# Learning from COVID and climatic events to build a resilient health system: Western Cape Department of Health

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## Background

The devastating KwaZulu-Natal floods in early 2022 were a reminder of the extensive damage to property and loss of life that climate change will exacerbate in South Africa. Extreme weather events are projected to increase in frequency and intensity in the southern African region. In recent years, the Western Cape has experienced fires, floods, drought, load-shedding, and COVID-19.

## Approach

This chapter reflects on the experience of the Western Cape Department of Health around a series of adverse events in the province. The main lessons are identified, and a framework is suggested to strengthen the health sector's response to climate change.

The Department has been on an intentional learning journey to strengthen the health system, build health-system resilience, and to learn from these events. In addition to the need to adapt to external events, the health system itself contributes to greenhouse gas emissions. As such, the Department has discussed the mitigation activities it is engaged in to reduce its contribution to climate change. Building on the lessons learned from adverse events, the Department has identified five focus areas to strengthen the health sector's ability to respond to climate change: (i) structural and relational aspects of governance; (ii) stewardship, leadership, and management; (iii) partnerships and intersectoral collaboration; (iv) system capacities; and (v) learning oriented culture.

## Conclusions

As the impacts of climate change are increasingly felt, there is an urgent need to share lessons from the health sector's response to adverse events. This learning can assist in implementing adaptive actions that strengthen health-system functions and that mitigate the health sector's greenhouse gas emissions. Health-sector leadership in South Africa needs to participate actively in climate action through the Presidential Climate Commission and other fora. The chapter concludes with recommendations that speak to the focus areas and shared learnings that can be helpful in other settings where health systems face climate risks.

## Introduction

With additional increases in global warming the western and southern African region, which includes South Africa, is projected to experience increased pluvial floods, heavy rains, droughts, increased wind speed, sea-level rise, and a decrease in mean precipitation.[1,2] Although further research is required into climate and health impacts in the Western Cape (WC) specifically, climatic projections of increased warming and drying, and increased intensity and frequency of extreme weather events in the province, have been associated with adverse health outcomes.[3] A changing climate also poses additional challenges to

the WC health system. However, over the past decade, including during the COVID-19 pandemic, the Western Cape Department of Health (WC DoH) has been on an intentional learning journey to strengthen its health system's resilience.[4] The Department has built organisational muscle in the process of responding to a range of shocks and stressors, including specific adverse events (Figure 1) as well as intractable everyday service pressures. With regard to climate change, it will be important both to engage in mitigation activities that reduce the health system's greenhouse gas emissions, and to implement adaptation actions that protect the health system from future climate risks.

## Health system resilience in the WC DoH

The literature provides a myriad definitions and frameworks of health-system resilience.[5] For the purposes of this chapter, and within the WC DoH, health-system resilience has been defined as having the capacity to absorb, adapt and transform in the short-term and long-term when exposed to a shock or stressor.[6,7] However, the Department has also considered 'everyday resilience', recognising that system resilience is rooted in the collective capacities embedded in individuals, teams, and organisational routines.[8,9]

A range of adverse events have impacted the WC health system over the last 23 years, as shown in Figure 1. These can be broadly summarised as fires, floods, COVID-19, drought and load shedding.

Fires are common in the province, whether these be naturally occurring wildfires or due to electrical faults. Apart from infrastructure damage, a significant risk of fires is smoke inhalation, which necessitates moving people. The physical damage to Swartland Hospital in March 2017 included equipment such as X-ray machines, and required interim arrangements over a prolonged period to move services and house patients. In the Knysna fire of June 2017, more than 1000 homes were destroyed, asbestos from infrastructure contaminated surrounding waterways, and connectivity to cellular and landline phones was lost. This required a massive collaborative effort between government, business, and civil society to protect people and property.

