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Flattening the Curve:
Voluntary Association Participation and the 2013-2016 West Africa Ebola Epidemic

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Abstract

To what extent does voluntary association participation correlate with reduced Ebola duration in districts across Guinea, Liberia, and Sierra Leone during the 2013-2016 West Africa Ebola epidemic? In this first cross-national quantitative study of Ebola outcomes across the three countries with nearly all the Ebola cases globally, I investigate how social capital influences epidemic outcomes. The epidemic struck along the border of three countries with similar health indicators, human development indicators, as well as cultural practices yet resulted in different outcomes. In this article, I examine the role of social trust, political trust, voluntary association participation, religious organization membership, and community meeting attendance in explaining international policy failure to reduce Ebola outcomes. Overall, in districts with a culture of raising issues and participating in voluntary and religious organizations, Ebola duration rates were lower.

Keywords: Civil society organization, Ebola, epidemic, social capital, voluntary association, West Africa

Introduction

The 2013-2016 West Africa Ebola Epidemic ended the lives of more than 11,000 West Africans (CDC, 2016), and set the entire world into panic. Even in New York City, residents avoided the typically crowded subway line 7 because it went towards UN Headquarters. Despite significant investment in civil society after a series of civil wars from 1989-2003, the international response to Ebola initially did not work with local and national organizations in Guinea, Liberia and Sierra Leone, citing a lack of capacity and the political nature of these organizations (UNMEER, 2017).

Ebola remained unaddressed for several months, and then reached Africa's rapidly urbanizing slums and necessitated the first United Nations health emergency mission styled after a peacekeeping mission (Rashid 2018; World Peace Foundation 2017). The top-down approach of the United Nations Emergency Ebola Response (UNMEER) excluded not only international NGOs from early consultations, but also national and local civil society organizations and community representatives (Lupel and Snyder, 2017). In the words of Center for Disease Control (CDC) director Dr. Thomas Friedman, Ebola was a test, and "we, the world, failed that test," (Sun, Bernstein, and Achenbach, 2014). The overall international response was insufficient, including efforts by the international NGOs and governments (Nohrstedt and Baekkeskov, 2018; Richards, 2016; Hofman and Au, 2017). Ebola was not only a test of international cooperation, but also a test to the fragile, post-conflict institutions and the delicate civil society[1] project in Guinea, Liberia, and Sierra Leone.

Given international aid to civil society since the end of the civil wars, to what extent did pre-Ebola voluntary association participation, influence Ebola duration and mortality outcomes, across districts? In this study, I examine how voluntary association participation, while discussing other forms

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of social capital, affects Ebola mortality (measured as deaths/1,000 inhabitants) and duration outcomes (measured in months of the epidemic) across districts in Guinea, Liberia, and Sierra Leone. Research on disasters increasingly emphasizes the role of social capital during and after crises (Dynes, 2005, 2006; Klinenberg, 2003; Norris et al., 2002). Social capital facilitates disaster preparedness, response, and resilience (Bolin and Stanford, 1998; Chamlee-Wright, 2010; Chamlee-Wright and Storr, 2009; Paton, 2007; Pelling, 1998; Pelling and High, 2005; Shaw and Goda, 2004; Nakagawa and Shaw, 2004). During Ebola, community leaders mobilized social capital by drawing on existing networks to raise awareness and educate communities on response measures, facilitating behavior change (Ali, Fallah, et al., 2022). Though social capital facilitates the flow of warnings, disaster preparations, supply distribution, and immediate aid and recovery (Hawkins and Maurer, 2010; Heller et al., 2005), social capital remains understudied in terms of disaster management, perhaps due to the difficulty in agreeing upon metrics (Aldrich and Meyer, 2015).

In this study, I draw on Putnam, Nanetti, and Leonardi's (1993) definition of social capital, as the features of social organizations, such as networks, norms, and trust that facilitate action and cooperation for mutual benefit. The Putnam et al (1993) conceptualization of social capital has a strong focus on voluntary association membership and social trust. Interest in the role of civil society organizations as drivers of democratic culture heightened when the fall of the Berlin Wall ushered in a new wave of democratization in many post-socialist states. Around the time of this post-Cold War democratic wave, Putnam et al (1993) emphasized the importance of voluntary associations in generating horizontal networks of civic engagement necessary for democracy – building upon the work of Alexis de Tocqueville. De Tocqueville highlighted the importance of associations with objectives *outside* of politics as essential to civic life fostering democracy (de Tocqueville 1835/1994). Building on Putnam's neo-Toquevillian vision of civil society, international organizations began to increasingly fund civil society organizations. Subsequently, inclusion of civil society became a core component of both peacebuilding and development processes (Sampson 2012). Bilateral donors increasingly reallocated development aid through bypass channels, such as NGOs, firms, or other intergovernmental organizations starting in the 1990s due to perceptions of the underperformance of aid (Easterly 2003; Dollar and Levin 2006; Easterly and Williamson 2011, in Reinhardt, 2015).

Consequently, I focus on voluntary association participation, as a measure of membership in voluntary associations, also known as community-based organizations and civil society organizations in West Africa, which are all forms of nonprofits. Many of the voluntary associations emerged from peacebuilding and democratization in the 1990s and early 2000s, as I find in my interviews with 100 organizations as part of this study. I examine voluntary association participation, in addition to raising issues and social trust, across all 54 districts in Guinea, Liberia, and Sierra Leone, and their correlation with Ebola outcomes. I also investigate other variables such as political trust, religious group membership, community meeting attendance, distance from the capital, population density, and educational attainment.

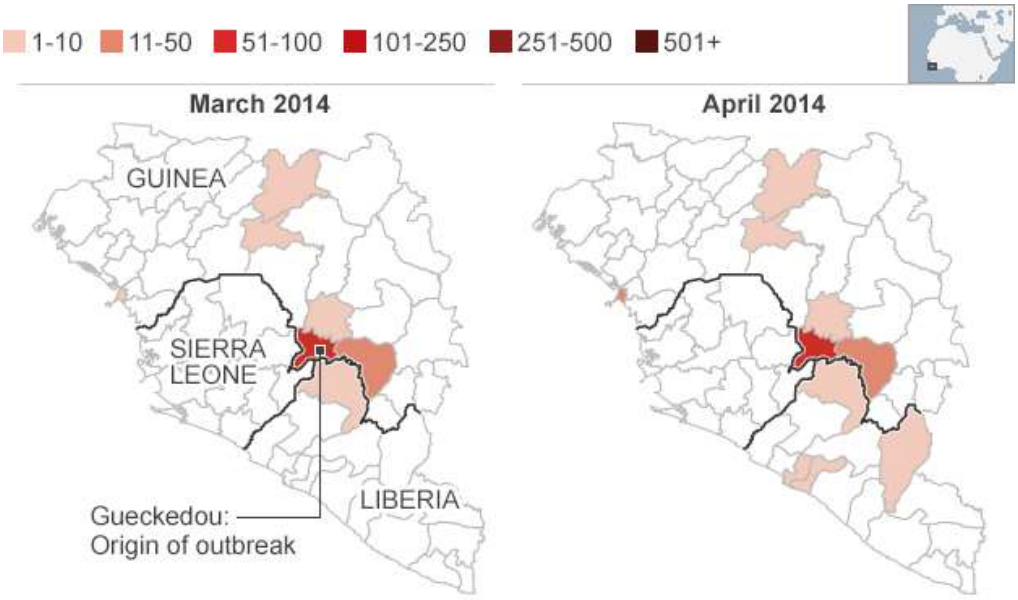
Existing Explanations for the Variation in Ebola Outcomes

Viral, health, and epidemiological factors alone do not account for the variation in outcomes in the Ebola policy response (Cenciarelli et al., 2015 in Calnan et al., 2018). Social conditions contributed to the virulence of the epidemic in Guinea, Liberia, and Sierra Leone, and necessitate more interdisciplinary

research examining social dimensions of the Ebola response at international, national, and community levels (Roemer-Mahler and Rushton, 2016; Abdullah and Rashid, 2017). However, there is limited research about local and national responses to the 2013-2016 West Africa Ebola epidemic (Calnan et al., 2018).

Overall, 11,310 out of 11,325 deaths from Ebola occurred in Guinea, Liberia, and Sierra Leone (Center for Disease Control and Prevention, 2019). The three countries most impacted by Ebola had similar cultural practices and levels of health and human development.[2] Prior to the outbreak, Guinea, Liberia, and Sierra Leone had among the lowest physician per capital ratios in the world and the epicenter of the Ebola outbreak took place along historically marginalized border regions. However, there was wide variation in mortalities and epidemic duration across districts (see Figure 1) in the three countries.

Figure 1 Map of Initial Ebola Outbreaks in West Africa.



Source: WHO, National Health Ministries, and HDX (2014)

The three countries most affected by Ebola are argued to have poorer public infrastructure than their neighbors, and overall, the delayed intervention of international organizations, alongside weak state institutions, poor public infrastructure, and a lack of trust, undermined the Ebola response (Topka, Kaufmann, and Zanker, 2015) However, disaster researchers Aldrich and Meyer (2015) argue that governmental organizations over-emphasize physical infrastructure rather than social infrastructure, in terms of disaster resilience. In addition to weak health systems, social resistance also enabled Ebola to spiral out of control in Guinea, Liberia, and Sierra Leone.

Social resistance to international as well as local responders was pervasive. As an example, the WHO reported that they were at times met with violence, particularly during the first six months (WHO, 2015). The border regions at the epicenter of the epidemic were all home to marginalized ethnic groups.

Since the epidemic originated in this marginalized region, this led to stereotypes about Ebola and initial indifference at the national level. Rumors about Ebola proliferated due to the failure of governments to effectively communicate about Ebola (Lahai, 2017), and fueled social resistance across the three countries. Social resistance included riots, threats to burn down Ebola treatment centers (Moriba, 2014), massacres and general violence against Ebola responders (Mark, 2014; Momou, 2015). Other forms of social resistance included refusal to allow family members to be taken to Ebola treatment centers, stoning of ambulances and burial teams, resistance to quarantine, and 'secret' burials of Ebola victims in non-compliant ways.

The contrast between medical treatments and more traditional methods of healing catalyzed rumors and social resistance, especially with the marginalization of traditional healers, who had authority in many communities. For instance, as noted by the international NGO Concern Worldwide, responses to Ebola included "If you go into a clinic, you'll be given an injection to speed your death; Ebola can be cured by home remedies….the Government fabricated Ebola to depopulate rebellious provinces; health personnel and NGO staff are spreading the disease…"(Concern Worldwide 2014, in Lahai, 2017, p. 2).

In light of government failure to properly communicate and address the epidemic, international organizations intervened. Initially international organizations were reticent to work with local organizations. However, they faced significant challenges, especially social resistance given different cultural approaches to epidemic control and caring for the sick and dying. As a result of social resistance, international organizations began to work more closely with local organizations, and consequently, the response was more successful (Interviews, 2017). As noted by Richards (2016) "local agents and international responders, working together, discovered something not known hitherto – how to end an Ebola epidemic" (Richards, 2016, at 2). Local involvement in international crisis response leads to a more effective response and builds more capacity, reducing the need for humanitarian intervention in future crises (Mills, 2014). While Richards (2016) indicates that when local organizations were involved, the Ebola response was more successful, there is, to date, no cross-national analysis of the role of voluntary association participation during Ebola.

