


RESEARCH ARTICLE

# ‘It was organized from the bottom’: the response from community-based institutions during the 2014 Ebola epidemic

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## Abstract

What was the turning point in the world’s largest and deadliest outbreak of the Ebola virus disease? Public health interventions tend to focus on supply-side provision of public health goods. These goods are clinical resources such as medicine or equipment. However, no nation has enough resources to ‘treat’ its way out of a widespread epidemic. Behavioural changes, such as social distancing, are needed too. Behaviours are the demand-side of public health goods and if unaddressed, perpetuate disease transmission. Community-based institutions addressed demand-side barriers during the 2014 Ebola epidemic in Liberia and Sierra Leone. Sixty-seven interviews were conducted in several provinces in Liberia and Sierra Leone. The findings show that information asymmetry and collective action challenges lowered the demand for clinical resources. Community-based institutions intervened via health sensitization and emergency regulations. Therefore, health seeking and public cooperation improved. This research study demonstrates a need to integrate community-led action into public health emergency management.

**Keywords:** demand-side barriers; Ebola epidemic; Liberia; local governance; public health goods; Sierra Leone; traditional local institutions

## Introduction

Public health interventions for disease outbreaks tend to predominantly focus on supply-side management, which provides clinical and biomedical resources to affected areas. In the context of humanitarian aid, these resources are a type of public health good, such as medicine, equipment, healthcare volunteers, or the construction of treatment centres. However, social, political, logistical, and economic barriers pose a challenge to such interventions. These challenges, called demand-side barriers, were prevalent during the 2014 Ebola virus disease (EVD) outbreak in West Africa (Franklin, 2019). For example, individuals in rural provinces experience great difficulties travelling to access care, as it can take a day or more to reach a major hospital or treatment centre. So, if a non-governmental organization (NGO) builds a treatment centre in an urban area (i.e. supplying a clinical resource as a public health good) demand can be distorted due to logistical challenges. Information asymmetry (e.g. rumours) or stigma also prevented some individuals from seeking treatment entirely. Thus, even in situations where supply-side management strategies are effective in providing public health goods, demand-side barriers may still result in preventable fatalities and negative health outcomes, such as disability.

Therefore, it is not enough for public health experts to focus on supply-side barriers of providing clinical and biomedical resources to ‘treat’ their way out of a disease outbreak. The demand-side barriers of decision-making and behavioural changes are crucial but difficult for state and aid institutions

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to address. The COVID-19 pandemic demonstrates that this research study is timely, as there is a growing consensus that we cannot rely on biomedical strategies as magic bullet solutions to a health crisis (Carson, 2020; Paniagua and Rayamajhee, 2022; World Health Organization, 2015). I argue that community-based institutions, especially those governed by traditional authorities, can be effective in addressing the demand-side barriers to increase the uptake of public health goods. This paper examines the role and governance patterns of these community-based institutions during phase one of the 2014 Ebola epidemic in Liberia and Sierra Leone.

For the purposes of this research study, I divide the 2014 Ebola epidemic into two periods: phase one and phase two; this is based on the literature and the key informants' interviews. The first phase is from December 2013 to September 2014, ending a month after the World Health Organization (WHO) declared the outbreak a public health emergency of international concern. Phase one is characterized by a relative lack of international aid support, meaning there was not a strong supply of clinical and biomedical resources. The second phase is from October 2014 until the WHO declared the entire epidemic finished in June 2016. The second phase saw a scale-up of aid and donor involvement,<sup>1</sup> where international agencies and other countries promised resources and some intervened. There is much more literature and coverage of this second phase, although it tends to focus more on international donors' and humanitarian efforts. However in phase one, local community-led action and strategy to address the outbreak was rarely reported in the media and literature (Bullard, 2018; Franklin, 2019; Nyenswah *et al.*, 2016b), thus presenting a gap in knowledge on how community-based institutions played a pivotal role.

Community-based institutions governed by traditional authorities are termed traditional local institutions (TLIs) and these are the customs and laws governed by paramount chiefs, chiefs, clan leaders, councils, monarchs, youth leaders, and secret society leaders (Franklin, 2019).<sup>2</sup> Broadly in sub-Saharan Africa, and specifically in the West African nations of Liberia and Sierra Leone, the paramount chiefdom is a legally recognized order of public administration, but normally, these leaders do not ascend into power through a broad electorate. Traditional leaders can influence their constituents to cooperate with development projects or state-led campaigns (Baldwin, 2016).

In Sierra Leone, recent work has also found that the response to the 2014 EVD outbreak was more effective when traditional authorities were involved (Richards, 2016; Van der Windt and Voors, 2020). This paper also adds to the debate in the disaster response literature that has used the concept of collective action or common goods to analyse emergency management (Bentkowska, 2021; Skarbek, 2014). However, it does so through the lens of supply and demand barriers, specifically, how community-based institutions addressed the demand-side barriers, where state and aid institutions could not.

This article presents evidence gathered through qualitative fieldwork that was conducted in 2017 in Liberia and Sierra Leone via 67 semi-structured interviews. These interviews were conducted with healthcare workers, community leaders, and volunteers. These interviews' findings reveal that community-based institutions were critical in addressing collective action challenges before international aid intervention began scaling up in September 2014.

During phase one of the outbreak, the governments of Liberia and Sierra Leone attempted to gain public cooperation via disseminating biomedical information about the Ebola virus such as its lethality, banned wild game consumption, banned gatherings, and restricted movement and social contact. However, the chronically and severely under-resourced ministries lacked epidemiology experts, had poor logistics and supply management, had few resources to monitor or enforce the emergency mandates, and information was neither streamlined nor consistent (Franklin, 2019). These challenges in public health management resulted in a lack of monitoring and enforcement,

<sup>1</sup>Although I call it a 'scale-up' it is not to depict billions of dollars flooding in immediately. Bullard's (2018) research shows that many donors and NGOs took longer to arrive, some coming as late as December 2014.

<sup>2</sup>This paper prefers the term 'traditional', but it does not mean these institutions are archaic. Rather, they occupy a unique social and political space in Liberia and Sierra Leone and more broadly in sub-Saharan Africa.

information asymmetry, and confusion. The lack of collective action generated social disruption and mistrust of the healthcare system, which affected health-seeking behaviours; meaning people avoided health centres for any treatment out of fear. However, choices made regarding health-seeking behaviour or emergency mandates create nested externalities. Nested externalities are costs or benefits generated to a broader community from one decision-making unit (Oström, 2012; Paniagua and Rayamajhee, 2022), meaning an individual's action has consequences for his or her relative, neighbour, and community, for example, the decision to bury a loved one who died from EVD. However, because EVD is highly infectious on corpses, preparing the body for burial and gathering for funerals led to the costs of disease transmission and possibly death (Richards, 2016). This does not mean that people did not care about their health, but information asymmetry and poor state-led management meant that burials continued. There are virtually no professional mortuary services in West Africa, so these responsibilities normally fall on relatives, and the states' attempts to organize burial teams were ineffective during phase one. Traditional leaders resolved this collection action problem through rulemaking and health sensitization (Richards, 2016).

