Western Cape Government

DISASTER MANAGEMENT

FIRE RESCUE SERVICES

Western Cape Strategic Framework for Fire and Burn Injury Prevention

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Foreword

A fundamental function of government is the protection of its people from hazards. This is particularly the case where individuals, families and communities cannot easily protect themselves, or where the dangers are such that they can negatively affect entire populations. In the Western Cape, fires and the resulting burn injuries are such perennial danger, often devastating victims, families and communities. Every fire-related death is accompanied by many more casualties that suffer despite surviving the injury, with many enduring prolonged hospitalisation, disfigurement, trauma, and disability. The vast majority of destructive fires are caused by our actions and in many cases our inactions where we do not know how preventable fires and burns actually are.

Hence, there is an urgent need for a co-ordinated, robustly resourced and effectively functioning evidence-led strategy for fire and burn prevention in the province. Experience from a number of countries indicate that fire-related injuries are not random, but predictable events that can therefore be prevented. Over the past 10 to 20 years, a number of industrialised countries have reduced their fire-related injury death rates, some by as much as half. These reductions have been attributed to concerted and sustained prevention efforts, often initiated by governments as part of a national strategy or programme. The Western Cape Government has recognised the widespread fire-related death and injury in the province and the gaps in its prevention capabilities and responses, and solicited the support from the Medical Research Council and University of South Africa's Violence, Injury and Peace Research Unit and experts in the field to develop a fire and burn prevention framework for the Western Cape Government.

The Western Cape Strategic Framework for Fire and Burn Injury Prevention provides insight into the extent and the main drivers of the problem in the province. It recommends that we concentrate our efforts on strategic interventions that have been proven to work. We need to especially strengthen the leading role of the Fire and Rescue Service in the prevention of fire-related incidents in the first place, which is aligned and supported by Section 152 of the Constitution of South Africa, which states that the objective of Local Government is to promote a safe and healthy environment. We will need to collaborate with local communities, especially those at high risk, other public services and business to tackle these challenges effectively. Campaigns such as "Fire is Everyone's Fight" emphasise the centrality of collaboration and partnerships.

This Framework sets out our vision for fire and burn prevention in the province. Districts and local authorities will take key strategic decisions about what and how to implement fire and burn prevention interventions. Within this Framework we look forward to managers working with their staff to deliver the most effective service to improve and promote public safety. I believe that the time is right for all those who work in the fire and burn prevention field to unite around the vision of the Framework and work with the public and local communities that they serve to ensure safer places to live.

Minister Anton Bredell
Ministry of Local Government, Environmental Affairs and Development Planning

October 2015

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Acronyms

CAPFSA	Child Accident Prevention Foundation of Southern Africa
COGTA	Department of Cooperative Governance and Traditional Affairs
DOH	Department of Health
DHS	Department of Human Settlements
DLG	Department of Local Government
DotP	Department of the Premier
DRM	Disaster Risk Management
DM Act	Disaster Management Act No. 57 of 2002
F&RS	Fire and Rescue Services
FPASA	Fire Protection Association of Southern Africa
HESASA	Household Energy Safety Association of South Africa
MRC	Medical Research Council
NDMC	National Disaster Management Centre
NDMF	National Disaster Management Framework
NFPA	National Fire Protection Association
PSASA	Paraffin Safety Association of Southern Africa
PTSD	Post-traumatic stress disorder
PDMC	Provincial Disaster Management Centre.
RADAR	Research Alliance for Disaster and Risk Reduction
SA	South Africa
UNISA	University of South Africa
UNISDR	United Nations International Strategy for Disaster Reduction
VIPRU	Violence, Injury and Peace Research Unit
WC	Western Cape
WCED	Western Cape Education Department
WCDM	Western Cape Disaster Management Centre
WHO	World Health Organization

Glossary

Term	Definition
Burns	A burn occurs when some or all of the different layers of skin cells are destroyed by a hot liquid (scald), a hot solid (contact burns) or a flame (flame burns). Skin injuries due to ultraviolet radiation, radioactivity, electricity or chemicals, as well as respiratory damage resulting from smoke inhalation, are also considered to be burns (1).
Injury	An injury is the physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance. It is conventional to classify injuries by their cause, i.e. as intentional (deliberately inflicted) or unintentional (2).
Unintentional injury	Unintentional injuries are classified according to their causal mechanism (i.e. how they occurred), with most common sub-categories including road traffic injuries, falls, burns and scalds, drowning and poisonings (2).
Intentional injury or violence	Intentional injury or violence is defined in the World Report on Violence and Health (WRVH) as 'the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development, or deprivation.' Intentional injuries can be further classified according to the people involved in the event, i.e. self-inflicted, interpersonal (injuries inflicted by one person against an intimate partner, child or elderly person) and collective violence (2).
Injury prevention	The WHO defines injury prevention as the actions or interventions that prevent an injury event or violent act from happening by rendering it impossible or less likely to occur. Injury control refers to actions aimed at reducing injuries or the consequences of injuries once they have occurred (1).
Primary, secondary and tertiary prevention	Injury prevention interventions may be organised according to three levels of action: • Primary: The prevention of injury before its occurrence. • Secondary: The immediate responses once an injury has occurred. These include pre-hospital care, emergency medical care for physical trauma and shelter services, e.g. for abused women and children. • Tertiary: This focuses on rehabilitation and reconciliation. Services may include individual and family counselling (3).

Term	Definition
Universal, selected and indicated interventions	Prevention may also target specific vulnerable and identified groups: • Universal interventions: Targeted at the general population or groups without consideration for any specific risk groups. These may include, for example, public campaigns sensitising entire communities to safe pedestrian behaviour when crossing roads or conflict resolution training for all high school children or public campaigns that sensitise entire communities to the magnitude of injury. • Selected interventions: Targeted at groups shown to be at specific risk for injury, for example, home visitation for marginalised families with young children at risk of household injury and those that require parenting support. • Indicated interventions: Aimed at groups who have already been exposed to injury either as perpetrators or survivors. This may include gender sensitisation training for perpetrators of intimate partner violence (3).
Morbidity	Morbidity is an incidence of ill health. It is measured in various ways, often by the probability that a randomly selected individual in a population at some date and location will become seriously ill over some period of time (4).
Mortality	Mortality is the incidence of death in a population. It is measured in various ways, often by the probability that a randomly selected individual in a population at some date and location will die in some period of time (4).
Downstream or proximal risk factor	A downstream or proximal risk factor is a risk factor that represents an immediate vulnerability for a particular condition or event. Sometimes downstream risk factors precipitate an event. For example, an intensely stressful life experience, such as a divorce or loss of a job, is a downstream risk factor for a suicide attempt (5).
Upstream or distal risk factor	An upstream or distal risk factor is a risk factor that represents underlying social and infrastructural vulnerabilities for a particular condition or event. An upstream risk factor does not predict that the condition or event is about to happen, but rather that a person may be at risk for the condition at some time in the future (5).
Policy document	A plan of action adopted or pursued by an individual, government, party, or business (6).
Strategic framework	A strategic framework is a structured way to understand a project proposal by helping you clearly define each key service objective. The framework then helps you identify the resources, partners and innovations that might contribute to success. To be most effective, the strategic framework should work with one project-specific objective at a time. Strategic frameworks can be devised by one person and then presented to and reviewed by others, or they can be created through a facilitated group decision conference (7).

Opening note to the reader

The Western Cape Strategic Framework for Fire and Burn Injury Prevention has been developed to support the prioritisation of programmes that will help prevent fires and burn injuries in the Western Cape. This Framework is a strategic endeavour to change key environmental, social and behavioural factors that contribute to the causation of fires and burns. The Strategic Framework highlights evidence-led recommendations for the Western Cape Local Government Department to develop operational plans that utilise proven fire and burn injury 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 injury prevention strategies.

The Framework highlights the most common fire and burn injury settings and affected populations 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 fires and burn injuries. The Framework focuses upon primary (i.e. on pre-injury circumstances), secondary (i.e. on conditions specific to the injury event) and selected tertiary prevention (or rehabilitative) priorities. It offers department-specific prevention objectives, with the requisite flexibility to allow for the individual or collective uptake by Departments of fire and burn injury prevention opportunities. This Framework foregrounds the coordinating role of the Western Cape DLG, which manages the department of Fire and Rescue Services that is tasked with the control of fires. The DLG, however, does not hold the sole mandate for the prevention of burns or the management of its consequences.

There are safety issues that are led by other departments, such as Human Settlements and the Department of Health and Community Safety, which have much to offer in terms of models of prevention, response and treatment practices, and access to those vulnerable to injury. The Framework requires the formation of strong collaborations, both between these provincial departments and with other external stakeholders. It provides a framework for partners in the fire safety and burn injury prevention sector to collaborate on common service delivery activities to achieve the areas for action listed in the Framework. This Strategic Framework offers a platform from which Departments can implement priority burn prevention and safety promotion programmes. The Framework specifies strategic objectives, each with specific outcomes, recommended strategies, specific interventions and a lead department(s). Specific injury prevention implementation plans will be developed separately by departments, or 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.

Executive summary

There is an unprecedented burden of injury, disability and disadvantage arising from fires in SA. A burn injury occurs when some or all of the different layers of skin cells are damaged by a hot liquid (scald), a hot solid (contract burns), or a flame (flame burns). The burn mortality rate of 8,5 per 100 000 in SA is greater than the world average of 5 per 100 000, and the African Region average of 6 per 100 000. The majority of fatal burns in the Western Cape occur in the home, either over the cold and wet months or during recreational periods over weekends. Moreover, burns tend to affect vulnerable populations such as impoverished or marginalised families who live in informal housing.

SA's relatively high incidence of burn injuries is ascribed to its widespread poverty, and the consequent living conditions and overcrowding. Despite some recognition of these challenges, the prevention of burn injuries is not optimal, with municipalities reporting difficulty in implementing the preventative provisions of the Disaster Management Act as well as the Fire Brigade Services Act No. 99 of 1987, due especially to limited funding and training. Instead, funding and training is still largely allocated towards the implementation of responsive, or curative, fire control measures. The rationale for this Strategic Framework therefore arises from identifying gaps in the Western Cape's prevention responses towards fire control and the minimisation of burn injuries, suffering, and the often far-reaching economic consequences, and the urgent need for a co-ordinated evidence-led provincial strategy. The Framework offers sound, empirically based recommendations for provincial departments to carve out fire and burn prevention interventions. The Framework stresses that the prevention of fires and burns necessitates a coordinated, inter-sectoral evidence-led response. In recognition of the currently limited preventative measures, the Western Cape DLG approached the MRC-UNISA VIPRU in August 2013 for the development of a provincial strategy for the prevention of fires and burn injuries.

The Framework aims to bring together provincial departments to strengthen the implementation of empirically developed fire and burn injury prevention and control interventions. It places the emphasis on controlling the impact of fires and preventing injury before it occurs. This Framework signals a strategic evidence-led and co-ordinated endeavour to changing the social, behavioural and environmental factors that contribute to fires and injuries. The Strategic Framework places the accent on three key action areas that reduce burns by targeting priority socio-structural and technological risk factors, reduce human and behavioural risks, and facilitate supportive institutional environments. Following these key action areas, the Framework has the following strategic objectives as outlined in the figure below:

1

FIRES AND BURNS: A PERSISTING BURDEN

There is an unprecedented burden of injury, disability and disadvantage arising from fires in SA (8). A burn injury occurs when some or all of the different layers of skin cells are damaged by a hot liquid (scald), a hot solid (contract burns), or a flame (flame burns). Skin injuries due to ultraviolet radiation, radioactivity, electricity or chemicals, as well as respiratory damage resulting from smoke inhalation, are also considered to be burns. The burn mortality rate of 8,5 per 100 000 in SA is greater than the world average of 5 per 100 000, and the African Region average of 6 per 100 000 (8). In the Western Cape, there are approximately 500 deaths and 15 000 hospital admissions reported every year. The majority of fatal burns are registered as accidental and often occur in the home, either over the cold and wet months or during recreational periods over weekends (9).