The Role of Social Capital During the Ebola Response

Existing work is inconclusive regarding the role of social capital in explaining the cross-national and cross-district variation of Ebola outcomes, and this is the first study to focus on the role of voluntary associations comparatively. Individual country case studies examining the social environment around the Ebola response tend to point to the lack of social trust, or the lack of political trust, within their own case, as opposed to other contexts. For instance, numerous explanations of Ebola's virulence highlight the role of social resistance rooted in a lack of social trust (Dhillon and Kelly 2015 with reference to Guinea; Richards 2016 with reference to Liberia; Tokpa, Kaufmann, and Zanker, 2015 with reference to Sierra Leone). Lack of political trust, and in particular, distrust of the army, arguably also fueled social resistance in Guinea (Wilkinson and Fairhead, 2017). In Liberia, a lack of political trust led to social resistance, denial, and misinformation during Ebola (International Alert, 2015). Lower social trust, distrust of the government, distrust of the army, social resistance to the responders, and rumors were argued to be more prevalent in Guinea than elsewhere (Ensirink, 2015; Richards, 2016; Tokpa et al., 2015). Similarly, Pieterse (2019) notes that Sierra Leone had low levels of political trust that impacted

the Ebola response. Relatedly, Anderson and Beresford (2016) suggest that long-term political factors contributed to the Ebola crisis in Sierra Leone, which had more cases than in Guinea and Liberia. In Liberia, Kieh (2017) notes that a deep distrust of elites and outsiders catalyzed the spread of Ebola. Given social resistance, the need for community mobilization became apparent across all three countries (Abdullah and Rashid, 2017). External evaluations of the response point to the missed opportunity to engage local and civil society leaders to build trust and mobilize communities, especially in rural areas; this may even have been the turning point in the epidemic (Lupel and Snyder, 2017). Therefore, according to the ethnographic research, social trust and political trust were all argued to fuel social resistance during Ebola, across countries, at the same time, there was variation at the district and national levels in terms of Ebola duration and mortality. As a result, I turn to cross-national, cross-district quantitative analysis, triangulated by interview findings, to unpack the role of voluntary association participation, as well as social trust, political trust, and other related social capital variables, in Ebola outcomes.

While there is existing ethnographic work on variables related to social trust, political trust, and local culture during the Ebola response (see, for example, Richards, 2016; Dhillon and Kelly, 2016) most existing work focuses on a single country case. If comparative analysis exists, it only addresses two countries whereas the researcher might have only visited one of them for interviews and ethnography (see Wilkinson and Fairhead, 2017). A lack of social trust and political trust, as well as social resistance, were not unique to any specific country, however, and occurred across the three countries. The purpose of this paper is to provide the only, to this date, cross-national quantitative analysis of the role of voluntary association participation, substantiated by evidence from qualitative interviews conducted during fieldwork.

Cross-National Analysis of Voluntary Association Participation

Though similar in terms of levels of health infrastructure and development, all three Ebola-afflicted countries had different experiences of institutional development that are perhaps related to the social capital necessary to respond to crisis. Existing scholarship illustrates that the presence and density of nonprofits reflects civic capacity, as variation may be “enduring, sizable, and extensive” among communities (Clifford, 2018, p. 1577, in Brandtner, 2018, p. 3).

Overall, there is limited analysis examining the extent to which international aid to civil society generates the necessary social capital for crisis response. Local cooperation during a crisis is arguably cheaper, faster, more efficient, and leads to more resiliency of the social sector long-term. However, while local organizations and individuals comprise the majority of first responders, they receive little to no funding during international humanitarian crises, as compared with large-scale international NGOs and governments.

Ebola revealed that capacity goes beyond infrastructure and technical skills – relationships produce capacity, and the social embeddedness of the state, civil society, and external actors matter (Mallet and Harvey, 2015), particularly in terms of aid management and governance, and human agency (Abdullah and Rashid, 2017). Participation was a key strategy in combating the AIDS pandemic in sub-Saharan Africa as well as other health crises and implementing wider policy reforms (Barnes, Brown, and Harman, 2015). Relatedly, Arandel, Brinkerhoff, and Bell (2015) note that increased citizen engagement with local officials through a donor-funded collaborative governance project in Guinea improved service

delivery, resulted in more positive attitudes, and increased trust, depending on individual agency and leadership. Mutima, Gitomer, and Hobson (2015) indicate that local women's organizations in Guinea, Liberia, and Sierra Leone, for example, were crucial to ending Ebola.

Data and Methods

I use a mixed-methods approach to investigate the role of voluntary association participation and other forms of social capital in reducing Ebola mortality and duration during the 2013-2016 West Africa Ebola Epidemic. I first create a cross-national dataset merging variables related to pre-Ebola voluntary association participation and social capital with Ebola outcomes. Second, I interview 100 local and national NGOs and civil society organizations ("CSOs") on the emergence and evolution of their organizations, the role of their organizations during Ebola, and general challenges to the civil society sector as well as perceptions of international aid during Ebola.

For my field sites, I visited the areas most susceptible to Ebola: near the epicenter of the outbreak along the border regions, and in the capital. Therefore, my field sites include capital cities: Conakry and Freetown, which also have a high concentration of NGOs. Most studies of NGOs focus on international NGOs, particularly in capital city field offices or in headquarters in Western global capitals. However, I select only domestic civil society organizations founded and managed by nationals, which are widely understudied, particularly in the interior, with a national or local certification to operate, and interview at least 20 organizations within each field site. While informal organizations certainly play a role in civil society, for my interviews, I focus on formally registered organizations, particularly as these were part of the civil society project during peacebuilding and democratization, and formal registration is required for international aid. The activities of the organizations interviewed range from grassroots-based organizations and community-based organizations engaged in local projects (for example, community service, training, and volunteering), organizations engaged in advocacy around human rights, governance, peacebuilding, women's rights, youth rights, health, environment, and education norms, including Ebola survivor's groups, and a limited number of organizations that had technical capacity to deliver services in education, health, and water and sanitation.

In each country, I also selected a town in the interior at the epicenter of the epidemic, therefore conducting interviews in each of the border regions. These field sites included Nzérékoré (Guinea) and Koidu (Sierra Leone). Each town is the district capital and the largest city of the region bordering the Ebola epicenter. Additionally, each selected town was the second city, and not the first, to encounter Ebola. Epidemiologists and Ebola responders suggested selecting an interior town that was not necessarily "Ground Zero" like Guéckédou but one where there was already awareness that Ebola existed in the country, to examine outcomes related to the international response. All four towns/cities are highly ethnically diverse. Given the high amount of qualitative evidence, for the purpose of this paper, I will present the qualitative evidence within the context of explaining quantitative results and providing context.

Figure 2. Selection of Field Sites

Source: Google Maps.

Notes: Field sites indicated in yellow. Ebola Patient 0 indicated in red.

Data Sources

My dataset merges variables from Afrobarometer public attitude surveys with Ebola mortality data (March 24, 2014—March 28, 2015) from three sources: United Nations Office for the Coordination of Humanitarian Affairs ("UN OCHA") sub-national time series data on Ebola cases and deaths, which also draws from the World Health Organization ("WHO") and the Center for Disease Control ("CDC") Ebola situation reports, and district-level census data across three countries. The Afrobarometer Round 5 data (2011-2013) includes 14,396 individual respondents from across Guinea, Sierra Leone, and Liberia, collected before the Ebola crisis.[3] The sub-national time series data on Ebola cases and deaths in Guinea, Liberia, Sierra Leone, Nigeria, Senegal and Mali is a compilation of figures from the WHO, national health ministries and other sources. The census data includes 2014 census data from the Guinean National Statistics Institute, census projections for 2014 from the Liberia Institute of Statistics and Geo-Information Services (LISGIS), and 2015 census data from Statistics Sierra Leone. Data availability in West Africa is limited, though capacity is developing. Public health researchers Kelly et al. (2018) and Kelly et al. (2013) used the Sierra Leonean and Liberian census data in several studies. My dataset includes 14 districts in Liberia, 14 in Sierra Leone, and 27 in Guinea – covering all districts across the three countries.[4 5] More extensive information describing the dataset are in the data appendix.

Variables

Independent Variables

Social Trust. To measure social trust, I construct an index, similar to Kuenzi (2008) and Nunn and Wantchekon (2011), using survey data from Afrobarometer, based on responses on the degree to which

participants trusted most people, and then more specifically, their relatives, their neighbors, and people they know.

Political Trust. To measure political trust, I construct an index using survey data from Afrobarometer. I create a similar political trust index using 2011-2013 Afrobarometer survey responses, similar to Kuenzi (2008), Lavallée, Razafindrakoto, and Roubaud (2008), and Moehler (2008). I examine the degree of trust in government institutions: the president or prime minister, national assembly, local government authorities, police, courts of law, political parties, and the army[6]. In particular, a lack of trust in the army is frequently cited as a reason for social resistance to Ebola response efforts. The army enforced quarantine and restricted movement during the state of emergency. Kuenzi (2008) justifies the creation of an additive index due to high correlation and scale reliability coefficients amongst political trust items.

Voluntary Association Membership.[7] The international peacebuilding process in Guinea, Liberia, and Sierra Leone encouraged the development of civic associations to bolster support for democracy, peace, and reconciliation, and prevent relapse into conflict. To measure voluntary association participation, I use the response in the Afrobarometer survey to the question of whether respondents participate in a voluntary association or community group, and if they are an active participant or leader, creating a scale. In my model I use a dummy variable indicating whether they are a member, since having a scaled variable for non-members, inactive members, active members, and official leaders might skew results in favor of communities with many leaders but not many members.

Religious Group Membership. Putnam et al. (1993) find that religious organization participation facilitates vertical networks of engagement, rather than the vertical networks of engagement that foster democracy. However, their study was limited to a comparison between Northern and Southern Italy, where religious identity was predominantly Roman Catholic, in contrast to religious diversity in West Africa. In contrast to the Putnam et al. (1993) study, Boix and Posner (1996) maintain that the Catholic Church and other vertically organized associations may also facilitate opportunities for horizontal networks within their membership.

Relatedly, Aldrich and Meyer (2015) and Chamlee-Wright and Storr (2009) view religious organization participation as a potential form of bonding social capital. In particular, in a study of a New Orleans community heavily flooded during Hurricane Katrina, Chamlee-Wright and Storr (2009) found that bonding social capital and the role of the Catholic Church in the community, particularly in terms of coordination, enabled the community to recover faster. Religion is also a very salient part of people's lives in Guinea, Liberia, and Sierra Leone. To measure religious group participation, I use the response in the Afrobarometer survey that asks whether respondents are a member of a religious group that meets outside of regular worship services. I do not use the scale, which includes leadership, because there is variation in the ability of individuals to become leaders in their faith among religions.

Community Meeting Attendance. Afrobarometer (2013) maintains that attending a community is among the "actions that people sometimes take as citizens" (Afrobarometer, Round 5 Codebook, at 18). Respondents were asked whether they personally had attended a community meeting during the past year, if yes, how often, and if not, if they would attend a community meeting if they had the chance.

Raised Issue. Afrobarometer (2013) surveyed respondents as to whether they met together with others to raise an issue, qualifying this as an action at times individuals take as citizens. This perhaps

measures collective action outside of more formal voluntary association participation. I selected this measure as voluntary association participation may be more passive, for instance, belonging to a trade union would be a different level of collective action that might be led by others, as opposed to getting together with others to raise an issue.

Educational Attainment. Low educational attainment may heighten the likelihood of individuals believing rumors such as "Ebola is not real", as illiteracy in particular leads individuals to rely on others for information. I use the responses from the random sample composed by Afrobarometer to construct a regional/district mean variable for educational attainment, coding each level between "no schooling" to "post-graduate degree."

Control Variables

Distance from the Capital. I also control for distance from the capital in kilometers. Distance from the capital was important in terms of the delivery of supplies during the intervention. The long distance from the capital is a potential reason for Ebola's virulence in the border regions.[8]

Ebola Susceptibility Dummy. I define Ebola susceptibility as whether the district was at epicenter of the epidemic (region including or bordering where "Patient 0" or the first Ebola patient lived, Guéckédou, Guinea), or a capital city. I include capital cities given the rapid spread of Ebola there due to both population density[9] and the higher likelihood of travel from the interior to the capital rather than between interior towns and villages due to postcolonial patterns of trade. Ebola followed colonial trade routes: it traveled from the interior to capital cities, and then back out to the provinces, rather than across the provinces.

Country fixed effects. I also control for country fixed effects[10] in my models. My dependent variables are *Ebola duration* (measured in months, however results are the same for days) and *Ebola mortalities* (deaths per 1000 inhabitants in a district).

Models

I use OLS regression to examine whether differences in social capital are associated with the variation in Ebola outcomes. My model examines whether differences in social trust, political trust, participation in local associations, religious organization membership, raising issues, attendance at community meetings, women's group participation, youth group participation, educational attainment, may explain variation in the outcomes of the Ebola response. I match variables related to social capital at the district level with World Health Organization (WHO) Ebola mortality data. I control for Ebola susceptibility, distance from the capital in kilometers, and country fixed effects.

