The Socio-Economic Impacts of Ebola in Sierra Leone

Results from a High Frequency Cell Phone Survey

Round 1

January 12, 2015

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Overview

As of January 4, 2015, Sierra Leone had reported nearly 10,000 cases of Ebola Virus Disease (EVD), and nearly 3,000 deaths. While recent World Health Organization (WHO) reports show that the outbreak is stabilizing in Guinea and Liberia, Sierra Leone continues to see an increasing number of cases and deaths, and the virus has now taken hold across all districts and particularly in the capital, Freetown.

In an effort to collect timely and robust data on the impacts of EVD, the Government of Sierra Leone, with support from the World Bank Group and in partnership with Innovations for Poverty Action, is conducting mobile phone surveys with the aim of capturing the key socio-economic effects of the virus. Since the proportion of the population that has been infected is small, the largest impacts on household welfare are expected to result from indirect effects of measures taken to restrict disease spread and the general disruption to the economy caused by the outbreak. The results focus mainly on employment and migration, agriculture, food security and prices, remittances, utilization of non-EVD health services, as well as trust levels. The results focus predominantly on urban areas where cell phone coverage is highest, but rural areas are covered as much as possible given the sample available.

Based on the first round of data collection, it is clear that EVD has had important economic impacts on Sierra Leone. In urban areas, and particularly in Freetown, declines in employment are evident both among wage workers and the non-farm self-employed, with Ebola cited as one of the main reasons for not working. Among household heads, an estimated 9,000 wage workers and 170,000 self-employed workers outside of agriculture are no longer working since the EVD crisis. The percent of households engaged in a non-farm household enterprise that was no longer operating tripled and among households operating these businesses, average revenue decreased by 40 percent. No differences were found in employment impacts across quarantined and non-quarantined districts, further highlighting the importance of economy-wide indirect effects. Also, the data suggest there has not been recent large scale migration.

The Ebola outbreak has not shown a significant effect on the ongoing harvest although the unseasonably heavy rains appear to have delayed the harvest. Food insecurity is high in Sierra Leone, but it is unclear the degree to which this is Ebola-related. There is no current evidence to suggest that quarantine restrictions are preventing food from reaching markets, and food insecurity is not higher in the quarantined districts. The poorest households are the most food insecure and are less likely to have access to informal safety nets through remittances.

There is some evidence of a decrease in utilization of health services for non-EVD conditions in Freetown. A much lower proportion of women in the capital reported post-natal clinic visits than in 2013. In the rest of the country, on the other hand, there is little evidence of a decline in usage.

This first round of data collection can serve as a reference point to track changes as the Ebola outbreak continues to unfold in Sierra Leone. Subsequent reports are planned monthly going forward in order to help the government and other stakeholders address the most pressing socioeconomic issues as they arise and assist in planning for the eventual crisis recovery.

Map


IBRD 33478
SIERRA LEONE
SELECTED CITIES AND TOWNS
DISTRICT CAPITALS
NATIONAL CAPITAL
RIVERS
MAIN ROADS
RAILROADS
DISTRICT BOUNDARIES
INTERNATIONAL BOUNDARIES
GUINEA
LIBERIA
ATLANTIC OCEAN
FREETOWN
WESTERN AREA F.R.
PORT LOKO
KAMBIA
BOMBALI
KOINADUGU
TONKOLILI
KONO
KAILAHUN
KENEMA
MOYAMBA
BO
BONTHE
PUJEHUN
Falaba
Yana
Kabala
Bendugu
Kamakwie
Fadugu
Madina Junction
Kambia
Pendembu
Batkanu
Bumbuna
Alikalia
Kurubonla
Kamaron
Mange
Gbinti
Makeni
Binkolo
Kayima
Port Loko
Lunsar
Magburaka
Matotoka
Tefeya
Lungi
Pepel
Masingbi
Yengema
Sefadu
Masiaka
Njaiama-Sewafe
Gandorhun
Koindu
Songo
Yonibana
Yele
Waterloo
Mongeri
Kailahun
Buedu
Rotifunk
Moyamba
Dambara
Panguma
Banana Islands
Yawri Bay
Mano
Pendembu
Shenge
Sembehun
Bo
Lago
Daru
Blama
Kenema
Kribundu
Joru
Sherbro
Momaligi
Sumbuya
Matru
Turtle Islands
Sherbro Island
Bonthe
Potoru
Kittam
Pujehun
Zimmi
Lake Mabesi
Lake Mape
Fairo
Sulima
0 20 40 60 Kilometers
0 20 40 50 Miles
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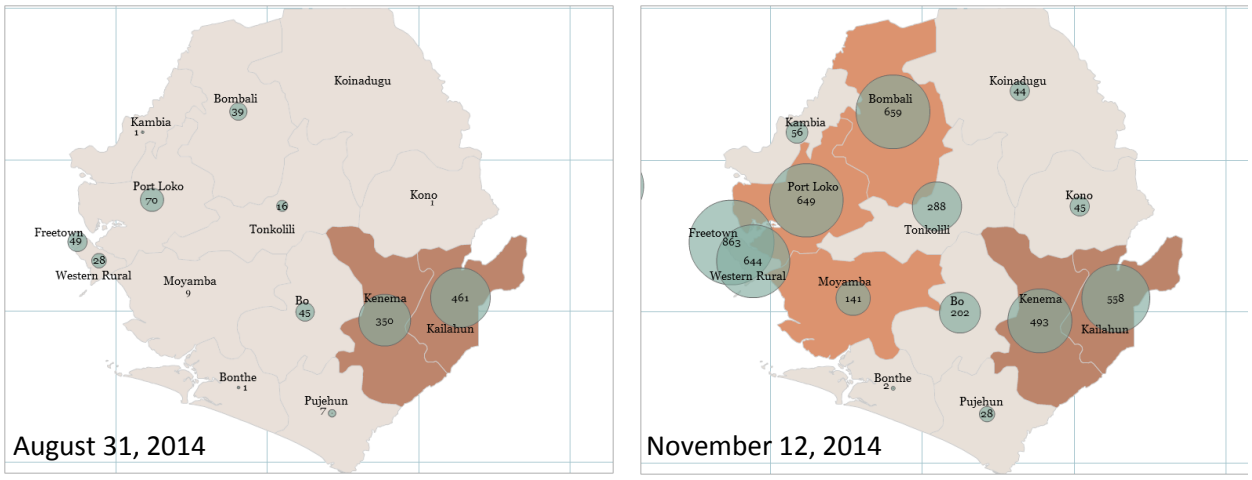
SIERRA LEONE
NOVEMBER 2004

Background and Motivation

Since its initial appearance in March 2014 in rural Guinea, the Ebola Virus Disease (EVD) has caused more than 8,000 deaths, with over 20,000 total cases in the region. As of January 4, 2015, Sierra Leone had nearly 10,000 cases and almost 3,000 deaths. While there have been reports from the WHO of the outbreak stabilizing in Guinea and Liberia, Sierra Leone continues to experience an increasing number of cases and deaths. The situation has become even more challenging as the virus has now taken hold across all districts and particularly in the capital, Freetown.

Since the outbreak began, the Government of Sierra Leone has taken a number of measures to control the spread of the disease. Schools in affected areas were closed in mid-June, and as the situation continued to deteriorate during the traditional summer break, the decision was taken not to reopen in September. Government instructed social centers to close throughout the country at this time. The two districts most severely affected in the first wave of the outbreak, Kailahun and Kenema, were quarantined from August 1, and an additional three districts – Moyamba, Bombali, and Port Loko – were quarantined in mid-September, with certain areas of the capital also under isolation. International travel has also been restricted. Many airline carriers stopped flights and some countries have restricted entry from those who were recently in West Africa. Some international nongovernmental organizations, private companies, and aid agencies have evacuated international staff.

Figure 1. Geographic spread of Ebola cases over time



Source: Ministry of Health and Sanitation, Sierra Leone. As of June 29, 2014 the start of the Labor Force Survey, there were only 27 cases in Kenema and 153 Kailahun.

While direct effects of EVD on employment are likely to be small as the number of cases represents 0.1 percent of the population, indirect channels have the potential to impact a wide variety of socio-economic outcomes. The combination of government restrictions and fear of infection have led to a reduction in activities that involve large gatherings. This affects the service sector including those working in marketplaces, restaurants, bars, transport, and schools. Increased transportation costs due to the increased number of checkpoints and night time travel restrictions contributes to higher operating costs. General uncertainty about the economic climate may lead businesses to defer investment and could impact credit conditions. Consumers may reduce discretionary spending, and

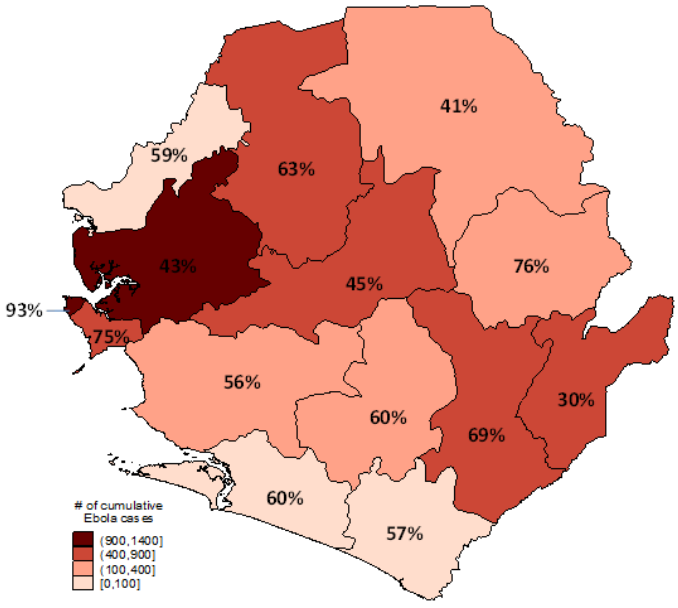
micro enterprises owners may be forced to spend operating capital on basic consumption. There is a great need to monitor these impacts in real time both to inform policy responses and to estimate the longer term costs of the epidemic.