Burn injuries can have a profound impact on the affected individual (10). Burn injuries threaten the individual's health and bodily integrity and may require intensive and prolonged physical treatment. Survivors are often faced with permanent scarring and in some cases with limited functionality (10). Apart from the fact that burns may lead to impairments of motion and limitation of activities, the change in the survivor's appearance may be a huge cause of distress (11). For example, burn survivors may develop PTSD, anxiety disorders and depression (11). The negative impact on the individual's confidence to form relationships, perform well scholastically and to access occupational opportunities is an indication of the strain of burns to the individual (10). There is a significant burden that is then further imposed on the family and the community, which include health, rehabilitation and care costs, the cost of lost schooling opportunities, and the loss of a current or potential breadwinner (11).

Fires and burns result in far-reaching economic losses. The overall cost of property loss (structural and environmental) due to fire is estimated to cost the SA economy more than R3 billion every year (12). These statistics reflect only the losses reported by local authorities to the FPASA. However, not all the Fire Services in

Figure 1. *National total fire losses 2005-2012*
Source: National Statistics from FPASA (2014) (13)

> ***"There is an unprecedented burden of injury, disability and disadvantage arising from fires in SA."***

SA contribute to the national statistics used to compile the current FPASA reports. Fire losses under a certain value are usually not reported, especially from fires in informal settlements and those assets that are not insured. The fire statistics of large industrial and other private services are also not included in the above figures as most large industrial agencies have in-house insurance facilities. The implication of this is that the reported economic losses are grossly underestimated (12).

The total cost of fire is difficult to measure in terms of economic losses because of the direct and indirect effects borne by the public, private sectors and individuals. Insurance financial data often refer to the tangible damage to property which refers to losses to which a monetary value can be assigned and direct effects of a fire, i.e. damage of assets that occur at the time of the fire or fire-related disaster. The main items in this category include the total or partial destruction of physical infrastructure, buildings, appliances, furniture, equipment, means of transportation, and documents (14). The intangible effects and indirect losses are not reported on due to lack of consistent and available data.

> ***"The overall cost of property loss (structural and environmental) due to fire is estimated to cost the SA economy more than R3 billion every year."***

Occupancy and fire causes 2012

DESCRIPTION	RAND DAMAGE	DESCRIPTION	RAND DAMAGE
Formal dwellings	556 062 426	Milling	9 276 000
Informal dwellings	114 556 248	Petroleum	1 117 500
Flats	51 584 320	Food and drink	2 068 500
Hotels and boarding houses	22 075 400	Paper and packaging	41 309 640
Hospitals and nursing homes	82 449 620	Chemical	24 596 500
Educational establishments	6 496 500	Metal	1 280 727 000
Churches and halls	7 470 000	Electronics	19 286 800
Cinemas and theatres	48 045 000	Mines (surface)	825 000
Museums, libraries and art galleries	543 000	Utilities	13 604 500
Night clubs and dance halls	2 273 000	Cars, motorcycles	78 827 641
Restaurants and cafes	9 831 780	Buses	14 681 800
Offices	50 027 150	Heavy goods vehicles	113 557 500
Department stores	36 946 100	Ships	3 065 500
Garages and workshops	24 141 200	Trains	5 454 320 200
Warehouses	83 842 100	Aircraft	2 340 000
Outside storage	42 864 000	Rubbish, grass and bush	5 982 120
Furniture	11 395 500	Plantations and forests	60 520 000
Plastics and rubber	80 848 000	Agricultural	1 924 000
Textile	2 760 200	Miscellaneous fires	44 668 478
Printing	1 280 000		
TOTAL: R3 162 240 443			

Box 1. *Economic consequences of fire*
Source: National Statistics from FPASA 2014 (13)

Fires are reported to impact upon particular settings, especially informal urban settings but also peri-urban and rural settings. In the Western Cape the veldfire risk is substantial, as illustrated by the March 2015 fires in Cape Town, with vulnerable economic assets including infrastructure, e.g. homesteads, telecommunications, industrial and forestry facilities, livestock, and rural industries. The economic impact of veldfires can include losses related to business interruptions, tourism and sales, and impact the loss of utilities and infrastructure. Members of the insurance industry report that the risk in the rural environment has shown an increase in the past decade with veldfires contributing to this trend (15).

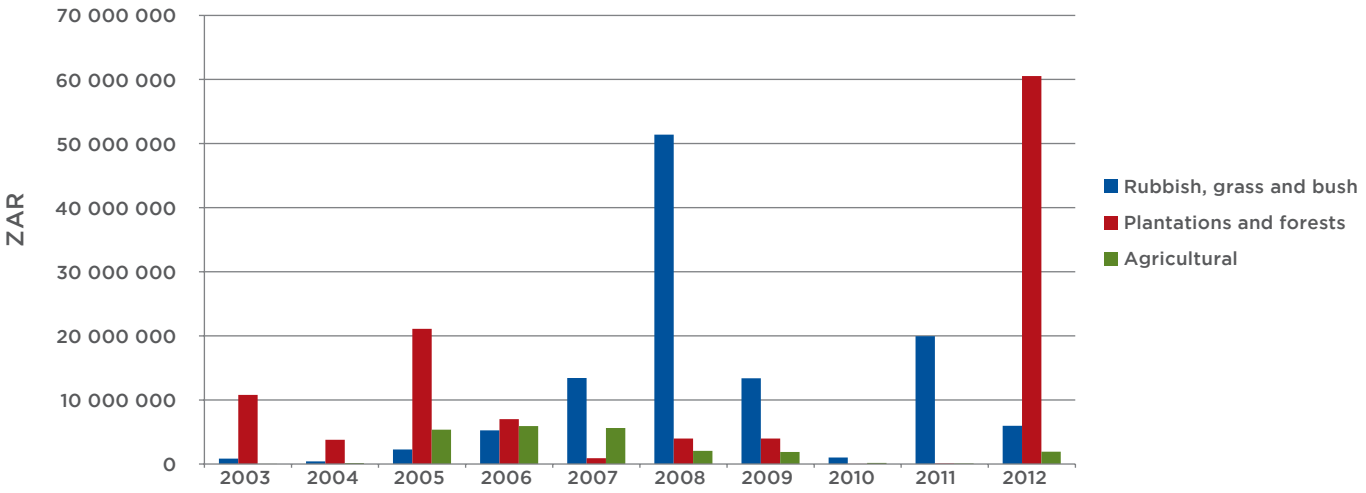

Figure 2. *National compared veld, agriculture and forest fires*
Source: National Statistics from FPASA (2014) (13)

> ***"Fires are reported to impact upon particular settings, especially informal urban settings but also peri-urban and rural settings."***

The impact of informal settlement shack fires on individuals and the economy has also received significant attention, both nationally and in the province. Between 2009 and 2012, about 5 000 informal settlement fires were reported, about 1 200 to 1 300 a year in the Western Cape, with significant, although variably quantified health and socio-economic losses reported. The impact of such fires typically result in reduced quality of life of the affected community, if not actual lives lost. In May 2014 for example, a series of shack fires across Cape Town displaced over a thousand people in Nomzamo (Strand), Khayelitsha, Goodwood, Pholile Park (Strand) and Masiphumelele (Fish Hoek), over just one weekend (17). Livelihoods were disrupted, sometimes permanently as in the case where households lost a breadwinner. Important documents such as birth certificates and identity documents were lost and are costly to replace in terms of time and money. Some people lost their life savings which were kept in their houses. Assets that sustain livelihoods such as utensils, clothing and furniture were also lost. In some instances, home premises also served as informal businesses, with the subsequent loss of employment. These material losses were typically not insured. Tangible cultural heritage is also a material loss. For example cultural heritage that is physical (e.g. sacred places to perform rituals or sacred treasures) may be lost during a fire never to be regained, with a monetary value difficult to assign to this type of loss.

> ***"Between 2009 and 2012, about 5 000 informal settlement fires were reported, about 1 200 to 1 300 a year in the Western Cape."***

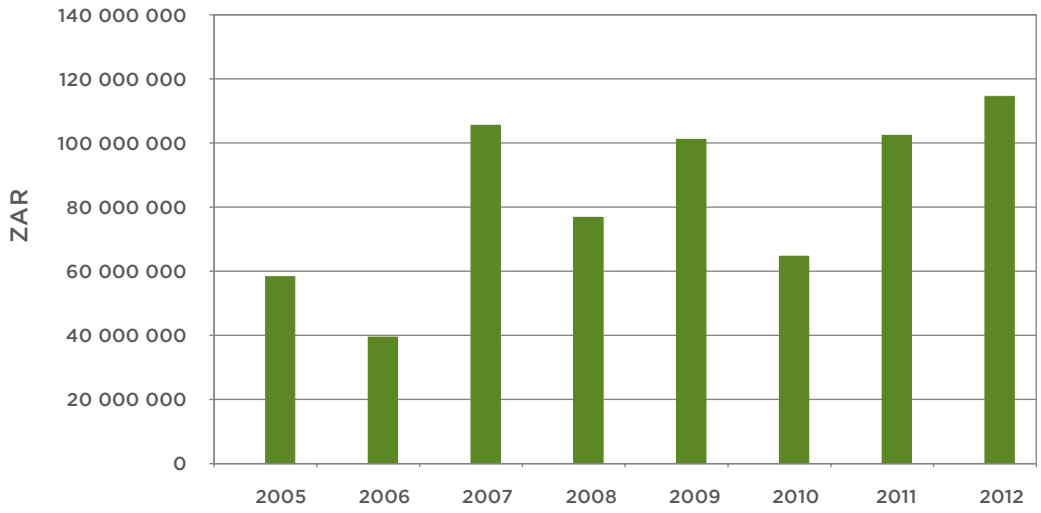

Figure 3. *National compared residential losses 2005-2012*
Source: National Statistics from FPASA (2014) (13)

MANDATE, RATIONALE AND CONTEXT

Despite SA and the Western Cape's high levels of destructive fires and resulting burn injury mortality, morbidity and economic losses, the country and province's prevention responses tend to be characterised by insufficient inter-sectoral collaboration, fragmentation, inadequate co-ordination, inappropriate resource allocation, insufficient adoption of evidence in planning, implementing and monitoring interventions, with a response orientation and only a limited focus on prevention (18). There appear to be funding constraints, as well as a lack of fire safety information, and the presence of conflicting information. In terms of funding, many municipalities do not make provision for fire risk-reduction in their planning and budgeting processes (19). As a result, SA still does not optimally provide for the prevention of fires and burn injuries and municipalities have difficulty implementing the preventative provisions of the DM Act as well as the Fire Brigade Services Act No. 99 of 1987. Despite the mammoth developmental backlogs faced by municipalities, funding is still largely allocated towards responsive fire control measures, with government focusing on burn relief and recovery funding when a fire occurs, with limited efforts on preventing the fire, which therefore increases the likelihood of burn injuries and other consequences (18).

There is a shortage of credible, preventative fire safety information (20). This lack of information is reported by community members, service members and policy makers. Many community members appear to lack basic fire prevention information, such as guidelines regarding the safe use of paraffin appliances (20). Tied to this is the fact that within government, policy-makers and those responsible for implementation, often have conflicting information, different priorities, a bias towards a response as opposed to risk reduction, as well as different understandings of the appropriate fire safety priorities for the Western Cape. The insurance sector, for example, concentrates on the financial loss or burden, while the health sector focuses on the physical and psychological trauma that a burn injury presents to the affected individuals (21), with the latter viewing its principal responsibility as being the provision of care to victims of injury. Moreover, many service members and policy-makers have only the traditional, responsive information with regard to the occurrence of fires, and lack a more comprehensive

> ***"Funding is still largely allocated towards responsive fire control measures, with government focusing on burn relief and recovery funding when a fire occurs, with limited efforts on preventing the fire."***

understanding of fire and burn causation and risk-reduction. SA, with its distinct sectoral interests, lacks a unified, inter-sectoral collaboration with regard to fire safety and prevention (21).

