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Is equity meaningfully incorporated into pandemic preparedness and response? A scoping review and critical analysis of Ebola and COVID-19 outbreak responses in Uganda 2019-2023

Pandemic preparedness, response and equity: A scoping review from Uganda

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ABSTRACT

Societal inequities *produce vulnerabilities that infectious disease can exploit*. Current approaches to pandemic prevention, detection and response are led by the International Health Regulations IHR and the Global Health Security Agenda. However, to contain the spread of infectious diseases, localised action to address systemic inequities must be considered. The purpose of this scoping review and equity analysis is to 1) Synthesise the available information on Uganda's Ebola Virus Disease (EVD) and COVID-19 preparedness and outbreak responses between 2019 and 2023, and 2) Critique if and how Uganda's Ministry of Health incorporated concepts of health equity in its EVD and COVID-19 interventions, while building national capacity to identify and prevent public health emergencies. This scoping review and critical analysis was conducted following the five-stage process defined by Levac et al. After identification and screening, the scoping review was based on six preparedness and response plans, three after-action reviews, and 20 grey literature and peer-reviewed articles. The findings revealed that the EVD and COVID-19 preparedness and response plans in Uganda show the country's commitment and readiness for early detection and response to infectious disease outbreaks. However, further examination of the plans reveals missed opportunities to address systemic inequities. The ongoing mpox outbreak, declared a PHEIC by WHO on July 23, 2022, with significant impacts in African countries including Uganda, further underscores the need for a paradigm shift in managing infectious disease outbreaks. Such a shift may be similar to that experienced by the field of disaster risk reduction, which underwent a significant transformation at the Sendai Conference in 2015 towards a more holistic and proactive approach that addresses underlying systemic issues and focuses on building resilience. The exclusive focus on biomedical strategies to manage infectious diseases fails to address the social aspects of transmission, the local perceptions of illness, and community vulnerabilities often associated with social and historical perspectives. The social determinants of health disparities should be incorporated into pandemic planning and response. This will contribute to fostering equitable health outcomes and resilience in the face of the multifaceted challenges posed by future pandemics and environmental changes.

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Africa; infectious disease prevention; pandemic; equity; Uganda; disaster risk reduction

Introduction

Uganda is a low-income country with a population of 45.9 million, ranking 166th out of 191 countries in the 2021/2022 Human Development Index (CIA, 2023; UNDP, 2022), and a growth rate of 3.2% (the second highest in Africa). Uganda is expected to reach 100 million people by 2050 (CIA, 2023; US Census Bureau. , 2023). It also hosts over 1.5 million refugees and asylum-seekers, making it one of the largest refugee-hosting countries in the world (UNHCR, 2023). While approximately 86% of Uganda's population resides within five kilometres of a health facility, barriers such as out-of-pocket costs, complex referral systems, and poor transport infrastructure constrain access to care (Uganda Ministry of Health, 2019/2020).

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Uganda is prone to frequent zoonotic disease outbreaks due to its high population density, reducing biodiversity and human-wildlife interactions (Buregyeya et al., 2020). Since 2000, Uganda has experienced eleven Filovirus outbreaks, including both Ebola Virus Disease (EVD) and Sudan Virus Disease (SVD), with the most recent declared as over in April 2025 (Nyakarahuka et al., 2020; World Health Organisation Africa, 2025). This has led the country to increase the capacity of healthcare workers in managing highly contagious and often deadly viral diseases, such as EVD (CDC Viral Hemorrhagic Fevers, 2023; Cinà et al., 2020).

To strengthen its capacity to respond to such emergencies, Uganda launched a Global Health Security Agenda (GHSA) pilot project in 2013 in collaboration with the US Center for Disease Prevention and Control (CDC) (Uganda Ministry of Health, 2019a). As part of this initiative, Uganda established a Public Health Emergency Operations Centre in 2013 which serves as a hub for coordinating preparedness, response, and recovery efforts during public health emergencies (CDC in Uganda, 2023). Uganda has also adopted the One Health approach and, as of 2023, was implementing the third iteration of the Integrated Disease Surveillance and Response programme with support from the World Health Organisation (WHO), to reinforce district-level surveillance and response systems (Buregyeya et al., 2020; Ugandan Ministry of Health, 2019).

These national efforts align with the International Health Regulations (IHR), a binding legal framework adopted by all WHO members to prevent, detect, and respond to public health threats of international concern (World Health Organization, 2016). The objective of the IHR is to manage public health emergencies of international concern in order to prevent them from becoming the next global pandemic. These regulations are currently under international scrutiny (review and revision) (World Health Organisation, 2023a). Adopted by WHO in 2005, the IHR are the overarching framework for global collaboration to enhance global health security. The regulations were designed to prevent and manage the transmission of diseases and other public health threats across borders, while ensuring minimal disruption to international trade and travel (World Health Organization, 2016; Doble et al., 2023). Uganda's participation in the GHSA and implementation of the IHR demonstrate the country's commitment to global health security.