Objectives and Methodology

In an effort to rapidly measure the socioeconomic impacts of the EVD crisis, the Government of Sierra Leone, with support from the World Bank and in partnership with Innovations for Poverty Action (IPA), is conducting high frequency cell phone surveys. The main focus of the data collection is to capture the key socio-economic effects of EVD, including impacts on labor market indicators, agricultural production, food security, migration, and utilization of non-Ebola essential health services, as well as trust levels and knowledge of Ebola. The reasoning behind not focusing on EVD itself is fourfold: (i) measurement of direct health indicators is best done by epidemiologists; (ii) collecting health indicators may jeopardize response rates, particularly given the repeated nature of the surveys, (iii) indirect effects may impact many more people than the direct effects, and (iv) there is still a lack of reliable information on the potential magnitude of these indirect effects.

The high frequency cell phone survey is designed to provide rapid indicators from a large sample of households across the country at a time when traditional face-to-face surveys are not possible. The survey follows a sample of households for whom cell phone numbers were recorded during the nationally-representative Labor Force Survey (LFS) conducted in July-August 2014. Among 4,200 households in the LFS, cell phone coverage was 66 percent overall (2,764 households) and unevenly distributed, with lower coverage among rural households (43 percent versus 82 percent in urban areas). While there is partial coverage in all districts and statistical adjustments were made (see Methodological Appendix), the results should be interpreted with caution, since households with cell phones tend to be better off. Because cell phone ownership is high in Freetown and other urban areas, there are higher coverage rates in these areas. The results in rural areas should therefore in particular be taken as informative rather than representative.

Figure 2. Household cell phone coverage (%) and severity of EVD



Source: LFS data and November 22, 2014 WHO Situation Report.

By re-surveying LFS respondents in the fall of 2014, it is possible to track how labor market outcomes have changed since the EVD crisis began. In the remainder of the sections, the analysis compares the

conditions measured in the cell phone survey to the best available comparison survey. A complete list and details provided in the Methodological Appendix.

The first round of the cell phone survey was carried out from November 12 to November 25, 2014 and administered to household heads in the subsample of households with cell phones. Response rates were generally high (70 percent) for this type of survey, particularly given the challenging conditions under which it was conducted. The resulting sample comprises 1,896 households that were successfully surveyed. The Methodological Appendix provides details on the data collection and statistical adjustments made to minimize potential bias. Future rounds are planned monthly beginning in mid-January 2015.

This report is structured in six sections covering employment and migration, agriculture, food security and prices, remittances, utilization of non-Ebola health services, and trust. In addition to standard disaggregation, where relevant, results are disaggregated by three areas hypothesized to have been differentially effected by Ebola: (i) Freetown,[1] the capital where approximately one quarter of the population resides and which has a large and rising number of Ebola infections; (ii) five quarantined districts – Bombali, Kenema, Kailahun, Moyamba, and Port Loko – areas with the highest Ebola caseloads and where the government at some point imposed a cordon or quarantines to slow the spread of the disease; and (iii) all the remaining districts in Sierra Leone where the outbreak has been less severe, although no district has been untouched by EVD.

Employment

Pre-EVD Structure of the Labor Force

At the onset of the EVD crisis, labor force participation was high and unemployment was low.[2] As measured by the Labor Force Survey conducted in July and August 2014, the employment rate was 62 percent of the working-age population, comparable with neighboring countries. The unemployment rate was four percent at the national level, and was primarily an urban phenomenon (seven percent in urban and two percent in rural areas). The inactivity rate, or percentage of the working-age population not in the labor force, was 35 percent. Of the inactive working-age population, 53 percent were in school, and 12 percent were engaged in unpaid household economic activities.

Sierra Leone is a largely agricultural economy, particularly in rural areas, while the non-farm household enterprise sector is predominant in urban areas. Prior to the EVD crisis, more than half (56 percent) of the employed population was engaged in agriculture as their main activity, almost all of whom were self-employed. In rural areas the percentage was 68 percent, compared to 13 percent in urban areas. Nearly 70 percent of the employed population spent some hours involved in agriculture at

[1] Freetown in this report refers to Western Area Urban. Western Area Rural is classified as non-quarantine.

[2] Unemployment in this context is based on three criteria, namely being: (i) without employment in the past week (and not temporarily absent); (ii) available to work in the past week or next two weeks; and (iii) seeking employment.

some point during the year (83 percent in rural and 20 percent in urban areas).[3] Around 29 percent of the employed was engaged in non-farm household enterprise activities as their main activity. Notably, less than half, 43 percent, of these worked exclusively on the household businesses; while the rest also engaged in farming activities as a secondary source of employment. This phenomenon is particularly marked in rural areas, where among the 21 percent working on non-farm enterprises as their main activity, 81 percent also worked in agriculture. By comparison in urban areas just over half of the employed were non-farm self-employed workers, but only 35 percent in urban areas outside Freetown, and nine percent in Freetown itself, engaged in part-time agriculture.

The wage sector is relatively small and concentrated in urban areas. Defining wage work as strictly non-farm wage employment, only six percent of the population worked in the wage sector on a regular basis as their main employment activity, with an additional two percent engaged on a casual basis. This includes wage jobs in the private and public sectors, , as well as a small number of wage jobs in agricultural. The percentage engaged in agricultural wage work and apprenticeships was negligible. Of all reported regular wage work activities, 75 percent were located in the urban areas. The mining sector, a prime driver of macroeconomic growth, did not contribute substantially to employment, with one percent of the employed population working directly in the mining sector as wage workers.[4]

The employment situation of household heads differs from the broader population. The November survey tracks mostly heads of households. This group is older and more likely to be male than the general population.[5] The average age of household heads in the LFS was 42, compared to an average age of 32 in the working-age population (ages 15-65). One-third of household heads are youth (defined in Sierra Leone as those ages 15-35), compared to two-thirds in the overall working-age population. Nearly three-quarters of household heads are males, compared with gender parity in the broader working-age population. Household heads are less likely to be in school or engaged in unpaid household activities, and exhibit a higher employment rate and lower inactivity rate. Among the employed household heads, the sectoral breakdown is similar to that of the broader working-age population, with a slightly higher proportion of household heads in the wage sector. Since younger, female individuals are more likely to be in non-farm self-employment than older males, employment effects on household heads may underestimate the impacts on the broader population if the self-employed have experienced larger impacts. On the other hand, if the wage sector was harder hit by the EVD crisis, the results shown here may overstate the impacts on the broader population.

[3] Agriculture in this context is defined as own-farm employment. There are a small number of hired farm laborers but they would be considered as wage laborers.

[4] The actual percentage of those engaged in the mining sector may be higher than that indicated in the LFS as the LFS covers only the population living in dwellings. Any workers housed in dormitories or other non-dwelling living arrangements would not be captured.

[5] A small percent of respondents were not household heads – see the Methodological Appendix for details.

Table 1. Employment indicators, August-July 2014: LFS full sample vs. household heads

	All working-age	Household heads
Working-age population (15-65)	3,056,080	818,244
Labor force participation status		
Employment rate	62%	88%
Freetown	47%	82%
Other urban	50%	85%
Rural	67%	90%
Unemployment rate	4%	2%
Inactivity rate	35%	10%
In school	*19%*	1%
Unpaid household work	*4%*	2%
Idle	*12%*	8%
Main activities of employed population		
Wage	9%	12%
Freetown	40%	44%
Other urban	21%	27%
Rural	3%	5%
Agricultural SE	56%	55%
Freetown	0%	0%
Other urban	20%	19%
Rural	68%	70%
Non-farm SE	29%	27%
Freetown	58%	55%
Other urban	54%	51%
Rural	21%	19%
Unpaid workers[6]	7%	5%
Freetown	3%	1%
Other urban	5%	4%
Rural	7%	6%

Source: Sierra Leone Labor Force Survey (July-August 2014).

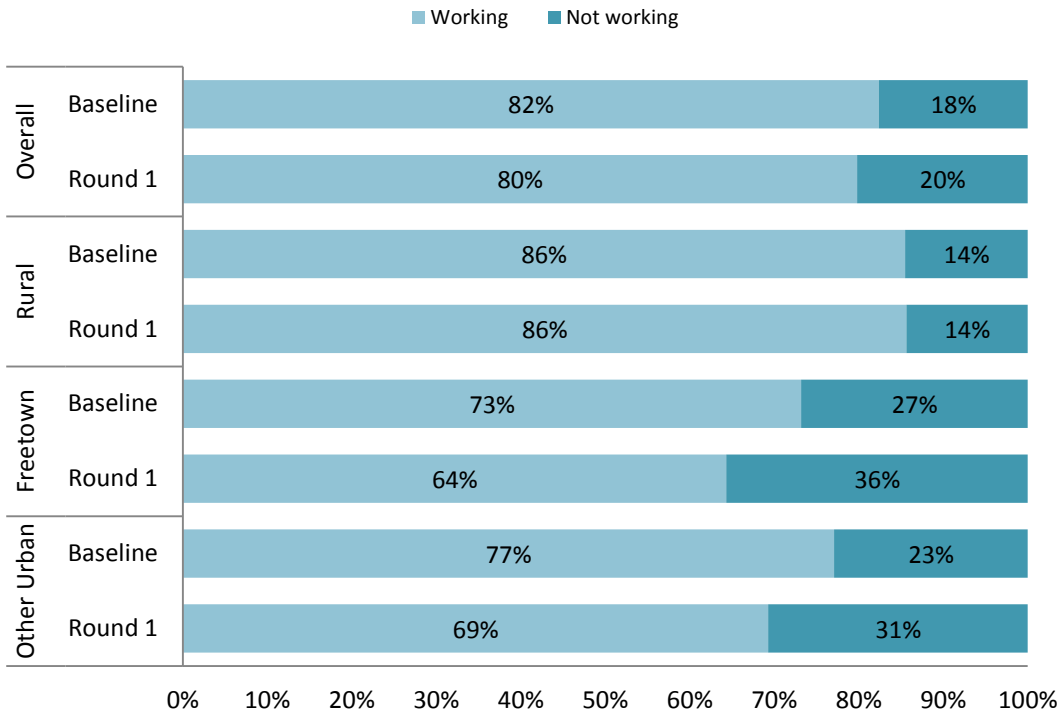
Impact of EVD on the Labor Force

There has been a significant impact of the EVD crisis on employment in urban areas, particularly in Freetown. While overall, employment rates are not statistically different in the Labor Force Survey (82 percent) and the cell phone survey (80 percent), this masks a large decline in urban areas. The urban employment rate decreased from 75 percent to 67 percent. Freetown, the capital and largest urban

