

# The Socio-Economic Impacts of Ebola in Sierra Leone

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*Results from a High Frequency Cell Phone Survey*

*Round 2*

*April 15, 2015*



**WORLD BANK GROUP**



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## Overview

As of April 8, 2015, Sierra Leone had reported more than 12,000 cases of Ebola Virus Disease (EVD), and over 3,800 deaths. Recent World Health Organization (WHO) reports show that Sierra Leone has seen a decrease in new cases each week in the month leading up to April 5, and that week's infection rate was the lowest seen since May 2014. This is cause for cautious optimism.

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. The results focus mainly on employment, agriculture, food security and prices, and health service utilization, covering predominantly urban areas where cell phone coverage is highest, but including rural areas as much as possible given the sample available.

Based on the second round of data collection in January-February 2015, it is clear that the impact of EVD on household wellbeing continues to be widespread, and that despite some improvements in the health situation, the economic situation remains uneven. The overall employment situation has improved since November, driven by increases in employment rates in urban areas. However, youth employment in Freetown has seen a continued decline and the percentage of households in non-farm enterprise work who reported that their business is no longer operating is now at four times the pre-crisis level.

Changes in earnings have depended on the employment sector. Wage workers are earning around the same as they did pre-crisis, while those operating non-farm household enterprises are seeing revenues well below what they earned before the crisis – a 54 percent drop from the Labor Force Survey conducted in July-August 2014. Women in particular are more affected, mostly due to the fact that they are more likely to be working in non-farm household enterprises, the sector most heavily impacted by the EVD crisis.

Rural areas continue to appear to have been the most resilient to EVD based on these data. However, food insecurity, which was high in Sierra Leone even before the crisis, continues to be a concern, with nearly 70 percent of households taking at least one action to cope with food shortages in the week leading up to the survey. Rural workers also continued to work less than before the crisis – by five hours per week – despite the harvest.

Delivery of social services has generally improved. The utilization of maternal care services has increased significantly since November: the percentage of women who gave birth in a clinic up from 28 percent to 64 percent and the percentage who received at least one prenatal visit up from 56 percent to 71 percent. National educational radio programs have also generally been successful in reaching the population, with 72 percent of households with school-aged children reporting that at least some children listened to these programs. Coverage of social assistance, mostly in the form of food, reflects targeting of high infection areas during the emergency response, suggesting efforts to reach the poorest are needed as the country moves toward recovery.

A third round of data collection is planned for April 2015, to continue to pinpoint the most pressing socioeconomic issues arising for households, and to help the country prepare for economic recovery.

# Map

IBRD 33478



## Background & Motivation

Since the initial appearance of the Ebola Virus Disease (EVD) in rural Guinea in December 2013, the virus has caused more than 10,000 deaths with over 25,000 cases in the region.<sup>1</sup> Sierra Leone has reported the highest level of cases of the three most affected countries, 11,974 as of April 1, 2015, with 3,799 deaths. Following a peak of around 500 new cases a week in early December, substantial progress has been made in controlling the outbreak: the case incidence fell sharply through December and January, levelled off in February, and then decreased again in March, dropping to 25 cases in the last week.

The trajectory of the outbreak has also changed. Kailahun and Kenema, the districts which were initially the most impacted by EVD, experienced very few new cases after November 2014. Districts in the North and West regions, including Freetown, Port Loko, and Bombali, also had a large number of cases but cases have continued to rise through January. Of those areas which were largely untouched by the initial wave, some saw sharp increases in new cases, such as Kono district, while others continued to have low numbers, including Bonthe and Pujehun.

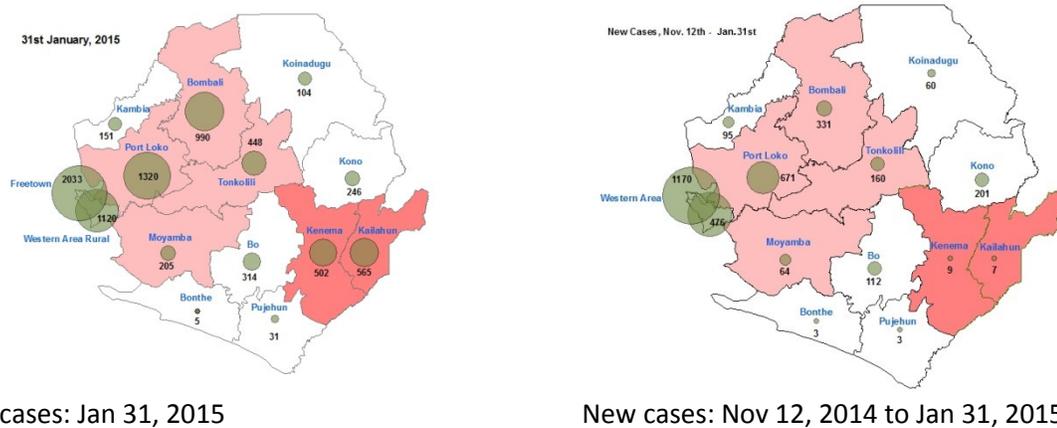
In response to improving medical situation, on January 22, the Government of Sierra Leone scaled back some of the measures imposed to slow the spread of the disease. The quarantine of Kailahun and Kenema districts was lifted, as were other district travel restrictions and regulations on the hours markets could operate. While reports of sporadic closures continue, the international land borders with Liberia and Guinea are now open, and trade has resumed, albeit at a lower volume and with additional health measures in place. Air links remain limited, and many countries still have special visa restrictions on Sierra Leoneans because of EVD. Schools did not open in September for the 2014-15 academic year. The latest expected date for reopening is April 14<sup>th</sup>, with some schools opening sooner to allow national standardized examinations to take place. Resumption of classes will be national except in chiefdoms that have not reached zero cases in time. Overall, however, the situation remains unpredictable. On February 27, responding to a new outbreak of cases in a Freetown fishing community, the government re-imposed some restrictions, including on the number of people traveling in taxis and on motorcycles, and reintroduced checkpoints monitoring the flow of people. Also, in an effort to identify any remaining infections not in treatment, there was a second three day lockdown held from March 27 to 29.

The rate of depreciation of the Leone/U.S. dollar exchange rate which had averaged around three percent over the first seven months of 2014, picked up significantly with the Leone ending the year about 13 percent lower. In parallel with the EVD crisis, the Sierra Leonean economy has been impacted by continued falls in the world price for iron ore, the country's main export, which fell by a record 50 percent in 2014. Production was interrupted at both iron ore mines in late 2014, and one mine remains closed through the first quarter of 2015. While relatively few Sierra Leoneans are directly employed in the mining sector, currently estimated around 8,000 total, more than 60 percent are in iron ore and many of these are well paid formal sector jobs. The decline in the price of iron ore and mine closures are likely to have had important negative impacts on other aspects of the economy, particularly on suppliers and on exports and government revenues.

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<sup>1</sup> These figures are from WHO Situation Report, available at: <http://apps.who.int/gho/data>. They differ slightly from NERC report of 8,563 cases and 3,491 deaths as of April 8, due to differences in tallying suspected cases.

Figure 1: Geographic spread of Ebola cases January 2015: total and new cases since November 2014



Source: Ministry of Health and Sanitation, Sierra Leone. As of June 29, 2014, the start of the LFS, there were only 27 cases in Kenema and 153 Kailahun. Shading represents areas that experienced quarantine (dark shading) or faced travel restrictions (light shading), at some point during the outbreak.