Therefore, nested externalities present during an outbreak can affect broader societal changes that perpetuate disease spread. These types of demand-side barriers were collectively addressed by community-based institutions through health sensitization and quarantines. However, TLIs have the power for rulemaking, fines, and monitoring and enforcement that other community-based institutions may not have. In view of this finding, the theoretical goal of the paper is to demonstrate how community-based institutions can induce positive health behavioural changes to reduce or eliminate nested externalities during a public health emergency. The behaviours that this paper reviews are health-seeking behaviours, restriction of movement/quarantines, and compliance with emergency mandates.

This paper is structured as follows: the next section 'Traditional local institutions,' gives a brief overview of chiefdoms and traditional institutions, and explains their economic and institutional significance, especially why they are often effective in gaining public cooperation. Then, the 'Public health goods and externalities' section uses an institutional framework to explain what public health goods and nested externalities are in the context of supply and demand barriers. The 'Methods' section presents the qualitative methodology used in this work, and I report the findings in the 'Findings: government failures' and 'Findings: community-based institutions respond' sections, which includes excerpts from key informants. These excerpts help demonstrate how government failures led to confusion and low compliance with emergency mandates. Therefore, local communities organized to address demand-side barriers. It also compares the response in both countries. In the final section, I conclude.

### Traditional local institutions

Paramount chiefs and other traditional leaders in sub-Saharan Africa existed well before the colonial period and have shown resiliency, despite changes in power structures during and after colonialism. Today, TLIs are still effective, and the leaders are part of the local political elite. The legitimacy of chiefs is through cultural and religious legacies that will likely remain despite how the state develops (Baldwin, 2016; Richards, 2016). However, this is the beginning to understanding their role and authority in the community and not the entire picture. In Liberia and Sierra Leone, the authority of chiefs includes (but is not limited to) the ability to pass laws called *bylaws*, impose penalties, collect taxes, oversee land tenure, chiefs are guardians of the state constitution and customary law,<sup>3</sup> and in some ethnic groups they are also the religious authority. Although, it is only chiefs that have the power to pass bylaws, they do so through an indigenous deliberative democratic process, which involves consulting with other traditional and religious leaders (Franklin, 2019). For example, during

<sup>3</sup>Customary law broadly refers to the traditional unwritten African legal institution; laws vary from one group to another. Its philosophy is a restorative justice that emphasizes restitution as the purpose is to heal community relationships that were harmed by a crime or dispute (Bwire, 2019).

the 2014 Ebola outbreak in Sierra Leone, the paramount chiefs in the Kailahun district had to deliberate with religious leaders to ban funerals and gatherings in places of worship, because the chieftaincy is secular among the Mende ethnic group. Therefore, they could not pass bylaws banning religious services without the consent and cooperation of religious leaders in the Kailahun district (Richards, 2016).

Thus, encouraging cooperation to resolve collective action problems is a significant value of chiefs and other traditional leaders. For example, Baldwin (2016) explains that elected leaders need community cooperation to engage with local development projects. State officials maintain good relationships with traditional leaders because they have the authority to organize communal labour, such as making bricks to build a school. Traditional leaders are self-interested actors; they have social and economic interests to deliver public goods because they live in these communities too. They are influential in organizing local communities because of their reputation. Although many countries are developing bigger markets; in rural communities, reputation is still crucial for cooperation and, 'the reputation may be political, moral, spiritual, or even idiosyncratic, or, often enough, all four at once' (North, 1991: 104). Reputation drives legitimacy and confidence in TLIs (Franklin, 2019).

Since the end of the civil wars in Liberia and Sierra Leone, the states have had significant challenges in providing healthcare services. These challenges, such as poor conditions of facilities, lack of trained professionals, and substandard care have led to a lack of trust. The lack of trust in the ministries of health resulted in poor ability to organize collective action initiatives to contain the EVD spread. However, because TLIs and other community-based institutions are invested in local communities and usually have a positive reputation, these leaders are often seen as trustworthy sources of information and leadership, and therefore, may legitimize the state's response. TLIs can employ soft power through social cohesion and mobilization and hard power through fines and punishment.

### Public health goods and externalities

How do we understand what public health goods are, and how they are currently governed? There are ongoing debates in the literature concerning whether such goods are private, public, or common goods (Smith *et al.*, 2003; World Health Organization, 2002). Some aspects of public health can be a purely public good, such as clean air, because it is non-rivalrous and non-excludable (Brousseau and Dedeurwaerdere, 2012), which means that no one can be excluded from consuming air and the air that one breathes does not diminish someone else's ability to also consume air (non-rivalrous). Therefore, it has been said that public goods should be governed by state institutions for the benefit of the public (Brousseau and Dedeurwaerdere, 2012; Smith *et al.*, 2003; World Health Organization, 2002). Private goods are governed via markets as these goods are rivalrous and excludable, such as purchasing healthy food. Communal goods can be governed by a range of institutions and are defined as non-excludable but rivalrous, such as two persons fishing in the same river, but they cannot consume the same fish. However, is this an effective approach when it comes to public health?

Rayamajhee and Paniagua (2021) argue that goods are not static and indeed their nature can change over time or due to a specific context. Thus, relying on a 'static model' of how goods are classified should not drive public policy, especially in a dynamically shifting context. An infectious disease outbreak would be an example of a dynamically shifting context. Public health goods can be tangible aspects of healthcare, such as vaccines, clinics, or human resources, which can technically be considered private goods. However, if they are under-supplied, which happens to be the case in many low-income countries, then a collective action approach may be needed (Smith *et al.*, 2003). Furthermore, in public health, 'Governments will occasionally intervene to modify the behaviour of private individuals in order to maximize the public health impact' (World Health Organization, 2002: 10). State intervention can include discouraging risky or unhealthy behaviours, such as no-smoking campaigns or encouraging healthier behaviours, such as healthy diet and exercise. The purpose of this section is not to classify public health goods as common goods or public goods, but rather to define them and their externalities. Thus, public health goods can be supply-side (tangible goods) or demand-side (behavioural changes) provision to maximize public health impact.