Floods experienced in the province have at times damaged transport infrastructure such as roadways and bridges, and disrupted access to healthcare facilities, rendering the latter inaccessible to patients and the emergency medical services (EMS). In the 2003 Montagu floods, helicopter services were required to move patients requiring emergency referral as roads were inaccessible. In the 2013 flood at Vergelegen Hospital, water was a metre deep on the ground floor, damaging equip-

## Figure 1. Adverse events impacting health services in the Western Cape, 1999-2022
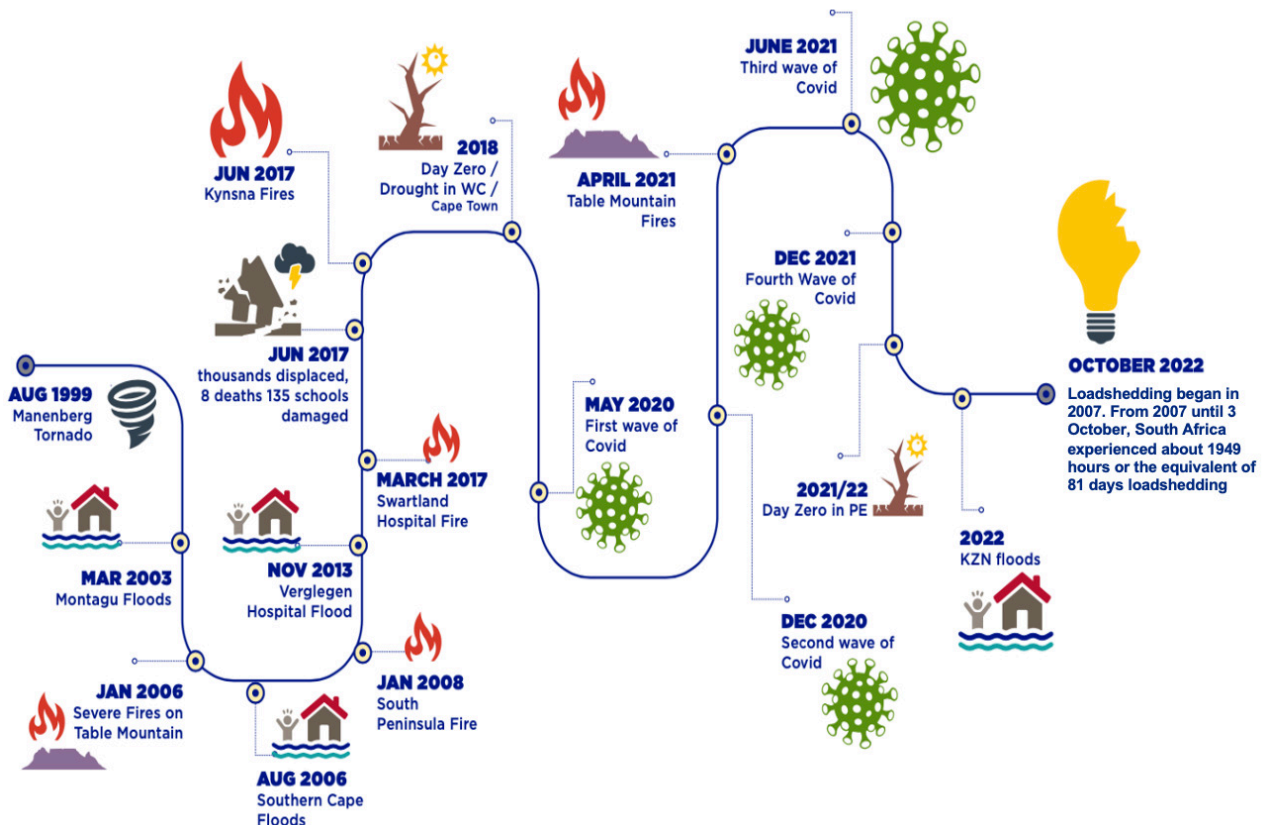


Source: Western Cape Department of Health.

ment and requiring an eight-hour operation to move about 130 patients to other facilities.

The drought, starting in 2016 and peaking in 2018, impacted the Western Cape health system significantly. Water supply to health facilities had to be augmented with water tanks and boreholes, water leaks were repaired, water pressure was lowered to save water, water consumption was reduced through changes in staff attitudes and behaviours, and use of sanitisers was introduced for hand washing.

Disruption in electricity supply due to load-shedding began in 2007. The disruption escalated and peaked from October 2022. Health services in the province have been negatively impacted as health facilities are not automatically exempt from load-shedding periods. In the past few years, the Department has had to install an infrastructure of generators, ensure an adequate supply of diesel, and monitor energy use at health facilities.

