

Crisis Governance and Emergency Response Coordination: Lessons from the COVID-19 Pandemic for Public Health Preparedness in Africa

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Abstract

This review examines the governance, institutional, and coordination lessons generated by the COVID-19 pandemic for strengthening public health preparedness across Africa. It evaluates how leadership structures, multilevel government relations, emergency decision-making, resource allocation, public communication, community engagement, institutional resilience, and digital systems influenced the capacity of African states to respond to a rapidly evolving health crisis. The study adopts a narrative review approach, synthesising relevant scholarly literature and empirical evidence from African and international contexts to identify transferable lessons for future emergencies. The findings show that effective crisis response depended not only on epidemiological and clinical capability, but also on the quality of governance arrangements connecting national authorities, subnational governments, health institutions, communities, and supporting infrastructure. Persistent weaknesses included fragmented mandates, uneven local capacity, delayed information flows, shortages of critical resources, inadequate transport and digital connectivity, and inconsistent public communication. Conversely, stronger responses were associated with clear institutional leadership, functional emergency operations centres, decentralised coordination, multidisciplinary collaboration, trusted communication, interoperable surveillance, adaptive resource management, and the protection of essential health services. The review further finds that preparedness is most resilient when embedded in routine institutions rather than activated episodically during crises. It concludes that future African health security requires durable governance systems capable of anticipating threats, coordinating actors, preserving service continuity, and adapting under uncertainty. The study recommends sustained investment in national and subnational emergency coordination, workforce development, resilient infrastructure, interoperable data systems, transparent accountability, simulation exercises, community-centred communication, and stronger continental cooperation.

Keywords: crisis governance; emergency coordination; public health preparedness; COVID-19; institutional resilience; Africa

DOI: 10.66592/dgpdfm14

1. Introduction

1.1 Africa's Public Health Emergency Landscape

Africa's public health emergency landscape is shaped by the interaction of recurrent infectious disease outbreaks, demographic pressures, uneven health-system capacity, infrastructure deficits and increasingly complex transboundary threats. Experiences with Ebola, cholera, measles, emerging zoonoses and COVID-19 have demonstrated that preparedness cannot be reduced to laboratory capacity or epidemiological surveillance alone. It also depends upon governance arrangements capable of integrating prevention, early warning, clinical response, logistics, public communication and continuity of essential services. Comparative evidence from 182 countries has shown substantial variation in capacities to prevent, detect and respond to public health threats, demonstrating that formal preparedness commitments do not automatically translate into equivalent operational readiness (Kandel *et al.*, 2020).

COVID-19 exposed this distinction particularly sharply across African health systems. Many countries entered the pandemic with constrained fiscal space, shortages of specialist personnel, limited intensive-care capacity, fragmented referral systems and persistent inequalities in access to essential services. Nigeria's experience illustrated both the vulnerabilities of existing health infrastructure and the importance of building preparedness mechanisms capable of supporting surveillance, case management, infection control and coordinated response during rapidly developing epidemics (Etteh, Adoga&Ogbaga, 2020). In South Africa, pressures associated with shortages of protective equipment, interruptions to routine healthcare, socioeconomic disruption and demands on already stretched services similarly demonstrated that emergency preparedness involves the resilience of the entire health and social system rather than isolated outbreak-control functions (Mbunge, 2020).

Geographical accessibility represents another critical dimension of African emergency preparedness. Rural and peri-urban populations may experience substantial delays in reaching health facilities because of poor road conditions, distance and seasonal accessibility constraints. Geospatial analysis of Nigerian rural networks demonstrates how deficient transport infrastructure can constrain physical access to healthcare, thereby converting geographical disadvantage into an emergency-response vulnerability (Alaka, Ajayi & Bolaji, 2020). Such vulnerabilities become particularly consequential during outbreaks when rapid diagnosis, referral, treatment and movement of personnel or medical commodities are time-sensitive.