Externalities are the impacts on third-party individuals, and in public health, these have been associated with the production or consumption of goods. For example, Becker and Becker (1997) examine how the consumption of tobacco or alcohol products creates negative externalities for other uninvolved individuals, such as a non-smoker breathing in smoke in a crowded room or the pedestrian death from a drunk-driving accident. However, in the context of a disease outbreak, consumption or production may be too narrow of a definition, thus a better way to reframe the concept of externalities is by understanding them as ‘nested externalities’ (Oström, 2012; Paniagua and Rayamajhee, 2022). ‘Nested externalities occur when actions taken within one decision-making unit simultaneously generate costs or benefits for other units organized at different scales’ (Oström, 2012: 356). For instance, in the middle of a highly infectious viral outbreak, the decision made by a private individual, such as wearing a mask or attending a large gathering, can affect another individual or perhaps whole communities at scale. The next sub-section explains how different institutions are designed to govern and address externalities.

### *Governance during public health emergencies*

Institutions are designed to meet specific governance challenges and each institution is responsible for commanding and securing resources to address challenges in its jurisdiction (Oström, 1990). Therefore, polycentric governance is different from the concept of decentralization of command or resources because there can still be a hierarchy under an institution, such as traditional chiefdoms and clans in West Africa. In the context of a public health emergency, it may seem intuitive that policy makers focus on supplying clinical resources and decentralize these public health goods, so that local leaders can decide how to distribute or use these goods. However, decentralization will not always be an effective solution because these goods do not always reach the local communities, nor do they arrive when they are most needed, as demonstrated by the delayed aid response in Liberia during the EVD outbreak (Nyenswah *et al.*, 2016b).

According to Paniagua and Rayamajhee (2022), there are not many examples of polycentric governance of large externalities in practice. This case study demonstrates there were large externalities during the Ebola epidemic, because the virus had spread throughout West Africa and overseas by autumn 2014. The Liberian and Sierra Leonean governments tried to address demand-side and supply-side barriers during phase one. However, state institutions were constrained due to limited resources, inefficiencies, poor infrastructure, demoralized workers, and lack of trust from the constituency. As demonstrated in the excerpts from informants in the ‘Findings: government failures’ section, one of the main weaknesses of the states’ response was information asymmetry, which led to confusion and high fatality rates. Many people decided to avoid seeking treatment at hospitals and opted for at-home caregiving instead. However, this is counterproductive to containing EVD because early treatment can increase survival chances and at-home caregiving increases disease transmission. Thus, at scale, these private decisions led to large negative externalities across communities.

All institutions have inherent strengths and weaknesses in their governance. Aid institutions are aware of demand-side barriers, such as rumours, information asymmetry, and hesitancy in seeking healthcare and sometimes attempt to address them. However, they are not designed to do so and often are not successful. TLIs and other community-based institutions are inherently designed to address social and political challenges and can influence community members to cooperate during times of crisis. These local leaders can be successful even with scant or no aid resources (Franklin, 2019).

Paniagua and Rayamajhee (2022) explain that economists and public health experts tend to create a response from the social planner approach. Meaning, an ‘expert’ usually within the state, is vertically executing public health emergency management. Therefore, disease outbreaks are often addressed from a biomedical lens, where the focus tends to be on pathogenic behaviour and the corresponding treatments as the effective solution.

However, demand-side barriers also drive disease outbreaks, and these challenges are economic, social, cultural, and political. For example, in the current COVID-19 pandemic, vaccines for the

novel coronavirus were rapidly funded and released in about a year into the pandemic. There was some hesitancy regarding taking the vaccines, according to one survey conducted right before the U.S. Food and Drug Administration began reviewing COVID vaccine candidates (Shekhar *et al.*, 2021). In this survey of healthcare workers, only 36% would take the vaccine as soon as it became available, whereas 56% were not sure or would want to review safety information first. Vaccine hesitancy does not equate to people not caring about their health, rather it was lack of information or information not presented clearly that lowered the demand for this public health good. Unaddressed, this demand-side barrier may result in nested externalities such as preventable loss of life, and further negative social and economic consequences, unless actors encourage uptake of these clinical resources via collective action. Hence, there is a need to understand how community-based institutions influence behavioural changes via collective action initiatives, specifically, disseminating information, emergency regulations, monitoring and enforcement, and persuading positive health-seeking behaviours. For instance, in the ‘Findings: community-based institutions respond’ section, informants discuss how anyone with flu-like symptoms were mandated, via regulation and enforcement by TLIs, to go to a health centre. Community leaders also conducted door-to-door health sensitization to correct information asymmetry on EVD.

## Methods

The data for this research study were collected through one-on-one semi-structured interviews in Liberia and Sierra Leone. A total of 67 interviews were conducted, with most interviews lasting about 40 minutes. Forty-two of the key informants were male and 25 were female. Out of the 67 interviews, 12 were with community stakeholders, and only one of the community stakeholders was a woman, a secret society leader from Sierra Leone (Franklin, 2019).

This gender imbalance is not surprising as women are broadly underrepresented in leadership (Day, 2012; Moran, 2012). Therefore, the definition of TLIs and the scope of this research study include the broader political elite that encompasses community stakeholders and reflects the political decision-making processes that include a range of actors, such as women leaders and youth leaders (Oosterhoff *et al.*, 2015). For this research study, community stakeholders are non-clinical professionals who aided or governed during the epidemic. These are traditional leaders, government workers, NGO representatives, and community organizers. Some liaised with state and health officials to pass local ordinances, made referrals into care, conducted health education and sensitization, and distributed supplies. They also contributed in non-technical ways as many are part of a trusted peer network in local communities and were able to leverage social capital to improve cooperation.

Fifty-five healthcare workers were interviewed, and 40 of these key informants were either a doctor, nurse, or nurse aide, whereas nine worked in a laboratory and six key informants worked in a pharmacy (Franklin, 2019). The initial targeting for key informants focused on doctors and nurses; however, this is a very small and difficult population to reach. So given that it is not uncommon in these countries for a patient to visit a laboratory for testing and then immediately seek medication for treatment, pharmacists and laboratory workers were added to the criteria since they also provide frontline direct care services (Franklin, 2019). Healthcare workers are sometimes classified as ‘volunteers’ in the healthcare system. For example, in Sierra Leone, a person can ‘volunteer’ in a health facility and get paid a stipend, if not officially registered as a government employee. However, this exploits many workers and has tenuous job security. This was outlawed after the Ebola epidemic, but it was still ongoing at the time of fieldwork (Franklin, 2019).

Fieldwork was conducted in Sierra Leone from January to March 2017 in the districts of Bo, Kailahun, and Kenema, and in Liberia from March to July 2017 in the counties of Lofa, Margibi, and Montserrado, which includes the capital city, Monrovia. These three provinces were selected in each country because they were initially and heavily affected by EVD during phase one (Franklin, 2019). However, the capital of Sierra Leone, Freetown, was not included since it did not fit this criterion.