Adversity caused by the COVID-19 pandemic was on another scale than these events, with tragic loss of patients and staff lives and an immense surge in service pressures. The impact of the pandemic experience has been well described locally and globally,[4] and applicable WC DoH learnings are described in more detail in the following sections.

## Lessons from adverse events, shocks, and stressors

The scale and pace of the COVID-19 pandemic tested WC health-system-resilience to its limits. The pandemic forms an important benchmark and reference point in assessing future preparedness. It was a unique adverse event, impacting communities and disrupting systems globally through high death rates, societal disruption, and consequences for livelihoods. In addition to COVID, the various smaller-scale, climate-related and other shocks and stressors (shown in Figure 1) necessitated WC DoH system responses to mitigate their impact. However, both the pandemic and these adverse events also provided opportunities to learn, build organisational muscle, and strengthen the system to ensure continuity of health-service delivery and protection or improvement of patient experience and health outcomes. These experiences showed that the health system could respond in previously unimagined ways, creating new pathways for future system functioning. Responding to these shocks and stressors resulted in five key lessons for the WC DoH.

First, the response to shocks often demands that **structural and relational governance** is quick, agile, and adaptive across internal and external governance mechanisms. Speedy responses are required to protect patients and staff and ensure continuity of patient care. Evacuating patients to alternative, well-equipped settings, as in the 2013 Vergelegen Hospital flood, is one example. Another is how, during the COVID response, the Department was able to convert the Cape Town Convention Centre to an adequately staffed and stocked

860-bed intermediate care facility within a six-week time-frame. These experiences show that in times of crisis, government entities can be very responsive despite bureaucratic red tape. Such interventions require close collaboration between support services, such as infrastructure and supply-chain services, and frontline health services. During COVID-19, surveillance 'huddles', in a variety of settings, enabled rapid stock-taking and decision-making and were invaluable to effective responsiveness. They served as short, sharp connecting points for relevant staff, be it clinicians, management, or technical staff, such as public health specialists.

Wide-ranging adversity across large geographical areas (Figure 1) necessitates mindfulness of specific local conditions, context, risks, and capabilities. Differentiated system responses are needed, rather than a rigid 'one-solution-for-all' approach. For example, during the 2018 drought, the triage system used to track different vulnerabilities and water shortages across the province helped to prioritise targeted interventions.

Second, **stewardship**, **distributed leadership, and management capability** are paramount to provide strategic direction, mobilise around a common cause, and ensure that plans are executed efficiently at provincial and local levels. For this to happen, role players, including the health sector, need to step up beyond their conventional service-provider role, and have skills sets and sensitivity to the dynamics and power relations between various actors across sectors. The recovery phase post-COVID has also provided an opportunity to strengthen decentralised management, creating space for innovative local responses.

Third, **partnerships and collaborations** are critical across sectors, spheres of government, and between government, civil society and business. Across these three stakeholder groups, strong relationships, information-sharing, open and transparent communication, and flexible governance mechanisms are crucial. This enables proper coordination and rapid decision-making. Positive experiences of intersectoral collaboration were seen during COVID through the hot-spot strategy, which addressed vulnerable areas and facilitated social mobilisation across sectors to improve vaccine coverage. Meanwhile, in the response to load-shedding from October 2022 onward, strong leadership and relationships with the municipalities has led to some exemptions for particular health facilities to allow continuous electricity supply.

During the 2013 Vergelegen floods, collaboration and open communication between private and public health-care facilities allowed for efficient transfer and accommodation of patients. This collaboration and partnership across government, the private sector, and civil society, as well as internal cooperation, were also central to the holistic response during the 2017 Knysna fires. Regular engagement between management across levels, including clinicians and public health specialists among others, helped build cohesion and a culture of joint problem-solving and collaboration.

Fourth, building a range of **system capacities** to strengthen response is a key lesson learnt. Some of the main capacities include staff wellness; transparent and timely communication; use of data and evidence; the ability to procure products and services rapidly; and surveillance, risk identification and mitigation capability.

