, these have the potential to pose risks for childhood drowning. Holes in the ground should be drained of rainwater or filled in order to prevent it from collecting water (Taneja et al., 2008). Containers, such as washing tubs, should be stored away to avert the collection of rainwater (Staines, Ozanne-Smith, & Davison, 2008). Furthermore, passive strategies in terms of infrastructure development, such as building safe bridges and installing piped water systems are reported to contribute to drowning reduction in high risk communities (Taneja et al., 2008; WHO, 2014).

Table 4.1 Approaches and strategies to water safety and drowning prevention

PRIMARY, SECONDARY AND TERTIARY PREVENTION	
Primary prevention (pre-event)	Focuses on the prevention or reduction of the occurrence of injuries.
Secondary prevention (event)	Focuses on activities that may prevent or minimise the consequences of injuries, in the likelihood that they will occur.
Tertiary prevention (post-event)	Focuses on the rehabilitation after the injury has occurred.
STRATEGIES	
Environmental	Modifying the physical environment for example restricting access to unsafe swimming areas.
Engineering	Involves adding or altering of the basic structure or function of equipment in order to enhance safety for example personal floatation devices, building bridges across rivers and dams, safe venues for recreational swimming, removing hazards and the provision of piped water.
Education	The provision of training and safety information in order to reduce drowning such as swimming lessons and water safety training for children.
Enforcement	Focuses on interventions that involve the application of safety laws for example the use of alcohol close to open water bodies and laws on pool fencing.

Having piped water will reduce the use of open bodies of water for purposes such as bathing, washing clothes or sourcing drinking water (Taneja et al., 2008). Moreover, it minimises exposure to collected rainwater and wells, common drowning hazards in many settings (Staines et al., 2008).

Safe recreational swimming venues may contribute to drowning prevention (Taneja et al., 2008). Natural bodies of water have several drowning-related hazards. The depth of water in them may not be known and there may be underwater hazards, changes of depth or deep holes. Strong currents and low temperature are also implicated in drowning (Taneja et al., 2008). Taneja and colleagues (2008) therefore recommend appropriately designed pools, in which the depth of each point is known and in which there are no hazards and currents

4.2 ENVIRONMENTAL STRATEGIES

Barriers and Fencing

The highest rates of drowning deaths and injury occur among children between the ages of 1-4 years, most of whom drown close to home (Burrows et al., 2010; Donson & van Niekerk, 2013; Pretorius & van Niekerk, 2015; WHO, 2014). Physical barriers can prevent children from coming into contact with open water sources such as swimming pools and dams and prevent drowning. This primary prevention strategy has proven to be effective in HICs such as the USA (Thompson & Rivara, 2000; Weiss, 2010). However, given findings that children in LMICs drown in natural bodies of water, such as dams and rivers, this type of intervention may be considered unrealistic in these settings because of costs (Donson & van Niekerk, 2012; Hyder et al., 2008; Rahman et al., 2012). Nevertheless, the WHO (2017b) reported alternative ways for placing barriers and fencing strategically so that access to open water bodies is limited and more tightly controlled. Such targeted barrier and fencing approaches include covering wells and water tanks, and fencing swimming pools with four-sided child-resistant fences and self-closing gates with safety latches (Morris et al., 2016; Richards, 2011; WHO, 2014, 2017b). Playpens have also been introduced as an effective way to prevent children from wandering into open waters (WHO, 2017b).

4.3 EDUCATIONAL STRATEGIES

Swimming Education and Skill Improvement

The increased rate of drowning among children has led to the increased interest in teaching swimming skills to children younger than five years (WHO, 2017b). The WHO (2017b) reported that teaching children to swim from a young age can protect them from drowning. Many high-income countries have developed formal swimming programmes that are supported by government, reinforced in school curricula and certified by appropriate bodies. For example, the 'Keep Watch Programme' and 'Watch around Water Campaign' in Australia, aims to prevent drowning deaths amongst toddlers (Royal Life Saving Society Australia, 2005). However, recent debates have highlighted concerns that swimming programmes might reduce a young child's fear of water and encourage him or her to enter the water without adult supervision (Weiss, 2010). Additionally, parents may develop a false sense of security and the misconception that their children will not drown once they have been taught how to swim (Taneja et al., 2008; Wiess, 2010). Nevertheless, water safety training helps with providing the right knowledge and skills to children and even adults so that they can participate safely in water-related activities. This increases water safety knowledge, skills and behaviours in order for people to make informed, responsible decisions for themselves and those who depend on them (Dyson, 2005). One successful education strategy developed within South Africa is the "Learn to Swim Program" which teaches children water orientation, basic swimming strokes and survival techniques so that river, lake, dam, ocean and public and private pool drowning can be reduced (Swimming South Africa, 2010).

Public Awareness and Supervision

In LMICs, childhood drowning tends to occur during caregivers busy hours, when they are busy doing housework or other daily tasks (WHO, 2017b). The WHO (2017b) reported that public awareness and behaviour change campaigns are crucial if drowning prevention measures are to be accepted and successful. In many cases, people may not be aware that drowning is a major problem. Therefore, strategic communications need to be integrated into preventative strategies (WHO, 2017b). Richards (2011) observed that, in the United States, public awareness and public education on water safety measures has contributed significantly to the reduction in drowning fatalities. The WHO (2014) reported that public awareness is most effective when it is directed at offering guidance for actions on specific risk factors, such as heightened adult supervision of young children. Furthermore, close supervision of children in the proximity of water is as an essential prevention strategy (Rubio et al., 2015). Carers should not be distracted while watching their children in baths, swimming pools or at the beach (Richards, 2011). Joanknecht et al. (2015) highlighted that parental awareness should include the dangers of paediatric drowning, even in relatively small volumes of water, as this may prevent household bucket and bathtub deaths.

Caregiver Rescue and Resuscitation Skills

Bystander rescue and resuscitation could make the difference between life and death in individual drowning situations (WHO, 2017b; Weiss, 2010). Often, untrained people help others who are in danger and this can place themselves at risk of drowning (Venema, Groothoff, & Bierens, 2010). Therefore, training bystanders and caregivers in safe rescue and resuscitation is essential to reduce their risk of drowning in a drowning incident. Education and training addressing safe rescue techniques may include cardiopulmonary resuscitation (CPR) training, and how to use a pole, rope or lifebuoy in a drowning emergency (WHO, 2017b).