I check for multicollinearity among my variables by examining the variance inflation factor (VIF) in my OLS regression model. The VIF measures the extent to which the variance of an estimated regression coefficient increases when there is correlation among the independent variables. The VIF for all independent variables (except those explained below) in both models ranged from 1.04 to 4.19, well below the threshold of 10 (O'Brien, 2007). I also double-check for multicollinearity by taking the square root of the VIF, which was well below the threshold of 2 for all independent variables.

In Model 1, social trust and voluntary association participation have high collinearity with country fixed effects. However, dummy variables are at times collinear with country fixed effects due to one country variable being dropped. When I checked the VIF and correlation with the scaled variable rather

than the dummy variable, there was much lower collinearity, therefore this result is due to the interaction of the dummy variable with the country fixed effects. The square root of the VIF for social trust is 2.014, nearly at the threshold of 2.0, yet Model 1 is not the main model of interest.[11] As an additional check, I run correlation tests for multicollinearity. I find that all of my independent variables, with the exception of the social trust index correlation with distance from the capital, are well outside of the threshold for multicollinearity.

In a final step, I conduct a sensitivity analysis, which illustrates that my findings about voluntary association participation, the practice of raising issues, and religious group membership are robust to using robust standard errors to calculate statistical significance. The sensitivity analysis can be found in the data appendix.

Results

Surprisingly, social and political trust were insignificant across models, even though much of the literature on Ebola points to limited social trust and political trust as explanations for Ebola mortality outcomes. Model 1 measures aspects of pre-disaster social capital in Guinea, Liberia, and Sierra Leone on Ebola mortalities. Distance to the capital[12] is not included in Models 1 and 2 because it is highly correlated with social trust.[13] Educational attainment was insignificant across the models.

My main finding is that communities that had a higher rate of "raising issues" were significantly associated ($p<0.05$) with lower Ebola duration levels (measured in days) (Figure 3). Voluntary association participation is also significant in terms of lower Ebola duration, though at the $p<0.1$ level (Figure 4). Neither voluntary association participation, nor the practice of raising issues, are significant in terms of mortality reduction. Second, communities with higher religious group membership rates (religious groups that meet outside of regular worship services) also correlate with lower Ebola duration ($p<0.05$) (Figure 5). Together, these results suggest that while voluntary association is significant, the practice of meeting with others to raise an issue was more significant in terms of reduced Ebola duration.

In addition to social trust and political trust, as well as education, health infrastructure, and distance to the capital, I examine variables related to civic participation: voluntary association participation (in terms of membership and non-membership), community meeting attendance, raising issues, and religious group membership.[14]

At first, it is striking to see that pre-Ebola voluntary association participation[15] is not significant in terms of district-level Ebola mortality outcomes. However, voluntary association participation (a dichotomous variable measuring membership and non-membership) is significant in Ebola duration outcomes (Model 4). Community meeting attendance is insignificant. However, this may be explained by the fact that community meetings were banned during Ebola because of the contagious nature of the epidemic. In terms of examining the quality of participation, the raised issue variable, as well as religious group membership (groups meeting outside of worship services), have the highest significance levels across all models. In Model 6, the pre-Ebola practice of "raising issues" correlates with reduced Ebola duration at the district level, and it is more significant than voluntary association participation in Model 5 ($p < 0.05$ versus $p<0.1$).

Figure 3. Pre-Ebola Practice of Raising Issues and Ebola Duration Outcomes

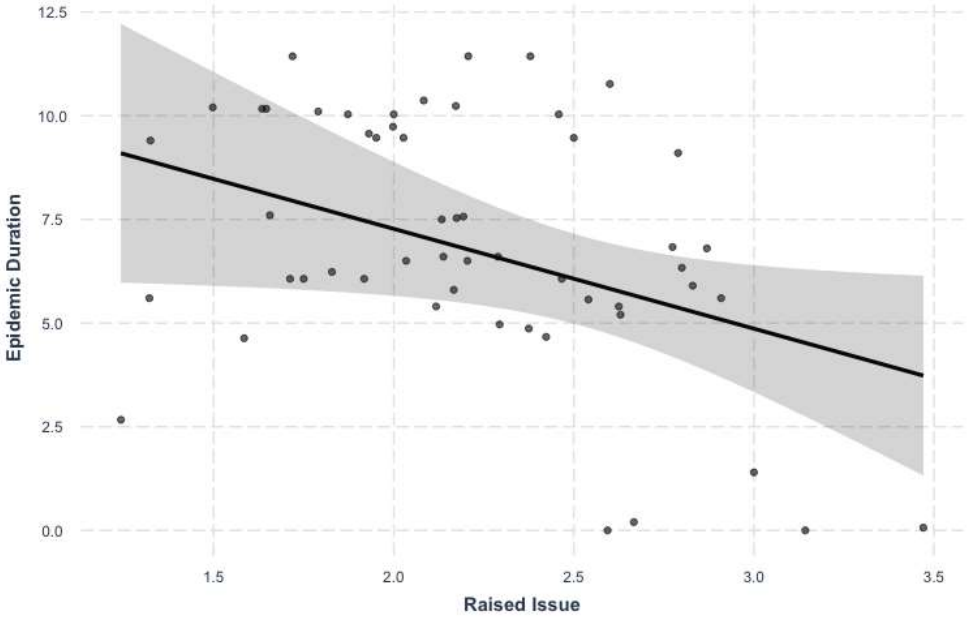


Figure 4. Pre-Ebola Voluntary Association Participation, Raising Issues and Ebola Duration Outcomes

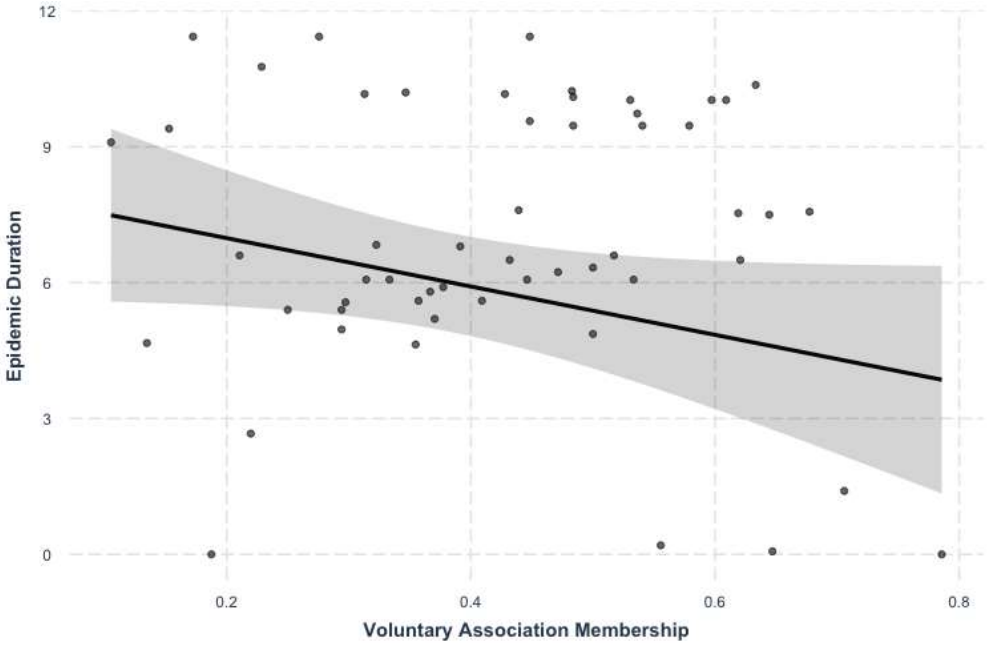
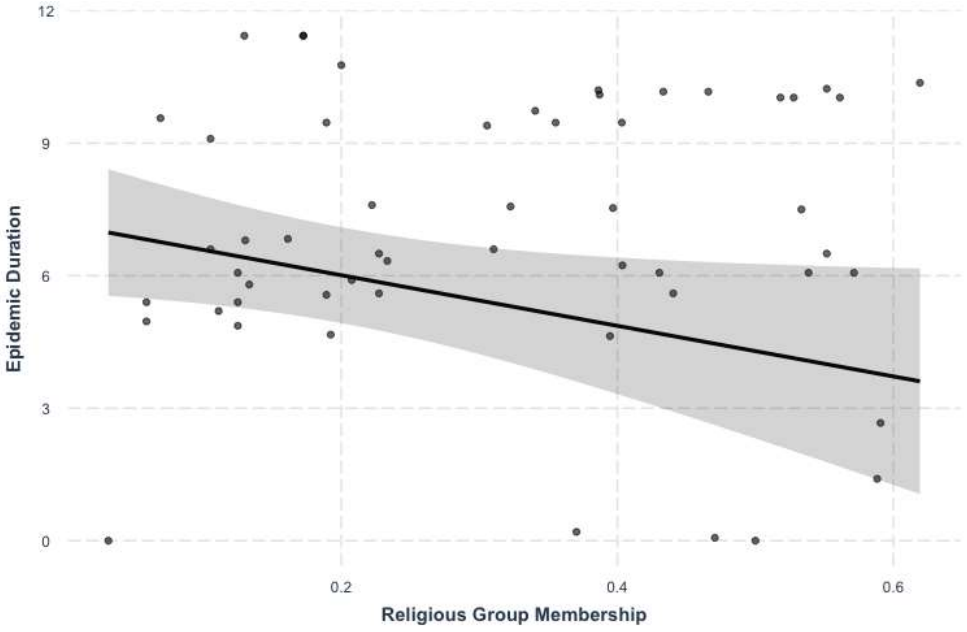


Figure 5. Pre-Ebola Religious Group Membership and Ebola Duration Outcomes



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Discussion

In these models, I examine a variety of variables related to social capital and voluntary association participation, on Ebola mortalities and duration. Pre-Ebola practices of raising issues with other community members, and religious group membership, correlate with reduced epidemic duration. Voluntary association participation is also significant, though to a lesser extent, in mitigating Ebola duration outcomes. Social trust, political trust, education, and community meeting attendance were not statistically significant.

Table 1. Variation in Ebola Outcomes in Guinea, Liberia, and Sierra Leone

Variation in Ebola Outcomes in Guinea, Liberia, and Sierra Leone, by district

	Dependent variable:									
	Mortalities	Duration	Mortalities	Duration	Mortalities	Duration	Mortalities	Duration	Mortalities	Duration
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Social Trust	-0.337	-0.644								
	(0.384)	(2.085)								
Political Trust	0.207	1.702								
	(0.215)	(1.171)								
Voluntary Association Participation	0.181	-2.701	-0.347	-5.339*						
	(0.597)	(3.243)	(0.509)	(2.797)						
Raised Issue					0.057	-2.407**				
					(0.209)	(1.134)				
Religious Group Membership							-0.378	-5.729**		
							(0.503)	(2.747)		
Community Meeting Attendance									-0.116	-1.316
									(0.191)	(1.069)
Ebola Susceptibility	0.460**	2.547**	0.389*	2.120*	0.448**	2.082*	0.415**	2.526**	0.408*	2.506**
	(0.213)	(1.157)	(0.209)	(1.149)	(0.209)	(1.135)	(0.201)	(1.096)	(0.204)	(1.141)
Distance to Capital			-0.286	-1.056	-0.237	0.045	-0.250	-0.489	-0.162	0.579
			(0.329)	(1.808)	(0.321)	(1.741)	(0.320)	(1.746)	(0.339)	(1.898)
factor(country)LB	0.121	1.125	0.300*	1.337	0.346	-0.596	0.387*	2.650**	0.258	0.868
	(0.301)	(1.638)	(0.166)	(0.912)	(0.237)	(1.283)	(0.202)	(1.103)	(0.180)	(1.006)
factor(country)SL	0.057	2.898*	0.228	3.328***	0.195	1.474	0.250	3.647***	0.162	2.352**
	(0.279)	(1.516)	(0.192)	(1.054)	(0.193)	(1.049)	(0.202)	(1.103)	(0.174)	(0.974)
Constant	0.393	5.086	0.439	8.116***	0.138	11.801***	0.367*	6.987***	0.572	8.979***
	(0.754)	(4.097)	(0.280)	(1.539)	(0.553)	(2.999)	(0.196)	(1.070)	(0.500)	(2.804)
Observations	54	54	54	54	54	54	54	54	54	54
R^2	0.210	0.331	0.196	0.305	0.189	0.317	0.198	0.315	0.194	0.276
Adjusted R^2	0.109	0.246	0.112	0.233	0.105	0.246	0.114	0.243	0.111	0.200
Residual Std. Error	0.486 (df = 47)	2.643 (df = 47)	0.485 (df = 48)	2.665 (df = 48)	0.487 (df = 48)	2.643 (df = 48)	0.485 (df = 48)	2.647 (df = 48)	0.486 (df = 48)	2.721 (df = 48)
F Statistic	2.079* (df = 6; 47)	3.877*** (df = 6; 47)	2.340* (df = 5; 48)	4.220*** (df = 5; 48)	2.244* (df = 5; 48)	4.451*** (df = 5; 48)	2.365* (df = 5; 48)	4.409*** (df = 5; 48)	2.318* (df = 5; 48)	3.651*** (df = 5; 48)

Note: *p<0.1; **p<0.05; ***p<0.01

In particular, the higher significance of "having gotten together with others to raise an issue" than voluntary association participation in and of itself suggests that having voice and an opportunity to discuss issues with others are perhaps the most important social factors in terms of mitigating epidemic outcomes. Gathering and raising issues perhaps best captures the level of participation in a community, as one may attend meetings or join an association but not be active. Given the contentious politics around Ebola and the response, the ability to raise issues in a community setting may have led to more buy-in of the response given the ability to question and obtain information. In addition, religious group participation (outside of services) was also correlated with reduced Ebola duration across districts.