- **Staff wellness** and caring for Department staff emerged as a central priority during the COVID response. Wellness included more than the physical safety of staff. Anxiety, stress and trauma were heightened during COVID, and a range of interventions occurred in response. There were visits by senior management to the frontline to support staff, hosting of over 40 healing and grieving sessions to allow staff to share their vulnerabilities and support each other, an expanded counselling service for staff, and weekly bilateral engagements between senior leadership in the Department and organised labour to build solidarity and joint action. Other interventions included the development of Occupational Health Service (OHS) standard operating protocols, access to training, specialist OHS support to advise staff at the frontline, and provision of adequate protective personal equipment to staff.
- **Appropriate, transparent, and effective communication** vertically and horizontally across the system and with external partners is critical to a cohesive response. An example of available and timely communication was seen during the 2017 Knysna fire where active satellite connectivity allowed the WC DoH to access patient records and receive vital communications during the event. The Department also learned the importance of regular, honest communication with the public to build confidence and public trust in Government. During COVID, weekly digicom meetings were hosted by the Premier, Members of the Executive Council, and the Head of Department. These meetings included the public and media, and provided status reports, alerts of immediate emerging risks, information, and required actions. Dashboards were also created to share COVID and vaccine data with the public.
- **Utilisation of accurate data and evidence** is necessary for an effective system response. During the 2018 drought, data were used to monitor dam levels across the province. This allowed the health system to adjust its response to differing conditions across geographical areas. The Department also learned the importance of keeping abreast of emerging evidence, and how to flexibly adapt its responses accordingly. During the pandemic, the pace at which evidence emerged proved challenging. Structures such as the vaccine advisory committee, the OHS collaborative, and the behaviour-change collaborative were created by the WC DoH to harness collective wisdom, and resulted in recommendations to management for better decision-making.

- The ability **to procure products, services** and staff at short notice proved essential to enable efficient and effective system responses during the COVID-19 pandemic. Contracting of staff was critical to expand service capacity rapidly and provide relief for ill staff across the Department.
- A final component for improved system capacity is a strengthened **surveillance, risk identification and mitigation capacity** within the health sector, particularly at provincial level. During COVID-19, surveillance 'huddles' were set up weekly between the Health Intelligence Directorate and local district representatives to share epidemiological and service-utilisation data and intelligence, including data on local outbreaks, to better inform the system response both provincially and locally.

Lastly, **fostering a learning culture across the Department** has led to ongoing reflection, learning, and continuous improvement, enhancing and augmenting the health system response over the years. Provincial responses have been informed and adapted by learning from frontline staff and local management on the ground. Training was also provided to staff during the pandemic to build staff skills and competencies. Ongoing almost weekly online training courses were available to staff, together with available technical advice and support by public health, clinical and other relevant expertise.

# Health systems are part of the problem – the case for mitigation

It has been recognised globally that the health sector is a significant contributor of carbon emissions, generating from 4.4% to 4.6% of greenhouse gas (GHG) emissions.[10,11] While the WC DoH has not yet quantified its carbon footprint, it is fair to deduce that it is in the best interests of the province and South Africa to reduce GHG emissions, including from health services. In 2020, South Africa was found to be the most polluting country on the African continent due to its strong reliance on coal, emitting almost 452 million metric tons of $CO_2$ emissions in that year.[12]

The WC DoH started a journey to reduce GHG emissions and implement mitigation activities almost a decade ago. It is critical to note that some mitigation activities can provide an adaptation co-benefit, helping the health system improve its adaptive capacity to shocks beyond climate risks while reducing emissions that contribute to the climate crisis. An example of a co-benefit activity is the response to load-shedding in South Africa, noted in Figure 1 and described in Box 1.

The WC DoH has been part of the climate change mitigation and adaptation conversations led by the Western Cape Department of Environmental Affairs and Development Planning, with the aim to develop provincial strategies on climate change. Before the COVID-19 pandemic, the WC DoH had been raising awareness among

## Box 1. Load-shedding in South Africa, an example of an adaptation co-benefit

Since 2007 when South Africa began 'load-shedding' (interruption of the electricity supply to reduce stress on the generating plant), until 3 October 2022, the country has experienced over 1 949 hours or the equivalent of 81 days of no electricity. In 2023 alone (1 January to 8 June), the WC experienced 151 out of 159 days of loadshedding. At the time that these activities began, the health system was not exempt from load-shedding in South Africa. Subsequently the Ministry of Health has negotiated with ESKOM and municipalities to have selected facilities exempted. A recent 2023, court ruling has exempted hospitals, schools, and police stations from load-shedding. However this matter is under appeal as these multiple exemptions would put too much stress on the national electricity supply.