Emergency coverage is equally affected by the distribution and connectivity of response assets. Network analysis of intercity highways in Kwara State identified spatial gaps in emergency-

response coverage, highlighting the practical importance of incorporating transport geography into preparedness planning (Tiamiyu, Alaka & Ajayi, 2021). Infrastructure prioritisation therefore has public-health implications extending beyond conventional transportation policy. Evidence from rural road prioritisation demonstrates the value of combining population, surface condition, market access and health-access indicators when allocating scarce infrastructure resources (Alaka *et al.*, 2023). For crisis governance, this reinforces the need to integrate health planning with transportation, local government, communications and disaster-management systems.

The pandemic further revealed that nominal preparedness rankings alone cannot adequately explain national performance. Cross-national evidence from 177 countries suggests that institutional trust, interpersonal trust, government capacity and broader social conditions significantly influenced COVID-19 outcomes alongside conventional preparedness indicators (Bollyky *et al.*, 2022). Consequently, African preparedness strategies require attention not merely to technical capability, but also to institutional legitimacy, accountable leadership and the ability to mobilise collective action during uncertainty.

A persistent structural challenge is the separation of global health security from routine health-system strengthening. Systems organised primarily around episodic emergency programmes may possess disease-specific capabilities while remaining unable to guarantee accessible primary care, workforce protection or continuity of essential services during shocks. Integrating universal health coverage with health-security investment is therefore central to building genuinely resilient preparedness architectures (Lal *et al.*, 2021). COVID-19 ultimately demonstrated that future emergencies require governance systems capable of translating preparedness plans into coordinated action across national and subnational institutions. Global assessments of the pandemic consequently emphasise sustained political leadership, stronger surveillance, adequately financed health systems and coordinated international and domestic preparedness as foundations for reducing vulnerability to future crises (Sirleaf & Clark, 2021).

1.2 COVID-19 Governance and Coordination Challenges

The COVID-19 pandemic exposed crisis governance as a fundamental determinant of emergency-response effectiveness. Beyond the epidemiological characteristics of the virus, governments confronted the institutional challenge of coordinating health agencies, political authorities, security institutions, subnational administrations and socioeconomic interventions under conditions of uncertainty. International experience demonstrated that variations in political institutions, administrative authority and policy processes strongly shaped how governments

interpreted risks and selected containment measures, making governance an indispensable dimension of pandemic analysis (Greer *et al.*, 2020).

Across Africa, these coordination pressures were magnified by uneven institutional capacity, resource constraints and competing socioeconomic priorities. South Africa's response illustrated the complexity of simultaneously implementing lockdowns, sustaining healthcare services and managing the economic and social consequences of restrictive measures. Although decisive interventions were introduced, implementation generated difficult trade-offs involving livelihoods, compliance, service continuity and institutional responsiveness (Ikwegbue *et al.*, 2021). Similar tensions were evident in Nigeria, where restrictions substantially altered essential travel and available transport options. The resulting mobility changes demonstrated that centrally determined public-health measures could produce differentiated consequences according to transport access and socioeconomic circumstances, underscoring the importance of incorporating local realities into crisis decision-making (Ajayi, Alaka & Tihamiyu, 2020).

Coordination challenges also reflected the distribution of authority across levels of government. Comparative evidence indicates that COVID-19 generated repeated shifts between centralisation and decentralisation as national leaders, ministries and subnational authorities negotiated responsibility for restrictions, service delivery and policy implementation (Greer *et al.*, 2022). Such institutional fluidity can hinder coherent action when mandates overlap, accountability is unclear, or information does not circulate rapidly between decision-making levels.

Effective pandemic governance therefore requires more than emergency command structures; it depends on credible leadership and implementation capacity. African regional experience shows that ethical leadership and consistent policy execution are important for translating formal institutional commitments into coordinated action across complex governance environments (Enaifoghe, Dlamini & Agwuna, 2020). At the international level, COVID-19 likewise revealed weaknesses in collective governance, including fragmented cooperation and difficulties coordinating responses to a transboundary threat that no state could manage independently (Gostin, Moon & Meier, 2020). Strengthening African preparedness consequently requires clearly allocated authority, interoperable institutions, timely information exchange, and coordination mechanisms capable of connecting national strategy with locally responsive implementation.