## Objectives and Methodology

To monitor the socioeconomic impacts of the EVD crisis, the Government of Sierra Leone is conducting a series of cell phone surveys. The first two surveys were conducted by Statistics Sierra Leone from November 12 to November 25, 2014, and from January 22 to February 4, 2015, with a third round expected in April 2015. This report provides results from the second of these surveys. Funding was provided by the World Bank and technical assistance from Innovations for Poverty Action.

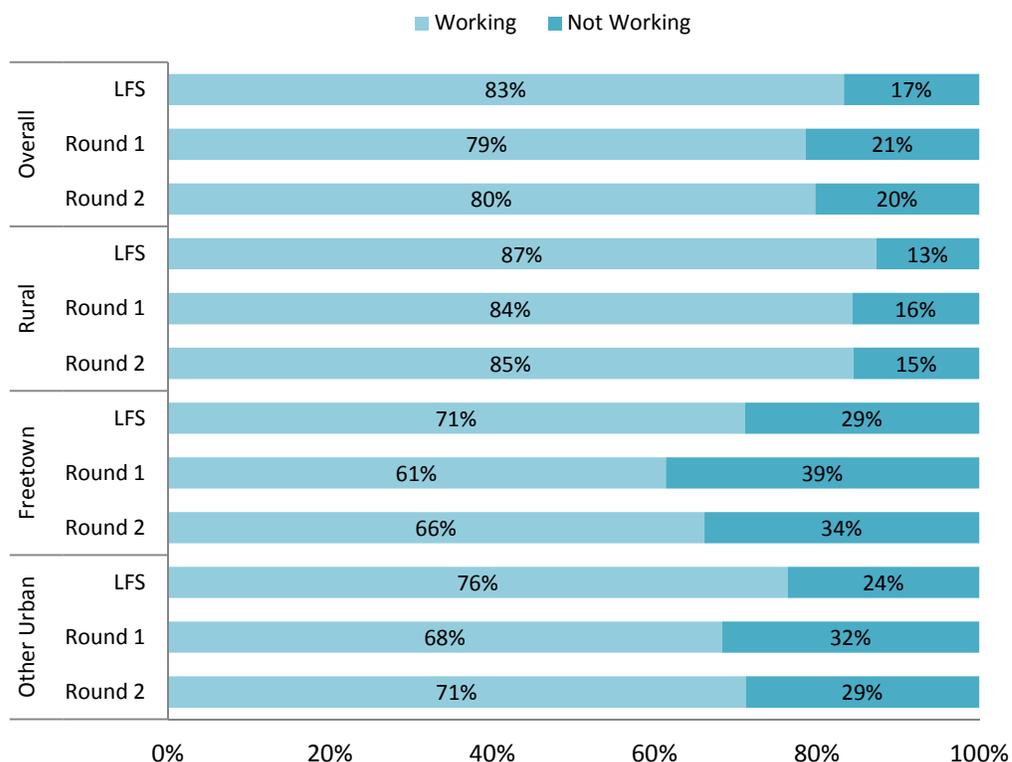
The survey followed household heads for whom cell phone numbers were recorded during the nationally-representative Labor Force Survey (LFS) conducted in July and August 2014. Overall, 66 percent (2,764) of LFS households had cellphones although this coverage was uneven across the country, with higher levels in urban areas (82 percent) than rural areas (43 percent). Of those with cell phones, 69 percent were reached during round 1, 68 percent in round 2, and 60 percent in both round 1 and round 2. Throughout the report, LFS data are for those who responded either in round 1, round 2, or both rounds (see the methodology appendix for more detail).

The report is structured in eight sections covering employment, agriculture, food security and prices, social assistance, remittances, migration, education, and health facility utilization. While the previous report on the round 1 data disaggregated the results based on three groups of districts that had experienced different levels of the disease, changes in the areas most affected makes it more complicated to disaggregate in the same way in this report. The previous report also suggested that the main geographic differences in socioeconomic impact were between urban areas and rural areas and not between areas that had different levels of EVD cases. Data in this report are therefore consistently disaggregated into three groups: rural areas, Freetown, and other urban areas.

## Employment

**Employment rates in urban areas recovered some of the losses seen during the earlier phase of the EVD outbreak.** Overall employment rates, which fell slightly between the Labor Force Survey and the first round of the cell phone survey from 83 to 79 percent, have stabilized in round 2 (80 percent).<sup>2</sup> The main employment impacts have been felt in urban areas, where there are now some signs of recovery: the employment rate in urban areas had fallen from 74 percent to 66 percent in round 1, but showed a statistically significant improvement to 69 percent between round 1 and 2. In Freetown, the employment rate fell from 71 percent to 61 percent between the LFS and round 1, but then rebounded to 66 percent in round 2. Other urban areas followed a similar pattern: the employment rate fell from 76 percent in the LFS to 68 percent in round 1 and 71 percent in round 2. Taken together, employment in Freetown and other urban areas is significantly higher than in round 1.<sup>3</sup>

Figure 2: Employment rates



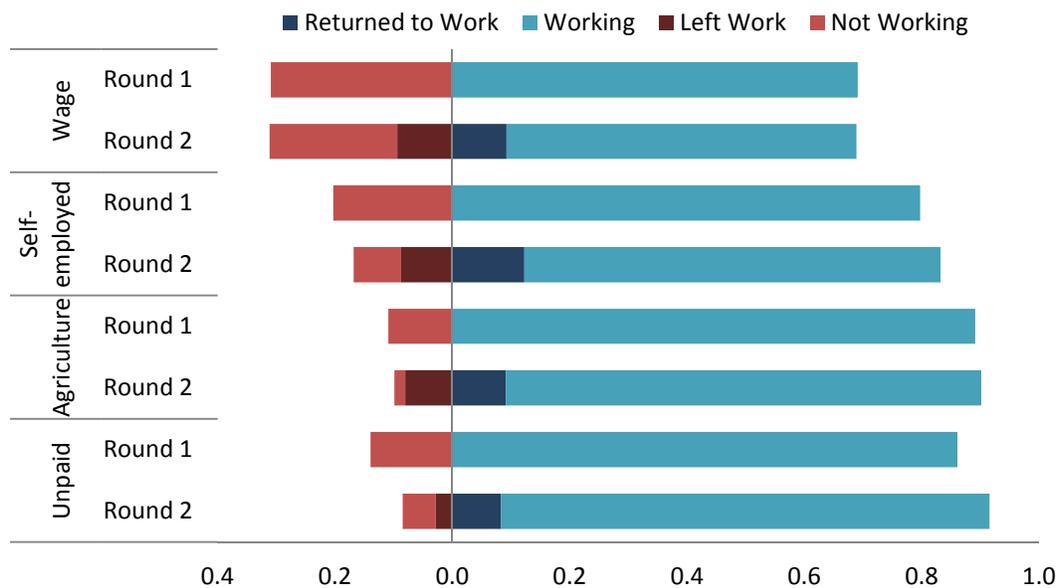
Source: Sierra Leone LFS (July-August 2014) and cell phone surveys round 1 (November 2014) and round 2 (January-February 2015).

<sup>2</sup> There are small changes in the employment rates shown here for LFS and round 1 compared to the round 1 report since respondents are considered in the labor force in all rounds if they are in the labor force in any round, given these survey rounds are conducted at high frequencies. Given this approach, the changes observed cannot be driven by changes in the size of the labor force, including changes in the number of discouraged workers who drop out of the labor force. See methodological annex for details.

<sup>3</sup> Taken separately there is no significant increase in Freetown and other urban areas between rounds 1 and 2.