> ***"SA, with its distinct sectoral interests, lacks a unified, inter-sectoral collaboration with regard to fire safety and prevention."***

An effective prevention approach in the Western Cape is premised on multi-sectoral and multidisciplinary contributions, with prevention contributions guided by a common vision, common objectives and common strategies, as illustrated elsewhere, such as in the UK (22). The formulation of a fire and burn injury prevention approach in such settings provided coherence and visibility to fire control, and burn prevention at the political level, but also allowed for the identification of possible conflicts and inconsistencies in different pieces of legislation, while facilitating the optimal use of resources. A national or provincial scale approach offers the added advantage of making sure that limited resources are shared among the most affected populations and communities. A shared vision and common values should help to unite all those who are involved in fire safety and burn prevention, such as the government sector, NGOs and community stakeholders, and in turn ensure that efforts are channelled in the same direction. Priority preventative measures may need standardised practices to ensure their effectiveness and efficiency. It will also help to define the respective roles and responsibilities of the various provincial departments (i.e. health, education and justice), who all have a vested interest in controlling the impact of fires and preventing burns.

The rationale for this Strategic Framework thus arises from the identification of the gaps in the Western Cape's prevention responses towards uncontrolled fires and the widespread burn injury mortality and morbidity, associated suffering, and the urgent need for a co-ordinated functioning evidence-led national strategy. Therefore, in order to provide substance for its rationale, the Framework draws on the fact that burn injuries are not random, but predictable events that are preventable (20). National strategies have been especially effective in reducing injuries in countries such as the UK, Australia, Canada and France (23). Therefore, this Strategic Framework aims to enable the consolidation of both existing and proposed prevention and control measures, facilitate inter-sectoral linkages, promote a focus on all priority risk groups and environments, and encourage evidence-led planning and implementation practices.

In recognition of limited credible preventative measures, the Western Cape DLG approached the MRC-UNISA VIPRU in August 2013 for the development of a provincial strategy for preventing burn injuries. A task team was formed, comprising of VIPRU and the Western Cape DLG. The task team was guided by a Steering Committee that provided critical oversight on the Framework.

> ***" . . .the Framework draws on the fact that burn injuries are not random, but predictable events that are preventable."***

HOW THE STRATEGIC FRAMEWORK WAS DEVELOPED

The public health and disaster risk reduction approaches and their associated principles guided the organising logic of the Framework. The Framework was based on this and developed through a process that included a comprehensive desktop review and analysis of burn injury prevention evidence, a situational analysis of existing prevention responses, and consultation and dialogue with experts in fire and burn injury prevention. Figure 4 below illustrates the key focuses, outcomes and recommendations that emerged from each component of the process of building the Framework.

Process	Scope and focus	Outcomes and recommendations
Desktop review and analysis of evidence	• Magnitude of fire and burn injuries • Risk and protective factors related to fire and burn injuries • The consequences of fire and burn injuries • South African evidence-led prevention interventions	• **Magnitude:** The burn mortality rate is 7,9 per 100 000 in Cape Town (5) • **Risk factors:** e.g. poverty, use of paraffin (16) • **Protective factors:** e.g. use of electricity (16) • **Consequences:** Death and disability, financial/ economic burden, community and family loss (10, 29, 11, 31) • **SA Prevention Interventions:** e.g. Learn Not To Burn programmes
Situational analysis	• Existing South African policies and burn prevention programmes • Identification of gaps in burn prevention	• **South African policies:** e.g. banning of fireworks, paraffin stove legislation (34) • **SA Programmes:** e.g. educational strategies such as the Learn Not To Burn programme (34) • **Identification of gaps in burn prevention:** e.g. improvements in the home such as utilisation of appropriate construction materials, electricity (34)
Stakeholder consultations	• Expert opinions • Priority areas for strategic framework • What works • Service delivery gaps and priorities	• **Priority Framework areas:** cross cutting risk factors; injury type specific risk factors, and systemic or institutional enablers (e.g. 24) • **What works:** evidence-led programmes, within public health approach to implementation • **Service delivery gaps:** emphasis on institutional arrangements, e.g. funding and prevention training

STRATEGIC FRAMEWORK

Figure 4. *The generation of fire and burn injury prevention recommendations for the Western Cape*

This review, process of consultation and analysis helped delineate certain priority fire and burn injury risks and areas for action. In summary, the consultation process and desktop review suggested the following:

1. Prioritise cross-cutting risk factors related to poverty, poor housing infrastructure, and prevention service delivery, especially those aspects related to greater fire or burn exposure.

2. The main recommended areas of focus for fire control and burn injury prevention are:
   - fire occurrence in informal settlements
   - fire occurrence in backyard housing units
   - adult male, and recently elderly, burn mortality
   - child mortality and morbidity due to scalding and fire burns

3. Leverage existing data systems, such as the Cape Town City's fire statistics to guide and monitor the implementation of the Framework.

4. Promote the institutional environments and capacities especially within the Western Cape Local Government's F&RS, to lead and support burn prevention.

5. Utilise the Framework as a platform to facilitate departmental burn injury prevention operational and implementation plans.

2

COMPLEX ECOLOGY OF FIRES AND BURNS IN THE WESTERN CAPE

Research in the Western Cape and Cape Town indicate that burn mortality is concentrated amongst males aged between 25 and 50 years. These deaths are reported as accidental, occurring most often in the home and in the early hours of the morning. They commonly take place over the weekend and other recreational periods across the year, with the expected concentration in the cold and wet months. Alcohol intoxication is a common denominator of the cases selected for testing. There is a smaller concentration of mortality amongst very young black children (9).

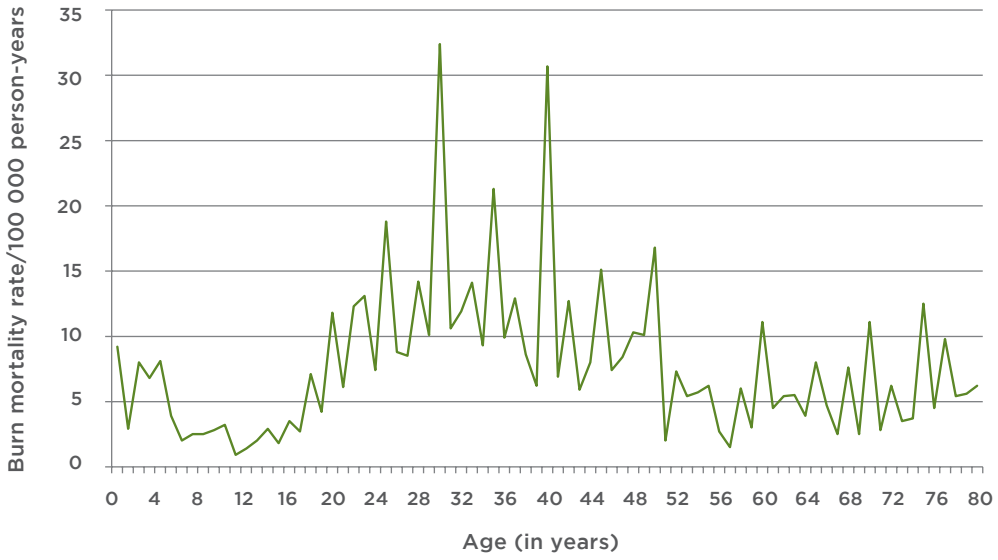

Figure 5. *Distribution of burn mortality rate by age, Cape Town, 2001 to 2004 (N=1024)*
Source: Source: Van Niekerk, A., Laubscher, R., and Laflamme, L. (2009) (9).

The greater exposure for males observed in Cape Town may be due or exacerbated by the elevated levels of alcohol consumption reported. Alcohol is widely used in Cape Town and its surrounds and is heavily embedded in everyday life, with the level of alcohol intoxication high compared to other SA cities (9). In combination with smoking, a high level of alcohol consumption is associated with a greater occurrence of flame mortality and linked for example to 73% of fire deaths in the United States (25).

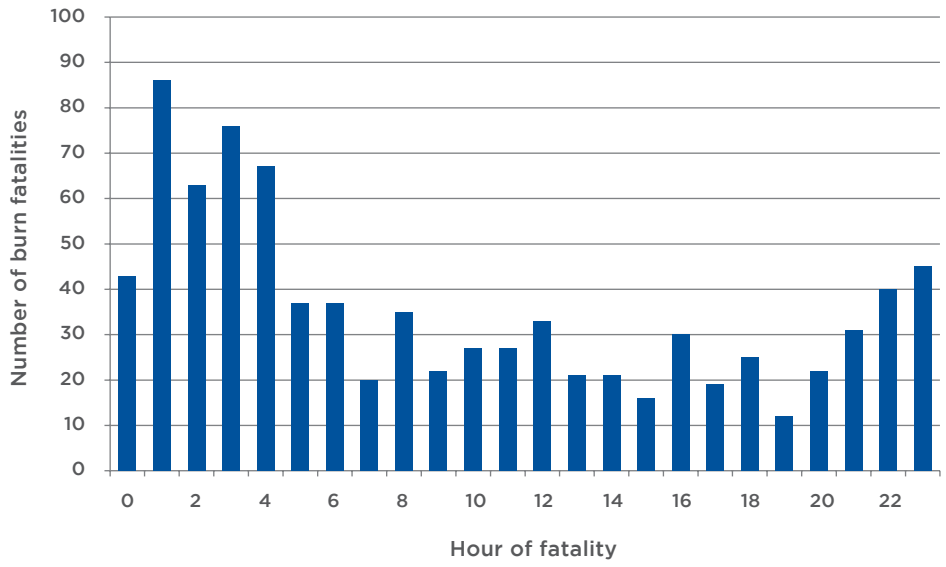

Figure 6. *Burn mortality by time of occurrence*
Source: Source: Van Niekerk, A., Laubscher, R., and Laflamme, L. (2009) (9).

The deaths in Cape Town occur in the early hours of the morning or during the late evening hours, when intoxicated drinkers would be difficult to mobilise in terms of rapidly spreading house fires. Other reports indicate that cigarette-ignited fires, often the result of smoking in bed while on medication or intoxicated may result in a period of smouldering before taking flame which then rapidly spreads, with resultant deaths typically reported between midnight and 06:00 (25). Household use of kerosene for kerosene or open-flame heaters will, however, result in especially rapid and devastating conflagrations (26, 27).