1.3 Review Scope, Objectives, and Significance

This review examines crisis governance and emergency response coordination as central components of public health preparedness in Africa, using the COVID-19 pandemic as a critical

reference point for evaluating institutional performance, policy implementation, intergovernmental coordination, and system resilience. The scope extends beyond immediate disease-control measures to consider how leadership structures, administrative arrangements, health-system capacity, emergency logistics, public communication, infrastructure, and community-level responsiveness influenced the effectiveness of pandemic management across diverse African settings.

The principal objective is to identify governance and coordination lessons that can strengthen preparedness for future public health emergencies. Particular attention is given to the interaction between national authorities, subnational governments, health institutions, emergency services, and other relevant actors responsible for translating policy decisions into operational response. The review also considers how fragmented responsibilities, resource inequalities, weak information flows, delayed implementation, and inconsistent public engagement can undermine otherwise well-designed emergency strategies. By examining these dimensions collectively, the study seeks to clarify the institutional conditions required for timely, coherent, and adaptive crisis management.

The significance of this review lies in its contribution to ongoing efforts to build more resilient public health systems across Africa. COVID-19 demonstrated that preparedness is not solely a function of medical resources or epidemiological capability; it also depends on governance systems capable of coordinating institutions, allocating resources efficiently, maintaining essential services, and responding to rapidly changing conditions. Accordingly, this review provides a structured basis for identifying practical governance priorities that can improve institutional readiness, strengthen accountability, enhance cross-sector collaboration, and support more equitable and effective emergency response across African countries.

2. Crisis Governance and Response Coordination

2.1 Institutional Leadership During Health Emergencies

Institutional leadership becomes particularly consequential during public health emergencies because conventional administrative routines are rapidly displaced by conditions of uncertainty, compressed decision timelines, competing priorities and potentially severe consequences of organisational failure. Effective crisis leadership therefore requires more than positional authority. Leaders must interpret incomplete evidence, establish operational priorities, communicate decisions clearly, protect the workforce and maintain essential services while adapting institutional arrangements to an evolving threat. Experiences among health-facility leaders in Lagos during the early COVID-19 period demonstrated how leadership responsibilities

expanded beyond routine management to encompass staff reassurance, infection-prevention adaptation, workforce welfare and continuity of care under substantial personal and organisational pressure (Balogun *et al.*, 2024).

At the governance level, leadership effectiveness also depends upon the ability to link national strategy with implementation across subnational and institutional structures. Evidence from Nigeria indicates that pandemic decision-making was shaped by relationships between federal and state authorities, technical institutions, development partners and civil-society actors, with timely implementation depending upon clarity of responsibility, access to evidence and mechanisms for translating decisions into action (Mukherjee *et al.*, 2023). Consequently, leadership during health emergencies should be understood as a distributed institutional function rather than the responsibility of a single office or political authority.

African experience further demonstrates the importance of structured emergency command arrangements. Public health emergency operations centres provide institutional platforms through which surveillance, logistics, risk communication, epidemiological intelligence and operational planning can be coordinated. Assessment across African countries nevertheless revealed considerable variation in the functionality and maturity of these centres, indicating that their effectiveness depends on sustained investment in governance, staffing, procedures and interoperable systems rather than their formal establishment alone (Fekadu *et al.*, 2023). Knowledge sharing, mentorship and cross-country networking among African emergency operations centres during COVID-19 also illustrated how institutional leadership can be strengthened through continuous learning and collaborative preparedness mechanisms (Etenget *et al.*, 2023).

The South African experience similarly underlines the value of pre-existing governance structures. Established outbreak-response mechanisms enabled authorities to adapt coordination arrangements during COVID-19, while transparent, science-informed and agile management remained important for harmonising decisions and sustaining institutional credibility (Moonasar *et al.*, 2022). This suggests that effective emergency leadership is built before crises occur through clearly specified mandates, tested command relationships and routines for intersectoral coordination.