[6] Includes those working without pay in own or another household's farm or business and unpaid apprentices.

center, experienced a slightly larger decrease in the employment rate, dropping nine percentage points from 73 percent to 64 percent. Employment in other urban areas decreased from 77 to 69 percent, while employment in rural areas remained steady at 86 percent. In urban areas, the estimated net losses in self-employment jobs in absolute terms are much larger than in wage employment, reaching nearly 170,500 and 8,500 jobs, respectively. This is not surprising given the wage sector represents a small portion of the country's labor market. There were no statistically significant changes in employment rates in either quarantined or non-quarantined districts. This suggests that the EVD impacts are not confined to the most affected EVD areas, and that the quarantines themselves have not had major disruptions on economic activity or that direct effects of the quarantines have been offset by other actions such as bringing in food into quarantined areas and other EVD-related activities.

Figure 3. Employment rates

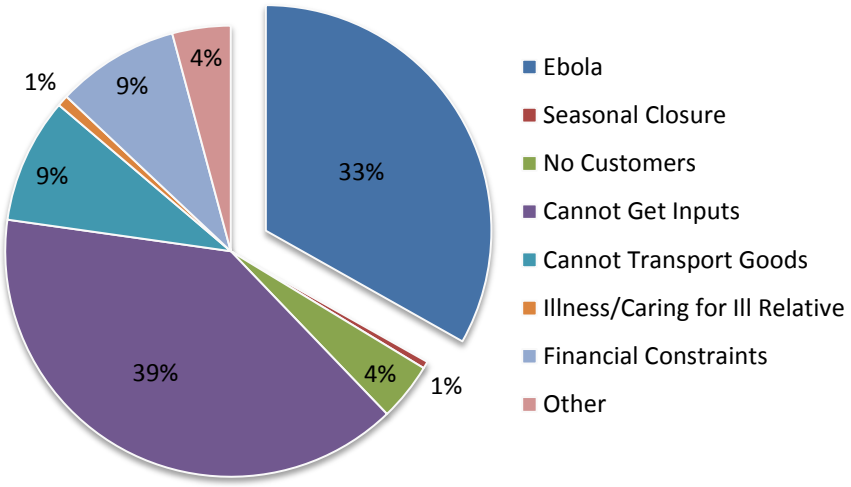


Source: Sierra Leone Labor Force Survey (July-August 2014) and cell phone survey (November 2014).

Ebola is cited as one of the main reasons for not currently working. Among those who were not working in the past week in the first round of the cell phone survey, 20 percent reported the absence was due to Ebola, but not directly for health-related issues. Only two respondents reported specifically EVD-related health issues. While EVD-related health issues may well be under-reported, it is indicative that indirect factors were more important in employment losses than direct health effects. The percent who report Ebola as the reason for not working does not differ across Freetown, other urban areas, and rural areas. The most common other reasons for absence include temporary layoffs (15

percent), lack of capital (11 percent), seasonal work (9 percent) and health reasons (8 percent), which were (statistically) similarly prevalent reasons prior to the crisis.

Figure 3. Reasons household non-farm enterprise is no longer operating



Source: Cell phone survey (November 2014). Note: The category other includes the following reasons: low sales, no customers, no jobs available, no stock, retired, student, or traveling.

The EVD crisis is disrupting business operations and reducing revenues among non-farm household enterprises. Among households engaged in non-farm enterprise work, the percent reporting that the business is no longer operating tripled, increasing from four percent to 12 percent. Among households that indicated their business was no longer operating, one-third cited Ebola as the reason. Among enterprises that did continue to operate, average revenues shrunk dramatically, dropping from monthly revenues of Le. 1.4 million (approximately 304 USD) to Le. 850,000 (approximately 182 USD).[7] Due to measurement differences across survey periods, it is not possible to directly estimate the net decrease in the total number of enterprises.

Box 1: Migration

Data from the cell phone survey show insignificant migration activities into and out of Freetown as well as overall. Approximately eight percent of households reported living in a different location from the LFS.[1] Though a limited sample size prohibits formal statistical tests, quarantine districts were the largest source of out-migrants, but these migrants did not systematically go to Freetown or non-quarantine districts. The majority of migrants within the Western area remained in that region, supporting the results in the employment section below that there has been limited movement into agriculture for those originally in the capital. While the pre-EVD data from the LFS are not strictly comparable, they suggest that work is among the main reasons, along with moving to join family and friends and going to school.

[7] Business revenues are measured with noise and subject to outliers. The means presented were trimmed at the top percentile of revenues. Alternatively if the top 5 percent are trimmed, revenues in LFS were about 1 million Leones and about 600,000 Leones in November.

Both Freetown and other urban areas exhibit significant employment instability. Around half of individuals followed over the two survey periods in Freetown and other urban areas[8] experienced a labor market transition (i.e., either changing sectors or moving into or out of work), with many of these no longer working. Table 2 presents transition probabilities across the main employment categories. The proportion transitioning is highest in other urban areas at 58 percent, compared to 45 percent in Freetown. While the proportion moving out of work was similar in Freetown and other urban areas, around 20 percent for both, in other urban areas this transition out of work was offset to a larger extent by entry among those not previously working. In Freetown, the majority of sector transitions and entries into work were into non-farm self-employment. This is consistent with the fact that agricultural activities are more limited in Freetown and outward migration from Freetown has been minimal. In other urban areas these transitions were mostly into farming activities.

It is difficult to estimate how much of the movement is typical of Sierra Leone's labor market as opposed to induced by the EVD crisis. There is a paucity of data on the labor force prior to the 2014 LFS, as there have been no nationally-representative labor force statistics in approximately 20 years. Thus, while it is possible that some of this reshuffling is in response to EVD, alternatively it may reflect normal employment churning for Sierra Leone, where most jobs are informal or casual.

Table 2. Labor market transitions

Overall

		Round 1				
		Wage	Non-ag SE	Ag SE	Unpaid	Not working
	N	324	365	404	61	565
Baseline	Wage	4.4%	1.1%	0.7%	0.2%	2.6%
	Non-ag SE	1.2%	8.7%	17.1%	1.7%	6.0%
	Ag SE	0.3%	2.2%	22.7%	3.0%	4.0%
	Unpaid	0.0%	0.6%	3.2%	0.2%	0.7%
	Not working	2.1%	1.4%	6.2%	1.0%	8.2%

Freetown

		Round 1				
		Wage	Non-ag SE	Ag SE	Unpaid	Not working
	N	112	136	12	9	167
Baseline	Wage	15.7%	6.0%	0.2%	1.2%	7.5%
	Non-ag SE	2.5%	19.1%	2.0%	0.4%	12.7%
	Ag SE	0.0%	0.3%	0.0%	0.0%	0.0%
	Unpaid	0.0%	0.5%	0.0%	0.5%	0.2%
	Not working	3.1%	6.1%	1.0%	0.5%	19.4%

[8] In rural areas, the small sample size is considered insufficient for analysis of transitions.

Other urban

		Round 1				
		Wage	Non-ag SE	Ag SE	Unpaid	Not working
	N	187	191	209	34	330
Baseline	Wage	7.9%	1.9%	1.2%	0.4%	6.7%
	Non-ag SE	3.5%	13.1%	11.5%	1.3%	11.3%
	Ag SE	0.6%	0.1%	9.2%	0.2%	2.2%
	Unpaid	0.0%	0.0%	2.0%	0.0%	0.6%
	Not working	4.4%	2.3%	5.7%	1.4%	11.5%

Rural

		Round 1				
		Wage	Non-ag SE	Ag SE	Unpaid	Not working
	N	25	38	183	18	68
Baseline	Wage	1.3%	0.0%	0.7%	0.0%	0.5%
	Non-ag SE	0.3%	5.6%	21.5%	2.0%	3.2%
	Ag SE	0.3%	3.1%	30.7%	4.3%	5.3%
	Unpaid	0.0%	0.8%	4.2%	0.1%	0.8%
	Not working	1.3%	0.3%	7.4%	0.9%	5.2%

Source: Sierra Leone Labor Force Survey (July-August 2014) and cell phone survey (November 2014).