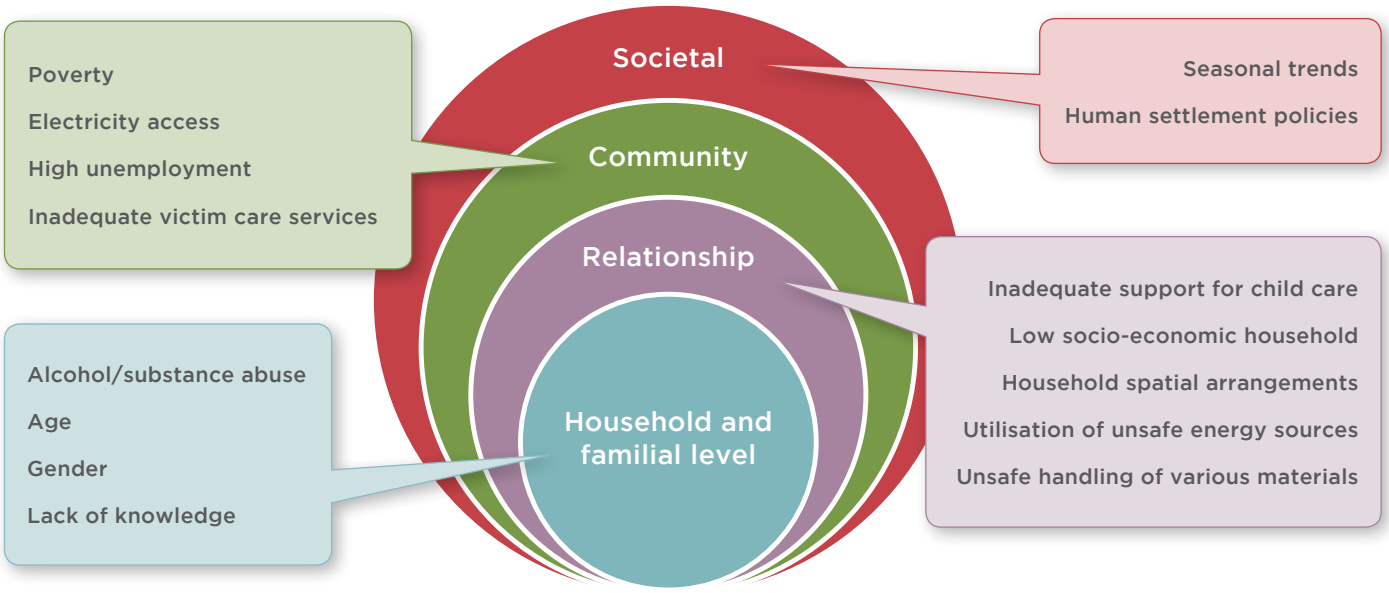

Figure 7. *Ecological model with risk factors for burn injures*

> ***"The deaths in Cape Town occur in the early hours of the morning or during the late evening hours. . ."***

The key drivers and risk factors for fires and burn injuries range from those that affect the individual to the community and societal-level as noted in Figure 7. There are specific individual practices, in particular alcohol and drug abuse that are strongly associated with fatal and serious burn injuries. There is a deeply embedded relationship between alcohol and injuries, with SA studies reporting two-thirds of injured patients with blood alcohol levels above the legal (i.e. for driving) limit. It is not uncommon for those who are intoxicated to be at greater risk for injuries such as burns (9). Intoxicated individuals are less likely to be able to respond to a rapidly expanding fire, especially in homes with a concentration of combustible material in their construction and with fossil fuels such as paraffin stored (9).

There are also individual attributes associated with the greater occurrence of burn injuries, these include age and gender. Children are at particular risk for experiencing a serious burn injury due to their reduced mobility, undeveloped risk appraisal, longer sleeping hours, greater likelihood of sleeping deeply, smaller surface area to body volume ratio, and physiological immaturity (29). Especially toddlers are vulnerable for hospitalisation; they are characterised by a curiosity of their environment and an increased, but still evolving and unstable physical ability to explore it. Toddlers are faced with the challenge of learning to walk, while still very unsteady on their feet and prone to grabbing towards objects to steady themselves, but thereby coming into greater contact with heat sources, such as cooking pots, kettles or heating equipment (82). Male children have also regularly been associated with an excess risk of burn injuries compared to girls (30). Boys are reported to behave more impulsively and over-estimate their physical abilities (31). The early effect of differential socialisation is a further consideration, with parents for example less likely to restrain the exploratory behaviour of boys, even if the child's behaviour is judged to pose an injury risk (32).

> ***"It is not uncommon for those who are intoxicated to be at greater risk for injuries such as burns."***

In recent years a number of fatal events have been reported amongst the elderly. Hearing impairments, increased frailty and the common use of medications all impair the ability to respond to a home fire, especially if this occurs during the evening hours.

Hazards at household and familial level include the layout and overcrowding in the home, use of high-risk equipment and family or other constraints to the care and support of children (8). In under-resourced communities, crowded family living arrangements are reported to significantly contribute to burn risk (28). In such overcrowded living conditions, as may be found in informal and low-cost housing units in and around Cape Town, the proximity of hazards such as open flames, candles, and other heat sources, to flammable material is enhanced. In these communities, homes are also frequently in close proximity to each other. Therefore, there is often the destruction of more than one home because of fires rapidly spreading between homes (33). Many low-income families use paraffin (also known as kerosene) as their main fuel source due to its lower cost and ease of accessibility (29).

Tied to the utilisation of unsafe energy sources is the unsafe handling of various equipment which may cause a fire or burn injury. For example, unsafe practices such as matches stored within reach of children or pot handles left facing outward on the stove may act as risk factors (20). In such under-resourced settings, caregivers are faced with multiple household, family, child care, and in some instances home business demands that may compromise the extent of care required in a household environment with a range of risks, e.g. burning candles, paraffin heating equipment or boiling kettles (33). In such settings tension and consequent domestic violence is common, with instances where homes are burned down as a result of fights between partners. In such settings caregiver and child ratios are reported to significantly contribute to childhood burn injury risk, where the relative absence of

> ***"Children are at particular risk for experiencing a serious burn injury. . ."***

adults and the sheer volume of children contribute to higher childhood burn injury risk rates (20, 33).

Hazards that may affect the entire community, such as high unemployment and poverty, are significant barriers to safety, mostly due to costly energy use, and strong predictors of burn injuries (28). Low-income communities are often environmentally degraded, have limited recreational facilities, and densely populated areas. There are often inadequate victim care services, as low-income communities tend to be further from healthcare facilities, thus mortality and disability from severe injuries may be higher (33). There are also disparities between the resources of district and the local fire services. In addition, distances from fire stations further exacerbate the problem. Fire services are either nonexistent in some communities or have to respond long distances often arriving after the community has extinguished the fire. In the Western Cape, government efforts to promote and fund the use of safe energy sources (such as the provision or the subsidisation of electricity as an alternative to kerosene appliances in high-risk neighborhoods) require strengthening, as does the subsidisation of larger and better constructed homes, to ensure that families do not utilise hazardous and combustible materials (34).

At a societal level, the different seasonal trends influence the occurrence of fires and burn injuries. The majority of burn injuries in and around the Western Cape occur during the colder, winter months, such as July (29). In the colder winter months, often with high winds, people cook indoors and heat their homes more frequently with hazardous appliances, which increases the likelihood of a burn injury from flames or liquids (29). Veldfires, however, occur more frequently in the hotter summer months like December and January and during periods with strong winds (35).

> ***"The majority of burn injuries in and around the Western Cape occur during the colder, winter months. . ."***

3

APPROACH, KEY CONCEPTS AND PRINCIPLES

This Strategic Framework follows the prevention orientation of the WHO, UNISDR and other international agencies, and is informed by the public health perspective and disaster risk reduction strategies. The value of the public health perspective lies in its emphasis on multi-disciplinary and inter-sectoral action, the modification or elimination of priority causal factors, and scientific logic. The public health approach is population-based, evidence-based and focused on prevention (see Box 2).

The public health approach to injury prevention

- **Population-based:** Targets the safety or health of, and extends better care to, whole populations.
- **Multi-disciplinary:** Draws on knowledge from many disciplines including medicine, epidemiology, engineering, sociology, psychology, criminology, education and economics, to promote health and safety.
- **Evidence-led:** Based on scientific methods, it draws on empirically produced evidence to plan, implement and evaluate services.
- **Inter-sectoral collaboration:** It emphasises collective action with cooperative efforts from such diverse sectors as health, education, social services, justice and policy.
- **Prevention:** The approach emphasises prevention. Its starting point is that injury events and violent behaviour, and their consequences, can be prevented and controlled.

Box 2. *The public health approach to injury prevention*

The public health approach provides a four-step logic that proceeds from identifying the extent of the injury problem, including burns and its risk factors, to identifying and implementing effective prevention interventions (see Figure 7).

The public health approach incorporates an ecological perspective in order to understand the multiple causes of injury. The ecological perspective, which strongly influences many other public health policies (for example, the WHO plan for Burn Prevention and Care, 2008 (36)), emphasises the importance of focusing on all levels of the system, including individual, relationship, community, and social components. The ecological perspective allows for a holistic understanding of injury causes and simultaneously enables comprehensive evidence-led prevention actions. Within this perspective, the prevention of injury and the promotion of safety occurs by:

- implementing evidence-based interventions
- targeting individuals and their multiple environments
- co-ordinating intervention efforts
- collaboration among identified stakeholders across sectors.

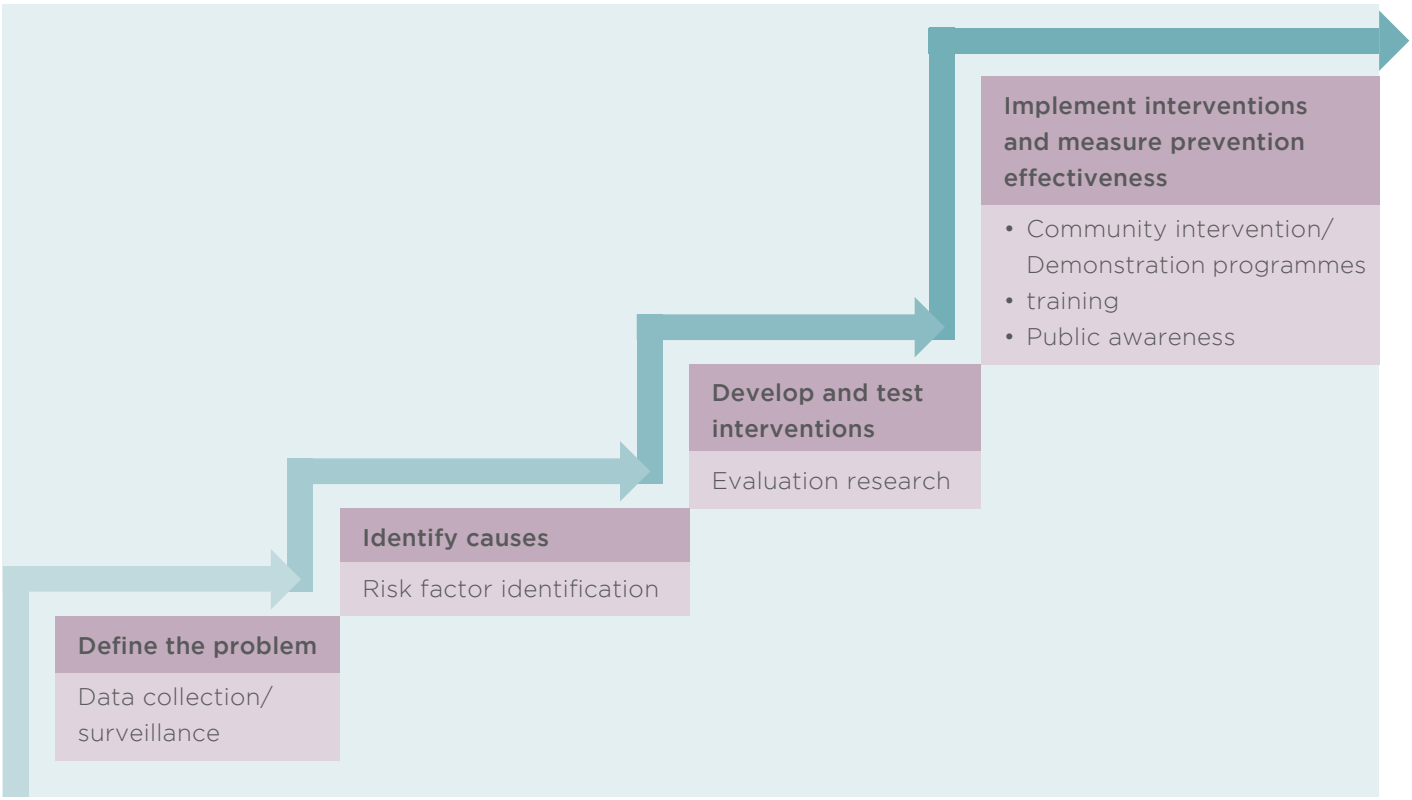

Figure 8. *Public health approach: Four interconnected phases linking data to action*
Source: Hammond, Haegerich & Saul (2009) (70)

Such interventions have in general been conceptualised according to a range of key principles. Interventions may be focused on different points along the injury continuum (pre-event, event and post-event), different groups (universal, selected or indicated), and various strategies (environmental, engineering, education, enforcement, and evaluation). These are outlined in Box 3.