Healthcare workers in Liberia and Sierra Leone are a hard-to-reach population for a recruitment and sampling strategy (Heckathorn, 2011). There was huge displacement and emigration of skilled workers during the civil wars in the 1980s and 1990s (Keith and Cadge, 2010). Furthermore, the Ebola epidemic mainly killed caregivers, including healthcare workers. In Sierra Leone, 21% of its health human resources died (Raven *et al.*, 2018). Depending on the size of the health centre, snowballing and target sampling was used to recruit key informants. Snowballing was used in large health facilities, whereas targeting was done in facilities with less than five persons present. Community stakeholders were recruited by target sampling. All targeting was done in consultation with field supervisors, gatekeepers, and key informants. The sampling excluded community members who had no role in assisting during the outbreak.

Qualitative data and analysis can provide a thick description, which is defined by Skarbek (2020) as an understanding of multifaceted and multidimensional characteristics. This research study was conducted as part of an overall doctoral research project from 2016 to 2020 (Franklin, 2019). The research design was developed using the Critical Appraisal Skills Programme qualitative studies toolkit for public health research (Critical Appraisal Skills Programme, 2022). The primary data were triangulated with epidemiology data from the WHO's Ebola situation report (World Health Organization, 2016).

All key informants were over the age of 18 and provided informed consent to be interviewed. All persons were introduced with the following information: my full name and that of the interpreter, university affiliation, and contact information for myself and doctoral supervisor. Each person was also shown a participant information sheet that contained full contact details, the nature of the project, and rights as a confidential informant. They were allowed to keep this sheet for their records in case they wanted to get in touch with me or the university.

No personal information was collected from the key informants. All interviews were audio-recorded with a device that encodes at an AES 256-bit level encryption for data security. Each audio file and the corresponding written transcript are anonymized with an eight-digit alphanumeric code. Each written transcript is encrypted with the 2016 Microsoft Word encryption feature and stored on a password-protected laptop with the researcher.

The written transcripts were coded using Nvivo Plus version 11 to structure the data into themes. The Liberian and Sierra Leonean interviews were coded separately in the software. The search function was used to find text with a setting of 'With synonyms' so more generalized results could be produced, resulting in larger search outputs. The search results were scanned and coded with the interviews from Sierra Leone, and then, the interviews from Liberia. Each time a new code was created, I would return to the other country folder and see if similar text could be found for coding. The software tallies each code, so one can see how many times a theme was mentioned. This search process to find and develop coding for the interviews was conducted from December 2017 until July 2018 (Franklin, 2019).

The following section describes an analysis of state institutional failures that affected the demand of public health goods during phase one. These excerpts are transcribed verbatim and any edits by the author are in brackets.

### Findings: government failures

Key informants explain how phase one of the epidemic was a confusing and frustrating time, due to the lack of guidance and action from the respective central government in Freetown or Monrovia. Information asymmetry varied, some areas lacked information, and in other areas, information was inaccurate or difficult to access. Twelve out of 33 informants in Sierra Leone discussed information asymmetry and 19 discussed government failures, such as not providing personal protective equipment (PPE) or training to manage the outbreak. Fifteen out of the 34 Liberian interviews discussed government failures and 15 references were made to information asymmetry. Government failures led to confusion and mistrust of the ministries of health, dampening public cooperation.

The following excerpt describes some factors that impeded healthcare workers' ability to provide care. These factors were confusing information, inadequate supply of PPEs, and lack of training on

how to safely don and doff more complex PPEs like hazmat suits. The nurse explains it was evident that the healthcare system was unprepared for EVD, lowering morale in healthcare workers and confidence from the community.

Well, initially we had a problem of even understanding the nature of the [EVD] disease itself. It was so complex, but we hadn't had adequate information [training] on it so, all the things we were doing, we were just like, 'trying'. That was a major challenge – we give people information today and tomorrow it changes, so that brought a lot of confusion and even trying to trust us with what we were doing. The resources [PPE] were – well, earlier on, they were not available and came in inadequate quantities. Those that did come, were a bit complex to use and we couldn't use them the way they are supposed to be used. So, we had to 'manage' with resources that were complex [i.e., hazmat suits] and were not enough in quantity, sometimes we used [them] and sometimes we went without. (Healthcare Worker, Kenema District, Sierra Leone, DS350015).

Below, in two instances, a nurse describes how the healthcare system was unprepared and crucial information on EVD, such as case definition, was poorly disseminated. Flu-like symptoms are more common in EVD patients, but many were misdiagnosed. Moreover, because protective equipment such as gloves, are always in high demand but inadequately supplied, healthcare workers must decide when to use gloves. So, misdiagnosing a patient as low risk (e.g. malaria), led to high fatality rates among healthcare workers and patients.

So, it [EVD] was the cause of many health workers to die. There were no PPEs, there were no gloves, and there was no health education pertaining to Ebola.

[W]e never had support and we were doing our own thing, trying in our weak [poor] ways and that's why people died so much. If you had running stomach [diarrhea] and vomiting, we just thought it was [an] ordinary sickness, we will go and care for our patient [without gloves or barriers]. (Healthcare Worker, Montserrado County, Liberia, DS350053).

Below, the excerpt further describes information asymmetry in educating the community and healthcare workers on EVD symptoms. The symptoms described are technically correct, but the more graphic symptoms (i.e. haemorrhaging) are rare, and most EVD patients do not display them. So, the community lost trust in healthcare workers and the state response, because many lost loved ones who had to travel far to visit a facility, believing they had malaria or another treatable illness, but did not return home. The misdiagnoses of EVD patients for another treatable illness also meant that healthcare workers treated patients without appropriate PPE, resulting in high casualty rates. Thus, confusing information led to stigma against healthcare professionals and lowered the demand for public health goods. This presented a collective action problem because if large amounts of people do not seek healthcare, then it is counterproductive to the state's efforts to trace EVD cases and monitor disease spread.

During the outbreak, the community people were given false information at the time. That is the IEC program, the Information, Education, and Communication program. They [the ministry] printed posters that people may be vomiting blood, blood running from the ears, from the eyes, are suspected Ebola cases. It came to a time now, where people [did not] show these signs and symptoms, so what happened? The community people said the health workers have failed them, they have teamed up to kill them, and people lost total confidence in the health system in Sierra Leone. (Healthcare Worker, Kailahun District, Sierra Leone) (Franklin, 2019: 169–170).

In West Africa, healthcare is in a curative medicine paradigm. This means that public health goods and health-seeking behaviours focus on treating illnesses that are feasible (Ravenel *et al.*, 1937). It is



costly for people in rural communities to visit a hospital, because this could mean days of travelling and hospital fees. However, because initial health education emphasized deadliness, rather than early treatment, many people decided to stay home and rely on familial caregiving until death. However, this perpetuated disease spread among family members and whole communities. EVD has had case fatality rates up to 90% in prior outbreaks (Pourrut *et al.*, 2005), but early treatment can increase chances of survival. This information asymmetry also lowered the demand for public health goods and continued disease spread, posing another collective action barrier.