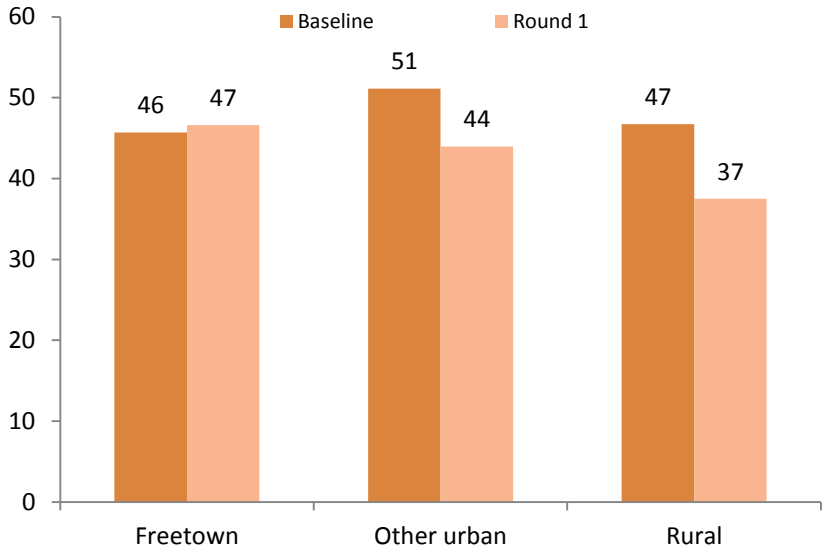
Gender impacts are inconclusive. Due to the limited number of female-headed households (24 percent), the sample of women is not sufficient to detect statistically significant differences in employment transitions between men and women. There are reasons, however, to expect women might be more affected due to the larger share of women involved in non-agricultural self-employment prior to EVD, which was the hardest hit sector of employment. This view is consistent with evidence from market surveys[9] that traders have been most affected, as women's work prior to the crisis was predominately (91 percent) in smaller stall and market sales in urban areas.

Outside of Freetown, workers in both farm and non-farm self-employment are dedicating less hours to work. The overall number of hours (amongst those working) showed a large drop across the economy from 47 hours to 39 hours in the past week, and workers in all sectors except wage work reduced the hours dedicated to work. The number of hours worked in the past week declined substantially in other urban areas, while remaining stable in Freetown, though the number of people working fell more sharply. The largest decline in hours was in rural areas, where workers on average worked 10 hours less (from 47 to 37 hours), with no significant difference in the number of people working. In the agricultural sector specifically, seasonal reductions due to the completion of the

[9] Glennerster and Suri, 2014 available at http://www.theigc.org/news-item/the-economic-impact-of-ebola-november-2014-report/.

harvest explain only a small portion of the decline, as there is no significant difference in the hours worked between those that still have rice in the fields to harvest and those that do not (38 versus 34 hours).

Figure 4. Hours worked last week among those employed, by area



Source: Sierra Leone Labor Force Survey (July – August 2014) and cell phone survey (November 2014).

Agriculture

EVD did not impact the main planting season activities of households in Sierra Leone. The planting season for the main annual agricultural crops in Sierra Leone (rice, maize, and sweet potato) is at the start of the summer rains in April or May. As the first few cases of EVD did not occur until May, it would not have affected the area under cultivation or to have restricted access to labor for planting. The other main food crop, cassava, is cultivated continuously with no specific planting period. Cocoa, coffee, and palm oil are important cash crops but are also continuously cultivated.

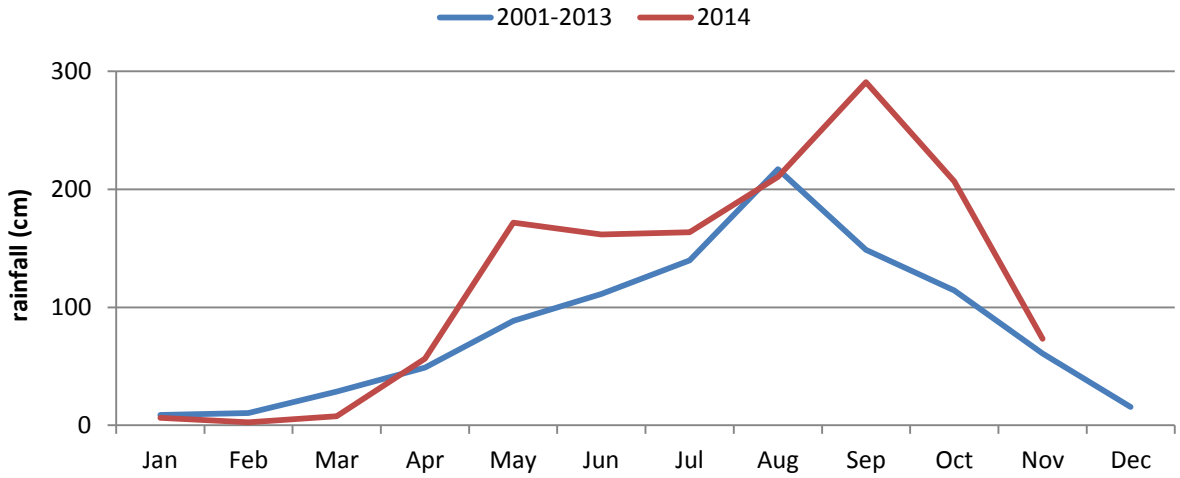
Figure 5. Usual Planting and harvesting seasons for main agricultural crops

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rice			clearing	planting					harvest			
Cassava	continuous harvesting											
Palm Oil				harvest								
Cocoa	harvest							harvest				

Source: Global Information and Early Warning System on Food and Agriculture (GIEWS).

The rice harvest may have been more impacted by 2014 environmental factors rather than EVD. Rice is the main crop in Sierra Leone, both in terms of food security and rural livelihoods, with 93 percent of agricultural households producing rice (SLIHS, 2011). The harvest season usually takes place from late September through December, and is therefore not yet completed for the 2014 agricultural season. Sixty-six percent of agricultural households reported there was still some rice in the field as of the cell phone survey in mid-November. The main reason cited by 72 percent of respondents, was that the rice was not yet ready to be harvested. More than 90 percent of agricultural households report that it is still raining, and rain stations report that rain during October was exceptionally high. If the unseasonably heavy rain continues, it may negatively affect yields.

Figure 6. Rainfall by month – Historic averages and 2014



Source: Glennerster and Suri (2014) from FEWS-NOAA Collaboration.

A small percentage of households cite labor constraints, mainly related to household labor. For households that have some rice still in the field, about 14 percent of respondents indicated that not having enough household labor was their main constraint, but only six percent of those with rice in the field reported a lack of labor available in the community as the reason. Unfortunately there is limited historical information available as to the magnitude of this issue, but areas under quarantine report less (though not significantly less) shortage of labor than those not under quarantine. In addition, more than half of agricultural households hired labor outside the household. As the harvest is not yet complete, this proportion is likely to rise. Traditionally, many agricultural households engage in exchange labor agreements with their neighbors, and therefore the percentage of households employing outside labor likely underestimates the percentage using outside labor. The results suggest that the fear of infection has not had a major impact on hiring practices. Only one respondent reported being unable to harvest due to illness.

Given that the rice harvest is ongoing, the impact of EVD remains to be assessed. With the early information that is available, however, there is no evidence that EVD has impacted the main inputs into

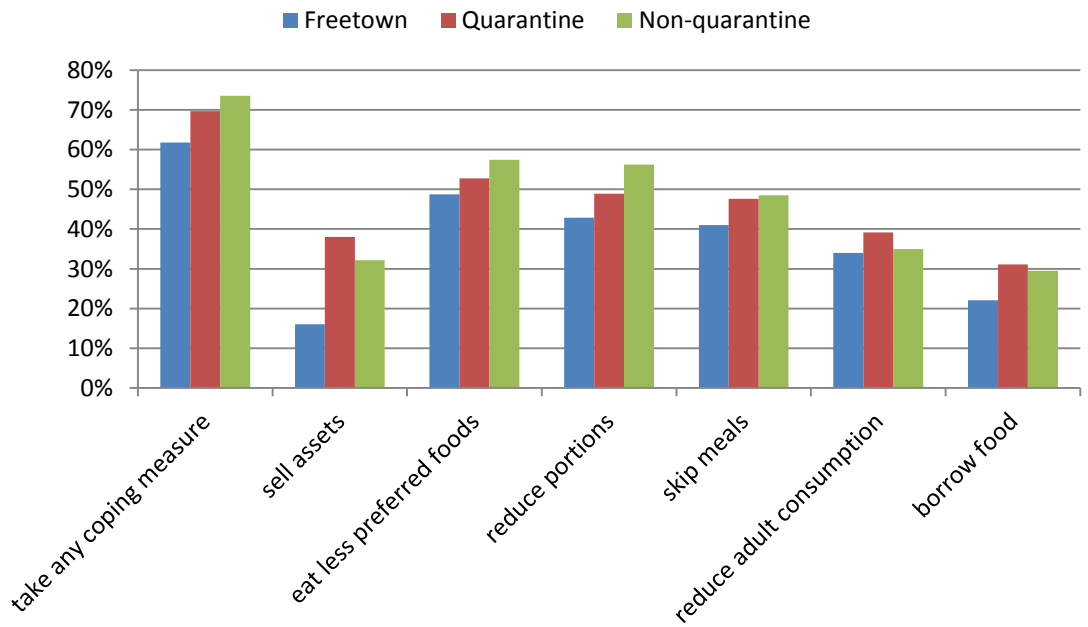
the harvest, namely planting and labor. The next rounds of the cell phone survey will continue to monitor the situation.

Cocoa, a major cash crop in affected areas, does not yet show negative impacts from EVD. Cultivation of cocoa is limited to specific geographies with Kailahun and Kenema, the first districts in Sierra Leone to report cases of EVD, among the major producing areas in the country. The 2014 harvest season for cocoa is also ongoing, with 56 percent of cocoa farmers overall saying they have harvested some of their cocoa. A greater percentage of farmers in quarantined areas had harvested their cocoa, 63 percent compared to 45 percent. While the number of observations is too small to test statistical significance, the result indicates that cocoa does not appear to be less likely to be harvested in quarantine areas. Though unlike rice much of which is consumed close to where it is grown, cocoa will need to be sold and transported through the quarantine lines for export. By mid-November, there did not seem to be a statistically discernable difference between quarantine and non-quarantine areas in terms of cocoa growing households' ability to sell cocoa crops. Thirty-nine percent of those in quarantine areas who had harvested their cocoa had sold at least some of their crop, compared to 66 percent in non-quarantine areas. It should be noted that there are only 127 responding households in the cell phone survey sample who grow cocoa, and only 59 who have sold cocoa, so these comparisons should be considered with caution.