4.4 ENFORCEMENT STRATEGIES

Sewduth (2007) identified a marked absence of direct reference(s) to drowning prevention and water safety enacted in legislation governing the various state departments in South Africa. The following documents: the National Environmental Management Act, 107 of 1998; Seashores Act, 21 of 1935; Integrated Coastal Management Bill, 2006-7; National Water Act, 36 of 1998; and Occupational Health and Safety Act, 1993 reveal that there are barely any legislative or policy references to drowning prevention and water safety. Sewduth (2007) has suggested the implementation of new policy and legislation to compel authorities to ensure appropriate measures are taken to prevent unnecessary drowning. These include legislation regarding pool fencing and barriers, alcohol consumption near water and the use of personal floatation devices.

Pool Fencing and Barrier Policy and Legislation

Legislation and policy regarding the fencing of swimming pools have been implemented and enforced in many high-income countries (Taneja et al., 2008). This type of legislation has proven to be effective at reducing rates of drowning. In South Africa, public and private swimming pool by-laws have been proposed in the City of Johannesburg advising that all pools must be registered with the City of Johannesburg and homeowners need to receive a certificate of

compliance (Cox, 2014). Furthermore, these proposed regulations state that the pool has to be surrounded by a wall or fence, built or erected according to National Building Regulations, which a child of seven years old will not be able to climb over (Cox, 2014). The proposed regulations have, however, been rejected based on home owners' costing concerns related to pool nets and fencing. Notably, home owners highlighted the need for swimming pool drowning statistics (Samuels, 2014). This points out that the availability of drowning epidemiological data would motivate home-owners to accept by-laws related to pool fencing and covers.

Personal Floatation Devices

Personal floatation devices (PFDs) include lifejackets as well as buoyancy devices designed to keep the wearer afloat (WHO, 2014). The use of PFDs is recommended for all children and adults while in boats or performing activities that may result in falling in water (Salomez & Vincent, 2004). The findings of a study of the United States Coast Guard records, comparing the risk of drowning death for PFD wearers and non-wearers, found that 50% of recreational boating drowning deaths might be prevented by wearing an appropriate personal floatation device (Cummings, Mueller, & Quan, 2011). Although the provision of PFDs has the potential to save many lives, low use of PFDs have been found in the African region pointing to an issue that needs to be addressed (Kobusingye, Tumwesigye, Magoola, Atuyambe, & Olang, 2016). The provision of PFDs has the potential to save many lives, however, Taneja et al. (2008) highlighted that, with regard to children, the device should not be used as a substitute for supervision.

Alcohol Control

The consumption of alcohol before or during activities in bodies of water increases the risk of drowning (Taneja et al., 2008). The WHO (2017b) has proposed the establishment of regulations that limit or ban alcohol use in water sports and fishing environments. In addition, the enforcement of laws through random breath checks on water at launch sites and policing local regulations banning public alcohol use in and close to water has been recommended (WHO, 2017b).

5

THE STRATEGIC FRAMEWORK

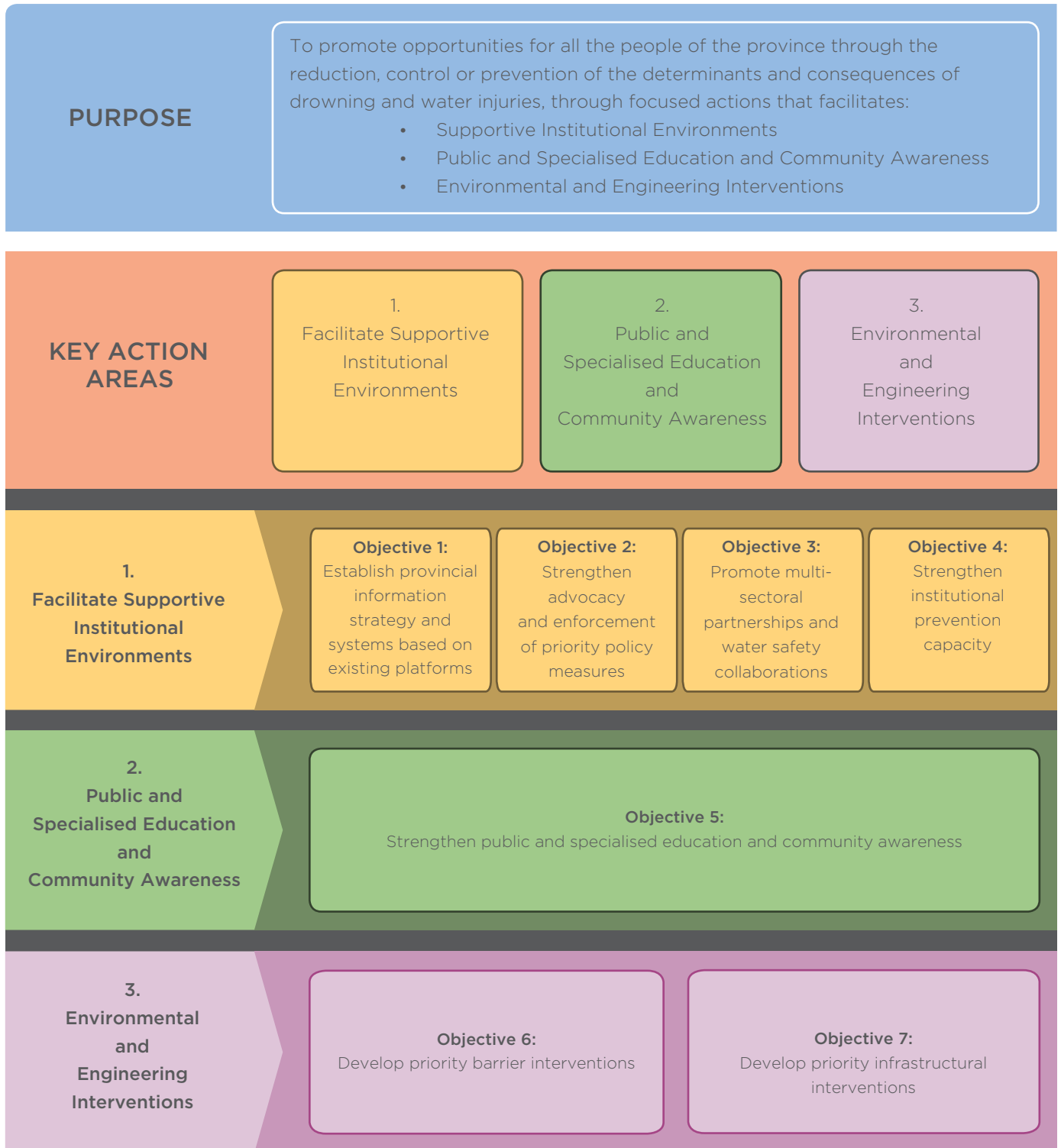


Figure 5.1 The strategic framework

5.1 MISSION

The Western Cape Drowning Prevention and Water Safety Strategy is aligned to the Western Cape Government and the Western Cape Disaster Management:

It is the aim of Disaster Management to identify and prevent or reduce the occurrence of disasters and to soften the impact of those hazards that cannot be prevented.

The Framework supports the Western Cape Disaster Management activities with the following aims:

- Prevention: Reduce local risk through prevention and awareness
- Protection: Improve local planning and preparedness
- Response: Improve the rescue services capability to respond to all fatal and non-fatal drowning incidents.

5.2 PURPOSE

The Strategic Framework seeks to promote health, especially in those most vulnerable, through the reduction, control or prevention of the determinants and consequences of drowning and water injuries, through focused actions that facilitate:

- Supportive institutional environments
- Public and specialised education and community awareness
- Environmental and engineering interventions

5.3 KEY PRIORITY AREAS FOR ACTION

The following chapter reports on the three key action areas and the selection of the specific objectives. 'Facilitate supportive institutional environments' is considered to be the first step in the development of drowning prevention strategies and the promotion of water safety in the Western Cape. This key action area includes the establishment of provincial information strategies and systems; the enforcement of priority policy measures; establishment of multi-sectoral partnerships and collaborations, and strengthening institutional capacity. The second key area involves the promotion of 'Public and specialised education and community awareness', and the third key area focuses on developing 'Environmental and engineering interventions'.



**KEY ACTION AREA 1:
FACILITATE SUPPORTIVE
INSTITUTIONAL ENVIRONMENTS**

OBJECTIVE 1: ESTABLISH PROVINCIAL INFORMATION STRATEGIES AND SYSTEMS BASED ON EXISTING PLATFORMS

Data collection and ongoing surveillance systems underpin much of what is known about drowning. Through the analysis of such data, the WHO (2017b) considers this as the first step to drowning prevention as it can establish the scale of the problem and identify who is most at risk of drowning. In the Western Cape Province of South Africa, there is a great need for systematic, reliable and good quality information systems that collect both fatal and non-fatal drowning data. Currently, fatal drowning data is captured by FPS and EMS, however, there are no surveillance systems that consistently capture non-fatal drowning data. What has been identified, is that individuals who have encountered a non-fatal drowning incident, often in and around their household, are rarely brought to health facilities, and therefore, estimates of non-fatal drowning are uncoordinated and unreliable. The WHO (2017b) recommends that in order to prevent drowning, data collection systems need to be improved and in some cases be established. An effective information system would support well-designed research studies to improve the understanding of risk factors, effectiveness of interventions and assist in monitoring and evaluating existing water safety initiatives and programmes.

RECOMMENDED STRATEGY AND INTERVENTION

Strategy 1: Establish a Provincial Information System

The Western Cape requires a reliable drowning incident reporting strategy that could be integrated provincially as a fatal and non-fatal drowning information system. This information system should aim at collecting, collating, and integrating core information on fatal and non-fatal drowning incidents from water safety NPO's and NGO's across the Western Cape as well as municipalities and governmental organisations. The collection of both fatal and non-fatal data can be analysed to determine drowning patterns and trends. A data structure would need to be determined by the information needs, that is, core data parameters for the incidents, for example, demographic information, the location of the drowning (type of water body), activity at the time of submersion and other contributory factors (WHO, 2017b). The Western Cape FPS already collects this information for fatal incidents. A similar information system specifically for non-fatal drowning incidents is also recommended, for coordination by a lead government agency or NGO. A decision as to who will lead with the coordination of collecting non-fatal data will need to be made amongst all organisations involved with water safety. There is already some non-fatal data sporadically collected by hospitals and clinics, medical aid companies and EMS.

“The collection of both fatal and non-fatal data can be analysed to determine drowning patterns and trends.”

Strategy 2: Promote Water Safety and Drowning Prevention Research

Drowning remains a neglected health concern, with a relatively limited research platform on drowning circumstances, prevention and water safety strategies in South Africa and, more specifically, the Western Cape. Well-designed epidemiological and intervention research, both quantitative and qualitative, would enable the best possible intervention programmes to be developed, modified or monitored (WHO, 2017b). It is proposed that the local research

platform be strengthened in order to develop interventions and strategies to prevent drowning. Current research priorities include: (1) analyses of existing fatal drowning data, in the Western Cape, to identify the scope, demographics, circumstances of occurrence and risk factors to the problem; and (2) research on the implementation and effectiveness of prevention and recovery interventions and programmes.

“Well-designed epidemiological and intervention research, both quantitative and qualitative, would enable the best possible intervention programmes to be developed, modified or monitored”

OBJECTIVE 2: STRENGTHEN ADVOCACY AND ENFORCEMENT OF PRIORITY POLICY MEASURES

Targeted legislation has been demonstrated to be an effective intervention in reducing the rates of drowning. In many high-income countries, such as Australia, legislation requiring four-sided swimming pool fencing has been enacted and enforced, and proven to be an effective strategy in the prevention of drowning (Tanje et al., 2008). Pearn, Nixon, Franklin and Wallis (2008) estimated that such safety legislation, specifically related to pool fencing, contributed a minimum of 30% to the reduction of accidental child drowning deaths in Australia. However, legislation such as swimming pool covers and barriers that prevent access to pools especially by small children remain unregulated in South Africa and in the Western Cape (Matthew, Robertson, & Hofmeyr, 2017). Sewduth (2007) recognised that there are no dedicated references to drowning prevention or the promotion of water safety in any legislation in SA. The WHO (2017b) recommended that laws, policies and legislations be developed by government, and that the application and enforcement of new laws be supported by media (to promote awareness and community uptake), lifesaving organisations, government public awareness advertisements, and by the police in enforcing the new law. Enforcement measures are especially important to ensure compliance of both existing and new laws and legislations (WHO, 2017b).