Leadership quality within healthcare organisations is equally important. COVID-19 required nurse leaders and clinical managers to make rapid operational decisions while managing staff anxiety, shortages and changing clinical guidance. Evidence indicates that transformational characteristics—including communication, motivation, visibility and responsiveness—became especially valuable for maintaining workforce engagement under crisis conditions (Fowler & Robbins, 2022). Leaders also had to act when evidence was incomplete or contradictory,

requiring judgement, adaptability and the capacity to establish direction before consensus was available (Wymer, Stucky & De Jong, 2021). Building leadership capability within residential and long-term care settings is similarly important because emergency resilience depends upon competent leadership across the continuum of health and social care, not solely within tertiary hospitals (Ohunyon, Ojukwu & Ayinde, 2025).

2.2 Multilevel Government Coordination Mechanisms

Multilevel government coordination is fundamental to public health emergency governance because outbreaks simultaneously generate responsibilities at national, regional, local and institutional levels. Effective coordination requires vertical alignment between tiers of government and horizontal collaboration among ministries, health agencies, emergency-management institutions and service providers. COVID-19 demonstrated that decentralisation can improve responsiveness to local epidemiological conditions, yet fragmented authority can also produce inconsistent policies, delayed resource mobilisation and uncertainty over institutional responsibilities. Comparative analysis of public-health decentralisation showed that governments consequently adopted combinations of centralisation, executive coordination and horizontal intergovernmental arrangements to reconcile national direction with local implementation (de Biase & Dougherty, 2021).

The African experience illustrates why this balance is particularly significant. Ghana's pandemic response involved national directives, training and resource flows to municipal authorities, but weaknesses in bottom-up planning, local financing and coordination between district health structures and local governments created implementation gaps (Wallace *et al.*, 2022). More broadly, Ghanaian experience indicates that effective pandemic governance depends upon state capacity operating across multiple administrative levels rather than authority concentrated exclusively within central institutions (Arkorful, 2022). These lessons are pertinent for African preparedness systems in which subnational governments frequently carry substantial operational responsibilities despite uneven fiscal, technical and administrative capacity.

Federal systems elsewhere reveal comparable coordination dilemmas. In the United States, divided responsibilities across federal, state and local governments contributed to divergent public-health measures, demonstrating the importance of common standards and clearly articulated intergovernmental responsibilities during nationwide emergencies (Gordon, Huberfeld & Jones, 2020). Financing arrangements also shape coordination because subnational authorities cannot sustainably exercise emergency responsibilities without predictable fiscal transfers and resource-sharing mechanisms, as comparative evidence from Canada, Mexico and the United States illustrates (Bélandet *et al.*, 2021).

Coordination must additionally extend beyond governmental hierarchies to frontline organisations. Evidence from emergency departments demonstrates that multidisciplinary collaboration can strengthen information exchange, clinical decision-making and coordinated patient management, making institutional collaboration an operational extension of broader emergency governance (Ohunyon, Ayinde & Ojukwu, 2023). Similarly, structured governance frameworks demonstrate the value of clearly assigned responsibilities, standardised processes, oversight mechanisms and accountability pathways when multiple organisational actors must operate coherently (Faderoet *al.*, 2018).

The COVID-19 experience further indicates that decentralisation is effective only when authority is accompanied by capacity and legitimacy. Evidence from the Netherlands shows that regional institutions require sufficient decision authority, operational capability and legitimacy to connect meaningfully with higher tiers during crises (van Popering-Verkerket *al.*, 2025). For African public-health preparedness, multilevel coordination should therefore institutionalise predefined command relationships, interoperable information systems, transparent financing channels, joint simulation exercises and formal mechanisms for incorporating local intelligence into national decisions.

Table 1. Illustrative multilevel coordination framework for African health emergencies

Governance level	Principal responsibility	Coordination requirement	Preparedness priority
Continental/regional	Cross-border surveillance	Shared alerts and protocols	Interoperable surveillance
National	Strategy and standards	Ministerial integration	Unified command architecture
State/provincial	Resource mobilisation	Vertical information exchange	Surge coordination
Local/district	Community implementation	Bottom-up intelligence	Local response capacity
Health facilities	Clinical operations	Multidisciplinary coordination	Referral and continuity systems

2.3 Emergency Decision-Making and Resource Allocation

Emergency decision-making during public health crises requires institutions to allocate finite personnel, financing, medicines, diagnostic capacity and critical-care resources while

epidemiological conditions change rapidly. The COVID-19 pandemic demonstrated that conventional allocation procedures can become inadequate when demand simultaneously exceeds available capacity across multiple services. In Nigeria, resource scarcity disrupted routine programmes and intensified the need for transparent prioritisation capable of balancing pandemic interventions with continuing non-COVID healthcare requirements (Ilesanmi, Akande & Afolabi, 2021).