**Substantial churning in the labor market is observed, particularly among workers in non-farm household enterprises.** For those household heads who responded to the LFS and both cell phone survey rounds, it is possible to track flows into and out of employment. Across all sectors ten percent of those in employment during the LFS returned to work and eight percent left work between rounds 1 and 2. Figure 6 shows labor market churning by main sector of employment (wage work, non-wage agricultural activities, non-farm household enterprises) and unpaid work. There is significant instability in all sectors of employment across survey periods; however, churning is highest among those whose main activity is self-employment in the non-farm household enterprise. Among the non-farm self-employed, twelve percent restarted work while nine percent stopped working, for an overall employment rate of 83 percent in round 2 (insignificantly different from round 1). It is not possible to judge how unusual this level of churning is in the labor market as there was no nationally representative survey on labor market outcomes in almost 30 years prior to the LFS in 2014.

Figure 3: Inflows and outflows from employment by sector

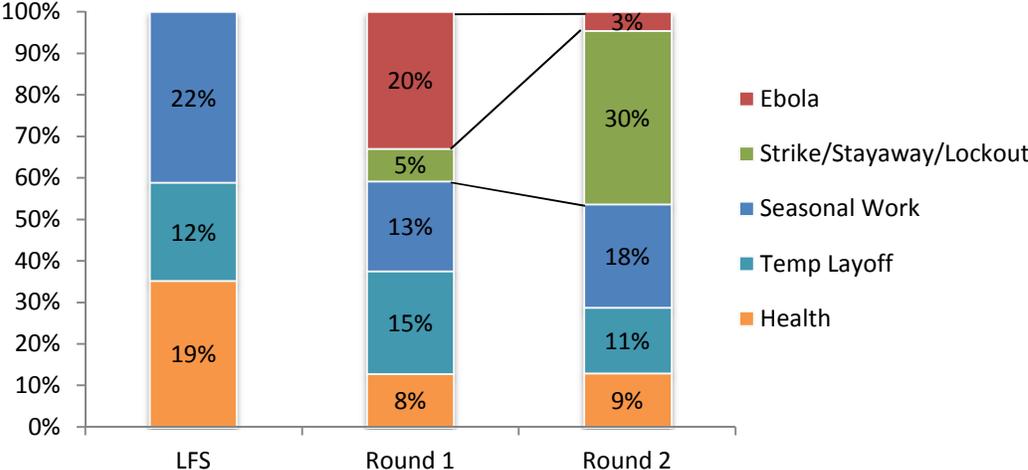


Source: Cell phone surveys round 1 (November 2014) and round 2 (January-February 2015). An individual's sector is defined by their sector of employment in the LFS.

**Districts with declining EVD rates did not see more people re-entering the workforce.** Regression analysis suggests that neither the level of EVD nor the change in the level of EVD was a significant predictor of the number of people starting work between rounds 1 and 2 of the cell phone survey (see Table A4 in the methodology appendix). While there is a statistically significant relationship between the number of cases of EVD in November and being out of work in all the baseline and both cell phone rounds, the size of the effect is very small. An additional 100 EVD cases was associated with a one percentage point higher likelihood of being out of work in all three rounds. In addition, the change in EVD between round 1 and round 2 is associated with a fall in the likelihood of being out of work in all three rounds. A similar pattern is seen for those not working in LFS but working in rounds 1 and 2.

**The frequency of Ebola being cited as the main reason for work absence is decreasing, but has been replaced by business closures.** Respondents who were absent from work during the previous week because their place of work was temporarily shut down (e.g., because of Ebola restrictions, lack of customers) could cite Ebola directly as a reason or report being absent because of a lock out. While the percentage of household heads who mentioned Ebola directly as a reason for absence decreased from 20 percent to three percent between rounds 1 and 2, when combined with lockouts, this rose to 34 percent from 24 percent. The other most common reasons for absence include seasonal work (18 percent), temporary layoffs (12 percent), health reasons (9 percent), and family obligations (9 percent) which were (statistically) similarly prevalent reasons in round 1.

Figure 4: Top five reasons for temporary absence from work in the past week



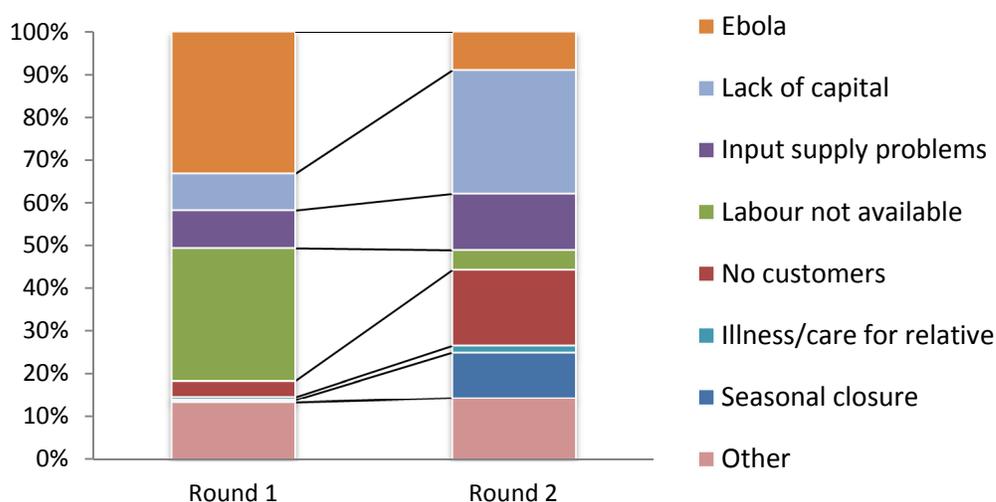
Source: Cell phone surveys round 1 (November 2014) and round 2 (January-February 2015).

**Overall earnings among wage workers remain at pre-crisis levels, with the exception of the non-agricultural private enterprise sector.** Only nine percent of those who worked in LFS earned a wage income. Among wage earners, which comprise mostly (83 percent) public sector employees and non-agricultural private enterprise workers, average earnings decreased from 680,000 Leones (approximately USD 159) in the baseline to 583,000 Leones (approximately USD 136) in round 2. This decline was not statistically significant; however, there was a significant wage decline among non-agricultural private enterprise sector workers, whose wages were 544,000 Leones (approximately US 127) in round 2, down 28 percent from LFS. This is consistent with the expectation that the business environment would experience more volatility than government and public sector employment due to EVD conditions such as transport disruptions and closure of large private enterprises. This decline is across the sector and not just caused by exit of high wage earners, as the pre-crisis wage level is not different between those who remained in this sector and those who left.

**Business operations continue to be disrupted, but the constraints are shifting as the disease transmission decelerates.** Among households engaged in non-farm enterprise work in the last six months, the percent reporting a business is no longer operating continued to increase, reaching four

times the pre-EVD level. This figure was at 22 percent in round 2, up from 13 percent in round 1, and 5 percent in the LFS (8 and 17 percentage point increases, respectively).<sup>4</sup> However, compared to round 1, fewer people directly cited Ebola as the reason for closure (9 percent versus 33 percent). There was also an increase between round 1 and round 2 in seasonal closures; while it is difficult to know if this is typical, the recall period includes the Christmas holiday season. On the other hand, lack of customers – potentially due to the Ebola outbreak – and capital are becoming more prevalent reasons for closure. Lack of labor was less of a constraint (5 percent versus 31 percent). This shift reflects the evolution of the crisis, as emergency conditions associated with high disease transmission become less severe and visible (e.g., prevalence of roadblocks) while the indirect economic effects persist. The higher capital constraint may signal that the extended duration of the slowdown has meant household enterprises have been forced to use working capital for consumption or – given the covariate nature of the shock – are unable to secure capital to restart, as this is typically sourced from family or friends. This finding is consistent with the upcoming Markets and Food Security Joint Assessment Mission report, which finds that many agricultural traders whose businesses closed during the crisis now lack capital to reopen.