RECOMMENDED STRATEGY AND INTERVENTION

Strategy 1: Develop Municipal By-laws on Pool Fencing or Safety Nets

The Western Cape lacks by-laws and regulations that specifically enable drowning prevention and the promotion of water safety. The proposed recommendation is to develop municipal by-laws that specify standards for fencing off and covering open bodies of water, such as municipal and domestic swimming pools, wells, and dams, where possible, with four-sided fences and with nets and covers. In order to ensure the effective enforcement of new by-laws, a base of support from individuals, community, professionals, coalitions and organisations is required (Vincenten & Gerdmongkolgan, 2014).

“develop municipal by-laws that specify standards for fencing off and covering open bodies of water”

According to the Local Government Transition Act of 1993, the following constitutes the steps to developing municipal by-laws.

1. Drafting and legal examination: this step involves the identification and decisions around a possible danger or wrong condition that should be cured and the manner in which this condition should be cured. The draft must be examined to ensure that the proposed is valid and consonant with the constitution.
2. The Municipal Council then formally adopts the proposed by-law by resolution.
3. The proposed by-law must be published in the newspaper circulating in the municipal area and must indicate the purpose of the by-law, advising the public when and where the proposed law may be inspected, and advising the time by when and to whom written objections must be submitted.
4. The Municipal Council may receive objections; the Council may amend, modify or confirm the proposed by-law.
5. In the final stage, section 160(3)(b) of the final constitution applies. This section states that 'when it comes to the passing of a by-law, a decision must be taken by a municipal council with the supporting vote of a majority of its members, and all other questions before a municipal council, must be decided by a majority of the votes casts.'
Section 162(1) states that a municipal by-law may be enforced only after it has been published in the official Gazette of the relevant province. Furthermore, a provincial official Gazette must publish a municipal by-law upon request by a municipal council.
6. Gazette of the relevant province. Furthermore, a provincial official Gazette must publish a municipal by-law upon request by a municipal council.

Strategy 2: Strengthen Enforcement of Existing Safety Laws

The consumption of alcohol before or during activities in and around bodies of water increases the risk of drowning (Taneja et al., 2008). Currently, there is a municipal by-law that states that “no persons may, while on the beach area, swim or enter the bathing area or any part of the beach while under the influence of alcohol, drugs or any other dependence producing substance” (Beaches By-Law, 2015, p. 8). However, this law is only applicable to beaches and not to recreational facilities with open dams and rivers. The consumption of alcohol while boating, diving and swimming should be prohibited and as strictly enforced as the ‘drinking and driving’ law for road vehicles (Vincenten & Gerdmongkolgan, 2014). Therefore, the proposed recommendation is to firstly, tighten enforcement of existing safety laws and regulations including the use of penalties for the lack of compliance to laws, regulations and policies especially around alcohol consumption at beaches, and to extend this law to other water recreational facilities. Secondly, strengthen the enforcement of PFDs on vessels used in the Western Cape and around its shoreline. Vessel safety regulations indicate that it is compulsory for both commercial and pleasure vessels to have PFDs such as lifejackets and buoyancy aids on board for each person (National Small Vessel Safety Regulations, 2007).

“tighten enforcement of existing safety laws and regulations”

OBJECTIVE 3: PROMOTE MULTI-SECTORAL PARTNERSHIPS AND WATER SAFETY COLLABORATIONS

The lack of an over-arching, responsible body to coordinate drowning prevention efforts may explain the limited actions on drowning prevention (WHO, 2017b). A partnership may range from a more formal perspective, which involves a contractual relationship between two or more parties, to an informal perspective, which implies connection, cooperation and common interests but without obligations (Scarr, 2014). The term collaboration is more frequently used which describes the act of working together for a common purpose and often does not involve a binding agreement (Scarr, 2014). Partnerships and collaborations between NPO's, NGO's, government organisations, academics, health systems, practitioners and community members has been identified as a proven strategy for the prevention of unintentional injury (WHO, 2017b). For example, road traffic injury prevention have incorporated multi-sectorial approaches, by which ministries and government departments have a stated responsibility to reduce the rates of traffic injury (Peden et al., 2004). The underlying notion of partnerships and collaboration is the idea that a common goal is effectively achieved by working together (Scarr, 2014). There is an internationally recognised need that various governmental sectors, NGO's, NPO's, health-care sectors and researchers, work together in order to more effectively, at a local, regional and national level, enable the required resources and activities to prevent drowning (WHO, 2017b).

RECOMMENDED STRATEGY AND INTERVENTION

Strategy 1: Establish a Provincial Water Safety Task Team

There is no subcommittee in the Western Cape that focuses on the coordination of drowning prevention programming and promotes the safe use of water bodies. The proposed recommendation is to formally constitute a provincial collective, which could be in the form of a task team or subcommittee, to coordinate water safety and drowning prevention efforts in the Western Cape. Such a task team, or subcommittee could be accountable to an existing standing committee in the public health sector. However, establishing such a subcommittee would require formal collaboration between water safety agencies, organisations and the Western Cape government. It is recommended that the current Task Team involved in the development of this Strategic Framework form the basis of this subcommittee. The next step would be to appoint a lead agency, that is, one partner that takes a coordinating role, to coordinate through participatory, sectoral consultation, priority drowning prevention and water safety programming more effectively (Scarr, 2014).

“coordinate water safety and drowning prevention efforts in the Western Cape”

Strategy 2: Support Water Safety Collaborations

The effective coordination of priority drowning prevention and water safety programs in the Western Cape, requires formal collaboration among water safety and drowning prevention sectors or agencies such as Government departments, NPO's, NGO's, and researchers. Scarr (2014) identifies a number of potential benefits arising from partnerships and collaboration as a strategy in drowning prevention. These include greater consensus of prevention

priorities, the minimisation of duplication, the sharing of expertise and resources, mitigation of financial, reputational and programmatic risks, attraction and deployment of funding, expansion of geographic reach, and acceleration of programmatic momentum. It is recommended that the Western Cape drowning prevention and water safety sector consolidate current relationships through formal collaborations, to enable coordination, greater implementation, and monitoring of the Framework.