In order to continue the electricity supply to health facilities and services, the WC DoH built relationships with municipalities and invested in a hybrid inverter system with lithium batteries and photovoltaic panels, installed at 50 rural clinics in the province. The system is linked to the essential electricity system, allowing services to be rendered during load-shedding periods.

For example, photovoltaic panels are used as parking-bay roofs at an administration building, ensuring no interruptions during load-shedding. Such activities are helpful in mitigating carbon emissions of health facilities, but they also serve as adaptation activities. The health sector's effort to ensure continuity of services and access to electricity during load-shedding events will also be helpful during a climatic event if power outages are experienced.

Source: Western Cape Department of Health

staff to influence behaviour change. Several tools were created to measure energy and water consumption at facility level, and smart metering for electricity consumption was rolled out at 53 hospitals and 15 primary healthcare facilities. The Department also created governance and coordination structures that include other Departments and external partners. The WC DoH was the first Department on the African continent to join the Global Green and Healthy Hospitals network in 2015. This network is a rich resource of global expertise and provides a platform for sharing experiences and knowledge on mitigation strategies to all members of the network.

The WC DoH continues to scale up, strengthen, and increase the pace at which mitigation strategies are implemented (Box 2). It is now striving to become a net zero carbon emitter by 2050. The rate of global warming makes this initiative even more urgent. These mitigation strategies will increase the Department's resilience in providing future health services, reduce the health sector's dependence on the national energy grid, and reduce its water consumption.

## Strengthening the health sector adaptation response to climate change

An important message was relayed in the Adaptation Agenda launched by the South African presidency at COP27, the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change. The message, delivered by Dr. Moheildin, the UN Climate Change High-Level Champion for COP27, was that "at the core of the outcomes is the recognition that adaptation is often locally driven and globally relevant, while simultaneously needing to address equity, diversity and justice". The Adaptation Agenda outcomes are wide ranging and include, among others, food security, agriculture, water and nature, human settlements, ocean and coastal, infra-

structure, and cross-cutting planning and finance. However, the health sector does not feature significantly in the current South African Presidential Climate Commission (PCC) plans. The WC DoH responses to climate-related adverse events described in this chapter can inform future PCC plans and support the case for increased investment in health-sector adaptation.

Lessons drawn from past experience in the Western Cape (summarised earlier) form a critical foundation for continuing WC DoH efforts to strengthen health-system resilience in the face of climate change. Figure 2 depicts a framework derived from these experiences, with five interconnected focal areas relevant to strengthening health-system resilience.

## Structural and relational governance

Governance is central to enabling rapid decision-making, fostering alignment and cohesion both internally within the health system as well as with external partners, and ensuring efficient and effective execution.[13,14] It is important to review and adapt governance arrangements and processes constantly. A combination is needed of command and control, and participative and inclusive governance mechanisms that are context- and situation-appropriate. Attention should be paid to both the structural elements of governance such as organisational arrangements, lines of reporting and accountability, roles and responsibilities, and decision making, as well as relational aspects such as strengthening relationships, open and honest communication, inclusivity, navigating power dynamics, and trust. Strengthening governance also requires more than policy pronouncements – it also requires attention to daily practice.[15] Finally, the Department is exploring ways to strengthen sub-districts as the pivotal unit closest to the ground for coordination of service delivery as well as intersectoral collaboration.