However, one could say that at the start of the outbreak, one of the information that went out created a lot of discrepancy in information, like misinformation. Like saying, 'it's an illness that hasn't got a cure' and people completed the sentence by saying 'then why should I go to the hospital?' If it hasn't got a cure, then why should I go there? Rather, I stay at home and die...so that was one thing. It was a weakness on the side of the system, which presented reluctance or resistance from the community, [and] made the outbreak worst. (Healthcare Worker, Bo District, Sierra Leone) (Franklin, 2019: 171).

Below, a nurse in Monrovia discusses the state's slow response, and the ineffective travel restrictions. People continued to move around undetected, especially if they found out that their area had an EVD case. This presented another collective action problem because it made contact tracing very difficult.

Time. Time to trace the contacts, the Ministry took a lot of time in tracing people. If a person, 'Mary', is in place A and the virus took over place A; she will leave place A to go to place B before the Ministry of Health will get to know about 'Mary'. And [when they] get to 'Mary' [it] will be too late. Time of arrival, time to get the information, there was a break [down] there. (Healthcare Worker, Montserrado County, Liberia) (Franklin, 2019: 166).

The states' attempts to inform the public and supply appropriate resources to the health centres did not gain the cooperation it needed to curtail the outbreak. The next section discusses how community-based institutions responded to these collective action problems, by enforcing quarantine and travel restrictions, mandating health screenings, and conducting health sensitization to reduce information asymmetry.

### Findings: community-based institutions respond

Some communities are marginalized, which contributed to the ineffective response from state institutions. For example, in its entire history as a state, Liberian politics and wealth have been dominated by a single minority ethnic group: the Americos, which is largely concentrated in Monrovia (Harris, 2012). Communities mobilized because they value their health and leaders in state institutions are often viewed as distant and unaccountable. Out of 34 Liberian key informants, six discuss the impact of community-level engagement.

It was organized from the bottom: communities were effective. We are in a system where the rich or well-to-do is not going to get down there, I mean they [politicians] were flying out of the country... So, they [local leaders] became more proactive in order to save themselves and save their communities. (Community Stakeholder, Monsterrado County, Liberia) (Franklin, 2019: 174).

Many roads were still lacking checkpoints by August 2014, which meant that quarantine measures were not monitored and enforced. Therefore, in a suburban neighbourhood in the Monrovia area, a local group of neighbours organized a checkpoint, addressing a collective action barrier. Below, the same nurse describes how these checkpoints allowed neighbourhoods to isolate and restrict travel.

Each person in this community [was] asked, ‘Where are you from?’ ‘We have never seen you in this community. Please go back where you come from.’ And you will see these people at the junction [main street intersection].<sup>4</sup> When you enter, and they stop you, they won’t be hostile or anything to you, but will ask you those questions and if the person say, ‘Oh, I got my mother here’ or ‘I got my housing place here’, like, where ‘Mary’ was but decided to come back, you will not enter your house. You will go back to where you came from until after the crisis. So, that was how community tracing and [the] Ebola started to be reduced. (Healthcare Worker, Montserrado County, Liberia) (Franklin, 2019: 173).

In the excerpt below, this taskforce organizer explains health sensitization and hospital referrals for residents that had any symptoms. A ‘hospital referral’ was practiced as accompaniment to the local health centre. This improved contact tracing and provided social support for suspected EVD patients.

The community took the initiative to organize themselves, like for us, we organized ourselves. We put ourselves in a group and [went] from house to house; we find sick people and we make sure those sick people were transferred to the hospital for proper care. So, as for me, my community, the \_\_\_\_ community<sup>5</sup> we didn’t experience any outbreak and there was no symptom of Ebola in the \_\_\_\_ community. Because we mobilized ourselves into a group without anybody helping us. (Community Leader, Montserrado County, Liberia) (Franklin, 2019: 173).

Health sensitization allows trusted peers to give information in a way that is appropriate and dispel myths and fears. This helped to resolve information asymmetry and encourage positive health-seeking behaviours.

Below in the next excerpt, this community stakeholder explains that local communities decided to screen visitors (history intake) and conduct door-to-door health sensitization and referrals. This helped improve contact tracing and isolation measures for suspected cases.

I think [the] strength would be the community, the community had to take matters into their own hands. What I mean by that is they had to create their own structure, their own guidelines, for example... ‘no stranger comes in’ and any stranger that comes in, has to report to a source point to be evaluated and a decision can be made if the person can stay in the community or has to leave. Communities, really had to take leadership on making decisions that all homes will be visited on a regular basis, temperatures will be checked, so communities had to take responsibility. (Community Stakeholder, Montserrado County, Liberia, DS350067).

Below, this NGO worker uses HIV/AIDS as a comparison, to demonstrate how information asymmetry initially scares people from seeking treatment. However, revamping the message to ‘early treatment and survival’, improves public cooperation to change health-seeking behaviours to reduce transmission and fatalities.

So, it was just the same with Ebola, that once you catch Ebola, you are going to die. So that was the first message [and] people were afraid. But later the message changed; that there is possibility of survival – you can be treated and survive. So, it was a similar approach with that of HIV, people stigmatized them [survivors] at the time, but through community engagement, population mobilization, information dissemination, the attitudes have been changed. (Community Stakeholder, Lofa County, Liberia, DS350044).

<sup>4</sup>Street intersection omitted for confidentiality.

<sup>5</sup>Neighbourhood location omitted for confidentiality.

Traditional leaders also engaged in rulemaking alongside community mobilization. In the Kailahun district of Sierra Leone, paramount chiefs passed bylaws in June 2014, then traditional leaders in Kenema district followed suit. By August 2014, it was scaled up as part of the state's emergency plan for all chiefs to pass bylaws as emergency mandates (Franklin, 2019; Richards, 2016; Van der Windt and Voors, 2020). Out of the 33 key informants from Sierra Leone, 20 persons mentioned the significance of the bylaws.

If you are talking about successful programs in a chiefdom, we have to go through the community leaders. So, the Paramount Chief is the head, the administrative head and he has his chiefdom divided into sections and each has a chief. And each section has villages, and each village has a chief. So, until we bring all these people together, to get this information, you will find it difficult for people in the village to understand [comply] with what is going on. So, the local leadership has been very very useful, not only in Ebola, although in Ebola it was more useful. (Community Stakeholder, Kenema District, Sierra Leone) (Franklin, 2019: 183).