Figure 5: Reasons for closures of non-farm household enterprises



Source: Cell phone surveys round 1 (November 2014) and round 2 (January-February 2015).

**Revenues of non-farm household enterprises remain well below pre-crisis levels.** Among households with at least one enterprise operating, average revenues per household fell to 680,000 Leones (approximately 160 USD), a 17 percent fall from round 1 and a 54 percent fall from LFS. While revenues are often reported with considerable noise and the fall between round 1 and round 2 is not robust to different ways of excluding outliers, the fall in revenues between LFS and rounds 1 and 2 is large and robust to dropping different outliers. However, average revenues among these households across all methods do not surpass 60 percent of LFS levels, suggesting the household enterprise sector still has a long road to recovery.

<sup>4</sup> These estimates are slightly different than the ones in the round 1 report due to the additional households added to the sample in round 2, which are then also added to LFS baseline estimates.

**The reduction in hours worked outside Freetown persisted despite the ongoing harvest.**

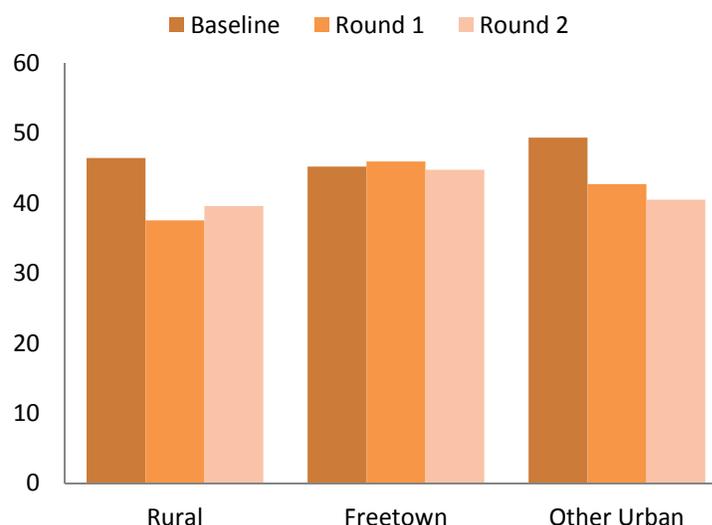
The average number of hours worked in the last week among those working remained at the round 1 level at 40 hours compared to 47 hours in LFS (rounds 1 and 2 are statistically indistinguishable). The decline in hours worked compared to LFS was concentrated in areas outside of Freetown (47 hours versus 40 hours), of which the agricultural self-employment and unpaid sectors saw the largest decline in average hours worked, decreasing from 45 hours to 37

hours and 45 hours to 35 hours between the baseline and round 2, respectively. The changes in the other sectors are statistically insignificant. Hours worked for workers in Freetown remained unchanged across all three rounds. The decline in hours worked in rural areas since the baseline is unlikely to be entirely driven by the agricultural harvest as the number of hours worked are indistinguishable between round 1 and round 2, while the percentage of rice farmers who report having completed their harvest rose from 34 to 88 between the two rounds.

**Youth employment rates in Freetown have been disproportionately affected and young workers outside Freetown are working less hours.**

Although the overall youth<sup>5</sup> employment rate does not exhibit any statistically significant decline between the three survey rounds, it decreases significantly in Freetown, and this decline is larger than for Freetown’s older population. In round 2, the employment rate among youth in Freetown was 60 percent, statistically indistinguishable from round 1 but down significantly from 75 percent in the LFS. In the meantime, the employment rate for the rest of the working age population in Freetown rebounded to 70 percent in round 2, a significant rise from 60 percent in round 1 and statistically indistinguishable to LFS levels (69 percent). Although employment rates among youth are stable outside Freetown, hours worked decreased both in rural areas and other urban areas. However, these decreases are similar to the general working age population. In round 2, hours worked in the last week reported by youth was 39 hours, down significantly from 45 hours in round 1 and 49 hours in LFS. In rural areas, the reported hours by youth were 38, statistically indistinguishable from round 1 but down significantly from 46 hours in LFS. Hours worked for youth working in Freetown remained stable between survey rounds.

Figure 6: Hours worked last week among those employed, by area



Source: Sierra Leone LFS (July-August 2014) and cell phone surveys round 1 (November 2014) and round 2 (January-February 2015).

<sup>5</sup> Youth defined as those between ages 15 to 35, which represents 34 percent of survey respondents.

**Youth business operations were also more severely disrupted, but revenue declines were similar to non-youth owned enterprises.** In round 2, 25 percent of young respondents reported a household enterprise was no longer operating, up from 15 percent in round 1. This is compared to 20 percent and 12 percent in these rounds for non-youth. Since these groups have the same baseline level of 5 percent, this implies the share no longer operating among youth-headed households is five times higher than the pre-EVD level compared to four times among the non-youth businesses. However, young households with surviving enterprises did not experience larger declines in average revenues households: in round 2, average revenues among youth-headed households declined to 574,000 Leones (approximately USD 135), a 42 percent fall from LFS compared to 52 among the older cohort.

**There is some evidence that women are also facing more severe employment effects from the EVD crisis.** While the number of female household heads is relatively small in the sample, regression analysis suggests female headed households have been hit harder by EVD than male headed households (see Table A4 in the methodology appendix). Compared to female heads, male heads were 12 percentage points more likely to have worked in all three survey rounds and 12 percentage points more likely to have worked in round 1 and 2 if not working in LFS. As noted in the previous report, much of this is related to the fact that women disproportionately worked in the self-employment sector, which has suffered the largest losses.

## Agriculture

**EVD does not appear to have substantially disrupted the rice harvest.** Though the completion of the harvest may have been later than in previous years, the delays appear to be more related to abnormal weather patterns than EVD. Rainfall was well above seasonal norms in October and November, but returned to normal levels in December and January. In round 1, only 34 percent of rice farmers had completed their harvest. This percentage rose to 88 percent in round 2. In both rounds, 70 percent of those who had not completed the harvest said it was because the rice was not yet ready. The second most common reason was insufficient household labor, cited by 17 percent.

**Harvest size was comparable to previous data but the challenge of collecting data by phone preclude certainty on trends.** While agricultural data is difficult to collect within the time constraints of the cell phone survey and therefore no directly comparable data exists, average rice harvests per household were not substantially different to the Agriculture Household Tracking Survey, collected in 2010. The total output per rice-farming household was 605 kg in round 2 of the cell phone survey. In the AHTS, the average output per rice farming household across the country was 697 kg, though the range varied between 270 kg in Bonthé and 1016 kg in Kambia. These findings are also consistent with the upcoming Markets and Food Security Joint Assessment Mission report estimation that 2014/2015 rice production was down slightly compared to the above-average 2013/2014 harvest. The rice harvest was in addition substantially higher in the second round of the cell phone compared to the first, though the small sample in the first round precludes statistical testing. There are, however, caveats to the above results. The sample of cell phone owning agricultural households is likely to differ from agricultural households generally, and the sample size is too small to perform sub-national analysis. The two of the three districts

considered the “breadbasket” of Sierra Leone, Kenema and Kailahun, which normally produce approximately 20 percent of the total rice crop, have only 70 and 33 observations respectively.<sup>6</sup> The Ministry of Agriculture has expressed concerns that the limited mobility due to the cordon of these areas early in the epidemic may have limited household’s abilities to properly tend crops during the growing season, leading to lower yields or the abandonment of some household plots. Should this be the case, the cell phone survey might not fully reflect these losses especially if these farmers were less likely to respond to the cell phone survey.