Effective allocation begins with anticipatory intelligence. Forecasting systems that identify demand patterns and operational bottlenecks can enable decision-makers to position resources before shortages become critical rather than relying exclusively on reactive redistribution. Such an approach strengthens preparedness by linking projected need to procurement, inventory management and operational planning (Akin-Oluyomi & Akhigbe, 2023). Where emergency responses involve several hospitals, laboratories or treatment centres, data-driven performance indicators can further provide a comparative basis for determining where capacity constraints are greatest and where intervention should receive priority (Akin-Oluyomi & Akhigbe, 2023).

Workforce allocation represents another critical dimension of crisis governance. Matching personnel availability, professional competencies and workload intensity can sustain essential functions during demand surges while reducing avoidable underutilisation or excessive staff burden (Akanbi, Ganiu & Sunday, 2022). Yet operational efficiency must remain subordinate to transparent and ethically defensible allocation principles. International experience during COVID-19 emphasised the importance of maximising benefits, treating individuals fairly and applying prioritisation criteria consistently when scarce medical resources cannot satisfy total demand (Emanuel *et al.*, 2020).

Such safeguards become particularly important where scarcity predates an emergency. South African experience with limited intensive-care capacity demonstrated the value of structured regional triage arrangements for promoting consistency, transparency and accountability across institutions rather than leaving exceptionally difficult rationing decisions to isolated clinical teams (Naidoo & Naidoo, 2021). For African public health preparedness, emergency decision systems should therefore integrate real-time capacity information, demand forecasting, predefined priority criteria and auditable allocation processes so that scarce resources can be deployed rapidly, equitably and strategically during future crises.

2.4 Public Communication and Community Engagement

Public communication is a core component of crisis governance because emergency measures depend not only on administrative authority but also on whether populations understand, trust

and act upon official guidance. During COVID-19, governments had to communicate rapidly while evidence and policies were changing. Across thirteen African countries, effective risk communication was strengthened where authorities combined mass-media messaging with community engagement, local languages and trusted intermediaries, while misinformation and limited access to credible information remained barriers (Adebisi, Rabe & Lucero-Prisno, 2021).

Community engagement is particularly important where national directives must be translated into locally acceptable practices. Evidence from Uganda shows that sustained engagement with residents and local leaders improved understanding of surveillance activities and increased acceptance of COVID-19 response measures across rural and urban settings (Bukonya *et al.*, 2024). African NGOs and community-based organisations similarly played an important role in countering infodemics, especially where distrust of government narratives or misconceptions weakened adherence to public-health guidance (Emovwodoet *al.*, 2022).

The quality of communication also shapes institutional legitimacy. European experience demonstrated that consistency, clarity, credible messengers and avoidance of contradictory messaging were central to maintaining public trust in non-pharmaceutical interventions (Warren & Lofstedt, 2022). Evidence from the United States further indicates that transparent communication can strengthen organisational trust and, through that trust, influence risk perceptions and protective behaviour (Lee & Li, 2021). Such findings reinforce the importance of communication that acknowledges uncertainty rather than presenting evolving evidence as fixed certainty.

For African preparedness systems, public communication should therefore be treated as an operational function embedded within emergency command structures. Communication strategies should combine scientific accuracy with cultural sensitivity, two-way feedback, local-language adaptation and participation by trusted actors. Australian experience likewise underscores that trust is accumulated before emergencies and can be rapidly undermined when official messages appear inconsistent or politically contested (Nutbeam, 2020).