## Box 2. WC DoH mitigation strategies to reduce emissions 2021 - Present

Some of the main focus areas and strategies include:

**Energy and water:**
- Increase awareness among staff to adopt energy-efficient behaviours (switch off lights, open windows, etc.)
- Introduce smart metering at facility level
- Ensure air conditioning is off when facilities are closed
- Install heat pumps to all facilities
- Upgrade laundries to achieve a saving of 19.6 million litres of water per annum and 557 tons of carbon emitted
- Introduce visual dashboards to monitor hospital energy and water consumption
- Include energy and water consumption indicators as part of the quarterly formal monitoring and evaluation process for senior management
- Introduce photovoltaic systems
- Encourage engineering and infrastructure designs that minimise the use of electricity for heating and cooling

**Proper waste management:**
- Encourage re-use, recycling and reduction of general waste
- Introduce environmentally friendly equipment for the treatment of healthcare risk waste as an alternative to the use of incinerators
- Introduce paper recycling and reduction of packages
- Increase digitisation to reduce paper usage (towards a paperless organisation)

**Green procurement:**
- Use mercury-free blood pressure meters
- Use the WC DoH green procurement policy framework

**Travel:**
- Reduce travel within the province and nationally
- Encourage virtual meetings (during COVID this was the norm)

Source: Western Cape Department of Health

## Figure 2. A framework of focus areas for health-system response to climate change, Western Cape, 2022



Source: Western Cape Department of Health

### Stewardship, leadership, and management capacity

System response requires that bold, value-based, decisive and responsive leadership be strengthened at all levels of the organisation. This requires investment in leadership development through formal and informal training, and a culture of constant review, with cycles of reflection, learning, implementation, and improvement. Leadership to provide visionary thinking and inspire change is important; however, management capacity to efficiently execute and implement policy and strategies is just as important.

### Partnerships and intersectoral collaboration

Response to climate change requires strategies internal to health departments, as well as intersectoral collaboration through a whole-of-government and society approach. These should be aligned and effectively governed with shared purpose and focus. Partnership with key stakeholders is essential, including other departments, organised labour, the private health sector, and donor organisations, as well as collaboration more broadly with civil society and business. These relationships must be constantly nurtured and strengthened through constructive engagement, information sharing, open communication, and joint action towards shared goals. In early 2022, the Department convened a widely attended Indaba of all the important stakeholders to seek consensus and co-ownership of the strategies towards health and wellness, building on momentum from the pandemic. Health can leverage off this momentum and play a more assertive role in influencing public policy in the commercial and social-service sectors. In this regard, the WC DoH has successfully advocated for violence and mental health to be seen and addressed as

whole-of-government and society issues requiring broad intersectoral interventions.

## System capacities

Ongoing focus on enhancing agile and adaptive health-system capacities must remain a priority. Some of these capacities have already been described, but others are the generic functions of policy development, strategic and operational planning, resource allocation, learning, monitoring and evaluation, supply chain management, information management, disaster planning and management, surveillance and risk management, service design, communication, and facilitation and navigation among multiple role players and their power dynamics. Access to data, use of data, and evidence for decision-making must continue to be strengthened. A generic approach that includes review, reflection, learning, and improved action should be applied to all these areas.

- **Strengthening surveillance and early warning systems** is an important prerequisite for an effective risk-mitigation and system response. Heightened vigilance for adverse events and risks is critical both globally and locally, as evidenced in the pandemic and with climate change. Among other things, this requires integrated data systems and efficient, timeous communication across disciplines that enable a cohesive intersectoral response. The Department is currently working with other departments and academic partners to create a data dashboard that combines weather data such as rainfall patterns, and geographical data such as flood plains and hospital locations, with population-vulnerability data to help with decision-making and planning.
- **Disaster-planning capability** and processes are essential, both within the health sector and across sectors, to ensure business continuity, safety of staff and patients, and protection of property and infrastructure. The Department has been engaging local hospital management and EMS over many years to strengthen this practice. The process of proactively engaging staff and partners, considering various scenarios, making contingency arrangements, and having disaster test drills, all contribute to better preparedness, as was evidenced in the Knysna Hospital fires in 2017. Lessons learnt from responding to some of the disasters outlined in Figure 1 have reiterated that the province must work as a collective. A team that plans together, trains together, understands common terminology, and builds strong relationships can respond effectively when the need arises. The Department will perform its mandate with regard to medical emergencies; however, to achieve this effectively requires the support of other agencies. This was particularly clear in the response to COVID-19, where Joint Operations Committees worked across sectors, including local government.