The purpose of this scoping review and equity analysis is to 1) Synthesise the available information on the Uganda Ministry of Health's preparedness and response to EVD and COVID-19 between 2019 and 2023; and 2) Critique if and how these responses integrated health equity considerations when strengthening national capacity for preventing and managing public health emergencies. By examining the existing response plans for EVD and COVID-19, after-action reviews, and related literature, this study explores how Uganda could enhance its response and preparedness for future outbreaks through a shift from primarily biomedical containment to a more holistic approach which addresses systemic inequities and promotes community resilience.

Methodology

This scoping review and critical analysis was conducted following the five -stage process defined by Levac et al (Levac et al., 2010). The five stages are: 1) Identifying the research questions; 2) Identifying relevant studies; 3) Study selection; 4) Charting the data; 5) Collating, summarising and reporting results.

Step 1: Identifying the research questions

The study was conducted to answer the following two overarching questions 1) Did the Ebola and COVID-19 preparedness and response plans in Uganda (2019–2023) integrate locally focused interventions aimed at addressing systemic inequities? and 2) Do after-action reviews, field reports, and evaluations of the COVID-19 pandemic response and the Ebola outbreak responses which took place in Uganda (2019–2023) identify potential recommendations for locally focused interventions to address systemic inequities? These questions were investigated using an equity lens informed by definitions and related concepts from the global public health literature, further detailed in the Data Analysis section.

Step 2: Identifying relevant studies

The review included three document categories from the Ebola and COVID-19 outbreaks in Uganda: 1) preparedness and response plans; 2) after-action reviews; and 3) grey literature and peer-reviewed articles documenting lessons learned from the responses. A search strategy was designed to identify the documents referred to in the research objectives. To achieve this a systematic approach was used to retrieve the documents from primary sources including:

1. Uganda Ministry of Health website: the EVD preparedness and response plans, COVID-19 preparedness and response plans, and after-action reviews were obtained from this official source as it is the repository of Uganda's national response efforts.
2. International public health care agency publication repositories: including WHO, the US Centers for Disease Control and Prevention (CDC), the Africa CDC and the European Centre for Disease Prevention and Control (ECDC), as recognised organisations for their published after-action reviews, evaluations and analysis of the EVD and COVID-19 responses.

The search for grey literature and peer-reviewed articles was conducted through Massey University Library 'Discover' (which incorporates the databases Medline, CINAHL and PsychInfo), followed by a secondary search of Google Scholar. The search terms included variations of: 'Evaluation', 'Ebola response', 'Ebola/EVD response', 'Sudan Virus Disease', 'SVD', 'Uganda', 'COVID-19 response', and 'lessons learnt/learned', combined using the connectors 'AND' and 'OR' to narrow or broaden the results as needed. Sudan Virus Disease is considered a subtype of Ebola Virus Disease (EVD), and relevant terms for both were included. Once the results were obtained the findings were filtered to extract qualitative and peer-reviewed articles.

Step three: Study and document selection

All available EVD and COVID-19 plans published by the Uganda Ministry of Health on its official website between 2019 and 2023 were included, as well as all EVD and COVID-19 after-action review documents published by the Uganda Ministry of Health, WHO, US CDC, Africa CDC and ECDC published within the indicated timeframe of 2019 to 2023.

In addition, the databases Discover and Google Scholar were used to retrieve peer-reviewed articles or grey literature relevant to the outbreaks between 2019 to 2023 in Uganda (Milton, 2010). The selection criteria was defined following the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines, through an initial screening of titles and abstracts for relevance (Page et al., 2021). Relevant articles referenced in the selected studies were reviewed following the PRISMA principles for validity and potential inclusion in the final article selection (The results are outlined in Figures 1 and 2) (Page et al., 2021).

Exclusion criteria

Documents unrelated to the EVD and COVID-19 responses that took place in Uganda between 2019 and 2023 were excluded. The search was also limited to reports and peer-reviewed articles published in English between 2019 and 2023.

Data analysis. The critical analysis was based upon step four (charting the data) and step five (collating, summarising and reporting results) of Levac et al.'s framework (2010). All response plans and after-action reviews were thoroughly read and analysed according to the questions outlined in Table 1. Information from the included peer-reviewed and grey literature was then synthesised into the summaries of findings presented in the next section.

Equity-related terms were defined both deductively, based on existing frameworks, and inductively, based on themes emerging from the literature. The deductive definition of equity was drawn from WHO (World Health Organisation, 2023b), which defines health equity as 'the absence of unfair, avoidable or remediable differences among groups of people.' This definition provided a consistent conceptual lens for the analysis of the plans and after actions reviews. Additional terms identified in the literature included marginalisation, defined as the systematic exclusion of certain groups from full participation in society (Popay et al., 2008); social exclusion, understood as dynamic processes of being shut out from systems and services that shape life chances (Baum, 2015); and mistrust, particularly when stemming from historical and structural inequities that erode confidence in institutions (Baum, 2015). The analysis also