OBJECTIVE 4: STRENGTHEN INSTITUTIONAL PREVENTION CAPACITY

The presence of first emergency responders, such as lifeguards at beaches and public swimming pools, greatly improves the outcome of non-fatal drowning because of immediate rescue and resuscitation opportunities (Vincenten & Gerdmongkolgan, 2014). Lifeguards are known to be models and enablers of safe behaviour as they actively control the risk-taking actions of swimmers and prohibit or restrict swimming if behaviour or conditions pose a hazard (Taneja et al., 2008). The role of the lifeguard is however more multidimensional than that of purely rescue and resuscitation. It is required of lifeguards to be vigilant and alert at all times when on-duty but also to engage in education and coaching (Bradstreet, 2014). For their work to be effective, lifeguards in SA go through extensive training. However, the conditions under which lifeguards work may hinder their abilities to carry out their duties effectively (Schwebel, Jones, Holder, Marciani, 2010). During the summer months of December through till February, and especially over the summer holidays, beaches and public swimming pools are overcrowded. It becomes difficult for lifeguards to remain vigilant when the swimmer to lifeguard ratio peaks. There is a need for increased deployment of lifeguards especially at high-density beaches and swimming pools during peak seasons, days of the week, and times of day. There are a number of Western Cape municipalities that have reported either a high incidence of drowning (per population) or a high number of drowning events (i.e. irrespective of the population size), and this would need to be supported for priority deployment of lifeguards. Internationally, lifeguard-to-swimmer ratios have been suggested at 1:25 (Safe-Wise, 2008), however this is dependent on a number of factors such as the location of beach, whether a beach or swimming pool, the age group of the swimmers, and the presence of adults.

RECOMMENDED STRATEGY AND INTERVENTION

Strategy 1: Increase the Employment of First Responders

It is recommended that government and NGO partners ensure the required resources to employ more first responder or emergency personnel such as lifeguards at priority beaches and public swimming pools, considering the numbers of the population using these sites or facilities, but also the risk that may exist there as indicated by recent drowning and rescue incidents. The greater presence of law enforcement officials is recommended, especially on beaches or pools during high use seasons and times, to ensure and support ongoing enforcement of safe behaviour.

“Increase the Employment of First Responders”



**KEY ACTION AREA 2:
PUBLIC AND SPECIALISED
EDUCATION AND COMMUNITY
AWARENESS**

OBJECTIVE 5: STRENGTHEN PUBLIC AND SPECIALISED EDUCATION AND COMMUNITY AWARENESS

Children and adolescents are a population vulnerable to drowning (WHO, 2014, 2017b), globally and in the Western Cape. The WHO (2014, 2017b) strongly recommends teaching children swimming and survival skills, including personal and peer rescue skills. Teaching children water safety knowledge and swimming skills may be facilitated by accessing public schools. In the Western Cape there is however a lack of formal integration of water safety and swimming skills training programmes in the public school curriculum (Sewduth, 2007). The need for water safety and swimming ability training programmes in Western Cape schools has been indicated in a number of fora (e.g. the Western Cape Water Safety Task Team).

Furthermore, the prevailing circumstances related to rescue and resuscitation is problematic. Many rescue efforts, to save a person from drowning, end with the rescuer drowning either due to a lack of swimming ability or a lack of knowledge related to simple and safe rescue techniques (WHO, 2014). For example, in the Western Cape, it has been indicated that emergency professionals often drown while attempting to rescue someone from drowning. Relating to resuscitation, in South Africa, a large proportion of individuals in drowning incidents do not receive resuscitative measures, highlighting the possibility of strengthening bystander and emergency professionals' knowledge regarding rescue and resuscitation (Morris et al., 2016). Rescue and resuscitation, such as immediate mouth-to-mouth ventilation is so crucial, the WHO (2017b) states that it can "make the difference between life and death in individual drowning situations" (p. 47). Furthermore, as individuals or bystanders, including children, without formal CPR training are usually the first person at a drowning scene, the provision of bystander rescue and resuscitation training becomes even more important as it will equip these persons with the capacity to perform safe rescues (Joanknecht et al., 2015; WHO, 2017b).

Both internationally and in the Western Cape, inadequate supervision has been implicated in child drowning (Morris et al., 2016; Petrass, 2014). Local research findings regarding unwitnessed child drownings indicates an increased need for parental or caregiver supervision (Donson & van Niekerk, 2013; Morris et al., 2016; Joanknecht et al., 2015). The WHO (2017b) supports the sharing of supervision-related information to caregivers.

In many contexts, and possibly, in the Western Cape, many people may however not be aware of the scale of drowning and the risks that may affect many individuals (WHO, 2017b). This makes public awareness and behaviour change campaigns critically important, particularly if drowning prevention interventions are to be well received and used by the public (WHO, 2017b). In the Western Cape specifically, there is a strong need for drowning-related awareness campaigns, mostly focused on the importance of avoiding risky behaviour in and around water bodies. Despite living in the province, many people are unaware of emergency contact numbers; some are uninformed about the dangers related to various water bodies; some ignore advice to only swim between lifeguard flags and only swim in water bodies with lifeguards present; and many individuals within the province continue to use alcohol when involved in swimming activities. Therefore, awareness campaigns should focus on these particular issues that affect the Western Cape. Recent research supports the implementation of such specific awareness campaigns as may be needed in the Western Cape (Donson & van Niekerk, 2013; Kobusingye et al., 2016; WHO, 2017; Willis & George, 2014).

RECOMMENDED STRATEGY AND INTERVENTION

Strategy 1: Strengthen Awareness, Knowledge and Skills Regarding Water Safety amongst the Child and Youth Population

School-aged children should be taught basic swimming skills and water safety knowledge, for example insight into the hazards around water bodies such as rocks and strong currents. Survival skills training, such as simple and safe knowledge and skills related to personal but also peer rescue (e.g. holding onto or extending a pole, rope or garden hose and CPR) is further recommended. There may be risks associated with this type of training intervention, and appropriate safety measures should therefore be implemented (WHO, 2017b). These safety features would include factors such as formalising water safety and swimming interventions through certification by relevant bodies, the use of trained and accredited instructors, and ongoing monitoring of the effectiveness and safety of such training (WHO, 2017b). This type of formalisation would strongly rely on government support, and supportive prioritisation and advocacy may be required to drive the implementation of such interventions. In particular, this intervention could be integrated into the public school curriculum i.e. the Life Orientation lesson, and thus facilitate access to a large proportion, if not all, of the Western Cape child and youth population.