**Sales have increased with completed harvests.** In November, 16 percent of rice farmers had sold at least some portion of their crop. By January, this figure had risen to 26 percent suggesting that local rice is entering the domestic market. Though as noted above the figures are not directly comparable, the AHTS recorded 21 percent of households selling rice in 2010. The slightly higher rate of sales in the cell phone survey may reflect that those answering a cell phone survey are likely to be less remote and thus more connected to markets.

## Food Security and Prices

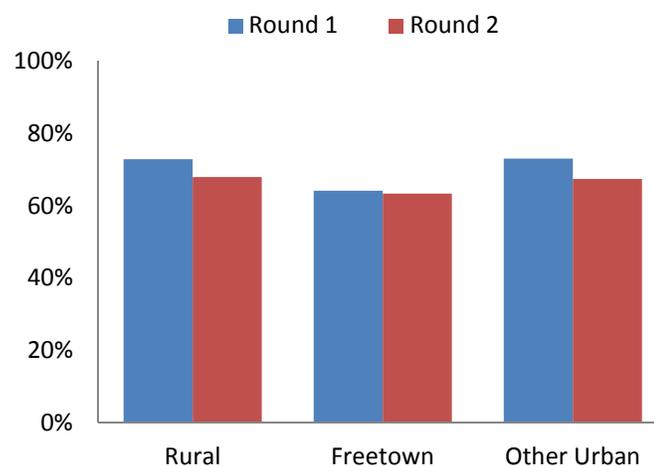
### Food insecurity remained unchanged since round 1.

At least once in the week previous to the survey, 52 percent of households ate less expensive or less preferred foods, 51 percent of households reduced portion size, 43 percent reduced the number of meals they ate, 37 percent restricted consumption by adults in order for small children to eat, 30 percent had to sell assets to buy food, and 18 percent borrowed food. Overall, 67 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. General

levels of food insecurity remained high across Sierra Leone despite the completion of the harvest by most households. Only urban areas outside Freetown saw a statistically significant fall since November in the percentage of households taking any coping strategy, and the magnitude of that decline was less than five percentage points.

**Rice prices have risen since November outside of Freetown.** The median price for a kilogram of rice increased from 3200 Le in rural areas in November to 3600 Le in January - February, while the price increased from 3200 Le to 3400 Le in urban areas outside Freetown. The median price remained 3200 Le

Figure 7: Food insecurity



Source: Cell phone surveys round 1 (November 2014) and round 2 (January-February 2015).

<sup>6</sup> Kambia is also a large producer of rice with among the highest output per household and was less impacted by EVD than some other areas.

in Freetown. Historical data from WFP VAM and International Growth Center indicate the prices generally begin to rise from post-harvest lows beginning in January, but subsequent rounds will continue to monitor these trends.<sup>7</sup>

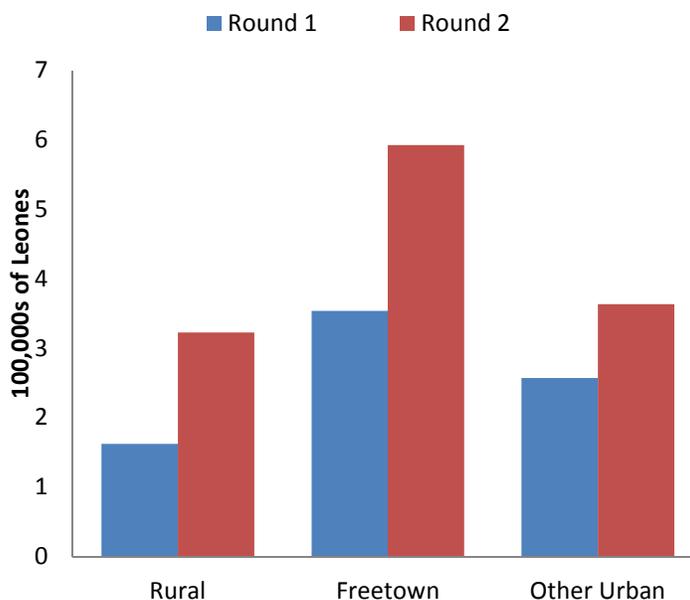
## Remittances

**The percent of households receiving remittances remained unchanged although the value of these remittances rose.**

In the month prior to the round 2 survey, nine percent of households received remittances either internationally or domestically. About 16 percent of urban households, including Freetown, received remittances, compared to five percent of rural households. The value of remittances in the previous month for those who received them was 400,000 Leones (70 USD) in round 2, an increase of 72 percent compared to November. Similar to the first round, two households which received more than \$2,000 USD

were excluded from these calculations. It is likely that the increased amount of remittances were related to the holiday period, which fell within a month prior to the round 2 survey.

Figure 8: Value of remittances for those receiving them



Source: Cell phone surveys round 1 (November 2014) and round 2 (January-February 2015).

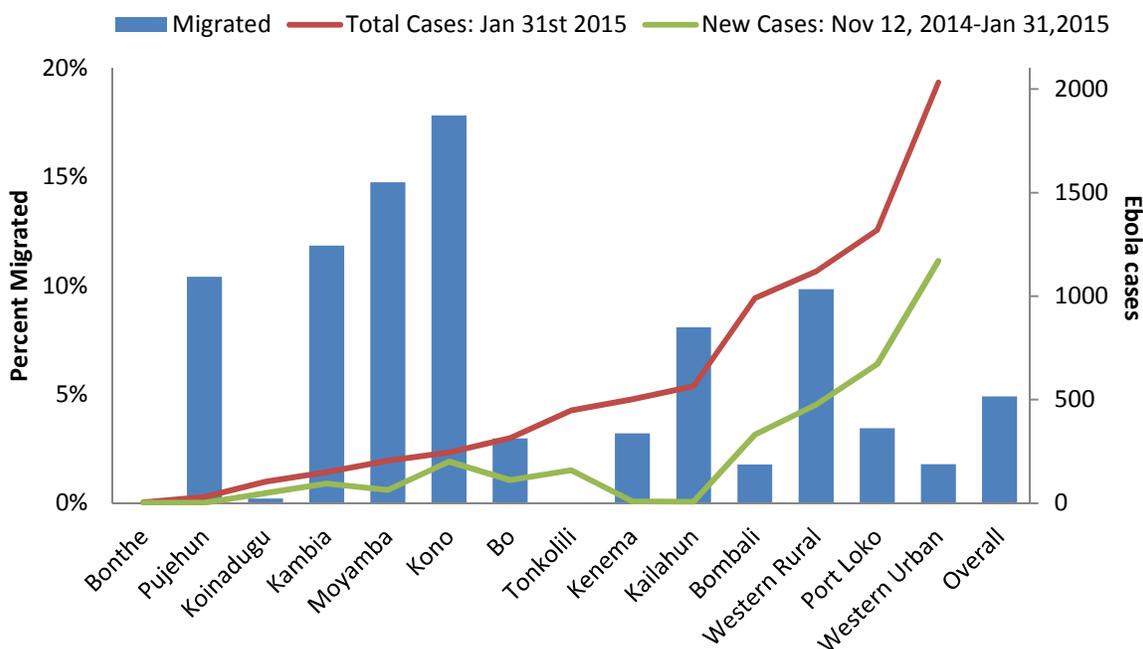
## Migration

**Migration was limited in most areas and does not appear to be related to outbreak levels.** Only five percent of household heads reported living in a different location in round 2 than in LFS. The highest levels of migration were found in Kono and Moyamba districts, 18 percent and 15 percent respectively. Both of these areas had relatively low levels of Ebola cases, though Kono experienced an increase more recently. The districts with the lowest levels of migration, however, Tonkolili, Bonthe, and Koinadugu, also had relatively low levels of Ebola infection. It is likely that a number of factors, including the general economic slowdown, infection levels, and proximity to other opportunities contributed to individual migration decisions, but it does appear that the motivations were more economic than related to a fear of infection.