Voluntary association participation, in terms of membership, is significant as opposed to the scaled variable of non-member, inactive member, active member, and leader. The scaled variable, as I predicted, is over-weighted on leadership and levels of activity (non-member, inactive member, active member, leader). A civil society that has many leaders and fewer followers may be more hierarchical than vertical. Higher membership rates facilitates more civic participation. Therefore, the organizational structure of civic organizations may influence their levels of political socialization. This correlates to my finding on the importance of having voice, or rather "raising issues", as being the most significant variable in mitigating Ebola duration outcomes. Relatedly, Ebola lasted much longer in Guinea, where voluntary association membership was lowest, than in Liberia and Sierra Leone. At the same time, when voluntary association leadership was measured, Guinea scored highest, but as noted, this variable was not significant.

Pre-Ebola Voluntary Association Participation and Reduced Ebola Duration

Though voluntary association participation did not appear to impact mortalities, it correlates with reduced Ebola duration in Model 4. When international organizations, once met with social resistance, finally started working with local organizations, the Ebola response was better received by communities (Richards 2016). The response was better able to do this in Liberia and Sierra Leone, where there were more pre-existing relationships with international NGOs. In particular, the variables "voluntary association participation", "religious group membership", and "raised issue" are significant in terms of reduced Ebola duration (however not mortalities). The response worked better at garnering local buy-in in communities where individuals were used to raising issues and participating in associations. However, voluntary association participation was not significant in terms of Ebola mortality outcomes.[18]

The insignificance of the voluntary association participation variable in terms of mortalities also points to (1) the lack of coordination during the international humanitarian response to Ebola and (2) the notion that social capital might not always have net positive effects on a community, as citizens were able to mobilize against the international response. A tightly-knit community also may have been better able to circulate misinformation regarding Ebola, fueling social resistance.

My results suggest that social capital does not only have positive effects, but can also lead to organization against the humanitarian response. Chambers and Kopstein (2001) note that "particularlist civility" differs from democratic civility as the "goods associated with participation" are relegated to one particular group, often resulting in less trust and public spiritedness of members outside the group. Social capital, may be positive or negative, and civil society in democratizing countries depends much more on socioeconomics than existing research suggests (Chambers and Kopstein, 2001). Social capital

and horizontal networks of civic engagement fostering "particularist civility", particularly in a post-conflict context with remaining strong ethnic divisions, fueled social resistance during Ebola. Once there was communication and outreach to local organizations, the elimination of a purely top-down approach by international organizations led to more horizontal networks of locals, nationals, and internationals – even if the aid relationship still means they were somewhat vertical.

Lack of Coordination, Social Resistance, and Finally Collaboration

Typically, the UN Office for the Coordination of Humanitarian Affairs (OCHA) coordinates local, national, and international organizations. However, instead of an OCHA-led coordination, for the first time, the UN created an emergency health mission, the UN Special Mission for the Emergency Ebola Response (UNMEER), based in Ghana. Largely focused on coordinating UN agencies (Rashid, 2017), UNMEER did not view working with local organizations as part of its mandate, citing their lack of technical capacity and perceived political nature (Interviews, 2017). UNMEER and the international response as a whole was militaristic and security-oriented, rather than collaborative, and even international NGOs expected UNMEER to coordinate their efforts and include them in consultations (Kamara, 2016; Snyder and Lupel, 2017). The initial response to Ebola was largely hierarchical, reflecting differences in organizational culture between top-down peacekeeping approaches and more horizontal humanitarian responses, leading to friction in coordination and exclusion of many stakeholders (Snyder and Lupel, 2017).

Model 4 illustrates that in fact, voluntary association participation is positively associated with reduced Ebola duration. Once communities were provided a space to express concerns and raise issues, this likely reduced social resistance and the response improved. My findings also illustrate that the opportunity to raise issues and have discussion around interventions is more perhaps more effective at generating civic participation and engagement, than merely attending a meeting or being a member of a voluntary organization. Membership in and of itself may not make or break communication during a crisis, but the opportunity for dialogue may very well indicate whether or not international humanitarian intervention succeeds. Therefore, organizations where there is more opportunity to participate and have dialogue may be more successful at generating civic participation, as exhibited by the success of consortia in the qualitative data. Strong community networks in and of themselves might either organize in favor of the international response – or, as we see with Ebola, galvanize social resistance to the international response, particularly when it is top-down either on the part of international responders or government or capital elites. Certain types of organizations, particularly those that are membership-based, may be better at providing a space for dialogue, than others that have many leaders vying for power and fewer members. These organizations, though they may lack technical capacity, have a strong added value in communication, as observed in the organizational interviews and may be key in generating the necessary behavior changes for a successful epidemic response (Interviews, 2017). My model suggests that in contexts where there is increased space for discourse and participation among beneficiary populations, disaster response improves.

Religious organization membership was associated with a reduction in Ebola duration outcomes, however not for mortalities. This finding is consistent with qualitative evidence that eventually, imams, priests, and ministers addressed distrust within communities and encouraged them to no longer attend services, given the ban on public gatherings (Interviews, 2017). In Sierra Leone, government and

humanitarian organizations did not involve religious leaders in the response until late 2014, and their participation, particularly in revised burial practices, was reportedly a "game changer" in terms of social resistance given high levels of trust by communities (Featherstone, 2015).

Likely, in the beginning mortalities may have been initially higher among this population because they were more likely to attend services and come into contact with Ebola. This is also similar for the voluntary association variable. In both instances, international organizations began to work more with local organizations once the epidemic peaked (Interviews, 2017).

Community meeting attendance, despite its role in facilitating information-seeking, exchange, and civic participation, was not statistically significant, either, again, likely due to the risk of contamination, and the fact that community meetings were banned. Attendance of community meetings in itself may not be enough, however, having the opportunity to raise issues appears to be more important than simply attending community meetings.

Community engagement was pivotal to the Ebola response, in particular, as epidemics necessitate community buy-in and behavior change. International responders initially portrayed communities as hindering the response due to social resistance, yet once the epidemic exploded, response tactics changed to view communities as central to the response (Interviews, 2017). Raising awareness may not sufficiently lead to enactment of behavior change, however, trust played an important role in adopting behavioral changes during Ebola as the message and messenger (community leaders, local organizations) needed to be trusted first (Ali, Fallah, et al., 2022; Ali, Fallah et al., 2021). Evidence from the qualitative interviews illustrates that some of the most trusted organizations were faith-based organizations, therefore explaining the positive association of religious group membership with Ebola duration outcomes.

At the same time, community engagement approaches, particularly those funded by donors, may at times mobilize hierarchy rather than broaden vertical networks of participation. For instance, in a comparison of community-based interventions during Ebola in Guinea and Sierra Leone, Wilkinson, Parker et al. (2017) found that communities appreciated community care centers however resented their limited role in planning, which was led by international organizations, officials and chiefs, who villagers felt gave high salaried jobs to favored individuals. Villagers also indicated that international organizations, officials, and chiefs gave high salaried jobs to favored individuals (Wilkinson et al., 2017).

Particularly in contexts of low literacy, there is more space for elites who have access to education to dominate community discussion and participation, since well-educated people, due to their cultural capital, are more confident (Young, 1997; Sanders, 1997). When deliberation of policy issues assures that information is accessible, moderators are neutral, and participants have access to information on policy and are able to ask questions, deliberation results in a higher response rate by participants (Fishkin, 2015). Therefore, group deliberation in contexts with low structural equality, should provide accessible information (particularly in non-print formats) and the opportunity for individuals to raise issues, similar to the approach of local organizations engaging in sensitization ("outreach") approaches.

Limitations

Upon close examination of the WHO and CDC data, reporting of Ebola cases and mortalities was at times done by the same enumerator in rural districts, who had to travel from one remote district to another, therefore case and mortality counts in some districts were reported on different days, limiting

the types of analyses that could be conducted. In addition, while the Afrobarometer survey data was at the individual level, the Ebola case and mortality counts had to aggregated at the district level once the dataset was merged with WHO and CDC data, which only existed at the district level.

Conclusion

The capacity of organizations to generate the horizontal networks of civic engagement as suggested by Putnam (1993) is essential in crisis response. Overall, it seems that in districts where community members already were used to raising issues, Ebola duration outcomes were lower. Therefore, it is not merely voluntary association participation, but perhaps more importantly, the opportunity to raise issues and exchange information, that generates civic engagement during a crisis. A civic culture that embraces deliberation and raising issues improves community engagement. The lack of communication early into Ebola increased mortalities, however the implementation of cross-network collaboration reduced duration. Duration has more to do with larger systemic and social elements of crisis management that goes beyond short-term crisis response.

Voluntary association participation, while correlated with reduced Ebola outcomes, did not correlate with reduced Ebola mortalities. One main reason is that international organizations did not work with local organizations until they were met with massive social resistance (Interviews, 2017). In some instances, communities may have had strong social capital within, rather than bridging social capital with national and international responders, fueling social resistance and rumors during the response. In communities where there was already a culture of dialogue, of discussing and contesting information, the response appears to have worked better in terms of reduced Ebola duration.

Future research might examine the role of local organizations, and religious organizations and leaders, in the current COVID-19 response, especially given that international NGOs will be less able to send aid workers and supplies given the global reach of the pandemic. As of July 2, 2020, the borders of thirty-six African countries remained closed to international travel (WHO, 2020). Given the pandemic and the resulting economic crisis, the COVID-19 response in Africa will rely much more on local organizations. For example, in May 2020, Oxfam, one of the largest international NGOs, announced the closing of offices in eighteen countries (including Sierra Leone and Liberia) and layoff of 1,450 out of nearly 5,000 programmatic staff, due to coronavirus and the subsequent economic crisis, citing a move towards accompanying local organizations to fill the gap in services and advocacy (Worley, 2020). Even the engagement of religious organizations and local organizations might be of assistance in combating COVID-19 in more developed contexts, for example, in communities in the United States where there is resistance to vaccines and mask-wearing.

In addition, comparative work could examine how Guinea, Liberia, and Sierra Leone drew on lessons learned from Ebola, such as the importance of working locally and communicating with populations, and how this may have influenced the COVID-19 response. For example, one could assess to what extent local organizations adopted more metrics, monitoring, and evaluation practices as a result of working with international NGOs, and to what extent the COVID-19 response drew upon the experience of local organizations engaged in community outreach during Ebola.

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Data Availability Statement
Afrobarometer granted access to restricted data upon request. There is publicly available data but not at the same unit of analysis (district level).

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Data Appendix

1. Afrobarometer Survey Data

Afrobarometer is a series of national public attitude surveys measuring the social, political, and economic atmosphere in over 30 countries in Africa (Afrobarometer, 2016). The Afrobarometer team conducts in-person interviews with a randomly selected sample of 1,200 or 2,400 in every country surveyed.