Food Security & Prices

More than two-thirds of households experienced food insecurity in the week prior to the survey. At least once in the week previous to the survey, 55 percent of households ate less expensive or less preferred foods, 51 percent of households reduced portion size, 47 percent reduced the number of meals they ate, 36 percent restricted consumption by adults in order for small children to eat, 32 percent had to sell assets to buy food, and 29 percent borrowed food. Overall 71 percent of households took at least one of these six actions in the last week, and more may have taken other actions not specifically included in the questionnaire. It is difficult, however, to gauge the relative impact of EVD as households in Sierra Leone experience high levels of food insecurity even in non-crisis years. In addition, there are no comparable datasets that track food security by month and can be analyzed separately by urban and rural areas. As the cell phone respondents are mainly urban, they are less subject to seasonal fluctuations as they purchase rather than harvest rice and most purchased rice in Sierra Leone is imported (SLIHS, 2011).

Figure 7. Food insecurity and coping strategies



Source: Cell phone survey (November 2014).

Food insecurity is not related to the prevalence of EVD in the area. Households are more likely to take measures in response to food insecurity in non-quarantine areas, where Ebola infection rates are lower. This may in part reflect the success of the Government and international community's response to food insecurity in quarantined areas. Data from 2011 SLIHS suggests the level of food poverty, a similar measure to food insecurity, was lower in Freetown but showed no differences between quarantine and non-quarantine districts. In the cell phone survey, Freetown has the lowest rates of food insecurity, although the differences are small and food insecurity in Freetown is still high. There are also no differences in the coping strategies across quarantine areas and non-quarantine areas, though households in Freetown are less likely to employ all strategies except restricting consumption by adults in order for small children to eat and reducing the number of meals eaten, which they were equally likely to use.

Among poor households, rural and agricultural households are no less likely to be food insecure. Households above the median in the wealth index showed lower incidence of having to use one of the six coping strategies in the week prior to the survey. Within each wealth status group (above and below median wealth), there were no significant differences in food security coping strategies based on location, comparing between Freetown, rural, and other urban areas, and between quarantine and non-quarantine areas. Similarly, within wealth groups, there are no differences in food security outcomes by the household head's sector of employment. These findings show that food insecurity is widespread among the poor and that those working in agriculture or living in rural areas are just as likely to experience insecurity as urban non-producers, though this may change as the harvest continues.

Quarantines do not appear to be preventing food from reaching markets or consumers. Prices paid by households for rice in November 2014, the main staple crop, are marginally lower in quarantine districts (3,134 Leones per kg) than in Freetown (3,482 Leones) and non-quarantine districts (3,359 Leones). There also do not appear to be issues with shortages, as 99 percent of respondents indicated rice was available for sale in their community. These results echo the findings from other work monitoring food prices in markets throughout the country. A high frequency phone survey of 185 randomly selected markets conducted by IPA and the International Growth Center (IGC) found that prices for all staple foods, including domestic and imported rice, are on average similar to those collected from the same survey in previous years. There were some markets where prices were substantially higher than average and there were more of these "outlier" markets than in previous years. Some of these markets were close to the borders of Guinea and Liberia which have been closed to help prevent the spread of the disease, and some were in quarantined areas. On average, the IPA/IGC market survey did not find higher prices for food in quarantined compared to non-quarantined districts. Results from this current study suggest that the stable food prices in markets are translating into stable food prices for consumers. One caveat is that the current survey, because it only includes people with cell phones, includes few respondents in remote areas.

Remittances

Remittances have largely been going to wealthier households. Unfortunately as remittance data is usually collected with a 12 month recall period, it is not possible to tell from this data if the level of remittances has increased since the onset of the EVD crisis. Ten percent of households reported receiving remittances from friends or family either domestically or abroad in the last month, but these payments have been going mainly to better off households. About 18 percent of households above the median wealth index reported receiving remittances in the month before the survey, compared to eight percent of households below the median. The amounts of remittances received were also higher in more well-off households. Excluding two outlier observations of transfers more than 2,000 USD, which went to households above the median in Freetown and Kenema, the average amount was more than 50 percent higher for the well-off, 319,902 Le. (74 USD) compared to 151,305 Le. (35 USD). There was, however, no difference in the amounts received between the quarantine and non-quarantine areas outside of Freetown.

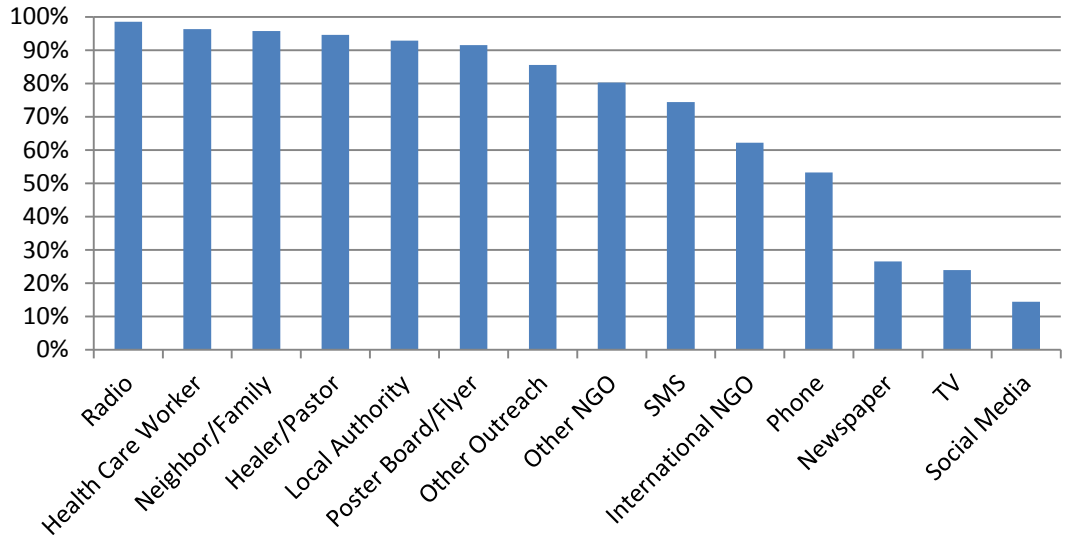
Health

Knowledge of Ebola

Ebola information campaigns were largely successful. When asked if they had heard of Ebola virus and if they had received information about how to protect themselves, all respondents answered yes to both questions. The most common sources of information were by radio, interactions with family and neighbors, and through outreach workers. A substantial percentage, more than three-quarters, indicated receiving information from SMS messages, though this statistic is likely over-represented given that all respondents necessarily have cell phones. About 20 percent of respondents indicated receiving

information through social media, including more than 40 percent of those living in Freetown. In addition, a question was asked as to whether the household was visited during the September 19 – 21 lockdown. More than 97 percent of households were visited during this period, and there were no differences across regions or districts.

Figure 8. Sources of information regarding EVD



Source: Cell phone survey (November 2014).

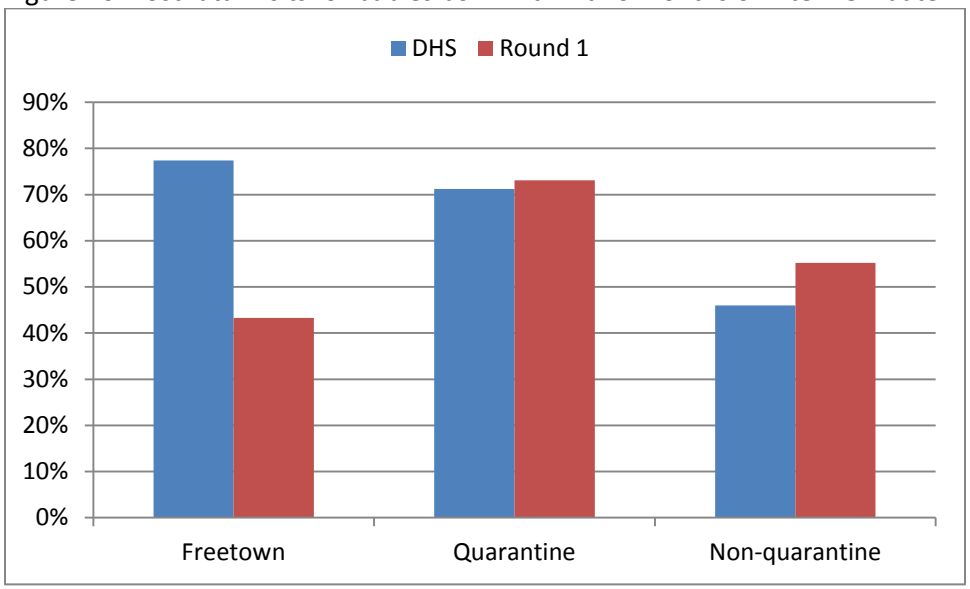
Health facility utilization

Usage of health care facilities may have declined in Freetown due to EVD, but in other districts it seems unaffected. A major concern has been that the Ebola outbreak has deterred people from using health facilities for non-Ebola related health needs. The baseline for this analysis is the 2013 Demographic and Health Survey (DHS), which was conducted just over one year prior to the cell phone survey. To determine if the usage had declined, the cell phone survey asked questions related to the care received by pregnant women and new mothers. Approximately 78 percent of households with pregnant women indicated they had gone to at least one prenatal visit in the previous two months, and 27 percent of new mothers reported giving birth in a clinic. While these percentages are low compared to international standards, particularly with regard to clinic births, Sierra Leone has had historic problems meeting the demand for maternal health care.