<sup>7</sup> See <http://www.theigc.org/country/sierra-leone/> and <http://foodprices.vam.wfp.org/Analysis-Monthly-Price-DataADV.aspx> for further detail.

Overall, one-third of this migration was to Freetown, which had both the highest numbers of infections and the most employment options. It should also be noted that the remote nature of the cell phone survey makes the measure of migration more challenging because respondents do not always accurately self-report their location, and the cell phone surveys have found differences in the level of migration based on the methodology used (see appendix for details). Nevertheless, the overall level remains low.

Figure 9: Proportion migrated since LFS and number of Ebola cases by district



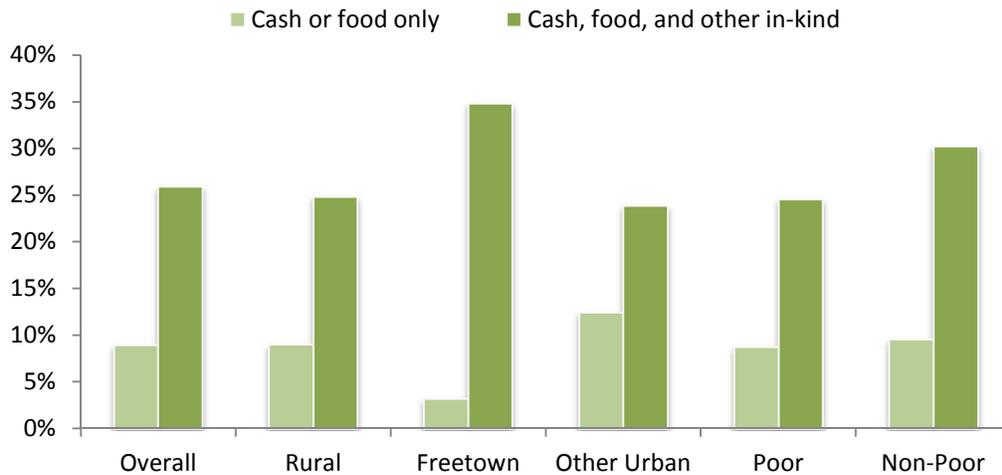
Source: Cell phone survey round 2 (January-February 2015) and Ebola Situation Report March 11, 2015 (World Health Organization).

## Social assistance

**Social assistance in response to the crisis thus far has mostly been in the form of in-kind support.** In the six months prior to the round 2 survey, nine percent of households reported receiving any social assistance excluding non-food in-kind transfers. Of these, only four percent were cash transfers including cash for work, with the other 96 percent in the form of food. The incidence of social assistance was highest outside Freetown (ten percent compared to three percent in Freetown).<sup>8</sup> When including those receiving other in-kind support, the overall percent receiving assistance increases to 26 percent and incidence is highest in Freetown (35 percent versus 25 percent). However, most other in-kind support is likely to have been disease-related, including medicine, soap, chlorine, and other hygiene and disinfectant products.

<sup>8</sup> The difference in the social assistance incidence between rural and other urban areas is not statistically significant.

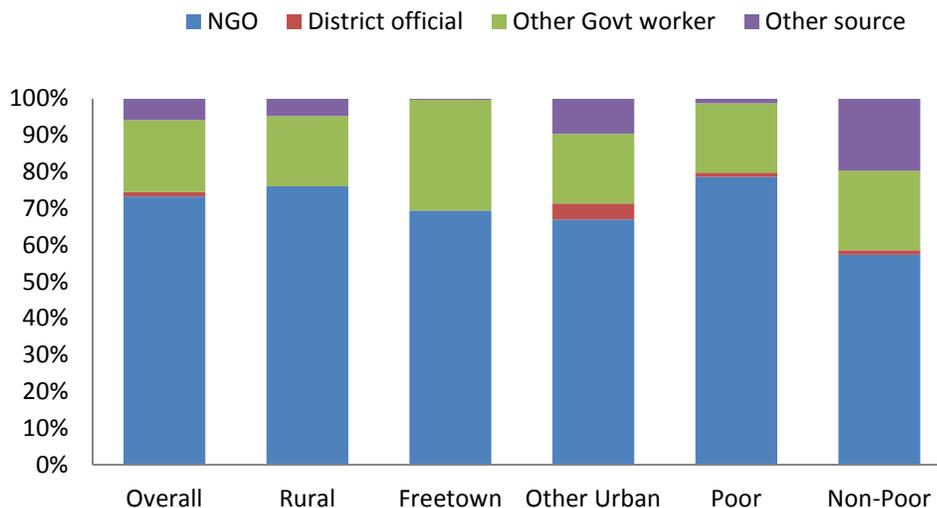
Figure 10: Percentage of households receiving social assistance in the last 6 months



Source: Cell phone survey round 2 (January-February 2015).

**Food distribution since the outbreak intensified was mostly carried out by non-governmental organizations.** Of households receiving food assistance, 73 percent reported that the food was distributed by an NGO, one percent reported it was distributed by district officials, 20 percent said it was from other government officials, and six percent reported it was from other sources. Other sources include faith- and community-based organizations and the World Food Program (which also distribute through NGOs). Interestingly, non-poor households (i.e., above median wealth index levels) are more likely to receive support from sources other than NGOs. However, this result should be interpreted with caution as Ebola treatment centers (ETU), quarantine zones, and other hot spots were intentionally targeted based on disease-specific rather than poverty criteria and are also the areas where transfers are more likely to be delivered through Government channels.

Figure 11: Source of food assistance, among those receiving support



Source: Cell phone survey round 2 (January-February 2015).

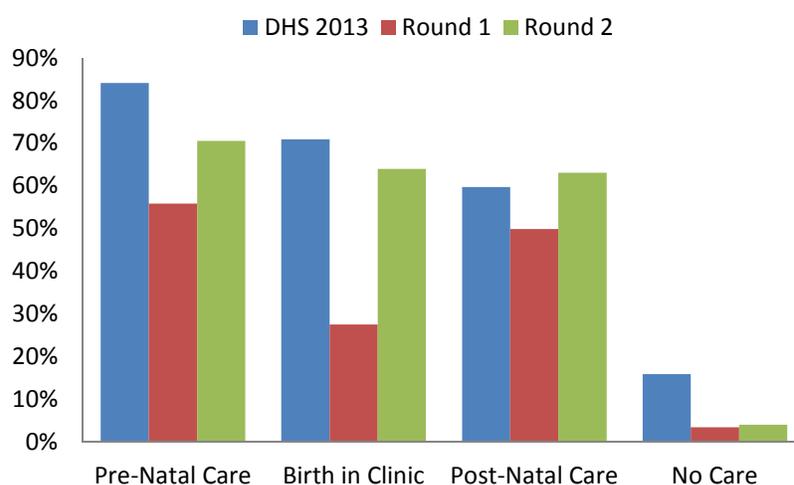
**The poor are less likely to receive assistance than the non-poor in other urban areas.** Among households with below the median level wealth index, the percentage receiving social assistance in the form of food or cash transfers in the six months prior to the round 2 survey was nine percent, statistically indistinguishable from the percentage receiving assistance among those with above the median wealth index (9.5 percent). However, in other urban areas, the non-poor were more likely to receive social assistance than the poor. One important caveat to this is that many of the poorest households in rural areas are not included in the sample because only 43 percent of rural households have cell phones. As mentioned above, this is to a certain extent expected given the emergency context and emphasis on ensuring households in ETUs, quarantine and other high EVD intensity zones had access to basic necessities. However, these data also highlight the need to ensure that social assistance reaches the poorest as the country moves into the recovery phase.