Above, an NGO worker discusses the importance of engaging with TLIs because information will be streamlined and disseminated in a culturally appropriate way to improve public cooperation. The following excerpt describes some of the emergency bylaws.

They told us, 'Whosoever has a sick person at home should report to the nearest PHU or main practitioner that is closest to you [mandatory reporting bylaw].' If you don't do that, and they realize that – they will fine you 500,000 (Le). And Mende people fear fines so much. They told us that we should not touch corpses. When there is a corpse – a dead person, we should call a medical practitioner... You want to touch or clean it or so, but when your loved one is dead, we are infected by that. So, we [could] never touch any dead ones [funeral bans]. And travel was canceled, because if you traveled, they wouldn't allow you to sleep in any other places. So, I think that saved us greatly. (Community Stakeholder, Kailahun District, Sierra Leone) (Franklin, 2019: 176).

Above, a chief explains the bylaws he believed helped reduce nested externalities. Hospital referrals were mandatory, so anyone with signs or symptoms had to go to a health centre. The high fine was a deterrent, as paying hospital fees is much lower, this reduced disease transmission from at-home caregiving. Burials and travelling were also prohibited, and many people isolated at home.

Below, a female secret society leader describes how they stopped initiation rituals (e.g. female genital circumcision) and how the bylaws were monitored and enforced through fines. Funds from the fines were used to staff checkpoints in her village.

So, part of their strategy was to prevent Ebola, they caught five bike riders and fined them 500,000 Leones (Le) each. [T]hat money was given to the security men who were looking after this town, so that helped greatly. Then, they put an end to every society initiation until the end of Ebola [e.g., circumcision rituals]. So, these were measures put in place to prevent Ebola from reaching here, this is what helped the health system... [D]uring the Ebola, the chiefs came together and brought bylaws. They fought very hard and never had a case here in this town. (Secret Society Leader, Bo District, Sierra Leone) (Franklin, 2019: 177–178).

The above quotes demonstrate that enforcing whole communities to isolate resulted in reduced disease spread or prevented EVD cases in some chiefdoms. 500,000 Le was roughly one month's salary in most places in Sierra Leone, and thus, a significant deterrent as economic production had stopped, and most people had lost their source of income. This monitoring and enforcement strategy improved public cooperation to restrict travelling.

Below, the next excerpt shows that traditional leaders leveraged social capital to restore social cohesion and trust, which was disrupted due to information asymmetry and government failure.

[W]e will have a team of social mobilizers and psychosocial support who will go into a village and summon a meeting with the chief and other elders and formally present that person and confirm by hugging him in front of them, to [demonstrate] that this man or woman is free of the virus and fit to stay in the village and no longer infected. So, we are bringing him back to stay in his community. In most cases they were received with open hands, but there were a few cases wherein – in fact, the survivors even refused to go back, because they knew what is ahead of them. Maybe two cases where the survivors were rejected. We had to talk to the people to [help them] understand, but an alternative was set wherein the community leader had to take the responsibility to safeguard the survivor and we kept visiting until final integration was done. (Community Stakeholder, Kenema District, Sierra Leone, DS350014).

Many people feared survivors because initial information said that EVD kills everyone. So, there was a belief that survivors were not cured and were still contagious. The excerpt above explains how healthcare workers and chiefs would present survivors and publicly embrace them to show that there was no reason to be fearful. It reinforced the message that survival is possible and restored trust in the healthcare system's ability to cure EVD. There was also a bylaw that prohibited discrimination against EVD survivors, as explained below by this chieftom speaker.

In fact, that is within our bylaws that if there is any stigma from anybody towards those [EVD] survivors, [there is] a fine of 500,000 (Le); if that is reported to [us], the local authorities. (Community Stakeholder, Kailahun District, Sierra Leone, DS350012).

### *Comparing the local response in Liberia and Sierra Leone*

Traditional and community leaders influence the provision of public health goods and thereby encouraged behavioural changes, such as health-seeking behaviour and compliance with emergency mandates to curtail disease spread. These interventions helped mitigate nested externalities that are inherently present in public health emergencies. However, when comparing the local response in both countries, there is a discrepancy in the perspectives on community-level engagement. Liberian informants tended to view aid resources as a strength in the response during phase two, after the WHO declaration and international aid was scaled up. However, this perspective was not well reflected in the Sierra Leonean interviews. Significantly more informants from Sierra Leone discussed the successful outcome of community organizing in phase one, as demonstrated by this doctor below.

They created NERC [National Ebola Response Centre], the National Emergency Office was created. [Then] at the district level, the District Emergency Operations office was created, [and] other people were recruited, and they were managing the Ebola. Like for this district, there was some conflict among the health workers because [by] the time the emergency unit was created we had already done away with the Ebola here. It was not actually here [anymore]. Then you take the responsibility away from the health workers [and say] that they were not up to expectations. So, most of us were annoyed because we had already done the fight, instead of compensating us or give us thanks – [they come with] the manner [to] bring people to come and take over for us. (Healthcare Worker, Kailahun District, Sierra Leone) (Franklin, 2019: 184).

The epidemic was dominant in rural Sierra Leone. It initially concentrated in the remote-forested area, which was characterized by poor road networks and lack of infrastructure. There were very few NGOs in this region. It was not until phase two when EVD cases spread to Freetown and the surrounding metropolitan, where there is better infrastructure, saw a scale-up of aid resources.

Furthermore, the bylaws from TLIs were scaled up nationwide in phase one, meaning every chiefdom implemented the same bylaws. However, there was not the same bottom-up approach in Liberia.

The effort in Sierra Leone had measurable impact in terms of being able to trace EVD contacts and refer suspected cases into early treatment. Sierra Leone reported 14,124 cases and 3,956 deaths and Liberia reported 10,675 cases and 4,809 deaths during the epidemic (World Health Organization, 2016). Therefore, EVD death rates in Liberia was 45%, whereas in Sierra Leone it was 28%, according to these figures. Sierra Leone, which had an integrated response with TLIs, identified almost 4,000 more cases because rulemaking and health sensitization improved contact tracing, but recorded nearly a thousand less deaths, likely because of early treatment (Franklin, 2019). Liberia's outbreak also ended later due to repeated discoveries of hidden EVD cases (Bullard, 2018). This suggests that referral to care and contact tracing in Liberia was not as rigorous.

The coastal areas in Liberia were impacted by EVD in phase one, making NGOs' response more visible to healthcare workers. However, this only resolved the supply-side of public health goods and not the demand-side barriers, as the same taskforce organizer from Monrovia explains:

When we got the information that Ebola was raising hell [and a] serious problem in other communities, immediately, we organized ourselves as a group. We didn't have any assistance from government, we didn't have any partner [NGO], we just organized ourselves in a form and manner which we went and collected some money, where we task ourselves, put it together, and we were able print some shirts and we [began] to map our community. That's what we did, nobody came to our aid, nobody helped us. (Community Stakeholder, Montserrado County, Liberia, DS350045).