In recent years, there has been increasing recognition of the role that a public health approach – a strategy that aims primarily to reduce risk factors – can play in tackling social ills. A public health approach is based on four main premises: defining the condition in the population, determining the risk factors for the condition, developing interventions to address the risk factors and therefore reduce the frequency of the condition, and lastly implementing and monitoring the effectiveness of the intervention on a population basis (3). For fire and burn injuries, a public health approach means concentrating on reducing the risk factors that give rise to burns, rather than focusing on fires and burns once they have occurred. A public health approach thus translates as

a preventive approach, with emphasis on eliminating the risk factors (3). Moreover, a public health approach is based on evidence-based decision-making and thus is a science-based approach, which involves all relevant sectors, disciplines and actors (19).

The Public Health Approach to Burn and Fire Safety: Organising intervention activities

- **Primary, secondary and tertiary prevention**
  Fire safety should focus on primary (pre-event), secondary (event), and tertiary (post-event) interventions.
  Primary prevention focuses on the prevention or reduction of the occurrence of burn injuries. For example, primary prevention strategies for fire and burns can include community programmes that advise community members against wearing loose clothing around open flames, about proper storage of flammable substances and adequate child supervision.
  Secondary prevention focuses on activities that may prevent or minimise the consequences of burn injuries, in the likelihood that they will occur. Examples include keeping a bucket of dry sand in the kitchen to contain fires once they start and training focused on the application of cool water to a burn. Secondary prevention also includes emergency and hospital care for burn wounds.
  Finally, **tertiary prevention** focuses on the rehabilitation after the burn injury has occurred. For example, individual and family counselling, burn survivor rehabilitative camps, skin grafting treatments.

- **Universal, selected and indicated groups**
  Interventions may be directed at the general population or specifically affected sub-sets.
  Universal interventions target the general population without considering any specific risk groups. These can include public campaigns directed at entire communities on the safe use of electrical, gas, paraffin or other heating, lighting and cooking appliances.
  Selected interventions are those that are aimed at groups shown to be specifically at risk of burn injury. For instance, an intervention focused on children as a high risk group can include home visits that educate parents in low income communities about the dangers of having young children around hot drinks (coffee, tea, etc.) or near highly flammable materials.
  Indicated interventions are designed for individuals who have already been exposed to a burn injury. These interventions may include support groups for burn survivors.

- **Strategies**
  The following highlights the four E's of injury control:
  Engineering involves the adding or altering of the basic structure or function of equipment in order to enhance the safety. For example, making the base of paraffin lamps more stable so that they will not fall over. Alternatively, implementing ceiling fire sprinkler systems, which have revolutionised fire safety by automatically putting out fires in the room of origin and preventing fires from spreading or re-igniting.
  Environmental modifications focus on modifying the physical environment, for example, electrification to reduce dependence on kerosene and candles or tap water temperature reduction.
  Education involves the provision of training and safety information in order to decrease burns. For example, teaching individuals about unsafe practices, such as not to keep matches within reach of children, teaching first-aid courses that includes the application of cool water to burns, or Learn Not To Burn programmes.
  Enforcement focuses on all interventions that involve the application of safety laws, such as laws on the temperature of hot-water taps, the banning of fireworks and standards for child-resistant lighters.

Box 3. *Public health approach to burn and fire safety: Organising intervention activities*
Source: Community Psychology: Theory, Method and Practice, 2014 (37)

INTERNATIONAL AND SOUTH AFRICAN FIRE AND BURN PREVENTION APPROACHES: AN EMERGING EMPHASIS ON PREVENTION

In some countries, such as the UK, elements of a public health and risk-reduction approach have been adopted and credited with the reduction of burn injuries (3). The UK government, as part of its Fire and Rescue Service, prioritised the reduction of fire and other risks in all communities through effective prevention and protection (22). A Fire and Rescue National Framework for the UK was implemented, prioritising the identification and assessment of the full range of fire and rescue related risks, the provision for prevention and protection and response activities to incidents, partnerships with communities and a range of partners locally and nationally to deliver their service, and lastly, accountability to communities for the service provided (38). The public health efforts and successes in the prevention of fire and burn injuries has gained momentum in countries such as the UK, with many lessons for settings such as SA and the Western Cape.

In SA, the NDMC through the COGTA is mandated to administer the Fire Brigade Services Act No. 99 of 1987 as well as the Disaster Management Act No. 57 of 2002 which forms the legislative basis upon which disaster management, fire services and related matters are dealt with (39). The Disaster Management Act is the cornerstone of disaster management in SA. This Act defines a disaster as a progressive or sudden, widespread or localised, natural or human-caused occurrence which causes or threatens to cause death, injury or disease, damage to property, infrastructure or the environment or disruption of the life of a community, and is of a magnitude that exceeds the ability of those affected by the disaster to cope with its effects using only their own resources. It provides for an integrated and co-ordinated disaster management policy that focuses on preventing or reducing the risk of disasters, mitigating the severity of disasters, emergency preparedness, rapid and effective response to disasters and post-disaster recovery. It also ensures the establishment of national, provincial and municipal disaster management centres; as well as disaster management volunteers (39). Furthermore, this Act requires metropolitan and district municipalities to establish institutional arrangements for implementing DRM in their jurisdictional areas. These arrangements must correspond to the national and provincial DRM arrangements and provide mechanisms to facilitate cooperative governance, inter-governmental and inter-departmental relations and community participation (40). In contrast, the Fire Brigade Services Act encompasses the requirements for the provision of fire services through the establishment, co-ordination and standardisation of the F&RS in the municipal sphere and private sector. This Act ensures that any service established must work towards the prevention of a fire outbreak or the spread of a fire, fighting or extinguishing a fire, ensuring the protection of life or property against a fire, the rescue of life or other property from a fire, and subject to the provisions of the Health Act, the rendering of an ambulance service as a vital part of the fire brigade service (39).

In the Western Cape, the WCDM has been established in accordance with the DM Act and the NDMF in order to deal with both the preparedness and response phases of Disaster Management. The WCDM consists of three main units: the Directorate Risk Reduction, Directorate Operations and the Sub-Directorate Fire and Rescue Services. The latter is responsible for the monitoring of municipal fire services, coordination of fire fighting activities and the administration of the Fire Brigade Services Act. In order to achieve this, the following activities are performed:

- Prevention: Reduce local risk through prevention and awareness.
- Protection: Improve local planning and preparedness.
- Response: Improve the fire and rescue services' capability to respond to all hazards.
- Professional Status: Improve the fire brigade services' professional status (26).

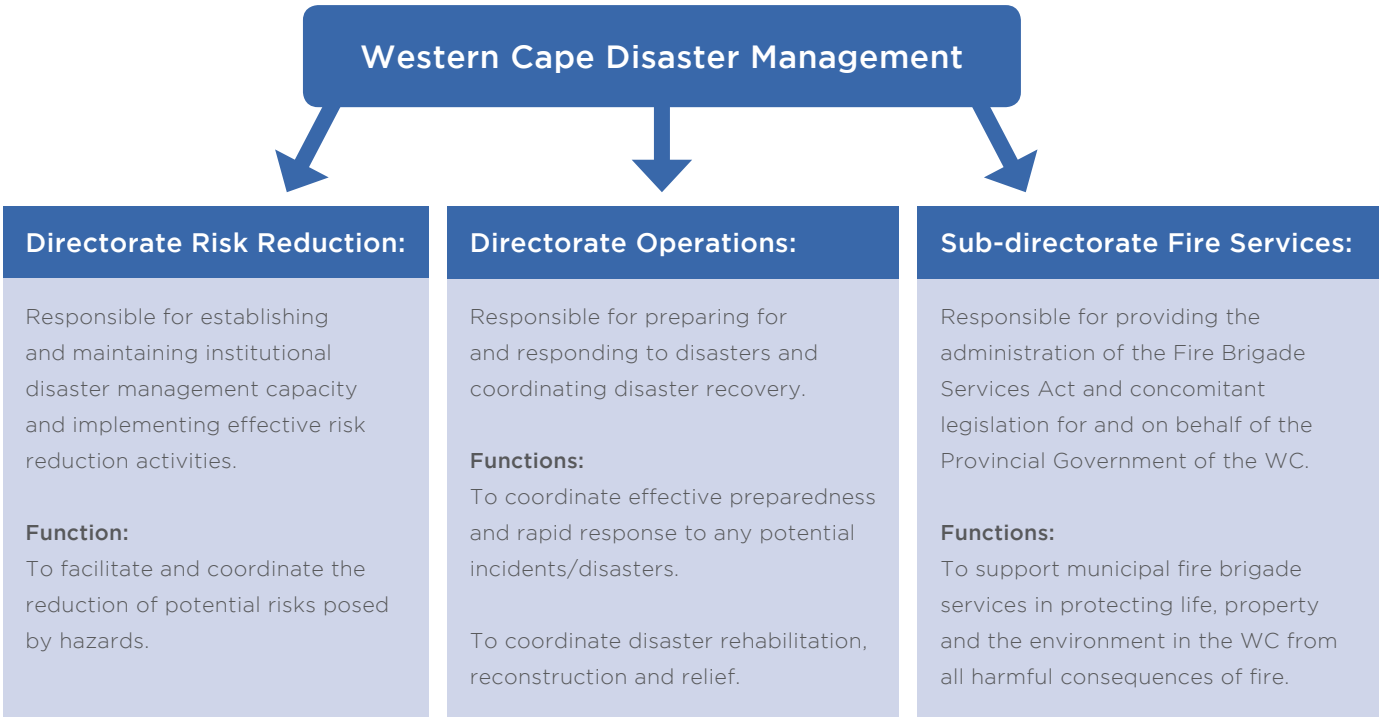

Figure 9. *The main functions of the WCDM*

Further preventative fire safety measures in the Western Cape include the Fire and Flood Awareness Campaign, which raises awareness around fire and flood safety in order to ensure a high level of preparedness by communities in case of these disasters (26). Many municipalities, however, do not make provision for risk-reduction activities or funding in their planning and budgeting processes (9). The current funding model for disaster risk reduction within government and the private sector does not provide optimally for the Western Cape's risk profile and diverse public financial management system. Many Western Cape municipalities have difficulty implementing the provisions of the DM Act and the guidelines provided in the NDMF due to a lack of funding (18). Instead of improving disaster-risk reduction, the lack of policy implementation leads to higher levels of vulnerability and increases the likelihood of hazardous events (such as burn injuries). As a result, the Western Cape government focuses on disaster relief and recovery funding when a disaster occurs, with limited efforts (and in some instances the absence) of disaster risk-reduction (18). These efforts are constrained by the limited data collection systems, with the current initiatives inconsistent, unreliable and fragmented. Currently fire incident data is collected by the F&RS; the MRC collects fire mortality data; and the FPASA collects fire data nationally. The Western Cape approach to F&RS requires an extensive amount of coordination and cooperation to function efficiently. The model is considered responsive to a range of supportive legislation, including the National Environmental Management Act, Act 56 of 2002, the Occupational Health and Safety Act, Act 85 of 1993 as amended, the National Building Regulations Act, Act 103 of 1997, the Major Hazardous Installations Regulation Act, the National Building Regulations and Building Standards Act (Act 103 of 1977 as amended), and the National Veld and Forest Fire Act, 1998 (Act 101 of 1998). The Western Cape Fire and Rescue Services has, within this setting, initiated the development of a Western Cape Strategic Framework for Fire and Burn Injury Prevention to coordinate the prioritisation and implementation of evidence-led programmes to prevent fire related injuries and promote fire safety that aims to alter crucial social, environmental and behavioural factors that contribute to the causes of fire related injury in the Western Cape and put into practice evidence-based preventative measures.