## Health Facility Utilization

**There have been significant increases in utilization of health clinics for maternal care since November.**

The percentage of women who had given birth in a clinic in the last two months increased from 28 percent in the first round in November to 64 percent in the second round in January.<sup>9</sup> This is similar to the 71 percent found among households owning a cell phone in the 2013 Demographic and Health Survey (DHS). This jump may reflect a supply as well as a demand response. Between round 1 and round 2, many hospitals and birthing clinics took steps to provide protective equipment and training to health workers involved in deliveries, easing health worker’s fears of infection if they assisted during deliveries. Women who received at least one prenatal visit increased from 56 percent in round 1 to 71 percent in round 2, compared to 84 percent in the DHS. The percentage of women receiving postnatal visits was not statistically different between round 1 and round 2 of the cell phone survey, but there was a large increase within Freetown. Direct comparisons with the DHS also likely underreport the frequency of health facility utilization prior to the outbreak of EVD as maternal care has been increasing with the Free Healthcare Initiative, as demonstrated by the low percentage of women seeking no care in the cell phone surveys.

Figure 12: Pregnancy related visits for mothers of babies born within two months of interview date



Source: Households with cell phones only, DHS (2013) and cell phone surveys round 1 (November 2014) and round 2 (January-February 2015).

<sup>9</sup> Unlike the round 1 report, only DHS households with cell phones are included as this sample is more comparable.

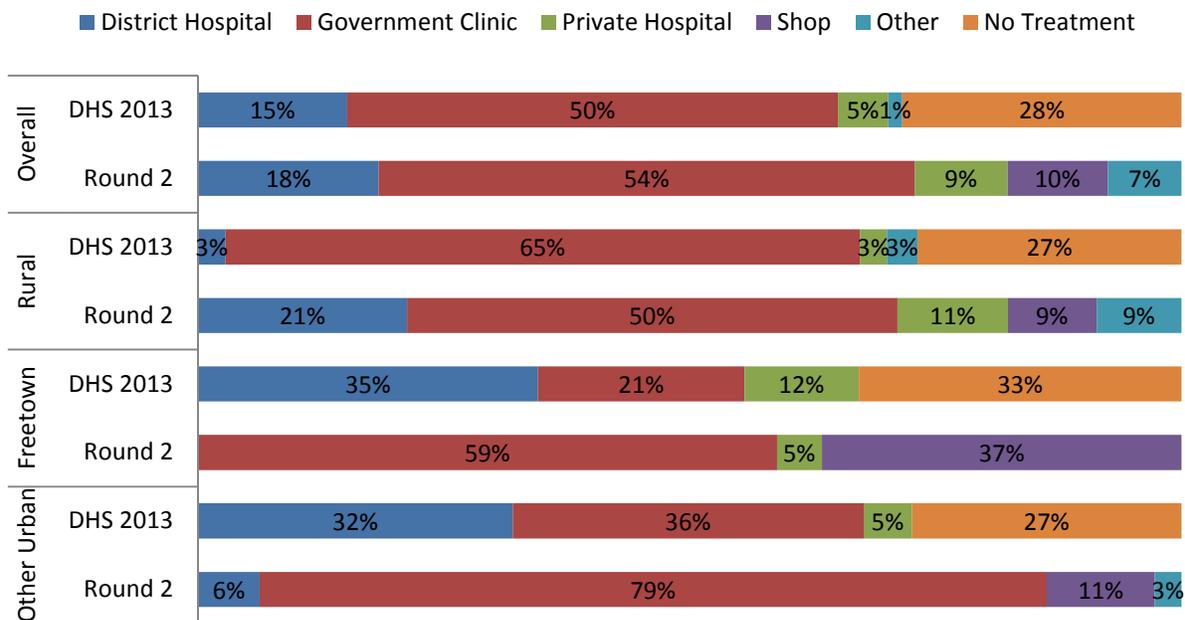
**There is no evidence in round 2 of a reduction in the reliance on government health care facilities for the treatment of diarrhea among children under five.**

In round 2, seven percent of households with a child under five reported an incidence of diarrhea in the last two weeks, compared to 14 percent among those with a cell phone in the DHS in 2013. The lower rate of reported diarrhea could reflect misreporting (diarrhea is one of the symptoms of Ebola), or it could also potentially reflect the different timing of the surveys. The DHS was conducted between June and November which included the rainy season, while round 2 of the cell phone survey was conducted in January and February, among the driest months of the year. Though there are comparability issues between the two surveys (see appendix), all respondents indicated their children had been treated, compared to 72 percent in the DHS. In rural areas, roughly the same percentage of households sought treatment in government facilities, although the percentage going to district hospitals increased.

**The usage of private hospital and purchasing medication at a shop or pharmacy also increased.**

In Freetown none of the respondents indicated seeking treatment for diarrhea at a district hospital, many of which served as triage locations for initial diagnosis of EVD. The percentage seeking care at government clinics increased, however, to offset the decrease at hospitals, though this may also be due to confusion among respondents as to the difference. Purchasing medication at a shop also dramatically increased. Similar trends were seen in urban areas outside Freetown, but the increase in usage of government clinics was much more dramatic. There are caveats due to potential misreporting, a relatively small sample size (80 households), and changes in the form of responses between surveys. However, overall the results suggest households were not avoiding health care facilities for treatment of non-EVD conditions in round 2, and in many cases were actually more likely to seek treatment at that time, but were cautious in their choice of provider.

Figure 13: Source of treatment for symptoms of diarrhea



Source: Households with cell phones only, DHS (2013) and cell phone survey round 2 (January-February 2015).

## Education

**Radio education programs are reaching most households with school-age children.** Since schools have been closed since July of last year to prevent infection, the Ministry of Education, Science, and Technology has developed hour-long radio lessons, which are broadcasted daily. Overall, 72 percent of households with school aged children report that at least some of the children listened to educational programs on the radio. The percentage varies from 69 percent in rural areas to 85 percent in Freetown. In rural areas, the main reason households is a lack of access to a radio, 55 percent of households not listening, followed by not enough time, 30 percent. Also in urban areas outside of Freetown the main reason was a lack of access, 47 percent, compared to 40 percent citing no time. In Freetown a lack of time was the main issue, 40 percent, followed by a lack of access, 30 percent. Since the data is collected at the household level, it is not possible to determine which children within the household are listening and how often. As the average household with school age children has 2.5 children between the ages 6 and 16, access is unlikely to be equal, and some have expressed concerns that girls, who generally have a larger share of household responsibilities, are less likely to be reached by radio education programs.