In phase two, international aid institutions managed the supply-side of goods provision and were fairly successful in doing this, but these goods were typically provided through state institutions, which meant that aid was a politically determined resource and some communities did not benefit from the efforts of donors and humanitarians. As illustrated by the quotes above, this was true in rural areas or communities that are not well connected. For instance, some donors did not want to provide resources to community-based actors because these groups were unknown to them (Nyenswah *et al.*, 2016a). There was a similar concern in the COVID-19 pandemic with vaccine distribution in the USA. Some argued that many Black communities may be underserved because of the lack of pharmacies in Black neighbourhoods as well as other systemic problems of racism and marginalization (Oladipo, 2021). Therefore, even in the context of a rich developed nation, relying only on the supply-side of public health goods provision can still leave many areas under- or unserved.

### Concluding remarks

The narrative from key informants shows that non-state actors played a pivotal role in flattening the curve of the EVD epidemic in Liberia and Sierra Leone. State institutions struggled to provide public health goods and enforce emergency mandates. This led to collective action barriers, such as at-home caregiving, avoiding healthcare centres, demoralized healthcare workers, and low compliance with emergency mandates. These factors also eroded trust and social cohesion in local communities.

Public health goods can be supply-side resources that are tangible, as well as demand-side factors, such as promoting healthier behaviours and discouraging unhealthy or risky behaviours. Thus, there are governance challenges on the supply-side and demand-side of providing these goods. No one institution can effectively provide and govern all aspects of public health goods. The mainstream narrative of how disease outbreaks are contained tends to focus on the supply-side, which are clinical resources, such as medicines or PPE. Moreover, public health experts focus on pathogenic behaviour and assume that communities will passively absorb and follow official guidelines. However, this is not the case in this or any disease outbreak (Carson, 2020; Franklin, 2019; Paniagua and Rayamajhee, 2022). No

country in the world has enough hospitals, beds, workers, drugs, vaccines, or tests to ‘treat’ themselves out of a widespread public health emergency.

The challenges to governing the Ebola epidemic were also on the demand-side of public health goods. Hence, there is a critical need to examine how these demand-side barriers hinder public cooperation and which institutions can address them. This case study shows that community-based institutions have the social capital and legitimacy to address these demand-side barriers. Traditional and community leaders used a combination of soft power, such as health sensitization, and hard power such as rules and punishment. Although demand-side barriers were being addressed by local communities, there were still challenges in obtaining state resources (e.g. burial teams) and aid resources into rural areas and even some urban communities.

The phenomenon of bottom-up rulemaking was only observed in Sierra Leone, and it cannot be demonstrated yet that the findings are applicable to other contexts (Noble and Smith, 2015). This paper did not examine all demand-side barriers that were present during the outbreak. This means that further research into the role of traditional and community leaders in emergency management is needed.

It has been a few years since fieldwork was conducted and even longer since the epidemic ended in West Africa. Nonetheless, given the current global health crisis and December 2023 marking the 10-year anniversary of the epidemic, the interviews and research are very relevant and timely. There is a growing consensus that we cannot rely on biomedical strategies as magic bullet solutions to health crises (Carson, 2020; Paniagua and Rayamajhee, 2022; World Health Organization, 2015). Social, political, economic, and environmental factors also drive how local communities respond to disease outbreaks. The Ebola epidemic was politicized, and communities responded because they were historically marginalized from state institutions. Furthermore, in COVID and Ebola outbreaks, the role of trust and social capital affects whether individuals believe the information provided by experts and government officials (Bentkowska, 2021; Blair *et al.*, 2017). This, in turn, affects their behaviours, such as choosing to wear a mask or vaccination. Moreover, these decisions also impact disease transmission as nested externalities in their communities.

There will always be disease outbreaks and bottlenecks with delivering biomedical and clinical resources. However, this research study attempts to provide a lens into the benefits and limitations of integrating community-led action into emergency management. Initially, this research study wanted to explore governance in the context of low-income countries where healthcare systems are very fragile, and resources are limited. However, the recent novel coronavirus pandemic also shows how critical it is to understand soft factors that drive disease spread and could help contain an outbreak. More research on these soft factors and how their cultural, social, political, economic, and environmental contexts can help us to better approach future public health emergencies.

### Limitations

There are some general limitations when conducting interviews. As human beings, we have imperfect memories, may lack knowledge of specific details, or give inaccurate information (Low, 2013). The size and breadth of the study helped to minimize these limitations, as there is a variety of stakeholders from two countries. An interpreter was also available, but most informants wanted to be interviewed in English. There were some technical difficulties with the audio recorder and one interview from Sierra Leone was deleted. Therefore, since a full-length transcript is not available, a summary of the discussion is used in the data analysis. This interview required interpretation, so the summary was verified by the interpreter (Franklin, 2019).