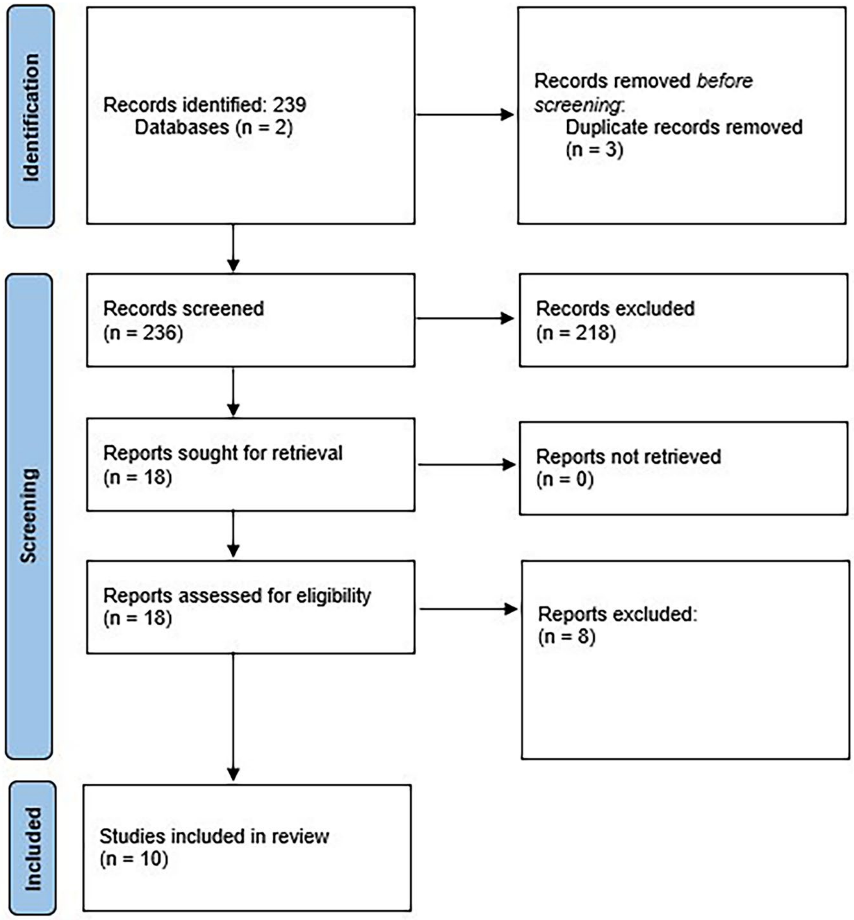

Figure 1. PRISMA flowchart for included studies on EVD and SVD from discover and google scholar.

incorporated the concepts of power relations and disempowerment, referring to unequal distributions of power that limit access to decision-making (Farmer, 1996; Marmot, 2005); stigma, which can deter health-seeking behaviour (Cénat et al., 2023); cultural safety, meaning care that respects cultural identity and addresses systemic power imbalances (Baum et al., 2021); gender inequality, particularly its influence on vulnerability and outcomes during outbreaks (Assefa et al., 2022); and lack of agency, or the inability to make meaningful decisions due to social or structural constraints (Nachega et al., 2021).

Findings

The final articles for inclusion are outlined in Figures 1 and 2. After identification and screening, the scoping review was based on six preparedness and response plans, three after-action reviews, and 20 grey literature and peer-reviewed articles. Four specific questions guided the review of the preparedness and response plans and the after-action review documents (see Table 1). In addition, a conceptual framework was developed to guide the selection and extraction of information from the grey literature and peer-reviewed articles (see Table 2).

The analysis of EVD and COVID-19 preparedness and response plans aimed to determine whether these plans integrated locally focused interventions to address systemic inequities (objective one of this research). Six Ebola and COVID-19 preparedness and response plans developed by the National Task Force of the Uganda Ministry of Health, with assistance from WHO, between April 2019 and January 2023 were included (See Figure 3).

The analysis of the after-action reviews, the grey literature and the peer-reviewed articles aimed to identify potential recommendations for locally tailored interventions with the goal of mitigating systemic inequities (objective two of this research). Four after action reviews and 20 grey literature and per reviewed articles were included (See Figure 3).