Afrobarometer works with national partners in each country surveyed. The national partners are responsible for selecting and training interviewers in country, and ensuring quality control (2016). The interviewers receive training to conduct surveys in both national and local languages, as well as training in sampling protocol and field practices. Interviewers are only permitted to use official translations, unless it is just a small modification due to dialect. The interviewers conduct interviews within two days following the training, with a field supervisor. Interviews last one hour and only occur with the respondent's consent, and are usually in the local language to ensure representation. The in-person interviews ensure that individuals of all educational levels and language backgrounds are included, particularly given the low literacy rate on the continent. In general, this approach results in a high survey response rate and opportunity for respondents to clarify responses. The Afrobarometer data also includes information on the respondent's age, gender, religion, ethnicity, educational, and occupational level. All survey responses are confidential. The data is then cleaned, entered, and reviewed by partner data managers and the Afrobarometer data manager.

In terms of sampling principles and weighting, Afrobarometer uses national probability samples designed to generate a sample representative of all citizens of voting age (18 and older) in the country. Afrobarometer draws on random selection methods and sampling with probability proportionate to population size when possible to ensure more populated areas have a proportionally greater probability of being selected into the survey sample (Afrobarometer 2016). The most Ebola-prevalent regions, however, were all represented in the 2014-2015 data.

Regarding sample size and design, samples usually include 1200 or 2400 cases. According to the Afrobarometer website, a randomly selected sample of n=1200 cases allows inferences to national adult populations with a margin of sampling error of no more than +/2.8% with a 95 percent confidence level, and with n=2400 the margin of error decreases to +/2.0% at 95 percent confidence level. The sample design is clustered, stratified, multi-stage, and an area probability sample. The sample is stratified according to the main sub-national unit of government and by urban or rural location, to reduce the likelihood that distinctive ethnic or language groups are left out of the sample. On this note, some populations may be oversampled on purpose if they are politically significant. Concerning gender representation, to ensure an equal number of men and women, each day half the group of interviewers is assigned to interview men, and the other half women, and then they alternate the gender surveyed each day.

I aggregate the Afrobarometer survey observations to the regional/district level to include 63 districts, since the WHO/National Ministries of Health data on Ebola mortality rates (through 2015) is organized by region/district. While the Afrobarometer covered the same geographic territory and had 100 districts, the WHO data grouped districts differently, yielding a total of 63 districts. I therefore based the districts off the WHO data and cross-checked with a CDC map of the epidemic (CDC, 2014). I then drop districts with 15-20 sampled respondents, resulting in a final total of 54 districts. There were only

30 instances of missing data on the voluntary association variable, and 9 instances where the respondent indicated "don't know."

II. Afrobarometer Survey Questions

Let's turn to your views on your fellow citizens. Generally speaking, would you say that most people can be trusted or that you must be very careful in dealing with people?

Value Labels: 0= Must be very careful, 1= Most people can be trusted, 9=Don't know, 998=Refused to answer, -1=Missing

How much do you trust each of the following types of people:
Your relatives? Your neighbors? Other people you know?

Value Labels: 0=Not at all, 1=Just a little, 2=Somewhat, 3=A lot, 9=Don't know/Haven't heard enough, 997=Not asked, 998=Refused to answer, -1=Missing

Social Trust

Political Trust

How much do you trust each of the following, or haven't you heard enough about them to say:
The President/Prime Minister? Parliament? The Electoral Commission of [country]? The [Tax Department]? Your Metropolitan, Municipal or District Assembly? The Ruling Party? Opposition Political Parties? The Police? The army? Courts of law?

Value Labels: 0=Not at all, 1=Just a little, 2=Somewhat, 3=A lot, 9=Don't know/Haven't heard enough, 997=Not asked, 998=Refused to answer, -1=Missing

Voluntary Association Participation

Let's turn to your role in the community. Now I am going to read out a list of groups that people join or attend. For each one, could you tell me whether you are an official leader, an active member, an inactive member, or not a member: A voluntary association or community group?

Value Labels: 0=Not a member, 1=Inactive member, 2=Active member, 3=Official leader, 9=Don't know, 998=Refused to answer, -1=Missing

Religious Group Membership

Let's turn to your role in the community. Now I am going to read out a list of groups that people join or attend. For each one, could you tell me whether you are an official leader, an active member, an inactive member, or not a member: A religious group that meets outside of regular worship services?

Value Labels: 0=Not a member, 1=Inactive member, 2=Active member, 3=Official leader, 9=Don't know, 998=Refused to answer, -1=Missing

Community Meeting Attendance

Here is a list of actions that people sometimes take as citizens. For each of these, please tell me whether you, personally, have done any of these things during the past year. If not, would you do this if you had the chance: Attended a community meeting?

Value Labels: 0=No, would never do this, 1=No, but would do if had the chance, 2=Yes, once or twice, 3=Yes, several times, 4=Yes, often, 9=Don't know, 998=Refused to answer, -1=Missing

Raised Issue

Here is a list of actions that people sometimes take as citizens. For each of these, please tell me whether you, personally, have done any of these things during the past year. If not, would you do this if you had the chance: Got together with others to raise an issue?

Value Labels: 0=No, would never do this, 1=No, but would do if had the chance, 2=Yes, once or twice, 3=Yes, several times, 4=Yes, often, 9=Don't know, 998=Refused to answer, -1=Missing

Educational Attainment

What is the highest level of education you have completed?

Value Labels: 0=No formal schooling, 1=Informal schooling only (including Koranic schooling), 2=Some primary schooling, 3=Primary school completed, 4=Some secondary school/ high school, 5=Secondary school completed/high school completed, 6=Post-secondary qualifications, other than university e.g. a diploma or degree from polytechnic or college, 7=Some university, 8=University completed, 9=Post-graduate, 99=Don't know, 998=Refused to answer, -1=Missing

Health Access

Are the following facilities present in the primary sampling unit/enumeration area, or within easy walking distance: Health clinic?
Value Labels: 0=No, 1=Yes, 9=Can't determine, -1 Missing

III. Descriptive Findings

An examination of the Afrobarometer survey data shows that in contrast to existing studies arguing that political trust was lowest in Guinea, Guinea had the highest levels of political trust, and the highest aggregate levels of social trust (Figures A.1 and A.2).

Figure A.1. Social Trust Guinea, Sierra Leone, and Liberia

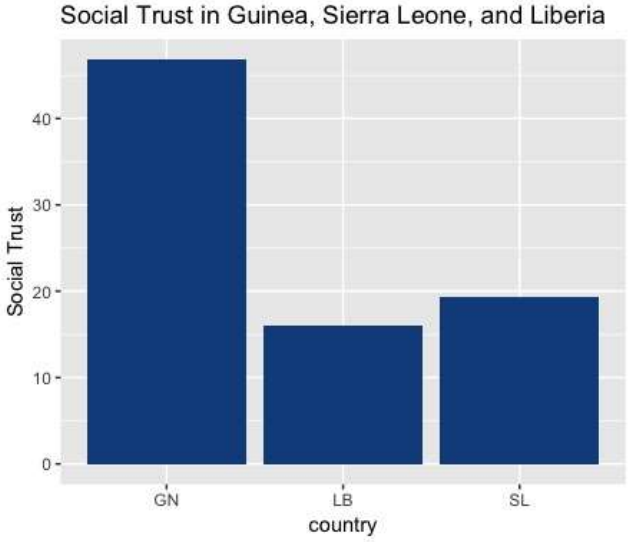


Figure A.2. Political Trust Guinea, Sierra Leone, and Liberia

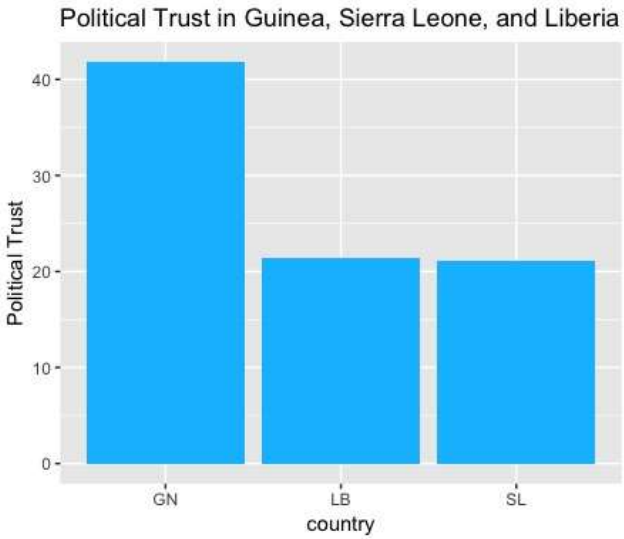


Figure A.2 illustrates social trust across districts in Guinea, Liberia, and Sierra Leone. Here, I examine social trust in the districts with the highest proportion of Ebola mortalities, with one or more deaths per 1000 people: Western Rural (Sierra Leone, the region just outside Freetown), Marigibi (Liberia), Macenta (Guinea), Montserrado (Liberia), Grand Cape Mount (Liberia), Lofa (Liberia), Port Loko (Sierra Leone – noteworthy for social resistance), Guéckédou (Guinea – noteworthy for social resistance). Social trust for these districts does not seem very low compared with other districts.