The 2013 DHS and the cell phone survey can be compared in terms of the incidence of women seeking postnatal care for babies born within two months of the interview date. Many poorer and more remote rural households may not have cell phones and it is not possible to determine which households in the DHS had cell phones, so this analysis is limited only urban households, where ownership rates are higher. The potential exclusion of poorer urban households though likely causes the cell phone estimates to be higher than actual percentages. The comparison shows some differences for the quarantined and non-quarantined districts, though the sample size of recent births is not sufficient in the cell phone survey to detect statistical significance. There is, however, a significant decrease in

Freetown despite the potential overestimation in the cell phone survey. This finding could be interpreted in two ways: either there has been a decline in service availability in Freetown due to a shift in health resources to EVD treatment, or it could point to a greater fear of exposure in Freetown than even in the quarantined areas, and an accompanying decline in use of health facilities. Regardless of the cause, the EVD crisis appears to have led to a decline in the use of non-EVD related health services.

Figure 10. Postnatal visits for babies born within two months of interview date



Source: Urban only, DHS (2013) and Cell phone survey (November 2014).

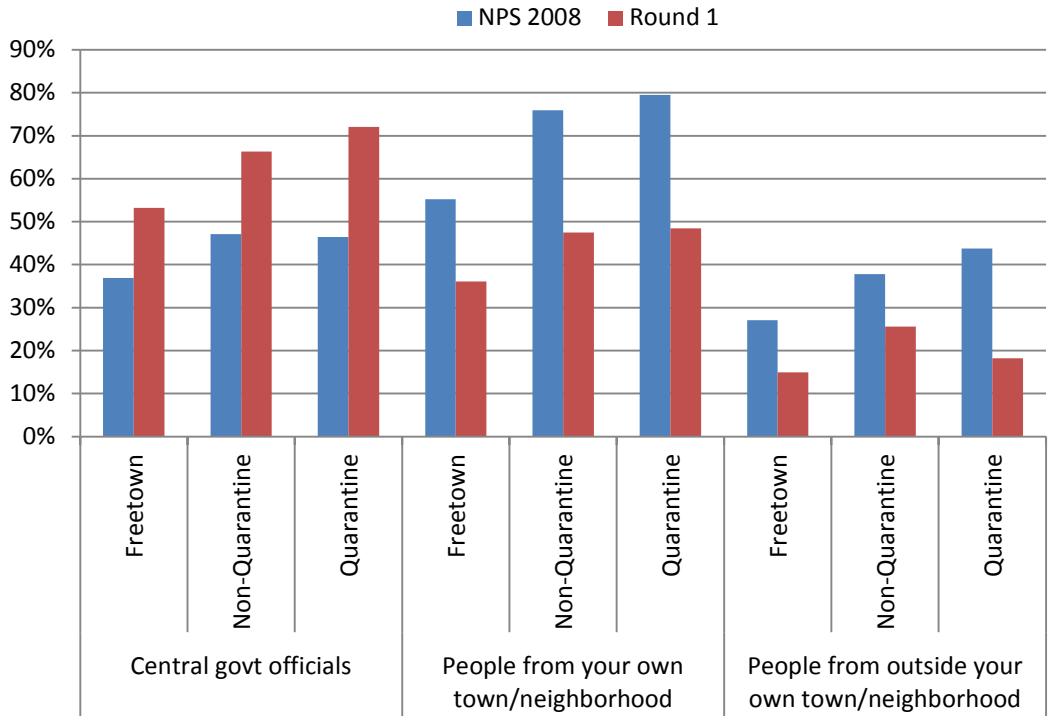
The cell phone survey also asked questions related to the incidence and treatment of fever in the household. Again looking only at urban areas, of those which reported a child under age 5 with a fever in the previous two weeks, more than 90 percent sought treatment across Freetown, quarantine areas, and non-quarantine areas, which is comparable to rates in the DHS. These results must be caveated, however, with the fact that the fever incidence questions proved to be problematic as the means showed vast differences between the two surveys. Ten percent of households reported a child under 5 with a fever in the previous two weeks in the cell phone survey, compared to 35 percent in the DHS. The change in Freetown was even more severe, dropping below five percent from 37 percent in the baseline. While it is possible that there is a seasonal component of the change or that there have been some improvements in child health occurred just over one year, it is more likely that respondents were afraid to report fever in the household as it is a common symptom of EVD. This then likely led to substantial under-reporting.

Trust

Reported trust in central government officials did not differ between quarantine and non-quarantine areas. Despite the outbreak of EVD, in November 2014, 72 and 66 percent of respondents in quarantine and non-quarantine areas outside of Freetown, respectively, reported that central government officials could be believed, while 53 percent of those in Freetown said they could be

believed. While this suggests that many people do distrust officials, the level of trust is still higher in all regions than it was when the same question was asked in the nationally representative National Public Services survey conducted by the Decentralization Secretariat in 2008.

Figure 9. Percentage indicating trust in relevant group



Source: National Public Service Survey (2008) and cell phone survey (2014)

Areas under quarantine saw a particularly steep relative drop in the level of trust in outsiders. Though there are large changes over time in the levels of trust in central government, neighbors and outsiders, these declines occurred since 2008 and likely driven by a number of factors unrelated to EVD. However, comparing the relative changes in trust across quarantine and non-quarantine areas, there are some striking differences. Areas under quarantine see a particularly stark fall in trust of outsiders, declining 26 percentage points (from 44 percent to 18 percent), while the decline in non-quarantine areas was only 12 percentage points (from 38 percent to 26 percent) This relative decline in quarantine versus non-quarantine areas is statistically significant.

Conclusions

The results from the first round of the high frequency cell phone survey indicate important economic impacts of the EVD crisis in Sierra Leone. The employment impacts are most clearly seen in urban areas and in particular in Freetown. These are also the areas where it is possible to draw the strongest conclusions because there are a high number of respondents, the cell phone coverage is wider, and work patterns are less likely to be influenced by seasonality. The percent of household heads who

worked during the last week has fallen by nine percentage points in Freetown, and eight percentage points in other urban areas, since the onset of the epidemic. The reduction comes both from those who were previously in wage employment and those in non-farm self-employment and Ebola was cited as one of the main reasons for not working. The hours worked for those remaining employed declined in other urban areas but not in Freetown.

In contrast, in rural areas there are fewer signs of employment impacts as measured in this survey, though the survey has fewer respondents in rural areas who are unlikely to be representative of the rural population generally. This, as well as the seasonality of labor demand and the unusual rains, makes it harder to draw clear conclusions about employment effects in rural areas at this stage. However, among rural respondents there was no reduction in the employment rate between July/August and November, although there was a reduction in average hours worked.

Although the harvest is still ongoing, there is no strong evidence that it has been affected by EVD. Planting took place before the outbreak and the majority of farming households are hiring labor, despite possible concerns they might have about infection from contact with people outside the family. Those farmers with rice still to be harvested report the rice not being ready as the main reason for not having completed the harvest, with lack of household labor the next most important reason. Rains this season may have a bigger negative impact on the harvest than EVD.

Sierra Leone has high levels of food insecurity, and households have employed a variety of coping strategies. However, it is not clear whether or by how much this is Ebola related. There is no evidence that quarantine restrictions are preventing food from reaching markets, and data from an IGC market survey does not show price increases over previous years. Additionally, about ten percent of households reported receiving remittances in the month prior to the survey, but these mainly went to wealthier households and therefore remittances are unlikely to have substantially increased food security.

There is some evidence of a decrease in the utilization of health services for non-EVD conditions. Again this appears to be primarily in Freetown: a much lower proportion of women report post-natal clinic visits than was recorded in the 2013 Demographic and Health Survey. There is little evidence of changes in health utilization outside Freetown.

As the EVD crisis in Sierra Leone continues to unfold, many of the outcomes measured will also evolve. The cell phone survey is planned to be implemented on a monthly basis to monitor these changes and to collect additional information to assist government and other stakeholders in addressing socioeconomic issues during the crisis and subsequent recovery.

Methodological Appendix

The high frequency socio-economic impact of Ebola survey was initiated conducted jointly by Innovations for Poverty Action (IPA) and Statistics Sierra Leone (SSL), with funding from the World Bank's Poverty and Social Protection Global Practices and close collaboration with researchers at Massachusetts Institute of Technology (MIT), to estimate the impact to well-being of the Ebola Virus Disease (EVD) crisis. The first round was conducted from November 12 to November 25, 2014, with subsequent monthly rounds planned. This note describes the survey methodology underlying the data collection and analysis.

Sample Design – The sampling frame for the cell phone survey was the Sierra Leone Labor Force Survey (LFS). The LFS is a nationally representative stratified cluster sample survey conducted in July and August 2014, and includes the oversampling of urban areas. As part of the LFS, a total of 4199 households in 280 enumeration areas (EAs) were interviewed. Interviewers collected the phone number, if available, for the head of household, and 2,764 households interviewed in the LFS included phone numbers. The phone numbers included 43 percent of rural households and 82 percent of urban households. Those households reporting numbers is unevenly distributed across the sample though there is at least partial coverage in all districts, ranging from 93 percent in Freetown (Western urban) to 30 percent in Kailahun district. All available numbers from the LFS were included in the cell phone survey. See table A1 at the end of this section for percentages by district.