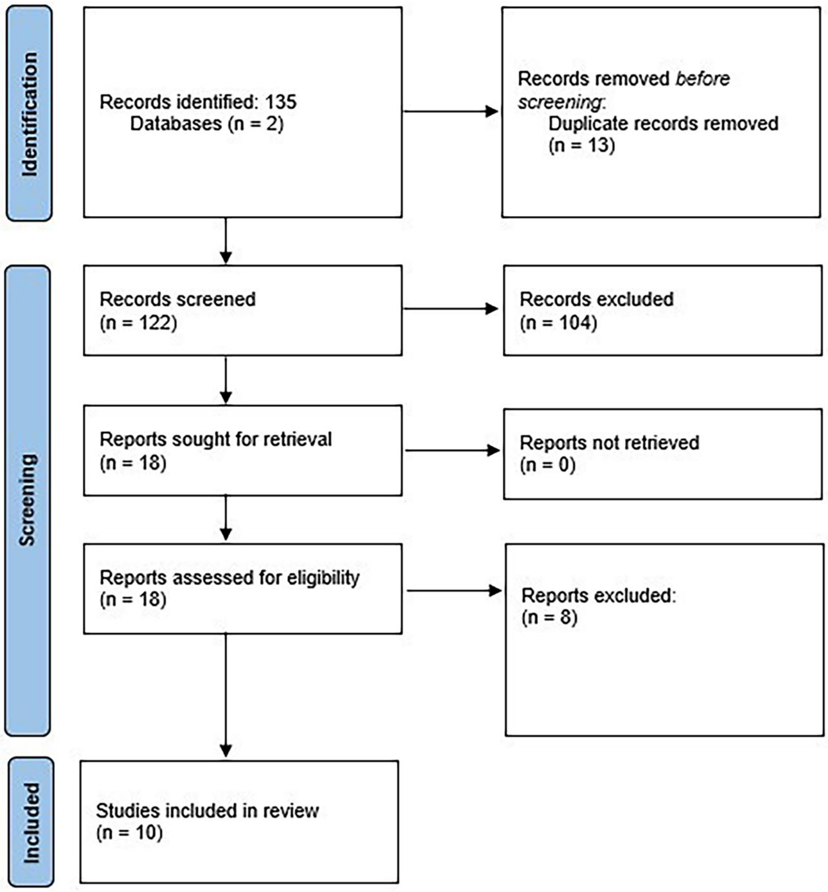

Figure 2. PRISMA flowchart for included studies on COVID-19 from discover and google scholar.

Table 1. Response plan and after-action review questions.

Response plans
1. Is the response plan designed to specifically target systemic inequities or vulnerabilities?
2. Do these interventions include specific strategies, measures, or initiatives which directly target and address systemic inequities related to infectious disease control?
3. Has the response plan considered the possibility of unintended impacts, both positive and negative, on equity and vulnerabilities resulting from the implementation of its interventions?
4. Do these locally focused interventions align with or complement global efforts promoted by the International Health Regulations (IHR) and the Global Health Security Agenda (GHSA)?
After-action reviews
1. Is the after-action review designed to capture the impact on systemic inequities and vulnerabilities?
2. Does the after-action review identify and assess unintended impacts, both positive and negative, on equity and vulnerabilities resulting from the response efforts?
3. Does the after-action review assess the level of stakeholder engagement and community involvement in the planning and implementation of locally focused interventions, particularly regarding equity and vulnerability considerations?
4. Based on the after-action review, do the locally focused interventions align with or complement global efforts promoted by the International Health Regulations (IHR) and the Global Health Security Agenda (GHSA)?

Table 2. Grey literature and peer-reviewed articles.

Conceptual framework	
Author year / Title	Reference to IHR
Type of public health emergency	Reference to GHS
Scope	Reference to the community
Focus	Reference to vulnerability
Summary	Key lessons learned
Methodology	Conclusions / recommendations

Analysis of the inclusion of systemic inequities in pandemic preparedness and response plans

All the selected preparedness and response plans followed the guidelines provided in the IHR for countries to develop core capacities to '*prevent, protect and provide a public health response to public health*

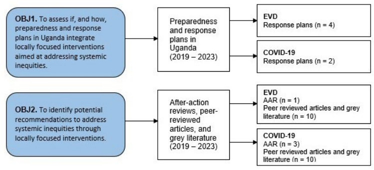

Figure 3. Documents reviewed according to study objectives.

threats', with timeframes oscillating between four and 16 months (World Health Organization, 2016). The response plans serve as guidance for response teams, and function as tools to facilitate partner coordination and resource mobilisation. In developing these plans, the National Task Force considers on-the-ground situational analysis, adheres to the guidance provided by the International Health Regulations (IHR), and integrates insights from the latest Joint External Evaluation (JEE) that took place in the country (in the case of Uganda in 2017) (World Health Organization, 2016; Kayiwa et al., 2019).

Ebola virus disease (EVD)

The four EVD plans included in the analysis were developed by the National Task Force of the Uganda Ministry of Health between 2019 and 2023 (See Table 3). Two of them were centred on EVD preparedness and response and were designed to prepare the country for potential EVD outbreaks, especially given the proximity of the Democratic Republic of the Congo (DRC), with which Uganda shares a porous border (Uganda Ministry of Health, 2019b; Uganda Ministry of Health, 2021a). The other two focus on the most recent Ebola Sudan Virus (SVD) outbreak that took place in Uganda in 2022 (Uganda Ministry of Health, 2022; Uganda Ministry of Health, 2023a).

The analysis of specific strategies addressing systemic inequities reveals that only the EVD preparedness and response plan (March - August 2021) had a targeted approach to increase ownership by the districts and to ensure sustainability through the integration of activities into long term planning. This plan emphasises the role of the Risk Communication and Community Engagement pillar in building the capacity of local communities for collective responsibility and action in relation to preparedness, prevention, mitigation, and post-recovery. In contrast, the SVD response plan includes community engagement activities but lacks explicit strategies for addressing systemic inequities (Uganda Ministry of Health, 2022). The Post-SVD recovery plan (January - July 2023) focuses on risk communication and stakeholder engagement with an emphasis on specific groups due to their vulnerability, such as traditional healers, fishing communities, or motorcycle taxi drivers. However, it should be noted that in the context of the recovery plan, vulnerability refers to exposure to the disease rather than wider vulnerability to poor health outcomes due to social or economic inequities. Therefore, explicit strategies for addressing systemic inequities are not present in the recovery plan (Uganda Ministry of Health, 2023a).