4

THE STRATEGIC FRAMEWORK

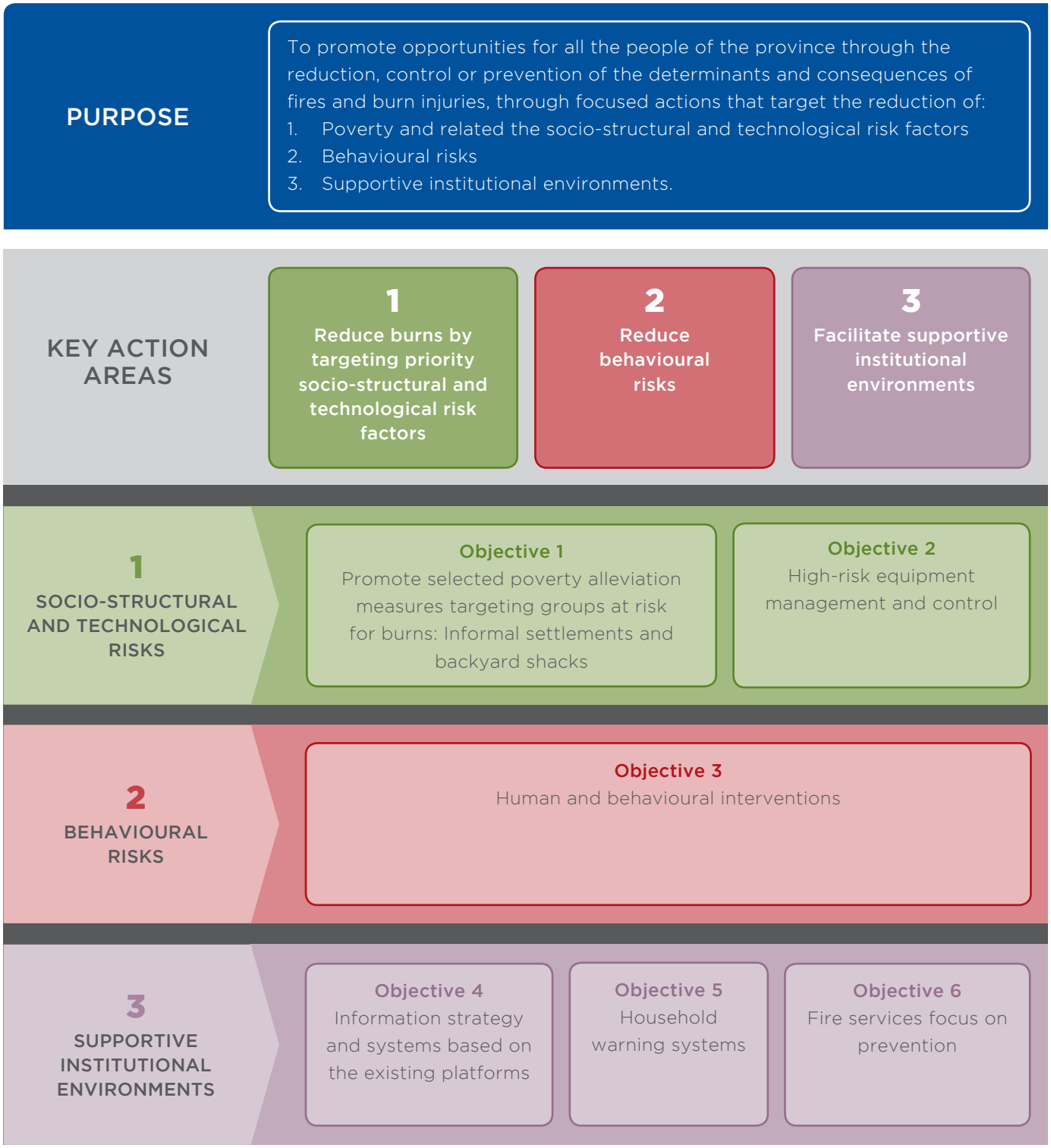

Figure 10. *The Western Cape Strategic Framework for Fire and Burn Injury Prevention*

MISSION

The Western Cape Strategic Framework for Fire and Burn Injury Prevention is aligned and seeks to operationalise the mission of the Western Cape Province, i.e. to promote freedom and opportunity for all the people of the province through emphases on:

- The policies and practices that strengthen the SA Constitution, thereby creating the conditions for sustainable economic and employment growth;
- Alleviating poverty by providing services directed at the protection of those unable to provide for themselves;
- Ensuring the safety of every person;
- Promotion of funding and skills; and
- Delivering clean, efficient, cost-effective, transparent, and responsive public administration.

The Western Cape Strategic Framework for Fire and Burn Injury Prevention is directly aligned to the mission of the Western Cape F&RS:

- It is the mission of the Western Cape F&RS to support municipal F&RS in protecting life, property and the environment in the Western Cape from all harmful consequences of fire.

The Framework therefore supports and monitors Western Cape FRS activities with the following aims:

- Prevention: Reduce local risk through prevention and awareness;
- Protection: Improve local planning and preparedness;
- Response: Improve the fire and rescue services' capability to respond to all hazards; and
- Professional status: Improve the F&RS professional status.

PURPOSE

The Western Cape Strategic Framework for Fire and Burn Injury Prevention therefore seeks to promote opportunities for all the people of the province through the reduction, control or prevention of the determinants and consequences of fires and burn injuries, through focused actions that target:

- The reduction of poverty related socio-structural and technological risk factors;
- The reduction of behavioural risks; and
- The facilitation of supportive institutional environments.

PRIORITY AREAS FOR ACTION

PRIORITY AREA 1: REDUCE BURNS BY TARGETING PRIORITY SOCIO-STRUCTURAL AND TECHNOLOGICAL RISK FACTORS

Objective 1: Promote selected poverty alleviation measures that target groups at risk for burns: Informal settlements and backyard shack households

SA faces a huge formal housing shortage, with numerous informal and sub-standard dwelling units. A relatively small formal housing stock and low and progressively decreasing rates of formal and informal housing delivery in SA have resulted in a massive increase in the number of households forced to seek accommodation in informal settlements and in backyard shacks. In the Western Cape there is a population of 5 822 734 people, with 1 059 738 people living in informal and sub-standard accommodation, with limited prospects of reversing the profound poverty manifested in such settings (17, 41). The 2011 census reports that in the Western Cape there were

169 013 dwellings with walls of corrugated iron, 138 782 dwellings with walls of wood and 9 024 dwellings with walls erected from cardboard (42). In addition, 14 238 households in the Western Cape had no access to tap water (42). Furthermore, 119 197 households utilise gas for cooking, 62 079 paraffin, and 20 682 households use wood (42). As formal housing has remained chronically short, informal settlements and backyard shacks have increased over recent years in the Western Cape (53), with the province reporting a decrease in the proportion of people residing in formal dwellings (81,3% in 2001 and 80,4% in 2011) and an increase in the proportion of people residing in informal dwellings (16,2% in 2001 and 18,2% in 2011) (41). There are 105 282 backyard shacks and 191 668 shacks in informal/squatter settlements in the Western Cape (41).

The Western Cape has in recent years reported a decrease in larger settlement fires but an apparent increase in backyard shack fires (43, 44, 45), a concern highlighted by the Research Alliance for Disaster and Risk Reduction in Stellenbosch (personal communication: Dr Ailsa Holloway). The informal settlement fire mortality rate appears to have decreased, from 7,9 per 100 000 in 2006 to initial, but still unconfirmed indications of 4,3 per 100 000 in 2013 (46). The total shack dwelling fires reported in 2011 was 4 046 and in 2012 was 4 516 (47, 48). While deaths caused by shack fires in informal settlements appear to be on the decrease, there is an emerging concern around backyard dwelling fires (45). As the demand for housing increases, more and more people are setting up homes in the backyards of family and friends. Overcroweded backyards make it difficult for firefighters to access those areas (49, 45, 50). This is compounded by a high migration rate in the Western Cape, with the province reporting one of the highest annual in-flow figures (of 432 790) (51). Overall, more people have migrated into the Western Cape (432 790) and fewer out (128 967) (51). Khayelitsha and Philippi are areas that have been greatly affected (52) and report high fire rates (47, 48).

> ***"The Western Cape has in recent years reported a decrease in larger settlement fires but an apparent increase in backyard shack fires. . ."***

Recommended strategy and intervention

The Western Cape's present tenure policy appears directed at facilitating tenancy to owner occupation (53). Given current rates of household formation and the huge backlog of housing demand, this remains an area of concern for Western Cape policy-makers. Rental housing accommodates large numbers of SA families and will continue to do so for many years to come. Without access to rental housing the already rapid pace of urban land invasions is likely to increase further. The Rental Housing Amendment Bill (53), however, requires rental housing structures, such as backyard shacks, to comply with health and safety standards. The strengthening of the existing housing policy and the strengthening of instruments for its enactment and support have been supported by officials in the Disaster Management Centre for the City of Cape Town (personal communication: Mr. Greg Pillay). A strategy to bring greater effect to the existing policies and regulations requires consideration of priority community density levels, migration and urbanisation, and use of combustible building materials, to accommodate for the limited impact of building regulations in informal settlements (personal communication: Mr. Greg Pillay). It is proposed that such a strategy integrate interventions with the Expanded Public Works Programme or Community Workers Programme which could provide a platform for poverty alleviation, community development and fire prevention interventions in high risk communities. An appropriate lead agency would be the DHS with participating agencies including COGTA and the DLG.

Objective 2: High-risk equipment management and control

High-risk equipment and appliances such as paraffin stoves, informal open flame heaters and candles are often utilised in lower income households as the primary source of energy for cooking, heating and lighting purposes respectively. They are favoured due to availability and cost (88). Risks associated with the use of paraffin include poisoning, rapid conflagrations and serious burns. The risk of house fires and burns from these sources is compounded by several factors, including lack of enclosure of open fires, fires located on the ground or floor, nearby storage of flammable substances and fuels and lack of exits (54). The problem with stove-related fires in particular include design and construction of the appliance, the combustibility of the fuel, and the instability of the device (55). These stoves often leak fuel and this is common when stove reservoirs are being filled (54).

A further hazard is that paraffin can leak on clothing or its vapours can ignite when heat and flames are present (55). These small portable stoves are unstable and can be easily tipped over. According to a study done by PASASA, it has been established that the demand for paraffin and paraffin-fuelled appliances will increase with the increase of informal housing (56). The National Electricity Regulator (57) has indicated that a total of 83,5 % of households are serviced with electricity in the Western Cape, with about 31% of rural households and 16% of urban households without access to electricity (57). Providing electricity to rural hosueholds has been more difficult due to their distance from the electricity grid resulting in higher connection costs. Apart from access to electricity, the cost of electricity also needs to be considered when it comes to the lower-income households and the cost of electrical appliances. Paraffin appliances or open flame cooking can also be linked to cultural preference even when electricity is available (56). Lastly government regulations and standards for these appliances are not adequately enforced.