Questionnaire – As the survey was administered by telephone, the length of the questionnaire was restricted to about 20 to 25 minutes. The questionnaire focused on employment and labor market conditions, non-agricultural business operations, agricultural activity, food security, health responses (covering only fever and pregnancy), remittances, travel, trust and knowledge about Ebola. The only questions on EVD focused on whether the respondent had heard of Ebola and what were their main sources of information were. This section was placed at the end of the questionnaire in order to elicit unbiased responses in other sections, since people may be distrustful of the government especially regarding Ebola, at a time of such emergency. Questions related directly to incidence of EVD within the household were excluded for two reasons. First EVD is a relatively rare event and the sample was unlikely to yield sufficient observations for meaningful analysis, and secondly, the respondents will be called repeatedly as part of the high frequency survey therefore it was necessary to avoid sensitive questions that may increase attrition in later rounds. The included questions were worded in such a way as to facilitate differences-in-differences comparisons. The vast majority of questions were identical in their wording to those asked during the LFS or other nationally representative surveys for which detailed data were available including the Demographic and Health Survey (DHS), the National Public Services survey (NPS) and the Agricultural Households Tracking Survey (AHTS). In a few cases, the time period over which the questions were asked was shortened to make it relevant to the last few months during which the outbreak has been growing. For example, the NPS asked about remittances in the last year whereas in November 2014, respondents were asked about remittances received in the last month.

Implementation – The survey was implemented by enumerators recruited by SSL and IPA from SSL's Freetown offices. The questionnaire was administered using computer assisted telephone interviewing from a CSPro application run on desktop computers. If respondents did not answer the phone after the initial attempts, a text message was sent to explain the purpose of the call. Respondents also received an incentive in the form of 50 phone units (valued up to 50 US cents) in cell phone credit for completed calls. A maximum of nine attempts were made to contact target respondents over the course of 14 days, with no more than three attempts being made in a single day. Interviewers called requested to speak to household heads. If a household head was not available after three tries, a spouse or another adult was interviewed. Of the households reached, 96 percent were household heads. If the respondent was not an original household member, the call was ended and an incorrect number was recorded.

Response Rate – Overall the response rate was higher than expected given the nature of the survey and the difficult conditions under which it was conducted. The data collection resulted in 1,896 complete interviews, 69 percent of the available 2,764 numbers and 45 percent of the 4199 total households in the LFS. The largest component of non-response was phones that rang but were not answered. Table A2 shows a breakdown of the call outcomes including unanswered calls, phone being switched off, rescheduled but never completed, refusal, bad network/call drops off, incorrect phone number, and number disconnected.

Comparing the characteristics of respondents to the overall sample frame, 96 percent were household heads and all were original household members. Overall, the characteristics of the respondents were similar to those in the original sample. Comparing the average age of respondents to that of the original sample of household heads, the most logical available comparison group, the average age of a respondent was 44.9, compared to 44.7 in the original LFS sample. Thirty percent of the cell phone survey respondents were female compared with 29 percent female household heads in the original sample. Tables A3 and A4 show the distribution of employment and geographic location for cell phone survey respondents and the original LFS sample.

Weights - The base weights for the cell phone survey were the probability weights from the LFS. Sampling weights for the LFS households were calculated by,

$$\text{Household weight} = 1/(P_{EA,strata} * P_{HH,EA})$$

where $P_{EA,strata}$ is probability of EA being selected within strata, and,
$P_{HH,EA}$ is probability of household being selected within the EA.

To account for higher likelihood of more populated EA's being selected, $P_{EA,strata}$ is calculated as,

$$P_{EA,strata} = (n_{EA,strata} * N_{HH,EA})/N_{HH,strara}$$

where $n_{EA,strata}$ is number of EA's selected within the strata,
$N_{HH,EA}$ is the total number of households within that EA, and,
$N_{HH,strara}$ is total number of households across all EAs in that strata.

Household selection probability was calculated using,

$$P_{HH,EA} = n_{HH,EA} / N_{HH,EA}$$

In addition, an attrition adjustment was applied. A propensity score adjustment, which uses the available characteristics of the household head from the LFS (age, gender, location, and sector) to calculate an aggregate probability of response, was calculated. The results of this analysis are presented in Table A5 at the end of this section. The inverse of this probability is then applied to the probability weights, therefore increasing the weight for underrepresented groups. As a second step, a post-stratification correction was applied, adjusting the weights to match known population totals at the district and urban/rural levels.

Wealth Index – As consumption data is not available for either the LFS or the cell phone survey, a wealth index using principal components analysis is used to proxy differences in well-being. The index includes information on livestock assets (goats, pigs, chickens), educational attainment (literacy and completion of primary school), housing structure (electricity, material of walls, and toilet facilities), and dwelling characteristics (water source and lighting source). This index is then divided at the median into an indicator variable for wealthier households.

Auxiliary data sets

Sierra Leone Labor Force Survey (2014)

The Sierra Leone Labor Force Survey is a nationally representative household survey and was conducted by Statistics Sierra Leone and the World Bank in July and August of 2014. The total sample size was 4,199 households, 59 percent in urban areas and 41 percent in rural areas. As urban areas were oversampled, probability weights are used to obtain unbiased national estimates. Of the total sample, 66 percent reported cell phone numbers. The main topics covered by the LFS were household listing and demographic information, education, training, and migration, unemployment and inactivity, current main and secondary economic activities, usual economic activity, industrial relations and occupational injuries, time use, family/household non-farm enterprises, and farming activities. The first cases of Ebola were detected in Sierra Leone in May.[10] Therefore while the LFS therefore does not represent a clean pre-Ebola baseline, the outbreak was much more geographically contained. At the end of June, there were only four cases outside of Kailahun and Kenema, the first two districts to be infected. The first restrictions placed on economic activity were imposed at the start of August when a cordon was imposed on Kailahun and Kenema, bars were asked to close throughout the country, and

[10] http://wwwnc.cdc.gov/travel/notices/warning/ebola-sierra-leone

schools were closed. Thus, 50 percent of the LFS was collected in a month when the economic impacts of Ebola were likely to be minimal and 50 percent was collected when the impacts were likely to be restricted to specific regions and sectors. To the extent that Ebola may have been already negatively impacting economic activity in July and August of 2014, the estimate of the economic impact of Ebola may be underestimated.

To analyze the effects of the EVD outbreak on employment, this study relies on measures of employment that ensure comparability across surveys while capturing short term changes. The study uses a measure of labor force participation that includes household heads in the labor force if they were in the labor force either at the time of the LFS or in the November round of the phone survey. It also no longer considers someone employed in November if they are temporarily absent from work for three months or less and the reason cited is Ebola. Since it is unlikely that household heads dropped out of the labor force over such a short period of time for reasons unrelated to the outbreak, this allows short term changes in work induced by the outbreak to be captured. When defined this way, the labor force participation rate among working-age heads is 98 percent.

Sierra Leone Demographic and Health Survey (2013)

The 2013 Sierra Leone Demographic and Health Survey (DHS) is a nationally representative survey focused on topics related to family and child health issues, including fertility, family planning, maternal and childhood mortality, maternal and child health, nutrition, and HIV/AIDS. The DHS was implemented by the Ministry of Health and Sanitation and SSL. Three types of questionnaires were administered, a household questionnaire, a women's questionnaire for all women aged 15-49, and a men's questionnaire for men aged 15-49 in every second household. The survey was administered from June to October 2013, and includes data on 12,629 households. Further information on the DHS methodology is available at http://www.dhsprogram.com.

National Public Services Survey (2008)

The National Public Services Survey (NPS) was conducted in 2008 by the Institutional Reform and Capacity Building Project, a joint initiative of the Government of Sierra Leone and the World Bank. It involved two questionnaires: a household questionnaire that was administered to ten households in each EA; and a community questionnaire that, in rural areas, was completed during an informal village meeting, and, in urban areas, was completed based on the survey enumerator's own observations. It is a nationally representative survey that focuses on the state of public services, political attitudes, and community organization in Sierra Leone. It covers a number of topics including the quality of, cost of, and satisfaction with public services; participation in and the accountability of various levels of government; and social capital and political attitudes. The survey contains data on 6,343 households in 634 enumeration areas (EA). These are the same EAs and, to a large extent, the same households covered when the survey was previously conducted in 2005 and 2007. In order to provide results representative at a district level, the sample over samples EAs in small districts. The results here are reweighted to ensure that the results are representative at the national level. Further information is available at

http://thedata.harvard.edu/dvn/dv/RepublicSierraLeone/faces/study/StudyPage.xhtml?globalId=hdl:1902.1/16786.

Agricultural Household Tracking Survey (2010)

The Agricultural Household Tracking Survey (AHTS) was commissioned by the Office of the President of Sierra Leone, and implemented collaboratively by the Ministry of Agriculture, Forestry and Food Security, Statistics Sierra Leone, and the Innovations for Poverty Action. It is a nationally representative survey of farming households in Sierra Leone. The questionnaire was designed to capture information on the agricultural activities of smallholder farmers, and covered topics such as: farmers' decisions; yields and production levels; access to services and technology; and food security. The survey was conducted between March and May of 2010 and contains data on 8,803 households in 917 EAs. The sampling of EAs was stratified by district, and the questionnaire was administered to ten households in each EA. The outcomes have been reweighted to make the results representative of agricultural households in the country as a whole. There are insufficient nonagricultural households included in the sample to allow for reweighting to give nationally representative outcomes.

Further information is available at:
http://thedata.harvard.edu/dvn/dv/ahts/faces/study/StudyPage.xhtml?studyId=85626&tab=catalog.