“School-aged children should be taught basic swimming skills and water safety knowledge”

This intervention could include context-specific swimming skills; water safety knowledge; and rescue and resuscitation skills development, as is recommended by the WHO (2017), which recommends the adaption of training to the circumstances specific to local bodies of water. This means that swimming skills and water safety knowledge should be taught in and as relevant to the local contexts where children and youth in the Western Cape are most likely to swim. For example, if a certain groups of children are more likely to swim in farm dams, then training programmes, i.e. ones that teach children how to swim, should be taught in these settings and tailored to the needs of that specific context.

Strategy 2: Enhance Awareness, Knowledge and Skills of First Responders

It is recommended that the water rescue and resuscitation skills of laypersons, especially those with some responsibility for child safety, including educators, police, emergency services staff, and caregivers, be enhanced through ongoing rescue and resuscitation training. This would enable these individuals to perform safer water rescues, will ultimately contribute to minimising the negative outcomes associated with a drowning incident, but may also protect these bystanders from placing themselves at risk for drowning (Joanknecht et al., 2015; WHO, 2017b).

“ongoing rescue and resuscitation training”

The focus of the rescue training should be on simple and safe water rescue methods which does not involve going into the water, such as holding onto or extending a rod, pole, rope, lifebuoy or hosepipe (WHO, 2014). Resuscitation training should include CPR training which involves both mouth-to-mouth and chest compression (WHO, 2014). Chest-

compression only CPR, referring to no mouth-to-mouth resuscitation, is not effective for individuals without a pulse or who are not breathing (WHO, 2014).

Strategy 3: Teach Caregivers the Importance of Supervision

To address the challenge related to inadequate caregiver supervision of children around waterbodies, it is recommended that caregiver campaigning programmes or initiatives be established that are aimed at emphasising the importance of child supervision, such as not being distracted when a child is bathing. It has been identified that, in the Western Cape, many childhood drownings occur in and around the home in baths and even buckets that may be used for bathing and washing dishes or clothing. Caregivers should be educated about the hazardous nature of water, including the risks associated with relatively small amounts of water found in and around the home environment (Joanknecht et al., 2015, Richards, 2011). With the current drought and related increased likelihood of water storage, caregiver education initiatives regarding the dangers associated with water storage is emphasised.

“caregiver campaigning programmes or initiatives be established that are aimed at emphasising the importance of child supervision”

There is a paucity of guidelines regarding what represents adequate supervision (Petrass, 2014). Nevertheless, in the research literature, it is consistently emphasised that caregivers should maintain close supervision of young children around water bodies (Joanknecht et al., 2015). Researchers have used terms such as “children should never be left alone” in such circumstances (Joanknecht et al., 2015, p. 123). Caregiver education and awareness regarding drowning-related risks may alter knowledge, attitude and beliefs, which may, in turn shape their behaviour (Joanknecht et al., 2015; Taneja et al., 2008).

Strategy 4: Enhance Public Awareness

It is recommended that the Western Cape implement continuous or at least seasonal public awareness campaigns. The local target population, especially vulnerable age groups and at risk communities, (i.e. because of proximity to hazardous bodies of water) should guide the form of the awareness campaign, and a variety of methods, such as billboards, pamphlets, social media and signage related to water safety should be used. The focus areas for awareness campaigns in the Western Cape should be directed at the following:

- Continuous awareness and provision of emergency contact numbers (coastal and inland emergency numbers).
- Understanding the dangers of different water bodies (e.g. beach currents vs. murky dam water).
- The importance of swimming between lifeguard deployed flags and in water bodies where lifeguards are present.
- Alcohol-related awareness campaigns, regarding the use of alcohol during swimming activities. These awareness campaigns should particularly be aimed at adolescent and mature adult males, because of particular risk behaviour, and should be implemented over high risk periods such as, Spring and Summer.



**KEY ACTION AREA 3:
ENVIRONMENTAL AND
ENGINEERING INTERVENTIONS**

OBJECTIVE 6: DEVELOP PRIORITY BARRIER INTERVENTIONS

The WHO (2014, 2017b) recognises that a lack of physical barriers preventing children's access to water poses a threat to child drowning. A number of studies conducted in SA have identified that the lack of adequate barriers around swimming pools may be implicated in drownings among children (Donson & van Niekerk, 2013; Joanknect et al., 2015; Morris et al., 2016). Therefore, in the Western Cape, there is a strong need for the implementation of physical barriers, including fencing and covers (i.e. safety nets), around domestic swimming pools, in order to restrict children's access to swimming pools and ultimately, reduce drowning.

Communities within LMICs, including South Africa, make use of water sources such as open wells, cisterns, barrels and other water collection containers. Despite the value placed on these water sources for daily activities, it can pose drowning risks, particularly for children. Therefore, ensuring safety around these water sources are crucial, particularly for the Western Cape, given the ongoing drought and likely increase in the use of these water sources, such as water storage containers. To facilitate safety around these water sources, the WHO (2017b) suggests that physical barrier interventions be used. These include covering wells, cisterns, containers with water in them; constructing a wall or fence barrier around ponds or rivers; or erecting fences around accessible water bodies nearby the home (Taneja et al., 2008; WHO, 2017b) which will contribute towards drowning prevention (Bennet & Linnan, 2014; WHO, 2017b).

RECOMMENDED STRATEGY AND INTERVENTION

Strategy 1: Fencing Off Swimming Pools

The Western Cape requires the development and specification of criteria regarding the fencing of domestic swimming pools of new houses. Moreover, the specification of fencing could be indicated as a condition for transfer between homeowners. As fencing may however be expensive, the use of alternative, more cost-effective measures, such as pool nets or covers are recommended as an alternative or supplementary measure. Standards for accredited supplies of fencing and other barriers will need to be established by the relevant municipal or provincial authorities. However, fences should not be climbable, should be sturdy and should consistently be checked for defects (WHO, 2017b). Local legislation will facilitate the implementation of fencing around domestic swimming pools (Sewduth, 2007).