While none of the plans explicitly target systemic inequities, there is an interesting development in the SVD response plan with the inclusion of a research section focusing on ecological and anthropological studies and investigations (Uganda Ministry of Health, 2022). Additionally, anthropologists were deployed during the SVD response, and there was a social scientist working in the department of health promotion, but their roles and the impact of their work was not evaluated. This new research focus offers a unique opportunity to guide early detection and containment of EVD outbreaks in wildlife, potentially shedding light on vulnerable population groups at risk of spillovers - the transmission of pathogens from animals to humans (Plowright et al., 2017). The Post-SVD recovery plan, on the other hand, has a very specific focus on interventions at the community level. This was in an effort to compensate for the community resistance faced by the response teams at the start of the outbreak, as well as to address the presence of a large number of survivors among the local communities (Uganda Ministry of Health, 2022).

None of the plans explicitly address unintended impacts on equity. However, the EVD Preparedness and Response Plan (March - August 2021) incorporates psychosocial support measures for vulnerable individuals, children, and families, indicating a partial recognition of potential negative impacts (Uganda Ministry of Health, 2021a).

Table 3. EVD, SVD and COVID-19 response plans analysis.

	EVD contingency plan (Apr - Dec 19)	EVD preparedness and response plan (Mar - Aug 21)	SVD response plan (Sep - Dec 22)	Post-SVD recovery plan (Jan – Jul 23)	COVID-19 preparedness and response plan (Mar 20 – Jun 21)	COVID-19 resurgence plan (Jun 21 - Jun 22)
Is the response plan designed to specifically target systemic inequities or vulnerabilities?	No	Yes	No	No	Yes	No
Do these interventions include specific strategies, measures, or initiatives that directly target and address systemic inequities related to infectious disease control?	No	Yes	No	No	Yes	No
Has the response plan considered the possibility of unintended impacts, both positive and negative, on equity and vulnerabilities resulting from the implementation of its interventions?	No	No	No	No	No	Yes
Do these locally focused interventions align with or complement global efforts led by the International Health Regulations (IHR) and the Global Health Security Agenda (GHSA)?	Yes	Yes	Yes	Yes	Yes	No

Corona Virus disease 2019 (COVID-19)

The analysis of the COVID-19 plans is outlined in Table 3. The first COVID-19 preparedness and response plan acknowledges the importance of maintaining essential health services for both communicable and non-communicable diseases (Uganda Ministry of Health, 2020). The plan does not explicitly mention targeting systemic inequities or vulnerabilities. However, by ensuring the continuity of essential health services, it indirectly addresses vulnerabilities in the healthcare system. The plan also aims to prevent increased morbidity and mortality which could disproportionately affect vulnerable groups.

The first COVID-19 plan includes the objectives of strengthening social protection mechanisms and mitigating impacts on vulnerable groups. It aims to achieve this through enhanced community engagement and social protection structures, along with social protection interventions for vulnerable populations. However, the plan does not include any indicators to enable the assessment of the effectiveness of these measures. Conversely, the follow-up plan, the COVID-19 resurgence plan, does not explicitly focus on systemic inequities (Uganda Ministry of Health, 2021). On the other hand, it does acknowledge the vulnerability of the poorest 40% of the population, particularly in rural and refugee-host communities. It also recognises the pandemic's potential disruption to essential health and social services, emphasising the relevance of community engagement to limit negative impacts. Despite this, in the case of the second COVID-19 plan, the allocation of only 0.50% of the total budget to the community engagement pillar raises concerns about the plan's commitment to addressing systemic vulnerabilities. The absence of any reference to the strategies addressing the vulnerabilities included in the previous plan suggests a gap in the intra-action review process, as well as a lack of attention to this crucial matter.

Assessing recommendations in after-action reviews, grey literature and peer-reviewed articles to address systemic inequities through local interventions

According to WHO (World Health Organization, 2019), an after-action review is a qualitative assessment of the actions that took place during the response to an emergency, aiming 'to identify best practices and challenges'. This provides a framework to objectively analyse the actions taken and their consequences with the ultimate objective of improving performance during future responses (Stoto et al., 2019). The grey literature and peer-reviewed articles include ten articles analysing different areas of the

EVD preparedness and responses, such as the overall response, social mobilisation, and surveillance; and ten articles analysing the COVID-19 response from different perspectives, including primary health care, surveillance, contact tracing, health system resilience, and community healthcare workers.

Ebola virus disease

One after-action review (see Table 4), nine peer-reviewed articles and one grey literature report about EVD were analysed to identify recommendations for addressing systemic inequities. Only four documents explicitly mentioned the IHR and GHS while all addressed communities, with three referencing vulnerabilities in some way.

The after-action review of the SVD outbreak in Uganda reveals several insights regarding the consideration of systemic inequities and vulnerabilities (Uganda Ministry of Health, 2023b). The after-action review itself is not explicitly designed to capture the impact on systemic inequities, but it does acknowledge unintended impacts on equity resulting from the response efforts. These include delayed outbreak detection, sub-optimal rollout of community-based disease surveillance, and challenges related to the community's mistrust and stigmatisation of burial-team members. Challenges such as community mistrust, reliance on volunteers, and delayed engagement of the community with the emergency response structure are highlighted. Positive elements that took place later in the outbreak include the activation of risk communication committees, the involvement of survivors in risk communication, and the deployment of social scientists for feedback collection. Challenges in stakeholder engagement and community involvement are acknowledged, and positive aspects include the MOH's sensitivity towards community control and existing collaborations.