Recommended strategy and intervention

Already recommended short-term strategies are to enforce compliance to paraffin appliance legislation and codes in SA, and the promotion of the safe use of candles. The medium to long-term strategies include investigations and interventions to support the transition to safer and more efficient forms of energy use such as LPG and electricity. Another avenue for energy access is the small-scale solar or grid-charged LED lighting systems, which requires safety testing and costing to be a viable alternative option (58). Renewable energy systems such as this (solar power) generally have a high initial cost, but saves money over time (59). Further, the adoption of technology usually takes place first in high-income areas and is later diffused to lower income areas. The following specific interventions are proposed:

- **Promote the legislation to regulate the design and quality of paraffin stoves.** There are presently two standards for paraffin appliances, one that applies to non-pressure stoves and heaters i.e. SANS 1906:2006 (60) and one that applies to pressurised paraffin-fuelled appliances i.e. SANS 1243:2007 (60). On-going advocacy and lobbying is required to create awareness of the legislation amongst community members. SABS-approved stoves include (61): Panda “New Safe” wick stove; Goldair Paraffin Heater Model RD-85A combo heater and stove and Panda wick combo heater and stove. Although people are willing to purchase a safe paraffin stove, it was at a price significantly lower than actual cost of safe, compliant appliances (62). Currently there is no implementation structure or provincial capacity to support enforcement, i.e. to monitor the distribution, supply and sale of non-compliant flame-based paraffin stoves.
- Further subsidisation of free basic energy to low-income homes. Free basic electricity is currently at 50 kWh per household per month for a grid-based system and 50 Wp per non-grid connected supply system. The average consumption of the smallest consumers showed an increase from about 25 kWh/month to 51 kWh/month after the implementation of the Basic Electricity Support Tariff (63). The significant recent escalation of electricity prices must be accommodated in reconsiderations of the subsidisation formula.
- Education and awareness campaigns to promote safe paraffin practices. A comprehensive education campaign targeting individuals through households, schools and high-risk communities should be considered, just before high-risk periods, especially just before winter in the urban areas. These interventions should seek to provide information on and increase knowledge to improve the safe use of existing paraffin appliances and ensure feasible safety strategies for homes and neighbourhoods. These could be incorporated into curricula for schools.
- The safe use of candles is promoted by a promising intervention initiated by Childsafe (64). These candles are placed in a jar with sand, with the ultimate aim to prevent fires and burn injuries by candles accidently falling over. Further, the glass jar makes the candlelight brighter, so lighting is more effective. Awareness can be raised about the dangers of candles via the media and other marketing sources. In addition, education targeted at various stakeholders and role players are needed to further enhance this concept to communities.

Lead Agencies would include the F&RS, DOH and HESASSA, which has evolved from the now defunct PASASA.

> ***“High-risk equipment and appliances such as paraffin stoves, informal open flame heaters and candles are often utilised in lower income households. . .”***

PRIORITY AREA 2: REDUCE HUMAN AND BEHAVIOURAL RISKS

Objective 3: Human and behavioural interventions

There is a lack of awareness surrounding burn injuries amongst the public (65, 66). Gaps in burn risk awareness are reported amongst adult males, children (67) and the elderly, with burn mortality and morbidity also concentrated amongst these groups (9). The lack of awareness amongst adult males particularly with regards to the specific contributing role that alcohol plays in burn injuries is a significant concern (28, 68), with alcohol consumption common amongst adult males in the Western Cape (69). Many adult male burn injuries and deaths are reported in the early hours of the morning or during the late evening hours and over the weekend, when intoxicated drinkers are less likely to mobilise in the case of rapidly spreading fires (70). Numerous adult male burn injuries and deaths are also reported over holiday seasons when alcohol consumption increases (70). Even though adult males account for a significant portion of burn injury and mortality in the Western Cape (65% of all burn admissions at the Tygerberg Burn Unit), there are limited injury control initiatives that target this population (70, 71). The majority of children also do not have adequate knowledge about the causation of fires and burn injuries in order to deal with the related hazards in their environment (33), with over 1 000 burn injuries annually reported by children aged 12 years and younger at the Red Cross Children's Hospital (30).

> ***"There is a lack of awareness surrounding burn injuries amongst the public."***

Recommended strategy and intervention

The proposed recommendations are:

- To address the limited awareness amongst adult males in terms of alcohol consumption and burns. This Framework proposes the implementation of a campaign in the Western Cape aimed at creating awareness around the effect of alcohol consumption and increased exposure to fires and burn injuries. Public awareness campaigns have ensured that adults are well aware of the role that alcohol intoxication plays in increasing the risk of certain or specific accidents or injuries, such as the connection between alcohol consumption and car accidents. Adults have therefore been advised on safe levels of drinking and appropriate driving behaviours. However, limited (if any) attention has been paid to educating adults, specifically adult males, about the role that alcohol intoxication plays in increasing the risk of burns.
- Home visitation programmes can deliver targeted interventions to address the immediate family and physical environments to which high risk and usually marginalised families and age groups, such as the young and elderly, are exposed.
- In order to address the lack of awareness amongst children with regards to fires and burns, this Framework proposes that education interventions such as the Learn Not to Burn Preschool Programme for children ages 4 and up be implemented in the Western Cape. This program is an adaptation of the NFPA Learn Not to Burn Preschool Programme, a practical, pilot-tested and evaluated programme to teach fire safety awareness and skills to pre-schoolers (72). This programme has the ability to prevent burn related injury from occurring, increase appropriate responses in the event of a fire, and promote the application of correct first aid, which can significantly reduce fires, burns and scalds (72). Fire and burn prevention programmes using educational messages presented by teachers in a preschool environment have shown to significantly improve knowledge and change behaviour practices of young children (73). Because fire related burns have a higher prevalence in the very young, the 3 to 5 year old group particularly in rural communities and informal settlements, have been identified as a priority.

The Lead Agency would be the WCED, with participating agencies such as the DotP and the DLG.

> ***"The majority of children also do not have adequate knowledge about the causation of fires and burn injuries in order to deal with the related hazards in their environment. . ."***

PRIORITY AREA 3: FACILITATE SUPPORTIVE INSTITUTIONAL ENVIRONMENTS

Objective 4: Information strategy and systems based on the existing platforms

There is a need for a systematic, reliable, easily integrated fire and burn injury data collection system. Currently fire incident data is collected by the F&RS; the MRC collects fire mortality data; hospital and clinics collect local burn injury information; and FPASA collects fire data nationally. However there are limitations to the data collected and the systems do not allow integration. An effective information strategy would support reporting, legal requirements, risk assessments, hazard identification, mitigation, prevention and response planning, and prevention. The secondary functions would include scientific research, and monitoring and evaluation to emphasise the fire priorities and emerging concerns, with comparative analysis possible with other provinces and countries.

> *"There is a need for a systematic, reliable, easily integrated fire and burn injury data collection system."*

Recommended strategy and intervention

The Western Cape requires a reliable fire incident reporting strategy that comprises a core data set and may be integrated provincially and linked nationally as a Provincial Fire Incident Reporting System (PFIRS). The PFIRS should aim at collecting and integrating core fire incident data from municipalities across the Western Cape. The provincial consolidated data can then be analysed for patterns and trends. The provincial system will contribute fire-related incident data to a National Database. A standard operating procedure should be drawn up for all the municipalities that contribute to the data collection strategy. A data structure would need to be determined by the information needs i.e. data parameters for incidents for example (98): general information for each incident, fire-related injuries or deaths for each incident, and hazardous materials involved, and indications of the structural impact of incidents. Such data can be collected in two ways. Fire departments without any data processing capabilities send their paper reports to the PDMC. This method will depend on the municipality's capability (Level 1-6). The office then enters the reports into a computer system. The other way is that local departments with data processing capabilities send their data electronically. In both cases the PDMC merges all reports onto a database. This database will be forwarded electronically to the NDMC. The NDMC can compare and contrast statistics for the province and make recommendations for national codes, standards and use this to inform or guide fund allocation. Guidelines for data entry and data quality standards must be clarified and fire fighters and other staff adequately trained. Statistical packages such as Statistical Analysis Software (SAS/STATA Software) can be used to manipulate the data to track trends (74). The Lead Agency would be the DLG.

Objective 5: Household warning systems

The majority of fire deaths take place in residential homes as occupants become trapped or overcome by smoke before they can escape. Most fire fatalities that occur in the home take place at night while people are asleep, when olfactory functions cannot be relied on to provide protection if a fire occurs (75). Smoke alarms are associated with a reduced risk of death for children (76) and adults (56, 77 & 78). Smoke alarms provide an early warning system that alert people and permit time for an escape before a fire spreads. These low cost devices can easily be installed and maintained in most household environments, with promising possibilities for community installations also recently emerging. Fires detected by smoke alarms are associated with lower casualty rates, more rapid discovery, and less property damage (76). The implementation of this intervention may involve the promulgation of laws that require smoke alarms in new homes, and education and social marketing to persuade people to install them in older homes.

> *"Smoke alarms are associated with a reduced risk of death for children and adults."*

Recommended strategy and intervention

Legislation exists for smoke alarms in commercial occupancies but not in homes in high-risk residential areas such as informal settings. A short-term strategy would be to distribute smoke alarms to such high-risk areas. Whilst normal smoke alarms cater for single homes, area-wide sirens can be used as an early warning system for a community or high-risk area as a whole, although in dense informal settlements a normal smoke alarm may disturb people in surrounding dwellings. This can lead to disconnections as neighbours become annoyed with false or nuisance alarms. The following intervention is recommended:

- A province-supported initiative of distributing and installing smoke alarms to high-risk hosueholds or communities may be implemented through a pilot programme to test for the intervention's viability. The smoke alarm programme can be conducted in both urban and rural communities. A key characteristic of the programme must include home fire safety education and fire escape planning together with smoke alarm maintenance. There are two main types of smoke alarms, which are categorized by the type of smoke detection sensor – ionisation or photoelectric – used in the alarm. Ionization and photoelectric smoke alarms are better at detecting distinctly different yet potentially fatal fires (79). An area-wide siren may be negotiated with receptive communities as public early warning systems. This will warn numerous people in seconds in the event of a fire incident.

The Lead Agency would be the DLG.

Objective 6: Fire services focus on prevention

The Fire and Rescue Service in the Western Cape requires support for a shift of its focus to strengthen a proactive approach to fire prevention. Currently the focus is on a quick response or reaction when a fire occurs. An enhanced approach should include and centre on fire prevention, grounded in community fire safety principles. The Fire and Rescue Service would therefore have a greater community role. This would need to be reflected in the current statutory framework, which should then place responsibility on the service to plan for, and respond to, a new range of prevention priorities based on a Western Cape community-based risk assessments. The aim will be to increase the focus on prevention through community risk reduction. The Fire and Rescue Service has a role to fulfil across a broad safety agenda that will involve improvements in prevention, protection, intervention, and education activities. The prevention strategy will therefore develop in recognition of emerging risks. Many of the current institutional arrangements, e.g. the method in which personnel and resources are deployed were put in place decades ago and is now out of date. This realignment will impact on the deployment of people and equipment to deal with the most likely risks of fire, and will involve the development or strengthening of the required training regimes, and clarification of roles and responsibilities (80).

> ***"The Fire and Rescue Service in the Western Cape requires support for a shift of its focus to strengthen a proactive approach to fire prevention."***

Recommended strategy and intervention

The Western Cape Fire and Rescue Service should have specific responsibilities for: risk reduction and risk management in relation to fires and other types of hazard or emergency; community fire safety and education; and fire safety enforcement (81). The associated budget or resource allocation together with statutory changes will be needed to support these responsibilities. Local fire authorities would need to determine the most appropriate ways of managing local risks. This approach should enable resources of people and equipment to be deployed in the most cost-effective way. It should also be possible to move more resources into fire prevention – community fire safety and fire safety enforcement which is expected to reduce existing levels of fire, without compromising the current response capacity. Individual Chief Fire Officers will have greater responsibilities under a risk-management approach and will need to engage closely with their fire authorities in taking the work forward, although authorities will need to provide the required political support for this shift. The risk-based fire prevention approach should be taken forward in stages (81):

Stage 1: Western Cape provides fire authorities with the power to deploy resources differently from the present requirements.
Stage 2: Western Cape instructs each fire authority to develop a Risk Management Plan that incorporates priority prevention activities, with the risk management plan a requirement for each local fire authority.
Stage 3: Fire authorities consult their communities and key stakeholders in the preparation of their plans. This process should be aligned to the IDP (Integrated Development Plan) of the municipality. The sectoral safety plan is generally a component thereof and should include fire and burn safety as well.
Stage 4: Chief Officers are empowered to implement their authority's plan.