“development and specification of criteria regarding the fencing of domestic swimming pools of new houses”

Strategy 2: Covering Other Water Bodies

In the Western Cape, ponds or dams are frequently used in rural and peri-urban settings for recreational purposes, as opposed to swimming pools; and is often the household water source (Bennet & Linnan, 2016). In these settings, such water bodies are viewed as a convenience as it provides water for everyday activities, including bathing, drinking, cooking and recreation (Bennet & Linnan, 2016).

It is therefore recommended that provincial or municipal guidelines or legislation be established for rural or peri-urban dam safety, and include: (1) establishing safety standards for rural dam construction; (2) criteria for child barriers; (3)

criteria for warning signage (indicating hazards and requirements for caregiver supervision); and the provision of personal flotation devices at rural dams.

“guidelines or legislation be established for rural or peri-urban dam safety”

Moreover, considering the current drought in the Western Cape, it is urged that smaller water storage containers be covered at all times. Relatedly, but deemed an engineering intervention, is the recommendation to always secure (i.e. store away) empty containers, or turn water storage containers, washing buckets or baths upside down - important drowning prevention techniques for financially constrained settings.

OBJECTIVE 7: DEVELOP PRIORITY INFRASTRUCTURAL INTERVENTIONS

Natural water bodies have a number of hazards for swimmers, such as strong currents; unknown water depths; obstacles in water; and unexpected and unnoticeable changes in depth or deep holes (Taneja et al., 2008). Despite the risks associated with other water bodies, such as ponds and dams, these also tend to be used for recreational purposes, including in the Western Cape. Supportive water body infrastructure may contribute to implementation of water safety and drowning prevention activities (Taneja et al., 2008).

RECOMMENDED STRATEGY AND INTERVENTION

Strategy 1: Develop Supportive Infrastructure

It is recommended that appropriately designed swimming pools are built, with indicated depths, with water safety features and which are free from hazards, particularly at schools and in high-risk communities. An alternative to the building of swimming pools at schools and in high-risk communities is, for example, the use of portable pools for young children. This strategy may facilitate the enhancement of swimming and rescue skills in these contexts and thereby, may contribute to drowning prevention efforts. Infrastructure should be developed, particularly in high density and high-risk areas for the purpose of supporting prevention and to enable rescue activities, such as facilities and equipment for lifeguards and lifesaving equipment.

6

CONCLUSION

Drowning is a serious and neglected public health threat. In South Africa, drowning accounted for 1690 deaths in 2009 and 1411 deaths in 2015. The drowning mortality rate within the Western Cape South Africa is stable at about 3.3 per 100 000 population. This Western Cape Drowning Prevention and Water Safety Strategy has been developed to support the prioritisation of programmes that will help prevent drowning and promote water safety in the Western Cape. The Strategic Framework highlights evidence-led recommendations for the Western Cape Local Government Department to develop operational plans that utilise proven drowning prevention interventions. The Framework targets the prevention of risk factors specific to priority groups and settings, it also emphasises the promotion of supportive institutional factors.

“Drowning is a serious and neglected public health threat.”

The following objectives have been identified:

1. Establish provincial information strategies and systems based on existing platforms,
2. Strengthen advocacy and enforcement of priority policy measures,
3. Promote multi-sectoral partnerships and water safety collaborations,
4. Strengthen institutional prevention capacity,
5. Strengthen public and specialised education and community awareness,
6. Develop priority barrier interventions, and
7. Develop priority infrastructural interventions.



THE FRAMEWORK MAKES THE FOLLOWING RECOMMENDATIONS:

- 1. Establish provincial information systems,**
- 2. Promote water safety and drowning prevention research,**
- 3. Develop municipal by-laws for fencing off and covering open bodies of water,**
- 4. Tighten the enforcement of existing safety laws and regulations,**
- 5. Establish a provincial water safety task team,**
- 6. Increase the employment of first responders such as lifeguards,**
- 7. Teach children basic swimming skills and water safety knowledge,**
- 8. Enhance the awareness, knowledge and skills of first responders,**
- 9. Teach caregivers the importance of supervision,**
- 10. Enhance public awareness,**
- 11. Fence off swimming pools and cover other water bodies, and**
- 12. Develop supportive infrastructure.**

The Framework requires the formation of strong collaborations between provincial departments and other external stakeholders.

It provides a framework for partners in the water safety and drowning prevention sector to collaborate on common service delivery activities to achieve the areas for action listed in the Framework.



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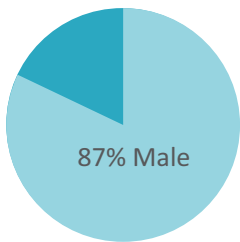
APPENDIX



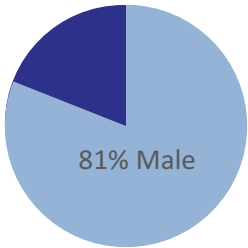
Western Cape Drowning Prevention and Water Safety Strategy Task Team

The data presented here provide a detailed breakdown of drowning mortality by age, sex and body of water for each of the eight Western Cape municipalities facing a high burden of fatal drowning. Suburb level data is indicated for all suburbs where the total number of fatal drowning incidents between 2010 and mid-2017 exceeded five. All reported mortality rates exclude 2017 data.