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## References

- Baldwin K. (2016) *The Paradox of Traditional Chiefs in Democratic Africa*. New York: Cambridge University Press.
- Becker G.S. and Becker G.N. (1997) *The Economics of Life: From Baseball to Affirmative Action to Immigration, How Real-World Issues Affect Our Everyday Life*. New York: McGraw-Hill.
- Bentkowska K. (2021) Response to governmental COVID-19 restrictions: the role of informal institutions. *Journal of Institutional Economics* 17(5), 729–745. doi:10.1017/S174413742100028X.
- Blair R.A., Morse B.S. and Tsai L.L. (2017) Public health and public trust: survey evidence from the Ebola virus disease epidemic in Liberia. *Social Science & Medicine* 172, 89–97. doi:10.1016/j.socscimed.2016.11.016.
- Brousseau E. and Dedeurwaerdere T. (2012) Global public goods: the participatory governance challenges. In Brousseau E, Dedeurwaerdere T and Siebenhüner B (eds.), *Reflexive Governance for Global Public Goods*. London: MIT Press, 21–36.
- Bullard S.G. (2018) *A Day-by-Day Chronicle of the 2013–2016 Ebola Outbreak*. Cham: Springer International Publishing.
- Bwire B. (2019) Integration of African customary legal concepts into modern law: restorative justice: a Kenyan example. *Societies* 9(1), 8. doi:10.3390/soc9010017.
- Carson B. (2020) Automaton or individuals? Voluntary responses to COVID-19 related epidemic externalities. *The Independent Review* 25(4): 551–567. doi:10.2139/ssrn.3734711.
- Critical Appraisal Skills Programme (2022) CASP qualitative studies checklist, published online. Available at <https://casp-uk.net/casp-tools-checklists/> (accessed 7 April 2019).
- Day L. (2012) *Gender and Power in Sierra Leone Women Chiefs of the Last Two Centuries*. New York: Palgrave Macmillan.
- Franklin S.I. (2019) *The Local Governance of the 2014 Ebola Epidemic: A Comparative Case Study of Liberia and Sierra Leone*. PhD unpublished thesis, University of Westminster. Available at: Westminster Repository.
- Harris D. (2012) *Civil War and Democracy in West Africa: Conflict Resolution, Elections and Justice in Sierra Leone and Liberia*. London: I.B. Tauris and Co. Ltd.
- Heckathorn D.D. (2011) Snowball versus respondent-driven sampling. *Sociological Methodology* 41(1), 355–366. doi:10.1111/j.1467-9531.2011.01244.x.
- Keith R. and Cadge N. (2010) *Unlocking Progress in fragile States: Optimising High-Impact Maternal and Child Survival Interventions*. London: Save the Children.
- Low J. (2013) Unstructured and semi-structured interviews in health research. In Saks M and Allsop J (eds.), *Researching Health: Qualitative, Quantitative, and Mix Methods*, 2nd edn. Thousand Oaks: Sage Publications Inc., 74–91.
- Moran M.H. (2012) Our mothers have spoken: synthesizing old and new forms of women's political authority in Liberia. *Journal of International Women's Studies* 13(4), 51–66.
- Noble H. and Smith J. (2015) Issues of validity and reliability in qualitative research. *Evidence-Based Nursing* 18(2), 34–35. doi:10.1136/eb-2015-102054.
- North D.C. (1991) Institutions. *Journal of Economic Perspectives* 5(1), 97–112.
- Nyenswah T.G., Engineer C.Y. and Peters D.H. (2016a) Leadership in times of crisis: the example of Ebola virus disease in Liberia. *Health Systems & Reform* 2(3), 194–207. doi:10.1080/23288604.2016.1222793.
- Nyenswah T.G., Kateh F., Bawo L., Massaquoi M., Gbanyan M., Fallah M., Nagbe T.K., Karsor K.K., Wesseh C.S., Sieh S., Gasasira A., Graaff P., Hensley L., Rosling H., Lo T., Pillai S.K., Gupta N., Montgomery J.M., Ransom R.L., Williams D., Laney A.S., Lindblade K.A., Slutsker L., Telfer J.L., Christie A., Mahoney F. and De Cock K.M. (2016b) Ebola and its control in Liberia, 2014–2015. *Emerging Infectious Diseases* 22(2), 169–177. doi:10.3201/eid2202.151456.
- Oladipo G. (2021) Black and Latino communities are left behind in COVID-19 vaccination efforts, *The Guardian*, 12 June, published online. Available at <https://www.theguardian.com/world/2021/jun/12/black-latino-left-behind-covid-19-vaccines> (accessed 3 February 2022).
- Oosterhoff P., Mokuwa E.Y. and Wilkinson A. (2015) Community-based Ebola care centres: a formative evaluation. *Ebola Response Anthropology Platform*, published online. Available at [http://www.ebola-anthropology.net/case\\_studies/community-based-ebola-care-centres-a-formative-evaluation/](http://www.ebola-anthropology.net/case_studies/community-based-ebola-care-centres-a-formative-evaluation/) (accessed 17 October 2022).
- Oström E. (1990) *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.
- Oström E. (2012) Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales?. *Economic Theory* 49(1), 353–369. doi:10.1007/s00199-010-0558-6.
- Paniagua P. and Rayamajhee V. (2022) A polycentric approach for pandemic governance: nested externalities and co-production challenges. *Journal of Institutional Economics* 18, 537–552. doi:10.1017/S1744137421000795.
- Pourrut X., Kumulungui B., Wittmann T., Moussavou G., Délicat A., Yaba P., Nkoghe D., Gonzalez J.P. and Leroy E.M. (2005) The natural history of Ebola virus in Africa. *Microbes and Infection* 7(7–8), 1005–1014. doi:10.1016/j.micinf.2005.04.006.
- Raven J., Wurie H. and Witter S. (2018) Health workers' experiences of coping with the Ebola epidemic in Sierra Leone's health system: a qualitative study. *BMC Health Services Research* 18, 251. doi:10.1186/s12913-018-3072-3.

- Ravenel M.P., Jay A., Young C.C., Vaughan H.F., Norton J.F., Hedrich A.W., Miller A.P., Kessler H.H., Frisbie W.S., Bolt R.A., Routzahn E.G., Faville K. E. and Maxcy K.F. (1937) Curative and preventive medicine. *American Journal of Public Health and the Nation's Health* 27(8), 828–830. doi:10.2105/ajph.27.8.828.
- Rayamajhee V. and Paniagua P. (2021) The Oströms and the contestable nature of goods: beyond taxonomies and toward institutional polycentricity. *Journal of Institutional Economics* 17(1), 71–89. doi:10.1017/S1744137420000338.
- Richards P. (2016) *Ebola: How a People's Science Helped End an Epidemic*. London: Zed Books Ltd.
- Shekhar R., Sheikh A.B., Upadhyay S., Singh M., Kottewar S., Mir H., Barrett E. and Pal S. (2021) COVID-19 vaccine acceptance among health care workers in the United States. *Vaccines* 9(2), 119.
- Skarbek E.C. (2014) The Chicago fire of 1871: A bottom-up approach to disaster relief. *Public Choice* 160(1–2), 155–180.
- Skarbek D. (2020) Qualitative research methods for institutional analysis. *Journal of Institutional Economics* 16(4), 409–422.
- Smith R.D., Beaglehole R., Woodward D. and Drager N. (eds.) (2003) *Global Public Goods for Health: Health Economic and Public Health Perspectives*. New York: Oxford University Press.
- Van der Windt P. and Voors M. (2020) Traditional leaders and the Ebola epidemic. *Journal of Politics* 82(4), 1607–1611.
- World Health Organization (2002) Global public goods for health: the report of working group 2 of the commission on macroeconomics and health. Geneva: World Health Organization, published online. Available at <https://apps.who.int/iris/handle/10665/42518> (accessed 2 February 2022).
- World Health Organization (2015) Liberia: a country – and its capital – are overwhelmed with Ebola cases. Geneva: World Health Organization, published online. Available at <http://www.who.int/entity/csr/disease/ebola/one-year-report/liberia/en/> (accessed 7 January 2018).
- World Health Organization (2016) *Situation report Ebola virus disease: 30 March 2016*. Geneva: World Health Organization, published online. Available at [ebolasitrep\\_30mar2016\\_eng.pdf](http://www.who.int/emergencies/diseases/nipah-virus/situation-report-30-march-2016-ebola-virus-disease) (who.int) (accessed 31 March 2018).