Figure A.3. Social Trust Across Districts in Guinea, Liberia, and Sierra Leone

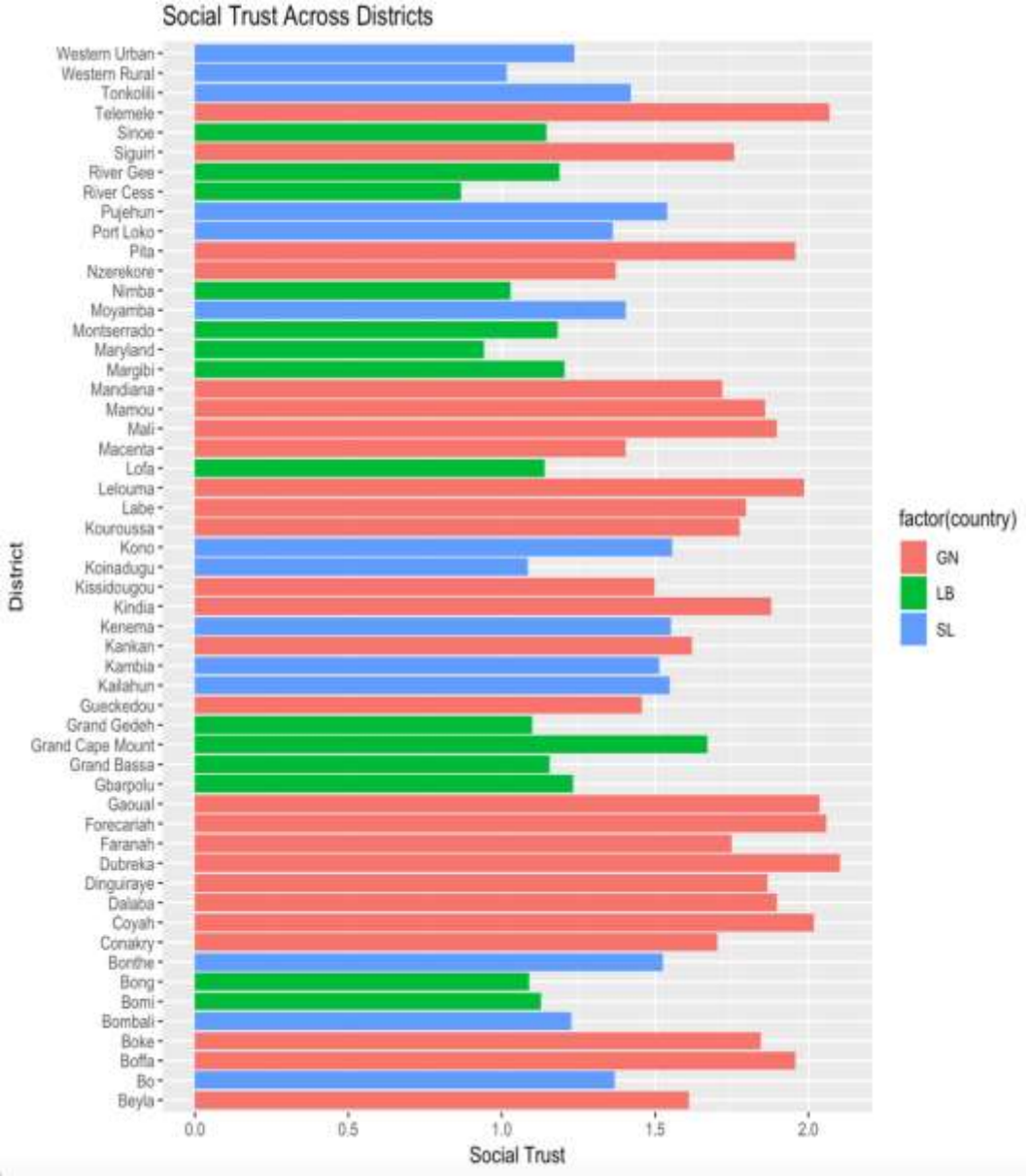
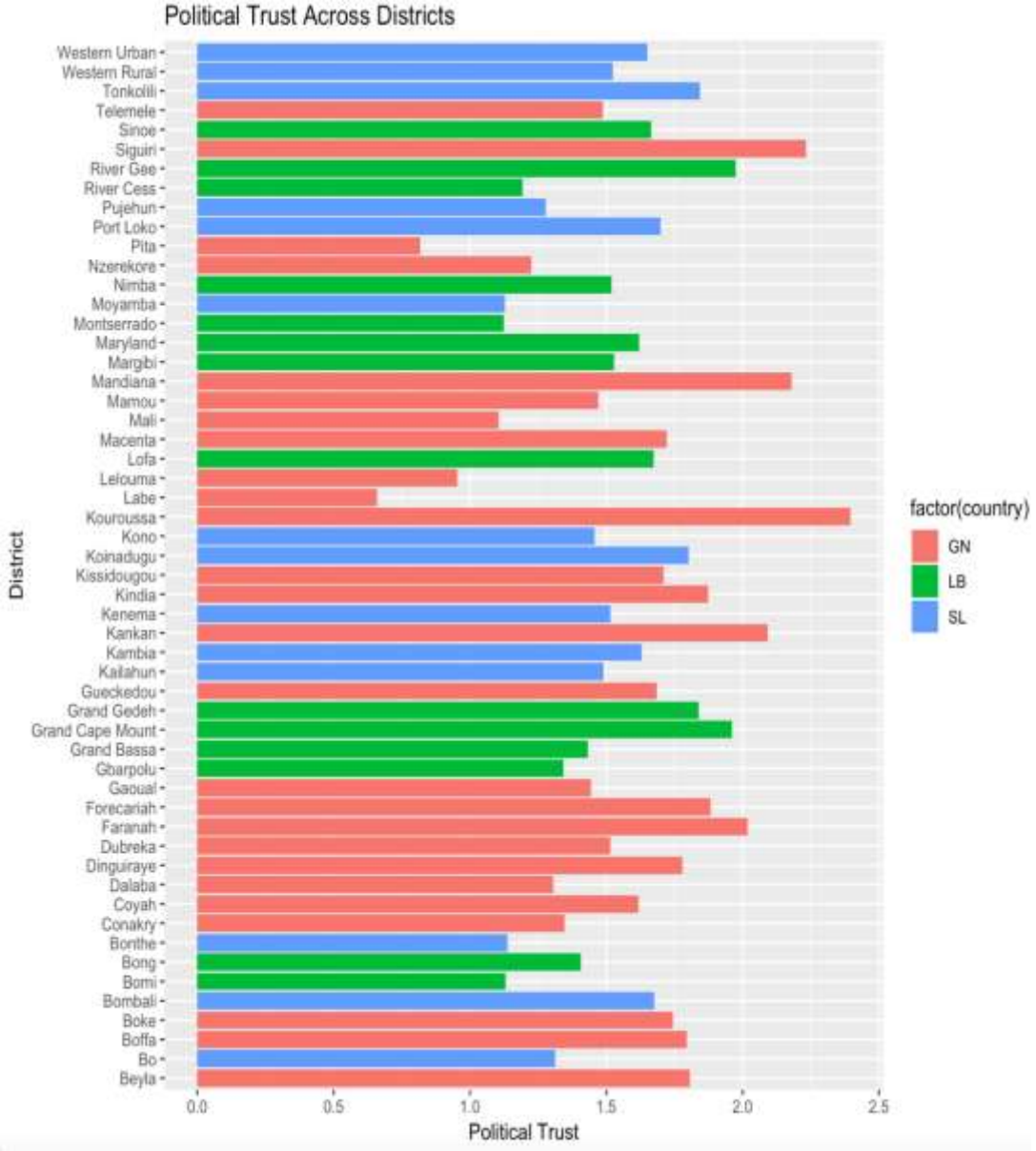


Figure A.4 illustrates political trust across districts in Guinea, Liberia, and Sierra Leone. Again, in the aggregate, the districts most hit by Ebola mortalities did not have very low levels of political trust.

Figure A.4. Political Trust Across Districts in Guinea, Liberia, and Sierra Leone



In Figure A.5, when looking at the scaled voluntary association variable which includes additional levels for active membership and leadership, Guinea leads. However, Figure A.6 indicates that Liberia leads with the most members of voluntary associations, when not accounting for leadership levels (measuring whether one is a member or non-member). Therefore, Guinea has more active members, and leaders of civil society, on average, but fewer members, on average, in contrast to Liberia. These dynamics lead me to explore specific variables such as community meeting attendance, raising issues, and religious organization membership. In addition, there is a lot of variation in terms of levels of voluntary association participation, across districts.

Figure A.6. Active Voluntary Association Membership Cross-Nationally

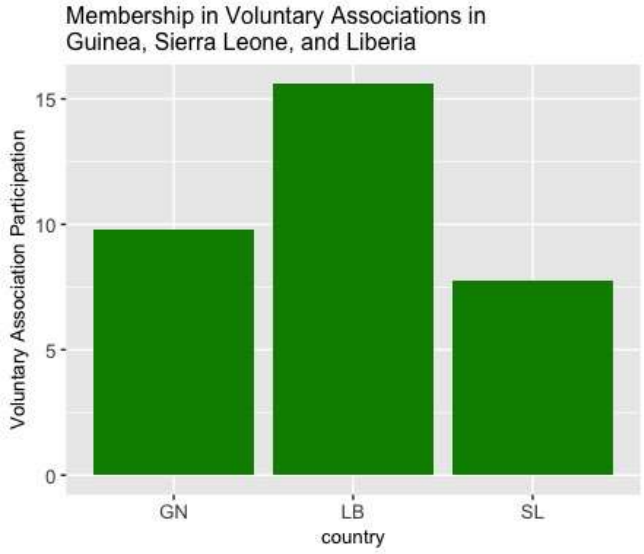


Figure A.7. General Voluntary Association Membership Cross-Nationally

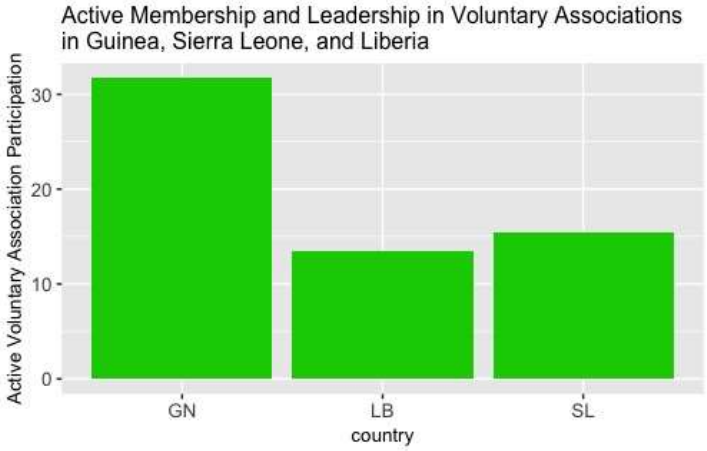
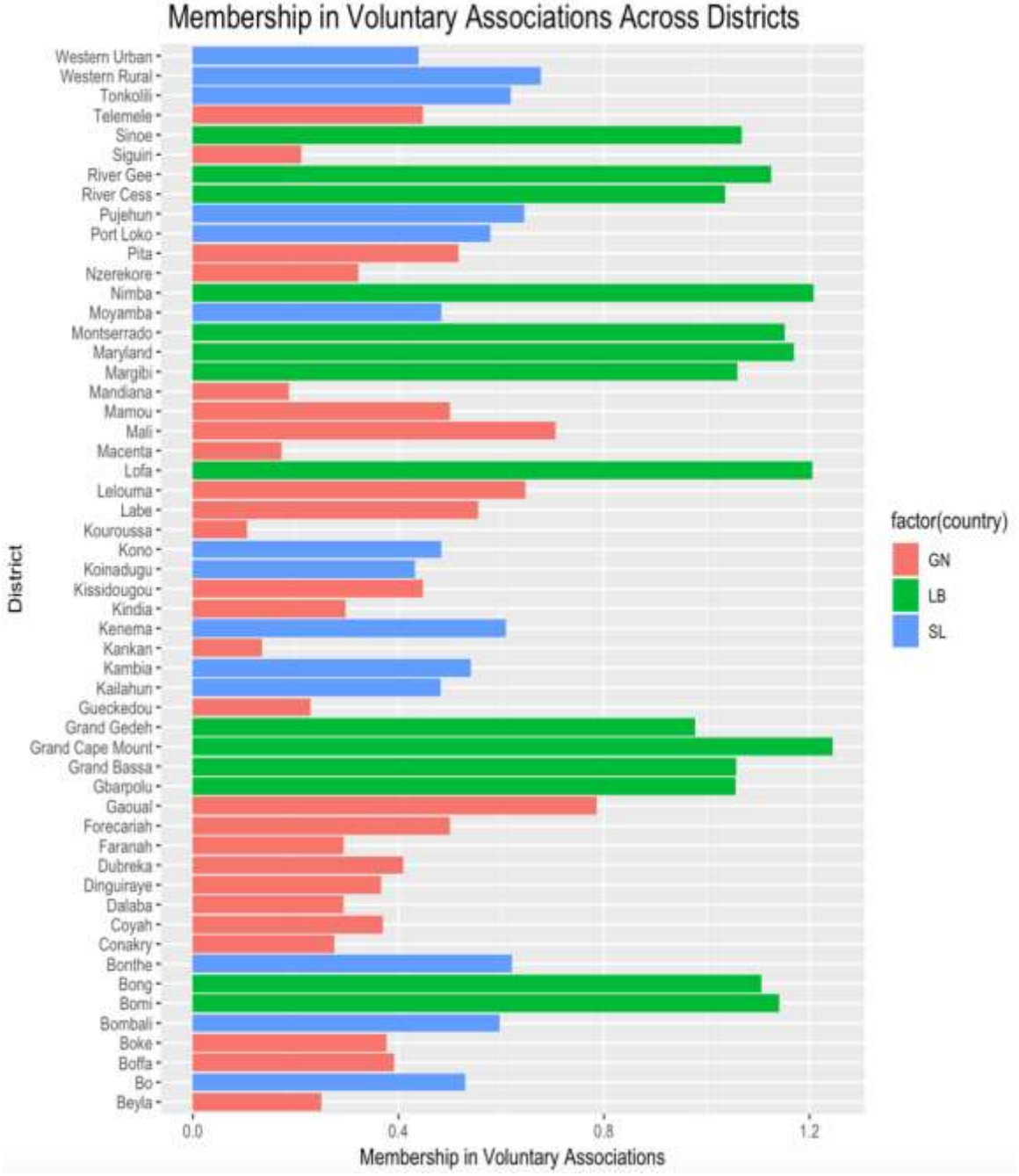


Figure A.8 illustrates general membership levels across districts in Guinea, Liberia, and Sierra Leone. There is visibly much more variation in voluntary association membership (Figure A.6) than in social trust (Figure A.4) or political trust (Figure A.5), across districts.

Figure A.8. General Voluntary Association Membership Across Districts



IV. Sensitivity analysis

A. Sensitivity Analysis

a. I examine the three variables with statistical significance, each in a separate table, with controls: whether the area was susceptible to Ebola based on location, distance from the capital, and country fixed effects.
b. I also conduct tests for robust standard errors and the variance inflation factor.[1]
c. I also draw from a new package, "sensemakr", in R to conduct a sensitivity analysis.
d. Findings about voluntary association participation, the practice of raising issues, and religious group membership are robust to using robust standard errors to calculate statistical significance.