Table A1: Geographical Distribution of LFS and Sample

District	Labor Force Survey				
	Freq.	Percent	Freq.	Percent	% of LFS Found in Nov
Kailahun	210	5	37	1.95	17.62
Kenema	420	10	214	11.29	50.95
Kono	420	10	244	12.87	58.10
Bombali	330	7.86	157	8.28	47.58
Kambia	181	4.31	59	3.11	32.60
Koinadugu	180	4.29	56	2.95	31.11
Port Loko	179	4.26	49	2.58	27.37
Tonkolili	180	4.29	46	2.43	25.56
Bo	421	10.03	185	9.76	43.94
Bonthe	269	6.41	113	5.96	42.01
Moyamba	180	4.29	62	3.27	34.44
Pujehun	180	4.29	44	2.32	24.44
Western Rural	288	6.86	149	7.86	51.74
Western Urban	761	18.12	481	25.37	63.21
Total	4,199	100	1,896	100	45.15

Table A2: Non-Response

Survey Completed	1896
Phone switched off	745
Incomplete	37
Wrong number	36
Mobile company no longer active	22
Call unanswered	13
Rescheduled but never completed	6
Refusal	5
Bad network/call drops off	4
Total	2764

Table A3: Employment Status Distribution of LFS and Sample

	Employment Status in LFS		Employment Status in Nov 2014	
	Freq.	Percent	Freq.	Percent
Employee regular	535	17.1	339	22.7
Employee, casual or seasonal	119	3.8	114	7.7
Self-employed, without regular employee	2,165	69.4	877	58.8
Self-employed, with regular employees	98	3.1	79	5.3
Member of producer's cooperative	7	0.2	1	0.1
Help without pay in own or another house	29	0.9	16	1.1
Help without pay in own or another house	137	4.4	34	2.3
Paid apprenticeship	30	1.0	9	1.0
Unpaid apprenticeship	2	0.1	22	1.5
Total	4,199	100	1,896	100

Note: The sample size of household heads here is 1,735. This is because in the initial LFS some heads were not interviewed as they were considered not part of the labor force. In the employment section of the analysis the analysis focuses only on the panel sample, i.e. the household heads that were interviewed in the LFS and in the November 2014 cell phone survey.

Table A4: Propensity Score Regression Results

	Coefficient	Std. Err.	z	P>|z|
Age	0.0234	0.0127	1.8400	0.0650
Age Squared	-0.0002	0.0001	-1.7400	0.0820
Gender	-0.0395	0.0797	-0.5000	0.6200
Wage Sector	0.2169	0.1157	1.8800	0.0610
Agriculture Sector	-0.4008	0.1068	-3.7500	0.0000
Non-Agriculture Self Employed Sector	0.2907	0.1025	2.8400	0.0050
Unpaid Workers	0.0310	0.2149	0.1400	0.8850
Household Head Can Read and Write	0.2598	0.1255	2.0700	0.0380
Household Head Has More Than Primary Education	0.3905	0.1308	2.9900	0.0030
Household Owns Livestock	0.1312	0.1988	0.6600	0.5090
Household Owns Goats	0.2068	0.1211	1.7100	0.0880
Household Owns Pigs	-0.5166	0.4247	-1.2200	0.2240
Household Owns Chicken	-0.0824	0.1881	-0.4400	0.6610
Stratum: Kailahun, Urban	1.3802	0.4089	3.3800	0.0010
Stratum: Kenema, Rural	0.9552	0.4124	2.3200	0.0210
Stratum: Kenema, Urban	2.7604	0.3564	7.7500	0.0000
Stratum: Kono, Rural	1.2543	0.3971	3.1600	0.0020
Stratum: Kono, Urban	3.0357	0.3591	8.4500	0.0000
Stratum: Bombali, Rural	1.2652	0.4028	3.1400	0.0020
Stratum: Bombali, Urban	2.6045	0.3669	7.1000	0.0000
Stratum: Kambia, Rural	1.3583	0.4004	3.3900	0.0010
Stratum: Kambia, Urban	1.9302	0.4307	4.4800	0.0000
Stratum: Koinadugu, Rural	0.7195	0.4236	1.7000	0.0890
Stratum: Koinadugu, Urban	2.6063	0.4349	5.9900	0.0000
Stratum: Port Loko, Rural	0.9414	0.4129	2.2800	0.0230
Stratum: Port Loko, Urban	1.6943	0.4305	3.9400	0.0000
Stratum: Tonkolili, Rural	1.0921	0.4095	2.6700	0.0080
Stratum: Tonkolili, Urban	1.8056	0.4305	4.1900	0.0000
Stratum: Bo, Rural	0.9186	0.4109	2.2400	0.0250
Stratum: Bo, Urban	2.2318	0.3555	6.2800	0.0000
Stratum: Bonthe, Rural	1.2118	0.4014	3.0200	0.0030
Stratum: Bonthe, Urban	2.2747	0.3777	6.0200	0.0000
Stratum: Moyamba, Rural	1.3079	0.3984	3.2800	0.0010
Stratum: Moyamba, Urban	2.5419	0.4300	5.9100	0.0000
Stratum: Pujehun, Rural	0.5161	0.4322	1.1900	0.2320
Stratum: Pujehun, Urban	1.9748	0.4314	4.5800	0.0000
Stratum: WA Rural, Rural	1.5570	0.3766	4.1300	0.0000
Stratum: WA Rural, Urban	1.5193	0.3783	4.0200	0.0000
Stratum: WA Urban	2.5619	0.3474	7.3700	0.0000
Constant	-2.9696	0.4575	-6.4900	0.0000
Number of obs		4,199		
Log likelihood		-2428.3048		

A5 : Means Tables

	LFS, Jul/Aug 2014		cell phone, Nov 2014	
Employment	*mean*	*se*	*mean*	*se*
Working	0.824	0.009	0.798	0.010
Working in Wage Sector*	0.112	0.009	0.103	0.009
Working in Ag. Self Employed Sector*	0.512	0.014	0.534	0.015
Working in Non. Ag Self. Employed Sector*	0.318	0.013	0.285	0.013
Working as Unpaid Worker*	0.058	0.007	0.078	0.008
Working, Rural	0.855	0.019	0.857	0.020
Working, Urban	0.755	0.012	0.674	0.013
Working, Other Urban	0.771	0.014	0.693	0.015
Working, Freetown	0.732	0.021	0.643	0.023
Working, Quarantine Districts	0.833	0.018	0.832	0.018
Working, Non-Quarantine Districts	0.841	0.013	0.811	0.014
Hours Worked in Past Week*	47.4	0.6	39.4	0.6
Hours Worked in Past Week, Wage Sector*	46.2	1.2	46.9	1.4
Hours Worked in Past Week, Ag. Sector*	45.2	1.3	36.9	1.0
Hours Worked in Past Week, Non-Ag. Sector*	51.5	1.0	43.6	1.0
Hours Worked in Past Week, Unpaid Sector*	46.0	3.7	32.1	1.6
Hours Worked in Past Week, Other Urban*	51.1	1.0	43.9	0.9
Hours Worked in Past Week, Freetown*	45.7	1.2	46.6	1.4
Hours Worked in Past Week, Rural*	46.7	1.3	37.5	1.1
Hours Worked in Past Week, Quarantine*	45.7	1.0	37.9	1.0
Hours Worked in Past Week, Non-Quarantine*	49.2	1.0	39.3	0.8
HH Had Non-Agr. Business in Past 6 Months	0.588	0.012	0.652	0.011
Business Still Operating	0.962	0.006	0.877	0.010
Business Revenues	1,953,403	180,355	850,741	84,635
Business Revenues, Trim Top 1%	1,411,932	73,698	846,704	83,781
Business Revenues, Trim Top 5%	1,087,345	40,869	604,043	35,164

	cell phone, Nov 2014	
Migration	*mean*	*se*
households relocating	0.075	0.013
Agriculture		
Some Rice Not Yet Harvested	0.661	0.028
Not Harvested Because Rice is Not Ready	0.721	0.023
Not Harvested Because Not Enough Labor in HH	0.138	0.018
Not Harvested Because Not Enough Labor in Community	0.057	0.012
Not Harvested Because Too Sick to Harvest	0.004	0.003
Not Harvested Because of Other Reason	0.079	0.014
Rains Stopped in Early September	0.019	0.005
Rains Stopped in Late October	0.043	0.008
Still Raining	0.938	0.009
Household Hired Labor	0.515	0.023
Any Rice Sold	0.168	0.022
Any Cocoa Harvested	0.560	0.045
Any Cocoa Sold	0.478	0.066

Food Security	*mean*	*se*
Employ an coping strategy	0.712	0.024
Sell assets	0.323	0.024
Rely on less preferred foods	0.545	0.027
Reduce portions	0.517	0.023
Reduce number of meals	0.472	0.028
Reduce adult portions so that children could eat	0.364	0.025
Borrow food from friends / neighbors	0.291	0.023
Remittances		
Received remittances	0.104	0.012
Amount if received*	231,942	32,488
Amount if received - households above median wealth*	338,740	40,113
Amount if received - households below median*	151,403	44,145
* excludes two outlier values		
Knowledge of Ebola		
Newspaper	0.280	0.024
Social Media	0.145	0.014
Healer / pastor	0.946	0.011
Neighbor / family	0.960	0.010
Other outreach	0.857	0.018
NGO worker	0.805	0.019
International NGO worker	0.633	0.027
Health care worker	0.962	0.009
Information phone number	0.542	0.022
SMS	0.746	0.025
TV	0.250	0.023
Radio	0.986	0.006
Poster / billboard / flyer	0.916	0.017

Health (urban only)	DHS, June/Oct 2013		cell phone, Nov 2014	
	mean	*se*	*mean*	*se*
Child under 5 with fever in previous 2 weeks	0.348	0.011	0.105	0.010
Child's fever treated?	0.978	0.005	0.966	0.017
Post-natal care (child born in two months prior to survey)	0.635	0.062	0.541	0.052

		NPS, 2008		cell phone, 2014	
Trust		*mean*	*se*	*mean*	*se*
Central Govt Officials Can be Believed	Quarantine	0.464	0.010	0.721	0.020
	Freetown	0.369	0.016	0.532	0.024
	Non-Quarantine	0.471	0.011	0.663	0.016
Neighbors and those in the commnity can be believed	Quarantine	0.795	0.008	0.484	0.022
	Freetown	0.552	0.016	0.361	0.022
	Non-Quarantine	0.759	0.008	0.475	0.017
Those outside the community can be believed	Quarantine	0.438	0.010	0.183	0.018
	Freetown	0.271	0.015	0.150	0.017
	Non-Quarantine	0.378	0.010	0.256	0.015