The emphasis would be on supporting or strengthening the implementation of priority prevention interventions, and hence decisions regarding resource allocation should reflect this. The roles and responsibilities of personnel will be more wide-ranging and this can have many positive spin-offs, such as varied work hours and more job creativity and flexibility. Municipal by-laws may need to make provision for the enforcement of Fire Prevention Codes at institutional level.

This approach will allow the Fire Service an opportunity to re-position itself within the community, with an emphasis on engaging with the community through educational and other activities to enable measures to prevent fires occurring rather than just dealing with fires after these happen. The professional image of the Fire Service will need to reflect this shift, through e.g. the International Fire Fighters Day which is traditionally celebrated on 4 May each year and which could also serve as a platform to promote community and political support for the changing fire services roles. High-level endorsement is required for the entire programme, by the Premier of the Province.

Lead Agencies are DLG, COGTA and DotP.

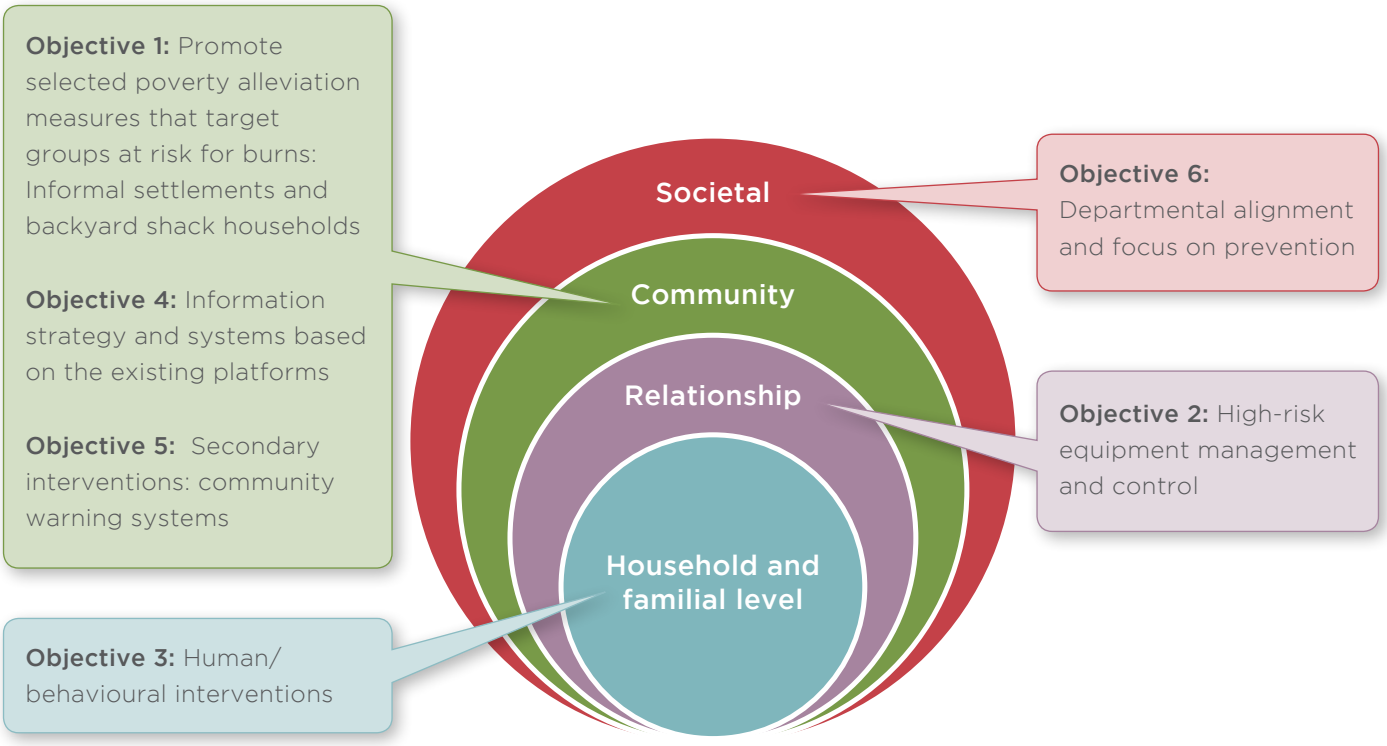

Figure 11. *Ecological alignment of the recommended interventions*

5

CONCLUSION

The Western Cape Strategic Framework for Fire and Burn Injury Prevention prioritises the development and implementation of programmes that aim to prevent or reduce burn injuries in the Western Cape. This Framework targets key environmental, social and behavioural factors that are known to contribute to the causation of fires and severity of burns. It emphasises three key action areas to reduce fires and burns through: targeting related socio-structural and technological risk factors; reducing key human and behavioural risks; and facilitating supportive institutional environments. The Framework recommends a combination of lead strategies that (1) promote the strengthening of existing housing regulations to take into account community density levels, migration and urbanisation, (2) enforce compliance to safe home appliance use, i.e. through the current paraffin appliance legislation and codes in SA, and through the safe use of candles, (3) support awareness raising campaigns that target vulnerable groups, especially children, young adult males, and the elderly in high-risk homes or housing settlements, (4) enables the distribution of smoke alarms to high-risk areas, (5) institutes a reliable and accurate fire incident reporting system that may be integrated provincially and nationally, and that (6) enables a shift of focus in the Fire and Rescue Service to strengthen its emphasis on fire prevention.

The Western Cape Local Government Department and cognate departments, including Human Settlements, Education, Health, Community Safety, and Trade and Industry, will use the Strategic Framework to develop their own specific implementation plans with defined and feasible outcomes and activate the Framework around proven or promising fire and burn injury prevention interventions. It is expected that a concerted and coordinated Strategic Framework will guide the province to realise a vision that offers increased safety for its citizens through significant reductions in key fire and burn risk factors and ultimately, significantly lower burn mortality and injury rates.

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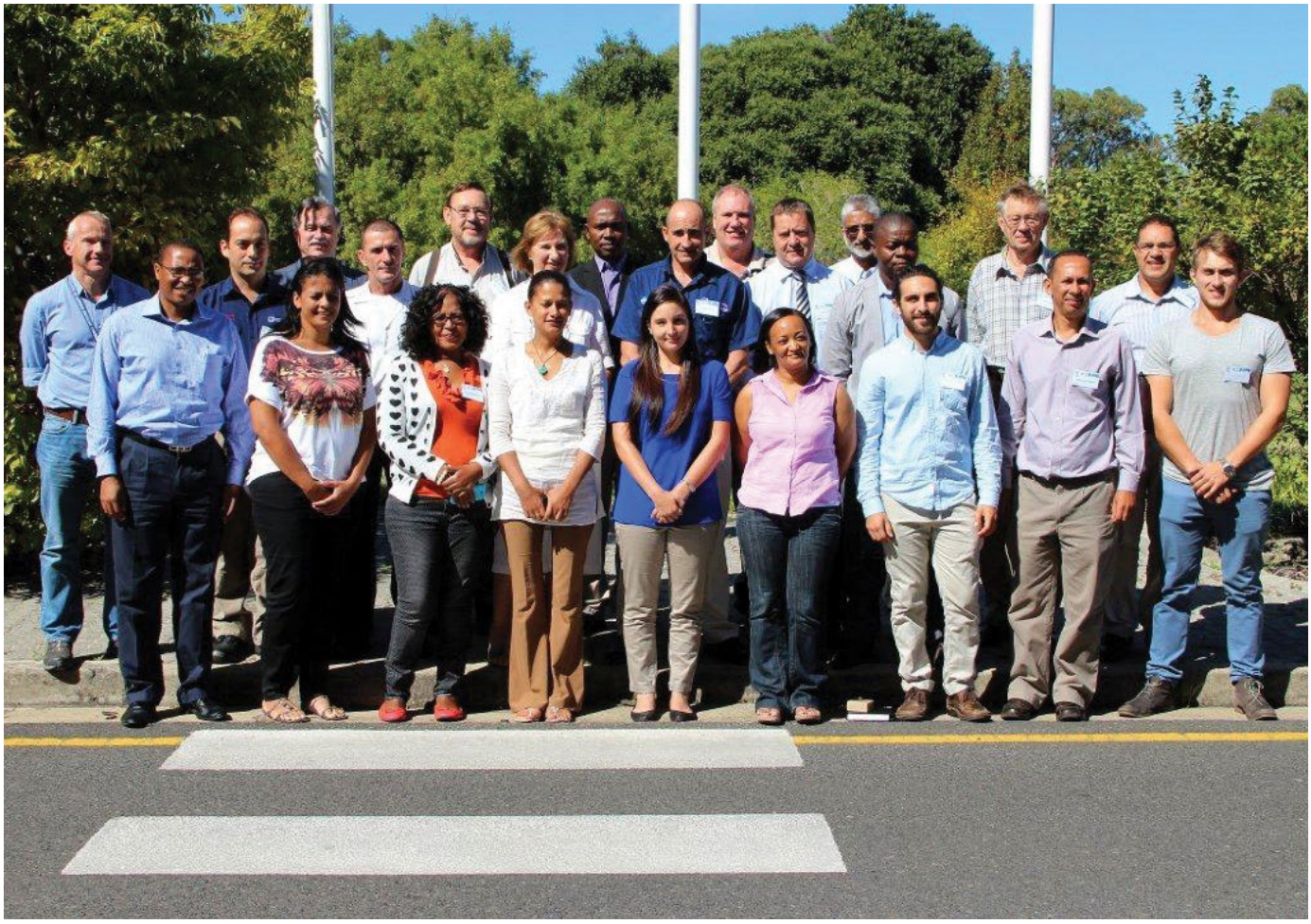
APPENDIX



Back row: *Crispin Pemberton-Pigott; Prof. Harold Annegarn; David Kimemia; Schalk Carstens; Prof. Mohammed Seedat*

Middle row: *Prof. Lee Wallis; Rodney Eksteen; Ian Schnetler; Dr Willemina Steenkamp; Etienne du Toit; Colin Deiner; Moses Khangale; Prof. Heinz Rode; Mark Pluke.*

Front row: *Patrick Kulati; Charlotte Powell; Pumla Mtambeka; Gilian Fortune; Bianca Dekel; Chandra Fick; Francois Petousis; Prof. Ashley van Niekerk; Marius Bartlett.*

CONSENSUS MEETING

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Rodney Eksteen
Bianca Dekel

Facilitator:

Prof. Mohammed Seedat

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   Head of Department: Local Government, Western Cape
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   President of Child Accident Prevention Foundation of South Africa (CAPFSA).
3. Prof. Elbie van der Merwe/Dr Willemina Steenkamp
   Head of Tygerberg Burns Unit
4. Colin Deiner
   Chief Director Disaster Management / Fire and Rescue Services
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   Deputy Director Fire and Rescue Services
6. Ian Schnetler
   Chief Fire Officer City of Cape Town Fire & Rescue Services
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   Managing Director Household Energy Safety Association of Southern Africa
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   Manager: Fire Services Coordination National Disaster Management Centre
9. Moses Khangale
   Senior Manager: Fire Services Coordination National Disaster Management Centre
10. Prof. Heinz Rode
    Emeritus Professor of Paediatric Surgery at Red Cross War Memorial Children's Hospital (RCWMCH).
11. Alderman JP Smith
    Mayoral Committee Member for Safety and Security, City of Cape Town.
12. Louis Law
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Western Cape Government

DISASTER MANAGEMENT

FIRE RESCUE SERVICES