3. COVID-19 Response Lessons Across Africa

The COVID-19 pandemic generated important lessons for strengthening crisis governance and public health preparedness across Africa. Although countries differed considerably in epidemiological burden, fiscal capacity, political structures and health-system resources, the pandemic demonstrated that effective response depended on institutional adaptability rather than preparedness plans alone. Nigeria's experience showed the value of transforming knowledge generated during earlier outbreaks into institutional learning systems, particularly through

documenting operational experience, revising response practices and strengthening organisational capacity to adapt during evolving emergencies (Saleh *et al.*, 2022).

One prominent lesson concerned surveillance and early detection. Weaknesses in laboratory networks, case reporting, data integration and community-level surveillance constrained the ability of some health systems to identify transmission patterns rapidly. The pandemic therefore reinforced the importance of investment in integrated disease-surveillance systems capable of connecting local detection with national emergency decision-making (Aborodeet *al.*, 2021). Contact tracing experiences across Nigeria, Rwanda, South Africa and Uganda similarly demonstrated that previous outbreak-response experience, community health structures, digital technologies and decentralised public-health capacity could be mobilised rapidly, although shortages of personnel, testing delays and incomplete information limited effectiveness in some contexts (Nachegaet *al.*, 2021).

A second lesson concerns health-system resilience. International comparative evidence demonstrates that resilient pandemic responses depended on the capacity to activate comprehensive interventions, adapt resources, maintain essential services and continuously revise policies as evidence evolved (Haldane *et al.*, 2021). South Africa's Gauteng experience illustrates this duality particularly clearly: multisectoral mobilisation and rapid innovation expanded response capacity, yet existing workforce deficiencies, data weaknesses and disruptions to routine healthcare exposed structural fragilities that emergency measures alone could not resolve (Rispelet *al.*, 2021).

The pandemic also demonstrated that emergency preparedness extends beyond hospitals and surveillance agencies. Movement of health workers, patients, specimens, medicines and essential commodities depends on functioning transport networks. Evidence from Lagos shows how congestion and weak network connectivity complicate time-sensitive routing, highlighting the logistical importance of flexible urban delivery mechanisms during disruptions (Tiamiyu & Alaka, 2020). Informal roadside transport activity can further constrain arterial traffic flows, demonstrating how everyday transport-system inefficiencies may become operational obstacles when emergency mobility must be maintained (Bolaji & Ajayi, 2021).

Digitalisation likewise cannot compensate automatically for weak physical infrastructure. Nigerian evidence indicates that deficient mobile-network coverage and poor road conditions jointly constrain digitally mediated transport outside major urban centres, illustrating the need to align technological preparedness with underlying infrastructure investment (Alaka, Ajayi & Bolaji, 2022). Collectively, Africa's COVID-19 experience demonstrates that future preparedness should combine institutional learning, surveillance, resilient service delivery, decentralised response capability and infrastructure continuity. Crisis governance must

consequently be designed as a whole-of-system capability in which public-health institutions, communities, transport systems and information networks remain operational and mutually connected throughout an emergency.

4. Strengthening Preparedness and Institutional Resilience

Strengthening public health preparedness in Africa requires moving beyond episodic emergency response towards institutions capable of anticipating, absorbing, adapting to and recovering from shocks while preserving essential functions. Resilience should therefore be understood as an active governance capability rather than simply the ability to return to pre-crisis conditions. Health systems need capacity to interpret changing circumstances, reorganise resources and transform weaknesses exposed by emergencies without sacrificing equitable access or routine services. This systems-oriented conception places governance, knowledge, legitimacy and institutional adaptability at the centre of preparedness (Blanchet *et al.*, 2017).

Experience from the West African Ebola epidemic demonstrated that health systems become resilient when they combine awareness of emerging threats with diverse response capacity, effective self-regulation, integration across institutions and the ability to adapt rapidly. Preparedness investments must consequently strengthen everyday health-system functions rather than constructing parallel emergency structures that deteriorate between outbreaks (Kruk *et al.*, 2015). More recent scholarship further cautions that resilience cannot be assessed only by institutional survival; attention must also be given to equity, relationships among system actors, and who bears the operational burden of adaptation during crises (Witter *et al.*, 2023).