- The brunt of adverse events is often shouldered by **emergency services**, including EMS used to transport patients and emergency centres (ECs) within health facilities. The communications centre and control room within EMS are well positioned to obtain an overview of health-system pressures, enabling appropriate transportation and distribution of acute patients. During the pandemic and other adverse events, EMS played a key role in redistributing inpatients between facilities to manage surges in patient demand. The capacity within EMS and ECs, and interrelationships with primary health care (PHC) and other disciplines within hospitals need to be strengthened. Communication and cooperation between public and private health sectors has been good during adverse events, and can help prepare for Universal Health Coverage and National Health Insurance. Currently, an integrated information system is being rolled out across ECs. This will be connected to the provincial data centre, which provides integrated person-level data harvested from a range of different systems. PHC and emergency services are nestled within a broader health ecosystem and must be ably supported by district, regional, tertiary, quaternary, and other specialised services.
- A key focus will be the **community-oriented PHC platform,** which has the largest physical footprint and reach within communities amongst other public sector services. Historically, community-oriented comprehensive PHC services, intersectoral coordination, community involvement, and social accountability have been underdeveloped in the WC health sector. It is critical that they are systematically strengthened in the short to medium term. The Department has made an important decision in this regard to strengthen decentralised management to sub-district level to improve local responsiveness in all the above-mentioned areas.

## Learning-oriented culture

The Department started a learning-culture journey several years ago, linked to leadership development. Organisational muscle has been developed through learning and actioning system responses to repeated adverse events over the years. The Department will continue to strengthen the culture, systems, and learning processes more systematically. The 'Learning Health Systems: Pathways to Progress' report by the Alliance for Health Systems and Policy Research and the World Health Organization provides very useful guidance in this regard.[16] Leveraging relationships with academic colleagues, accessing available expertise, and sharing existing data in a timely manner is important as the Department strives to become more data-led and evidence-informed in policy and system response. The learning culture should be built into the existing structures and meetings to become daily practice, as opposed to being seen as an add-on.

On-the-job learning is as important, if not more important, than attending formal training courses.

# Conclusions and recommendations

As the impacts of climate change intensify, the need for the Department to mitigate its carbon footprint and increase its adaptive capacity is paramount. The 2022 floods in KwaZulu-Natal (KZN) caused significant damage to health infrastructure and required major, rapid, contingency arrangements. Cross-provincial protocols and learning as well as cohesive arrangements are critical to building health-system resilience across South Africa, and may have better supported the KZN health-system response to the flood disaster. Applying lessons learned, scaling-up preventive interventions, and increasing the capacity to execute cohesive social and humanitarian responses as whole-of-government and whole-of-society action is critical to building climate-resilient health systems.

The recommendations below may also be useful to other provinces in South Africa and beyond. These recommendations need to be systematically addressed by health-sector leadership and management at all governance levels:

- The National Department of Health, supported by provinces, needs to engage in climate fora to register the importance of building health-sector resilience to climate change, and elevate it on the PCC policy agenda.
- The structural and relational aspects of governance within and outside the health sector need to be reviewed and adapted constantly, and applied in daily practice.
- Leadership and management needs to be bold, value-based, decisive, and responsive, and must be strengthened across the health sector to this end. Capacity and skills for effective stewardship should also be enhanced across sectors.
- A learning and improvement culture should be built into existing structures, meetings, and daily practice.
- Partnerships and intersectoral collaboration must be constantly nurtured and strengthened through constructive engagement, information sharing, open communication, and joint action towards shared goals.
- An ongoing focus on health-system strengthening that enhances system capacities must remain a priority. In addition to conventional management functions, service re-design (with a focus on emergency services and PHC), communications, innovative technology, surveillance and risk management, and disaster-planning capabilities, among others, must be strengthened significantly.

## Abbreviations

| Abbreviation | Description |
| --- | --- |
| $CO_2$ | Carbon Dioxide |
| COP | Conference of Parties |
| EC | Emergency Centres |
| EMS | Emergency Medical Services |
| GHG | Greenhouse Gas |
| KZN | KwaZulu-Natal |
| OHS | Occupational Health Service |
| PCC | Presidential Climate Commission |
| PHC | Primary Healthcare |
| SA | South Africa |
| WC | Western Cape |
| WC DoH | Department of Health |

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