The analysis of grey literature and peer-reviewed articles provided a series of recommendations aimed at increasing community participation in the preparedness and response efforts as the best way to generate community ownership for the management of infectious diseases. All the analysed literature recognise the importance of understanding local contexts and promoting community-driven approaches. This often entailed the involvement of local politicians and religious and cultural leaders in the implementation of activities in order to foster community ownership. Long-term community-led strategies involving trusted community members and leveraging existing structures such as schools and churches, are highlighted as being effective for communication and education (Cénat et al., 2023; Geiger et al., 2020; Kaawa-Mafigiri et al., 2020). From an equity perspective, addressing socioeconomic and cultural factors, community behaviours related to EVD exposure, and unequal access to resources and healthcare is crucial. Addressing system disparities, especially between urban and rural areas, is stressed in two articles (Kaawa-Mafigiri et al., 2020; Rugarabamu et al., 2020). Recommendations include shifting power to communities and promoting a One Health approach, representing a broader, people-centred health paradigm for epidemic preparedness and response.

Corona virus disease 2019 (COVID-19)

The materials analysed to identify recommendations for addressing systemic inequities during the COVID-19 pandemic in Uganda included an intra-action review (see Table 4), based on an inter-pillar

Table 4. After-action reviews analysis.

	SVD After-action review (May 2023)	COVID-19 Intra-action review (December 2020)	COVID-19 Intra-action review (July 2021)
Is the after-action review designed to capture the impact on systemic inequities and vulnerabilities?	No	No	No
Does the after-action review identify and assess unintended impacts, both positive and negative, on equity and vulnerabilities resulting from the response efforts?	Yes	No	No
Does the after-action review assess the level of stakeholder engagement and community involvement in the planning and implementation of locally focused interventions, particularly regarding equity and vulnerability considerations?	Yes	Yes	No
Based on the after-action review, do the interventions align with or complement global efforts led by the International Health Regulations (IHR) and the Global Health Security Agenda (GHSA)?	Yes	No	No

consensus meeting organised by the MoH and WHO (Ministry of Health, 2020). The second intra-action review (see Table 4) included in this analysis was organised by WHO between the COVID-19 vaccination phases in Uganda, to reflect on and identify ways to improve the subsequent vaccination phases (Uganda Ministry of Health, 2021c). Additionally, five peer-reviewed articles, one article under review, three review articles, and one report published between 2020 and 2023 were examined.

One critical objective of the initial COVID-19 intra-action review was to 'strengthen social protection mechanisms and mitigate impacts on vulnerable groups' (Uganda Ministry of Health, 2020). However, the review highlighted significant challenges in this regard. Funding for community-focused activities under the community engagement and social protection pillar was lacking, accompanied by insufficient human resources and administrative support. Furthermore, a lack of guidelines and tools hampered the effectiveness of this pillar's work. The review also exposed a lack of coordination and consensus on the role this pillar should play within the broader response. Recommendations from the review emphasised the need to decentralise the response, allocate necessary funding for community engagement, and fortify the social protection pillar. Additionally, references to social protection were comparatively diminished.

In the case of the second intra-action review, it identified a crucial flaw in the vaccination strategy – a lack of engagement with community leaders and village health teams at the grassroots level (Uganda Ministry of Health, 2021c). This deficiency significantly impacted the COVID-19 vaccination roll-out (Uganda Ministry of Health, 2021c). The focus of the review predominantly centred on enhancing the vaccination program, neglecting an evaluation of other areas influenced by the response. A noteworthy conclusion with regards to equity was the recognition that restricting the vaccine to pre-determined priority groups, without publicly available clear and context-specific national guidelines for rationing COVID-19 vaccines, fuelled community concerns and social accountability issues (Uganda Ministry of Health, 2021c; Barugahare et al., 2021). In response, the vaccination team proposed establishing innovative and more effective community engagement platforms.

Recommendations from the reviewed literature advocate for a community-centric approach to pandemic response, recognising the pivotal role of local communities in building resilience, promoting health education, and ensuring equitable access to healthcare services (Nachega et al., 2021; Innocent et al., 2020; Haldane et al., 2021). An illustrative challenge highlighted during the pandemic response in Uganda was the absence of community-level testing centres, obliging residents from distant districts to travel to hospitals for testing (Innocent et al., 2020). Moreover, multiple articles recommend tailored public health strategies to address the unique needs of diverse populations, including Indigenous peoples (Dickmann et al., 2018; Ray and Mash, 2021). Implementing effective risk communication and information sharing, customised to local contexts, is deemed vital to ensure inclusivity and identify vulnerable populations for relief programs. A critical recommendation stands out, urging investment in universal health coverage as a safeguard against health threats and economic burdens. Strengthening social protection mechanisms by allocating adequate funding to community-focused activities, and addressing resource and administrative challenges, is also underscored.