African experience underscores the importance of protecting routine capabilities during simultaneous shocks. Evidence from Ghana demonstrates that COVID-19 affected the health system's ability to respond concurrently to cerebrospinal meningitis, revealing how workforce pressures, resource diversion and service disruption can weaken responses to overlapping emergencies (Kunfahet *et al.*, 2025). Institutional resilience therefore requires surge arrangements that increase emergency capacity without dismantling surveillance, primary healthcare, immunisation or other essential functions.

Preparedness also depends on systematic assessment. Resilience analysis should incorporate capacities to anticipate hazards, absorb immediate disruption, adapt operational arrangements and transform institutional deficiencies revealed by crises. Applying these capabilities through explicit assessment frameworks can enable governments to identify vulnerabilities before emergencies rather than after institutional failure has occurred (Foroughi, Ebrahimi

&Aryankhesal, 2022). Such assessments should extend beyond healthcare facilities to critical infrastructure supporting emergency operations.

In Nigeria, geospatial identification of flood-exposed road segments illustrates how accessible spatial data can inform anticipatory planning for infrastructure disruption and help authorities identify vulnerable routes before hazards compromise mobility (Alaka, Bolaji & Tihamiyu, 2022). This is particularly significant for public health emergencies because continuity of supply chains, referrals, workforce movement and emergency logistics depends upon functioning transport networks.

Digital preparedness represents another increasingly important capability. Comparative analysis of healthcare organisations suggests that adoption of advanced technologies requires organisational readiness, governance structures, workforce competencies and management capacity rather than technology acquisition alone (Ayinde, Ojukwu & Ohunyan, 2025). Employee readiness is similarly central to successful technological transition because resilience-enhancing technologies cannot operate effectively when personnel are inadequately trained, resistant to change or excluded from implementation processes (Akhigbe, Falemi & Akin-Oluyomi, 2024).

Resilience must additionally encompass the security and continuity of interconnected digital infrastructure. Cyber-physical systems demonstrate the value of real-time sensing, adaptive protection and automated response when complex networks experience disruptions, principles increasingly relevant to digitally dependent health emergency systems (Shittu, Olagunju & Shittu, 2024). African preparedness strategies should consequently integrate institutional learning, workforce development, resilient infrastructure, interoperable information systems, contingency financing and continuous simulation. Such an approach transforms preparedness from a static emergency plan into a sustained institutional capability that can detect threats early, preserve essential services, redistribute capacity and adapt governance arrangements as crisis conditions evolve.

Table 3. Illustrative framework for institutional resilience

Resilience capacity	Preparedness function	Institutional requirement	Expected emergency value
Anticipation	Detect emerging threats	Surveillance and risk intelligence	Earlier intervention
Absorption	Maintain essential services	Surge capacity and reserves	Reduced service disruption
Adaptation	Reconfigure operations	Flexible authority and workforce	Faster operational adjustment
Transformation	Correct structural weaknesses	Institutional learning and reform	Stronger future preparedness
Digital resilience	Preserve information flows	Secure interoperable systems	Continuity of coordination
Infrastructure resilience	Maintain physical access	Hazard mapping and contingency routes	Reliable emergency logistics

5. Future Crisis Governance Priorities

Future crisis governance in Africa should move beyond temporary emergency mobilisation towards institutional arrangements that remain functional between outbreaks. The central priority is to embed preparedness within permanent national and subnational governance structures, with clearly assigned mandates, accountable leadership, sustainable financing and defined mechanisms for translating surveillance information into operational decisions. Nigeria's expansion of subnational Public Health Emergency Operations Centres illustrates the importance of decentralising coordination capacity so that states can organise multisectoral responses, manage information flows and mobilise resources without depending exclusively on national-level command structures (Oyebanjiet *et al.*, 2021).

At continental level, stronger crisis governance will require sustained investment in Africa-led institutions. The COVID-19 experience demonstrated the strategic value of Africa CDC in convening governments, coordinating surveillance, strengthening laboratory networks and supporting National Public Health Institutes. Future preparedness should therefore reinforce these institutions as permanent pillars of health security rather than mechanisms activated primarily during exceptional events (Fallah *et al.*, 2024).