B. Brief summary of sensitivity analysis (more details in sections A-C):

Raised Issue

Outcome: *months.epi*

Treatment:	Est.	S.E.	t-value	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=0.05}$
raised.issue	-2.407	1.134	-2.123	8.6%	26.3%	1.3%
df = 48	*Bound (1x ebola.susceptibility)*: $R^2_{Y\sim Z\|\mathbf{X},D} = 8.4\%$, $R^2_{D\sim Z\|\mathbf{X}} = 9\%$					

Outcome: *months.epi*

Treatment:	Est.	S.E.	t-value	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=0.05}$
raised.issue	-2.407	1.134	-2.123	8.6%	26.3%	1.3%
df = 48	*Bound (1x km_to_capital)* : $R^2_{Y\sim Z\|\mathbf{X},D} = 0\%$, $R^2_{D\sim Z\|\mathbf{X}} = 0.4\%$					

Religious Group Membership

Outcome: *months.epi*

Treatment:	Est.	S.E.	t-value	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=0.05}$
rel.grp.dummy	-5.729	2.747	-2.086	8.3%	25.9%	0.8%
df = 48	*Bound (1x ebola.susceptibility)*: $R^2_{Y\sim Z\|\mathbf{X},D} = 11.3\%$, $R^2_{D\sim Z\|\mathbf{X}} = 1.2\%$					

Outcome: *months.epi*

Treatment:	Est.	S.E.	t-value	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=0.05}$
rel.grp.dummy	-5.729	2.747	-2.086	8.3%	25.9%	0.8%
df = 48	*Bound (1x km.to.capital)*: $R^2_{Y\sim Z\|\mathbf{X},D} = 0.2\%$, $R^2_{D\sim Z\|\mathbf{X}} = 0.6\%$					

[1] I check for multicollinearity among my variables by examining the variance inflation factor (VIF) in my OLS regression model. The VIF measures the extent to which the variance of an estimated regression coefficient increases when there is correlation among the independent variables. The VIF for all independent variables (except those explained below) in both models ranged from 1.04 to 4.19, well below the threshold of 10 (O'Brien, 2007). I also double-check for multicollinearity by taking the square root of the VIF, which was well below the threshold of 2 for all independent variables.

In Model 1, social trust and voluntary association participation have high collinearity with country fixed effects. However, dummy variables are at times collinear with country fixed effects due to one country variable being dropped. When I checked the VIF and correlation with the scaled variable rather than the dummy variable, there was much lower collinearity, therefore this result is due to the interaction of the dummy variable with the country fixed effects. The square root of the VIF for social trust is 2.014, nearly at the threshold of 2.0, yet Model 1 is not the main model of interest.[1] As an additional check, I run correlation tests for multicollinearity. I find that all of my independent variables, with the exception of the social trust index correlation with distance from the capital, are well outside of the threshold for multicollinearity.

Voluntary Association Membership

Outcome: *months.epi*

Treatment:	Est.	S.E.	t-value	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=0.05}$
vol.assoc.dummy	-8.473	2.848	-2.975	15.6%	34.7%	12.7%
df = 48	*Bound (1x km.to.capital):* $R^2_{Y\sim Z\|\mathbf{X},D}$ = 2.9%, $R^2_{D\sim Z\|\mathbf{X}}$ = 11.3%					

Outcome: *months.epi*

Treatment:	Est.	S.E.	t-value	$R^2_{Y\sim D\|\mathbf{X}}$	$RV_{q=1}$	$RV_{q=1,\alpha=0.05}$
vol.assoc.dummy	-8.473	2.848	-2.975	15.6%	34.7%	12.7%
df = 48	*Bound (1x ebola.susceptibility):* $R^2_{Y\sim Z\|\mathbf{X},D}$ = 9.5%, $R^2_{D\sim Z\|\mathbf{X}}$ = 3.5%					

C. Detailed Sensitivity Analysis and Robustness Checks

Findings are grouped by variable.

A. Raising Issues and Ebola Duration Outcomes

1. Model with controls

Pre-Ebola Practice of Raising Issues and Ebola Duration Outcomes

	Dependent variable:			
	Ebola Duration in Months			
	(1)	(2)	(3)	(4)
Raised Issue	-2.684***	-2.218***	-2.136**	-2.407**
	(0.781)	(0.786)	(0.816)	(1.134)
Ebola Susceptibility		2.423**	2.407**	2.082*
		(1.131)	(1.141)	(1.135)
Distance to Capital			-0.720	0.045
			(1.715)	(1.741)
Country Fixed Effects				-0.596
				(1.283)
factor(country)SL				1.474
				(1.049)
Constant	12.926***	11.580***	11.634***	11.801***
	(1.768)	(1.822)	(1.841)	(2.999)
Observations	54	54	54	54
R^2	0.185	0.252	0.255	0.317
Adjusted R^2	0.169	0.223	0.210	0.246
Residual Std. Error	2.773 (df = 52)	2.682 (df = 51)	2.704 (df = 50)	2.643 (df = 48)
F Statistic	11.813*** (df = 1; 52)	8.610*** (df = 2; 51)	5.706*** (df = 3; 50)	4.451*** (df = 5; 48)
Note:				*p<0.1; **p<0.05; ***p<0.01

2. Robust Standard Errors

T test of coefficients: Pre-Ebola Practice of Raising Issues and Ebola Duration Outcomes

	Dependent variable:
	Ebola Duration in Months
Raised Issue	-2.407*
	(1.280)
Ebola Susceptibility	2.082**
	(0.971)
Distance to Capital	0.045
	(1.678)
Country Fixed Effects	-0.596
	(1.161)
factor(country)SL	1.474*
	(0.804)
Constant	11.801***
	(3.225)
Note:	*p<0.1; **p<0.05; ***p<0.01

3. Sensitivity Analysis to Unobserved Confounding Using "Sensemakr"

Sensitivity Analysis to Unobserved Confounding

Model Formula: months_epi ~ raised.issue + ebola.susceptibility + km_to_capital + factor(country)

Null hypothesis: q = 1 and reduce = TRUE
-- This means we are considering biases that reduce the absolute value of the current estimate.
-- The null hypothesis deemed problematic is H0:tau = 0

Unadjusted Estimates of 'raised.issue':
Coef. estimate: -2.4067
Standard Error: 1.1335
t-value (H0:tau = 0): -2.1232

Sensitivity Statistics:
Partial R2 of treatment with outcome: 0.0859
Robustness Value, q = 1: 0.2631
Robustness Value, q = 1, alpha = 0.05: 0.0129

Verbal interpretation of sensitivity statistics:

-- Partial R2 of the treatment with the outcome: an extreme confounder (orthogonal to the covariates) that explains 100% of the residual variance of the outcome, would need to explain at least 8.59% of the residual variance of the treatment to fully account for the observed estimated effect.

-- Robustness Value, q = 1: unobserved confounders (orthogonal to the covariates) that explain more than 26.31% of the residual variance of both the treatment and the outcome are strong enough to bring the point estimate to 0 (a bias of 100% of the original estimate). Conversely, unobserved confounders that do not

explain more than 26.31% of the residual variance of both the treatment and the outcome are not strong enough to bring the point estimate to 0.

-- Robustness Value, q = 1, alpha = 0.05: unobserved confounders (orthogonal to the covariates) that explain more than 1.29% of the residual variance of both the treatment and the outcome are strong enough to bring the estimate to a range where it is no longer 'statistically different' from 0 (a bias of 100% of the original estimate), at the significance level of alpha = 0.05. Conversely, unobserved confounders that do not explain more than 1.29% of the residual variance of both the treatment and the outcome are not strong enough to bring the estimate to a range where it is no longer 'statistically different' from 0, at the significance level of alpha = 0.05.

Bounds on omitted variable bias:

The table below shows the maximum strength of unobserved confounders with association with the treatment and the outcome bounded by a multiple of the observed explanatory power of the chosen benchmark covariate(s).

Bound Label.	R2dz.x	R2yz.dx	Treatment	Adjusted Estimate	Adjusted Se	Adjusted T	Adjusted Lower CI	Adjusted Upper CI
1x ebola.susceptibility	0.0900	0.0839	raised.issue	-1.6914	1.1494	-1.4716	-4.0024	0.6195
2x ebola.susceptibility	0.1800	0.1708	raised.issue	-0.8862	1.1519	-0.7693	-3.2023	1.4299
3x ebola.susceptibility	0.2700	0.2617	raised.issue	0.0364	1.1520	0.0316	-2.2798	2.3527
1x km_to_capital.	0.0045	0.0000	raised.issue	-2.4048	1.1481	-2.0946	-4.7132	-0.0964
2x km_to_capital	0.0089	0.0000	raised.issue	-2.4028	1.1507	-2.0881	-4.7164	-0.0892
3x km_to_capital	0.0134	0.0000.	raised.issue	-2.4008	1.1533	-2.0817	-4.7196	-0.0819

B. Religious Group Membership and Ebola Duration Outcomes

1. Model with controls

Pre-Ebola Religious Group Membership and Ebola Duration Outcomes

	Dependent variable:			
	Ebola Duration in Months			
	(1)	(2)	(3)	(4)
Religious Group Membership	-2.684***	-2.218***	-2.136**	-2.407**
	(0.781)	(0.786)	(0.816)	(1.134)
Ebola Susceptibility		2.423**	2.407**	2.082*
		(1.131)	(1.141)	(1.135)
Distance to Capital			-0.720	0.045
			(1.715)	(1.741)
Country Fixed Effects				-0.596
				(1.283)
factor(country)SL				1.474
				(1.049)
Constant	12.926***	11.580***	11.634***	11.801***
	(1.768)	(1.822)	(1.841)	(2.999)
Observations	54	54	54	54
R^2	0.185	0.252	0.255	0.317
Adjusted R^2	0.169	0.223	0.210	0.246
Residual Std. Error	2.773 (df = 52)	2.682 (df = 51)	2.704 (df = 50)	2.643 (df = 48)
F Statistic	11.813*** (df = 1; 52)	8.610*** (df = 2; 51)	5.706*** (df = 3; 50)	4.451*** (df = 5; 48)
Note:				*p<0.1; **p<0.05; ***p<0.01

2. Robust Standard Errors

T test of coefficients: Pre-Ebola Religious Group Membership and Ebola Duration Outcomes

	Dependent variable:
	Ebola Duration in Months
Religious Group Membership	-5.729*
	(3.171)
Ebola Susceptibility	2.526**
	(0.948)
Distance to Capital	-0.489
	(1.739)
Country Fixed Effects	2.650**
	(1.134)
factor(country)SL	3.647***
	(1.112)
Constant	6.987***
	(0.742)
Note:	*p<0.1; **p<0.05; ***p<0.01

3. Sensitivity Analysis to Unobserved Confounding Using "Sensemakr"

Sensitivity Analysis to Unobserved Confounding

Model Formula: months_epi ~ rel.grp.dummy + ebola.susceptibility + km_to_capital + factor(country)

Null hypothesis: q = 1 and reduce = TRUE
-- This means we are considering biases that reduce the absolute value of the current estimate.
-- The null hypothesis deemed problematic is H0:tau = 0

Unadjusted Estimates of 'rel.grp.dummy':
Coef. estimate: -5.729
Standard Error: 2.7467
t-value (H0:tau = 0): -2.0858

Sensitivity Statistics:
Partial R2 of treatment with outcome: 0.0831
Robustness Value, q = 1: 0.2591
Robustness Value, q = 1, alpha = 0.05: 0.0076

Verbal interpretation of sensitivity statistics:

-- Partial R2 of the treatment with the outcome: an extreme confounder (orthogonal to the covariates) that explains 100% of the residual variance of the outcome, would need to explain at least 8.31% of the residual variance of the treatment to fully account for the observed estimated effect.

-- Robustness Value, q = 1: unobserved confounders (orthogonal to the covariates) that explain more than 25.91% of the residual variance of both the treatment and the outcome are strong enough to bring the point estimate to 0 (a bias of 100% of the original estimate). Conversely, unobserved confounders that do not

explain more than 25.91% of the residual variance of both the treatment and the outcome are not strong enough to bring the point estimate to 0.