Discussion and conclusions

Recognising and responding to health inequities is crucial for effective outbreak responses. This study highlights how Uganda's pandemic response planning is still to adequately incorporate equity, as evidenced in both after-action reviews and adjacent literature. There is, however, strong evidence from other countries that the most effective responses to COVID-19 were holistic approaches beyond just biomedical measures, integrating both social support and public health interventions (Haldane et al., 2021; Bedford et al., 2019).

The social determinants of health, including employment, housing, education, social support, access to healthcare, and physical security, are well established as key drivers of health outcomes beyond individual behaviour and biology (Baum, 2015; Marmot, 2007; Fisher et al., 2021; Marmot, 2007). According to WHO (World Health Organisation, 2023b), health inequities are 'systematic differences in the health status of different population groups', with significant social and economic consequences. In the context of infectious disease, equity refers to the 'absence of unfair, avoidable or remediable differences among groups of people' (World Health Organisation, 2023b). These differences '*produce vulnerabilities that infectious disease can exploit*' Dibben in Gaillard et al (Gaillard, 2012). Pandemic preparedness, therefore, must include actions to reduce systemic inequities, actions that must occur in parallel with current approaches to prevention, detection and response led by the IHR and the Global Health Security Agenda.

Uganda's EVD and COVID-19 preparedness and response plans show the country's commitment and readiness with regards to early detection and response to outbreaks and health emergencies. However, a closer examination of the plans reveals missed opportunities to address systemic inequities (Haldane et al., 2021). Despite an acknowledgment by public health actors that 'epidemics begin and end in communities', responses remain largely top-down (Enria and de Laurentiis, 2023), overlooking the wealth of knowledge and expertise within local communities (Enria and de Laurentiis, 2023; Osborne et al., 2021). The threat of future pandemics, alongside a lack of access to healthcare and persistent inequities, highlights the need to prioritise the most vulnerable individuals and communities. Very often a population's vulnerabilities and inequities are conditioned by the social determinants of health (Marmot, 2005). For this reason, a social, political, and economic analyses of institutions and communities is important for understanding disease transmission and community response as well as being key elements in developing a more inclusive, community-centred response to outbreaks and health emergencies, such as EVD and COVID-19 (Osborne et al., 2021; Abramowitz et al., 2018).

A common thread in both the grey and peer reviewed literature analysed here is the need to go beyond the biomedical model for infectious disease outbreaks and consider the social determinants of health. This is particularly evident in the case of Uganda, where vulnerable populations have borne a disproportionate burden during EVD and COVID-19 outbreaks (Kaawa-Mafigiri et al., 2020; Ryan et al., 2022). Likewise, an analysis of the disparities caused by the COVID-19 pandemic internationally reveals a limited understanding of how social inequities influenced outbreak outcomes (D'Adamo et al., 2023; McCarthy et al., 2023). Without addressing systemic inequities, health disparities will persist in future pandemics. However, public health has the capacity to integrate the social determinants of health into its pandemic preparedness plans to prevent these vulnerabilities from being exacerbated by infectious disease outbreaks (Gaillard, 2012; D'Adamo et al., 2023).

The IHR (2005) are viewed as a measure of a country's capacities to guarantee Global Health Security (GHS). Yet evidence from the COVID-19 pandemic demonstrates that areas outside of the core pandemic related fields are of key importance in addressing possible future pandemics (Baum et al., 2021). According to findings from the COVID-19 responses in 28 countries, those with 'highly effective country responses' had applied a holistic approach. This approach combined interventions guided by science and biomedical information whilst also maintaining the continuity of essential care services and the protection of livelihoods (Haldane et al., 2021). Countries with government funded health systems where care, solidarity and community responsibility were at the centre of their public health approach such as Vietnam, Australia, New Zealand and Thailand had lower COVID-19 death rates despite not necessarily having a high Global Health Security Index score (Assefa et al., 2022). A higher GHS score was not a guarantee of a good COVID-19 response, with fragmented health systems being one of the key factors contributing to a poor pandemic response (Baum et al., 2021; Assefa et al., 2022). The disparities in the disease burden suffered by the most vulnerable populations within countries, independent of the individual country's Gross Domestic Product (GDP) demonstrates the confounding effect that socio-economic conditions can have on the impact of a pandemic. It also highlights the importance of considering the social determinants of health when retrospectively examining the consequences of the COVID-19 pandemic. Paraphrasing Baum et al (Baum et al., 2021), COVID-19 has demonstrated that the capacity of our global society to manage the next global pandemic will be '*that of its weakest member*'.

This study provides the opportunity to explore alternative approaches to addressing public health emergencies, approaches which are rooted in fostering systemic equity and community resilience, instead of only biomedically focused infectious disease containment. Inspired by the disaster risk reduction field, the authors argue for a strategic shift to one incorporating prevention through consideration of social determinants of health and addressing systemic inequities in pandemic responses.