Accountability should be equally central. Complex emergency systems frequently involve governments, donors, international agencies, private actors and technical organisations with

overlapping authority. Governance arrangements therefore need explicit decision rights, transparent reporting channels and mechanisms that clarify who is responsible for resource allocation and implementation. International experience during COVID-19 demonstrated how unclear institutional roles and limited participation can weaken transparency and public accountability even when substantial resources are mobilised (Moon *et al.*, 2022). Similar principles of transparency, measurable responsibility and strategic execution are relevant to the governance of complex institutions operating under uncertainty (Akhigbe, Falemi& Akin-Oluyomi, 2025).

Future preparedness must also become substantially more data-driven. Real-time monitoring technologies can support early detection of system stress, rapid identification of operational abnormalities and faster escalation of emerging risks, offering transferable lessons for public-health command environments that increasingly depend on continuous situational awareness (Shittu *et al.*, 2023). However, data availability alone is insufficient. European COVID-19 experience demonstrated that incompatible standards, legal restrictions and fragmented information architectures can obstruct timely data sharing, making interoperability, standardisation and predefined governance arrangements priorities for future emergencies (Tacconelli *et al.*, 2022).

Secure information exchange should consequently form part of crisis-governance architecture. Systems that regulate access according to defined attributes and responsibilities can strengthen information protection while allowing authorised actors to retrieve operationally relevant data across interconnected networks (Shittu & Nabil, 2023). This principle is especially important as African emergency systems increasingly integrate electronic surveillance, laboratory platforms, geospatial intelligence and cross-border data exchange.

Preparedness must additionally account for environments where formal datasets remain incomplete. Combining field observations with open geospatial information can strengthen infrastructure decision-making in data-scarce contexts and improve prioritisation of routes, communities and assets requiring intervention (Tihamiyu *et al.*, 2023). Future crisis governance should therefore integrate decentralised emergency institutions, continental coordination, auditable accountability systems, interoperable digital platforms, secure data exchange and locally grounded decision intelligence. These priorities would shift preparedness from reactive crisis management towards a durable governance architecture capable of anticipating hazards, coordinating actors rapidly and sustaining essential public-health functions under future shocks.

Conclusion

This review examined how crisis governance, institutional leadership, multilevel coordination, emergency decision-making, public communication, infrastructure resilience, and data systems shaped public health preparedness across Africa during the COVID-19 pandemic. Its objectives were met by identifying the principal governance strengths and weaknesses revealed by the crisis, assessing how institutional arrangements influenced operational effectiveness, and drawing forward-looking lessons for strengthening preparedness against future health emergencies. The analysis showed that preparedness cannot be understood solely as a function of medical capacity; it depends equally on the quality of governance, the clarity of institutional mandates, the resilience of essential systems, and the ability to coordinate actors across administrative and sectoral boundaries.

A central finding is that fragmented authority, uneven subnational capacity, delayed information flows, infrastructure limitations, and inconsistent public engagement can weaken emergency response even where formal plans exist. Conversely, stronger outcomes are associated with clearly defined leadership structures, functional emergency operations centres, interoperable surveillance, transparent resource allocation, trusted communication, community participation, and mechanisms that preserve routine health services during crises. The review also demonstrated that transport networks, digital connectivity, secure information exchange, workforce readiness, and geospatial intelligence are integral to health emergency governance because they determine whether policies can be translated into timely operational action.

The study concludes that Africa's future preparedness architecture should be institutionalised as a continuous governance capability rather than activated episodically during outbreaks. Governments should strengthen national and subnational emergency coordination structures, clarify decision rights, establish sustainable preparedness financing, expand surveillance interoperability, invest in resilient infrastructure, and routinely conduct simulation exercises. Greater emphasis should also be placed on workforce development, locally responsive risk communication, transparent accountability mechanisms, continental collaboration, and protected continuity of essential services. Embedding these priorities within routine public administration would enable African health systems to respond more rapidly, equitably, and coherently to future public health shocks while sustaining institutional legitimacy and long-term resilience.

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