-- Robustness Value, q = 1, alpha = 0.05: unobserved confounders (orthogonal to the covariates) that explain more than 0.76% of the residual variance of both the treatment and the outcome are strong enough to bring the estimate to a range where it is no longer 'statistically different' from 0 (a bias of 100% of the original estimate), at the significance level of alpha = 0.05. Conversely, unobserved confounders that do not explain more than 0.76% of the residual variance of both the treatment and the outcome are not strong enough to bring the estimate to a range where it is no longer 'statistically different' from 0, at the significance level of alpha = 0.05.

Bounds on omitted variable bias:

The table below shows the maximum strength of unobserved confounders with association with the treatment and the outcome bounded by a multiple of the observed explanatory power of the chosen benchmark covariate(s).

Bound Label	R2dz.x.	R2yz.dx	Treatment	Adjusted Estimate	Adjusted Se	Adjusted T	Adjusted Lower CI	Adjusted Upper CI
1x ebola.susceptibility	0.0119	0.1134	rel.grp.dummy	-5.0244	2.6293	-1.9109	-10.3110	0.2622
2x ebola.susceptibility	0.0239	0.2269	rel.grp.dummy	-4.3110	2.4702	-1.7452	-9.2777	0.6557
3x ebola.susceptibility	0.0358	0.3405	rel.grp.dummy	-3.5886	2.2957	-1.5632	-8.2044	1.0271
1x km_to_capital	0.0063	0.0017.	rel.grp.dummy	-5.6674	2.7822	-2.0370	-11.2614	-0.0735
2x km_to_capital	0.0126	0.0033	rel.grp.dummy	-5.6055	2.7887	-2.0101	-11.2125	0.0016
3x km_to_capital	0.0188	0.0050	rel.grp.dummy	-5.5431	2.7953	-1.9830	-11.1634	0.0771

C. Voluntary Association Membership and Ebola Duration Outcomes

1. Model with Controls

Pre-Ebola Voluntary Association Membership and Ebola Duration Outcomes

	Dependent variable:			
	Ebola Duration in Months			
	(1)	(2)	(3)	(4)
Voluntary Association Membership	0.117	0.133	-0.238	-8.473***
	(1.261)	(1.184)	(1.238)	(2.848)
Ebola Susceptibility		3.307***	3.177***	2.191**
		(1.168)	(1.175)	(1.063)
Distance to Capital			-1.894	-1.870
			(1.858)	(1.762)
Country Fixed Effects				7.420***
				(2.222)
factor(country)SL				3.721***
				(1.000)
Constant	6.917***	6.478***	7.332***	9.618***
	(0.880)	(0.840)	(1.186)	(1.560)
Observations	54	54	54	54
R^2	0.0002	0.136	0.154	0.369
Adjusted R^2	-0.019	0.102	0.103	0.303
Residual Std. Error	3.072 (df = 52)	2.883 (df = 51)	2.882 (df = 50)	2.540 (df = 48)
F Statistic	0.009 (df = 1; 52)	4.012** (df = 2; 51)	3.023** (df = 3; 50)	5.614*** (df = 5; 48)
Note:				*p<0.1; **p<0.05; ***p<0.01

2. Robust Standard Errors

T test of coefficients: Pre-Ebola Voluntary Association Membership and Ebola Duration Outcomes

	Dependent variable:
	Ebola Duration in Months
Voluntary Association Membership	-8.473***
	(3.062)
Ebola Susceptibility	2.191**
	(0.888)
Distance to Capital	-1.870
	(1.639)
Country Fixed Effects	7.420***
	(2.416)
factor(country)SL	3.721***
	(0.909)
Constant	9.618***
	(1.336)
Note:	*p<0.1; **p<0.05; ***p<0.01

3. Sensitivity Analysis to Unobserved Confounding Using "Sensemakr"

Model Formula: months_epi ~ vol.assoc.dummy + ebola.susceptibility + km_to_capital + factor(country)

Null hypothesis: q = 1 and reduce = TRUE
-- This means we are considering biases that reduce the absolute value of the current estimate.
-- The null hypothesis deemed problematic is H0:tau = 0

Unadjusted Estimates of 'vol.assoc.dummy':
Coef. estimate: -8.4726
Standard Error: 2.8477
t-value (H0:tau = 0): -2.9752

Sensitivity Statistics:
Partial R2 of treatment with outcome: 0.1557
Robustness Value, q = 1: 0.347
Robustness Value, q = 1, alpha = 0.05: 0.1271

Verbal interpretation of sensitivity statistics:

-- Partial R2 of the treatment with the outcome: an extreme confounder (orthogonal to the covariates) that explains 100% of the residual variance of the outcome, would need to explain at least 15.57% of the residual variance of the treatment to fully account for the observed estimated effect.

-- Robustness Value, q = 1: unobserved confounders (orthogonal to the covariates) that explain more than 34.7% of the residual variance of both the treatment and the outcome are strong enough to bring the point estimate to 0 (a bias of 100% of the original estimate). Conversely, unobserved confounders that do not explain more than 34.7% of the residual variance of both the treatment and the outcome are not strong enough to bring the point estimate to 0.

-- Robustness Value, q = 1, alpha = 0.05: unobserved confounders (orthogonal to the covariates) that explain more than 12.71% of the residual variance of both the treatment and the outcome are strong enough to bring the estimate to a range where it is no longer 'statistically different' from 0 (a bias of 100% of the original estimate), at the significance level of alpha = 0.05. Conversely, unobserved confounders that do not explain more than 12.71% of the residual variance of both the treatment and the outcome are not strong enough to bring the estimate to a range where it is no longer 'statistically different' from 0, at the significance level of alpha = 0.05.

Bounds on omitted variable bias:

The table below shows the maximum strength of unobserved confounders with association with the treatment and the outcome bounded by a multiple of the observed explanatory power of the chosen benchmark covariate(s).

Bound Label	R2dz.x	R2yz.dx	Treatment	Adjusted Estimate	Adjusted Se	Adjusted T	Adjusted Lower CI	Adjusted Upper CI
1x ebola.susceptibility	0.0352	0.0949	vol.assoc.dummy	-7.3114	2.7875	-2.6230	-12.9159	-1.7068
2x ebola.susceptibility	0.0704	0.1903	vol.assoc.dummy	-6.1036	2.6860	-2.2724	-11.5041	-0.7031
3x ebola.susceptibility	0.1056	0.2862	vol.assoc.dummy	-4.8449	2.5711	-1.8844	-10.0144	0.3245
1x km_to_capital	0.1128	0.0295	vol.assoc.dummy	-7.2654	3.0100	-2.4137	-13.3174	-1.2134
2x km_to_capital	0.2256	0.0606	vol.assoc.dummy	-5.8509	3.1696	-1.8460	-12.2238	0.5219
3x km_to_capital	0.3384	0.0943	vol.assoc.dummy	-4.1399	3.3671	-1.2295	-10.9099	2.6300

Notes

[1] A major challenge for civil society scholars is defining civil society (see, for example, Viterna, Clough, and Clarke, 2015; Dagher, 2017; Kaldor, 2003; Cox, 1999; Allison, 1996; White, 1994; Mudde, 2003; among others). According to Diamond (1994), civil society is the "realm of organised social life that is voluntary, self-generating, (largely) self-supporting, autonomous from the state, and bound by a legal order or set of shared rules," (Diamond, 1994, at 5). I define an NGO as a nongovernmental organisation operating in a developing country. My research in Sierra Leone indicates that NGOs are usually international or national, whereas local organisations are more commonly referred to as civil society organisations (CSOs) or community-based organisations (CBOs). In Sierra Leone, a local organisation needs to have a certain amount of funding and technical capacity, and operate in more than one district, to be considered an NGO. This definition also extends to Guinea, where I also conducted field research.

[2] In terms of human development in 2013, the year Ebola struck, Liberia ranked 174, Sierra Leone ranked 177, followed by Guinea at 178, out of 186 countries (Human Development Index, 2013). In terms of 2013 health indicators, Liberia ranked 175, Guinea ranked 179, and Sierra Leone ranked 183, out of 187 countries (United Nations Development Program, 2013).

[3] Further information on Afrobarometer is found in the data appendix, including survey questions.

[4] In 2014, the population of Guinea was 11.81 million, the population of Sierra Leone was 7.079 million, and the population of Liberia was 4.391 million (World Bank, 2014), so the larger number of districts in Guinea makes sense given its much larger population.

[5] My dataset ends in March 2015, just before quarantine was implemented by the U.S. and British armies in Sierra Leone and Liberia, therefore these quarantine measures do not interfere with my analysis.

[6] Given that there are sixty-three observations, I test several variables separately, outside of the models displayed in my results section. For instance, I test trust of the police and trust of the army separately, and in contrast to the existing literature, namely, Dhillon and Kelly (2015), neither variable is significant in my model.

[7] Given the proliferation of women's and youth organizations following the end of the civil wars, I also create separate variables for women's participation, youth participation, women's leadership, and youth leadership, in voluntary associations. None of these variables are significant in any of my models, though women's and youth participation improve model fit. There are relatively low levels of women's and youth participation.

[8] I test a similar variable, "Time from the Capital" separately (insignificant), given that poor road infrastructure was frequently a reason for Ebola's virulence in the border regions, particularly in Guinea where the epicenter of the epidemic was approximately 18 hours by car from the capital due to poor roads. I use Google maps to estimate driving distance and for trips longer than 10 hours I add another 12 hours given the protocol is to stop overnight. I cross-check Google maps driving distance with my own experiences.

[9] I test population density in a separate model and it was not significant. I also tested for health infrastructure and it was not significant in my model.

[10] Country fixed effects controls for potentially confounding factors that may be time-invariant and unobservable but specific to a country (Fischer, 2010).

[11] Social trust and political trust are not significant when run separately. I also could not control for distance to the capital in Models 1 and 2 because of collinearity between social trust and distance from the capital (one hypothesis is that this is linked to ethnicity).

[12] Distance to the capital is not significant in terms of epidemic duration. However, the model fit is better once distance to the capital is included.

[13] This supports my earlier point that communities in the epicenter of Ebola (in the interior, Mano River Basin area) *all* had low levels of social trust. Round 5 Afrobarometer survey data did not measure trust of foreigners or outsiders. Therefore, individuals may be trusting within their own communities but less trusting of outsiders.

[14] The scaled variable for voluntary association participation, which includes different levels for active membership and leadership (as noted in the data appendix), is not significant in any of the models.

[15] Women's participation, women's leadership, youth participation, youth leadership, and educational attainment are tested separately than in the models included here, given the low number of observations relative to the high number of observations to test.

[16] The scaled variable for voluntary association participation, which includes different levels for active membership and leadership (as noted in the data appendix), is not significant in any of the models.

[17] Women's participation, women's leadership, youth participation, youth leadership, and educational attainment are tested separately than in the models included here, given the low number of observations relative to the high number of observations to test.

[18] One explanation could be that voluntary association participation led to more reporting of Ebola mortality rates. A second explanation is that individuals who participate more are more likely to be out in the community and exposed to Ebola. A third explanation is the high mortality rate among initial responders to the epidemic. There was an astronomically high rate of healthcare worker mortality largely due to the higher risk of contracting Ebola coupled by the lack of protective equipment (Evans et al., 2015; WHO, 2015; CDC, 2015). Prior to the outbreak, Guinea, Liberia, and Sierra Leone had among the lowest physician per capital ratios in the world, with one to two doctors per 100,000 people, mostly concentrated in urban areas, as compared with 350 per 100,000 people in the European Union (The Global Fund, 2017; WHO, 2015). For instance, in Sierra Leone, 221 doctors, midwives, and health care workers died (The Global Fund, 2017). In the first four months of Ebola in Sierra Leone, half of the 474 confirmed deaths were healthcare workers, igniting fear among many healthcare workers to continue their work (Vitez, 2014). The high rate of mortality among healthcare workers may reflect a willingness of locals to contribute and risk their lives, given the lack of equipment and medical professionals. There was also hostility and attacks on health care workers, similar to the 2018-2019 Ebola response in the Democratic Republic of Congo, due to "heavy-handed measures by outside organizations, police, and the military that alienate communities" (Mahamba, 2019).