The global impact of COVID-19 and the expectation of more pandemics in the future, demonstrate that the management of infectious disease outbreaks needs a paradigm shift similar to the one experienced by the field of disaster risk reduction during the World Disaster Conference on Disaster Risk

Reduction that took place in Sendai in 2015. At this conference, a consensus emerged recognising the need for a more holistic and proactive approach that addresses systemic issues and focuses on resilience building. Consequently, the need to work on the vulnerability paradigm to mitigate the impact of disasters became a central strategy for risk reduction, an approach that has persisted ever since the Sendai Conference. The exclusive focus on biomedical strategies to manage infectious diseases misses the social aspects of transmission, the local perceptions of illness, and community vulnerabilities often associated with social and historical perspectives (Osborne et al., 2021; Enria et al., 2016). Recognising that some populations are more vulnerable to infectious diseases than others due to social inequities will require expanding the focus beyond epidemiology to include the perspectives of other social sciences (Farmer, 1996; Abramowitz et al., 2018). The work on global epidemic and pandemic preparedness should include the need to address social inequities in health and wealth, as well as developing specific plans for targeting the most socioeconomically vulnerable, in tandem with the current biomedical strategies (Bedford et al., 2019; Ryan et al., 2022). This paradigm shift must acknowledge that: 1) infectious diseases with pandemic potential, like EVD and COVID-19, are more than just a medical problem; 2) their epidemiology and impact are profoundly shaped by socioeconomic factors; and 3) large-scale infectious disease outbreaks are not confined only to the past or to low-income countries (Mamelund and Dimka, 2021).

The field of disaster risk reduction explicitly addresses the vulnerabilities which may increase the potential destructive effects of disasters, including health emergencies such as EVD and COVID-19 (Gaillard, 2012). To paraphrase Wisner et al (Blaikie et al., 2004) *disaster is the intersection of two opposing forces: the processes generating vulnerability on one side, and the natural hazard event on the other*. Similarly, the principles of action of the Commission for the Social Determinants of Health also included the need to 'tackle the inequitable distribution of power, money, and resources – the structural drivers of those conditions of daily life – globally, nationally, and locally' (Marmot and Bell, 2010). A linkage between the social determinants of health, the IHR, and the GHS Agenda would enable the development of a comprehensive framework to address these complex interconnections, promoting a more holistic and effective approach to global health security. By understanding and addressing the upstream structural determinants of disparities, the public health sector could contribute to fostering equitable health outcomes and resilience in the face of the multifaceted challenges posed by pandemics and environmental changes (Stowell and Garfield, 2021).

While this review offers valuable insights into Uganda's pandemic preparedness and response through the lens of health equity, it is important to acknowledge its limitations. The specificity of the topic, focusing on two disease outbreaks (EVD and COVID-19) within a single country, meant that the pool of relevant documents was relatively small. The final analysis was based on six preparedness and response plans, three after-action reviews, and 20 grey literature and peer-reviewed articles. This narrow scope allowed for a focused and context-specific exploration, but it also limited the breadth of comparative insights. A broader time frame, inclusion of additional disease contexts, or an inter-country comparative approach could have enriched the findings and provided a more comprehensive understanding of how health equity is operationalised during public health emergencies. Future research could build on this work by expanding the geographic and temporal scope to capture evolving strategies and cross-country learning.

There is a need to ensure that the valuable lessons from previous infectious disease responses are firmly integrated into future responses to pandemics and outbreaks. The insights gained from the management of previous events should be woven into overall response policies, standard operating procedures, and ways of working, so the next outbreak is addressed with the hard-earned wisdom that has been acquired, at times, at a great cost. The population, especially the most vulnerable, cannot afford response leaders who repeat the same mistakes and stumble over familiar obstacles.

As WHO prepares for future pandemics through treaty negotiations and revisions of the IHR, it must ensure coordination with efforts to address the social determinants of health. Aligning the Working Group on Amendments to the IHR with the Commission on the Social Determinants of Health could foster synergies far more impactful than siloed reforms. The convergence of global health security and social equity could reshape pandemic responses to be more inclusive, community-driven, and resilient.

There is both a moral and practical imperative to embed the lessons of past outbreaks into future responses. Institutional memory, once lost, costs lives. The most vulnerable cannot afford a response architecture that continues to reproduce past mistakes.

In the words of Paul Farmer:

> 'The key task for medicine', argued the pioneers Eisenberg and Kleinman some 15 years ago, 'is not to diminish the role of the biomedical sciences in the theory and practice of medicine but to supplement them with an equal application of the social sciences in order to provide both a more comprehensive understanding of disease and better care of the patient. The problem is not 'too much science', but too narrow a view of the sciences relevant to medicine' (Farmer, 1996).

Almost 30 years ago Farmer (Farmer, 1996) claimed '*transdisciplinary collaboration will be necessary to tackle the problems posed by emerging infectious diseases*' and yet we are still not there. WHO has a chance to seize this opportunity, so often missed in the past, by ensuring that the pandemic treaty negotiations and the Working Group on Amendments to the International Health Regulations work side by side with the Committee for the Social Determinants of Health. This collaboration would promote synergies and produce a result much greater than the sum of its parts. Let's break the silos and start the transdisciplinary work required so that no one is left more vulnerable simply because of their social status.

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All documents included in the review are publicly available. Author Gema Redondo can be contacted for data requests.

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