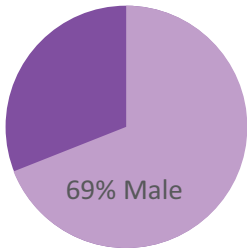
Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
Drakenstein Local Municipality	88	6,0	4,7
Suburb:			
Wellington	25	28,4	N/A
Paarl	24	27,3	N/A
Central Paarl	7	8,0	N/A
Saron	7	8,0	N/A
Mbekweni	7	8,0	N/A
Northern Paarl	5	5,7	N/A
Gouda	5	5,7	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>87% Male</p>	Children under 15 years old	25,3	Rivers & Canals	38,6
			Ponds, Dams & Lakes	33,0
	15 - 34 years	49,4	Swimming Pool	19,3
			Fresh water	5,7
			Bath	2,3
			Storage tank	1,1
	Adults older than 35 years old	25,3		

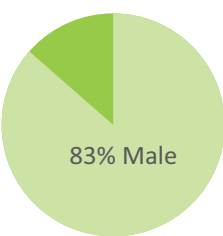
Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
City of Cape Town Metropolitan Municipality	496	33,7	1,7
Suburb:			
Harare	35	7.1	N/A
Strand	25	5.0	N/A
Kraaifontein	24	4.8	N/A
Mitchells Plain	20	4.0	N/A
Hout Bay	19	3.8	N/A
Somerset West	19	3.8	N/A
Mfuleni	18	3.6	N/A
Gordon's Bay	17	3.4	N/A
Macassar	16	3.2	N/A
Khayelitsha	15	3.0	N/A
Table View	14	2.8	N/A
Brackenfell	13	2.6	N/A
Mowbray	11	2.2	N/A
Strandfontein	11	2.2	N/A
Parow	10	2.0	N/A
Cape Town	10	2.0	N/A
Bellville	10	2.0	N/A
Philippi	9	1.8	N/A
Kuils River	9	1.8	N/A
Simons Town	9	1.8	N/A
Muizenberg	8	1.6	N/A
Durbanville	8	1.6	N/A
Sea Point	8	1.6	N/A
Table Bay Harbour	8	1.6	N/A
Camps Bay	8	1.6	N/A
Milnerton	6	1.2	N/A
Guguletu	6	1.2	N/A
Ocean View	5	1.0	N/A
Grassy Park	5	1.0	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>81% Male</p>	Children under 15 years old	39,0	Ocean	37,7
			Swimming Pool	21,8
	15 – 34 years	34,8	Ponds, Dams & Lakes	15,3
			Rivers and canals	8,7
			Fresh water	8,5
	Adults older than 35 years old	26,2	Bath	6,9
			Storage Tank	1,0
			Lagoon	0,2

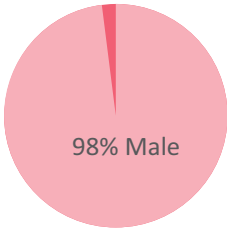
Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
Matzikama Local Municipality	91	6,2	17,7
Suburb:			
Vredendal	36	39,6	N/A
Klawer	30	33,0	N/A
Lutzville	14	15,4	N/A
Doringbaai	7	7,7	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>69% Male</p>	Children under 15 years old	32,6	Rivers & Canals	65,9
			Ponds, Dams & Lakes	20,9
	15 – 34 years	22,5	Ocean	7,7
			Swimming Pool	4,4
	Adults older than 35 years old	44,9	Fresh water	1,1

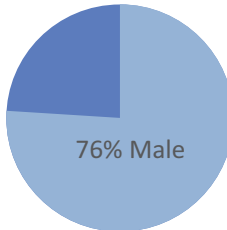
Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
George Local Municipality	86	5,8	5,7
Suburb:			
George	32	37,2	N/A
Uniondale	10	11,6	N/A
Herolds Bay	9	10,5	N/A
Thembalethu	9	10,5	N/A
Pacaltsdorp	6	7,0	N/A
Wilderness	5	5,8	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>83% Male</p>	Children under 15 years old	25,9	Ponds, Dams & Lakes	43,0
			Ocean	29,1
	15 – 34 years	50,6	Rivers and canals	14,0
			Fresh water	4,7
			Lagoon	3,5
	Adults older than 35 years old	23,5	Swimming Pool	3,5
			Bath	2,3

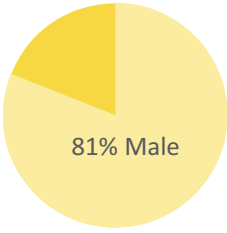
Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
Overstrand Local Municipality	84	5,7	12,7
Suburb:			
Hermanus	16	19,0	N/A
Kleinmond	13	15,5	N/A
Westcliff	8	9,5	N/A
Gansbaai	8	9,5	N/A
Stanford	7	8,3	N/A
Hawston	6	7,1	N/A
Pearly Beach	6	7,1	N/A
Sandbaai	5	6,0	N/A
Pringle Bay	5	6,0	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>98% Male</p>	Children under 15 years old	12,2	Ocean	75,0
			Lagoon	13,1
	15 - 34 years	48,0	Rivers and canals	5,6
			Ponds, Dams & Lakes	3,6
			Fresh water	1,2
	Adults older than 35 years old	39,8	Swimming Pool	1,2

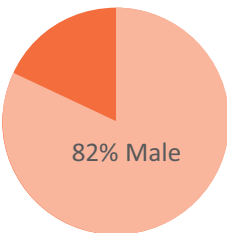
Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
Langeberg Local Municipality	59	4,0	7,6
Suburb:			
Robertson	24	40,7	N/A
Ashton	12	20,3	N/A
Bonnievale	7	11,9	N/A
Montagu	12	20,3	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>76% Male</p>	Children under 15 years old	27,1	Rivers & Canals	49,2
			Ponds, Dams & Lakes	37,3
	15 - 34 years	50,8	Swimming Pool	10,2
			Bath	1,7
			Fresh water	1,7
	Adults older than 35 years old	22,1		

Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
Cederberg Local Municipality	54	3,7	13,3
Suburb:			
Clanwilliam	30	55,6	N/A
Citrusdal	9	16,7	N/A
Lambertsbaai	9	11,1	N/A
Elandsbaai	6	16,7	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>81% Male</p>	Children under 15 years old	9,3	Ponds, Dams & Lakes	48,1
			Rivers & Canals	27,8
	15 - 34 years	44,4	Ocean	22,2
			Swimming Pool	1,9
	Adults older than 35 years old	46,3		

Municipality	Total number	Proportion of total (%)	Mortality rate (per 100 000 population)
Swellendam Local Municipality	22	1,5	8,4
Suburb:			
Swellendam	16	72,7	N/A
Barrydale	5	22,7	N/A

Sex	Age group	Proportion of total (%)	Body of water	Proportion of total (%)
 <p>82% Male</p>	Children under 15 years old	23,8	Rivers and canals	50,0
			Ponds, Dams & Lakes	45,5
	15 - 34 years	42,9	Swimming Pool	4,5
	Adults older than 35 years old	33,3		



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