## Conclusions

Though there has been substantial progress in containing the EVD outbreak in Sierra Leone in the last few months, this has translated into uneven improvements in economic outcomes. The overall employment situation has improved since the first round, led by increases in urban areas. Round 1 data showed significant declines in employment rate in these areas, but by round 2, about 40 percent of these losses had been recouped. An exception to this is youth employment in Freetown, which has declined since the baseline to a higher degree than for older workers. The employment rate has also remained unchanged between rounds, signaling greater difficulties of youth re-entering the work force. In addition and consistent with earlier data indicating an economy-wide slowdown, the impacts of EVD are not concentrated in areas that have seen the highest number of cases, nor are the modest gains seen in 2015 observed in areas that have made most progress in combatting the disease.

Despite the return to work, there is continued evidence of the impact of EVD on household well-being. Though wages in the limited wage employment sector are consistent with pre-crisis levels for nearly all workers, the non-farm household enterprises are, if anything, worse off than in November. Among households engaged in non-farm enterprise work in the last six months, the percent reporting a business is no longer operating continued to increase, reaching four times the pre-EVD level. Revenues of those remaining open were well below pre-crisis levels. These continuing difficulties highlight the gender dimension of the crisis as women were disproportionately working in this sector prior to the crisis.

Rural areas continue to show more resilience than urban, though they have not been unaffected. Rural employment levels have been consistently high across rounds, but hours worked per week remains below pre-crisis levels. In the agricultural sector, unseasonal weather patterns which may have delayed the harvest in round 1 returned to normal and by round 2 harvest activities were largely complete across the country. While the household harvest size appeared to comparable to previous years, this may mask regional differences, particularly in the high-production areas in Kenema and Kailahun that were initially

under quarantine. Food security levels remain high despite the harvest and there have been price increases for rice observed outside Freetown.

Most social support received by households was in-kind, such as food, medicines, or disinfectant products, reflecting the humanitarian emergency nature of the response. Formal social assistance in the form of cash transfers was rare. Food distribution was more widespread and mainly carried out through NGOs. The data indicate the poorest have not benefitted the most from social assistance in the form of food and cash, but this is in line with the fact that the emergency response intentionally targeted based on disease-specific criteria, such as Ebola treatment centers, quarantine zones, and other hot spots, rather than the poverty criteria. Safety nets in the form of remittances increased sharply since round 1, though this is may be at least partially attributable to the holiday season.

There appears to be some encouraging progress on health utilization for non-Ebola related health issues and diffusion of educational radio programs. In round 1, pregnant women and new mothers, particularly those in Freetown, were seeking less care than prior to the crisis. By round 2, however, these levels had largely rebounded. Similarly for the treatment of diarrhea for children under five, overall treatment levels have increased, likely due to a combination of diarrhea being a symptom of EVD and seasonal differences in infection rates. Where treatment is sought, however, has shifted away from district hospitals, where many EVD patients received initial care, to smaller clinics and private hospitals. Large numbers also reported purchasing medications from shops. While schools remained closed, the majority of households with school aged children are listening to at least some of the education programs on the radio.

## Methodological Appendix

The high frequency socio-economic impact of Ebola survey was 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 on well-being of the Ebola Virus Disease (EVD) crisis. The first round was conducted from November 12 to November 25, 2014 and the second round from January 22 to February 4, 2015. This note describes changes in the survey methodology since round 1 and any comparability concerns between the baseline and subsequent rounds.

### Questionnaire

*Knowledge of Ebola* – These questions were dropped as the round 1 analysis indicated widespread knowledge of the disease.

*Earnings* – Questions on earnings were revised to match the Labor Force Survey questions more closely, in particular to account for earnings that were expressed in time unit other than months.

*Migration* – The vast majority of questions were identical in their wording to the previous round of the questionnaire, but a few changes were made. The section on information about EVD was dropped. As the round 1 analysis found inconsistencies in the migration reporting, the related questions were redesigned. The method of calculating migration is therefore different in this report than that used in the round 1 report. In the round 1 report a household head was considered to have migrated if they reported living in a different district than they lived in during the LFS. However, if respondents are unclear about which district they live in, this methodology could inflate the level of migration. An examination of the data suggests this may well be the case. For example, while seven percent of respondents gave as their current district in round 1 a different district from that in which they lived in LFS, only two percent reported having moved since the LFS when asked specifically if they had moved. In round 2, the survey was pre-loaded with the district that respondents lived in during the LFS and then prompted them to confirm it was indeed different from LFS. Only if the answer to this second question was yes was the respondent classified as having moved.

*Social Assistance* – A section was added on social support to estimate coverage and main sources of social assistance received during the EVD crisis.

*Health* – Questions on the incidence and treatment of child diarrhea were added using identical wording to the DHS.

*Education* – Questions were added on listening to educational programs on the radio were added.

## Response Rate

Round 2 contacted 1878 (67.9 percent) of the 2764 households which provided cell phone numbers in the LFS and 44.7 percent of the total LFS households. Of these 1530 households appeared in both rounds. Of the households reached, 96 percent were household heads in round 1 and 99.7 were household heads in round 2. If the respondent was not an original household member, the call was ended and an incorrect number was recorded. Table A2 shows a breakdown of the call outcomes for round 2 including unanswered calls, phone being switched off, rescheduled but never completed, refusal, bad network/call drops off, incorrect phone number, and number disconnected, by round. Table A3 shows the distribution of employment and geographic locations for the two rounds of the cell phone survey respondents and the original LFS sample.

## Weights

Note that there are a number of different sets of weights. There is a set of weights for each repeated cross section of data used in this report, i.e. three sets, one each for LFS, cell phone survey round 1 and cell phone survey round 2. There is a separate set of weights for the 3 period panel of households (i.e. the set of households that are in all three rounds of LFS, cell phone survey round 1 and cell phone survey round 2). There is another separate set of weights for the sample that is a panel between only LFS and round 2 and similarly for the sample that is a panel only across rounds 1 and 2. That makes a total of 5 sets of weights.

## Definitions

*Eligible households* – For most of the report, the LFS and the two rounds of the cell phone survey are used as repeated cross sections and not a panel. To be as consistent with the round 1 report as possible, the repeated cross sections were created as follows. The round 1 and round 2 households are the full sample of households for which cell phone survey data was collected in November 2014 and January – February 2015 respectively. The LFS cross section includes all the households that were surveyed in round 1 and round 2 (some of those surveyed in round 1 were not found in round 2 and some of those surveyed in round 2 had not been found in round 1). In the round 1 report, the LFS data and the round 1 survey were treated as a pure panel, i.e. the only households included from the LFS were those that were subsequently found in round 1. That has been changed in this report to a focus on repeated cross sections. For the employment section, the sample is slightly different as it was in the round 1 report. There are some household heads in rounds 1 and 2 for whom there is no employment data in LFS as they were considered not part of the labor force during the LFS. In round 1, the employment analysis was therefore restricted to the panel sample of household heads that had employment data in the LFS. In this report, for the employment section, the round 1 and round 2 samples are restricted to those household heads for whom employment data was collected in the LFS. Most of the results in the employment section are based on using repeated cross sections of LFS, round 1 and round 2, except for two sub-sections where the sample is restricted to being the panel sample of households across all three rounds (i.e. the sample of households that are in LFS, round 1 and round 2). The two sub-sections where the panel sample is used are those on employment transitions, earnings and the regression analyses (see more below for the regression analyses).

*Employment Definition* – Given the high frequency nature of the three surveys used and the nature of the EVD crisis, a slightly modified definition of employment was used in the analysis. Households heads were categorized as in the labor force in any given round of the surveys if they were working, looking for work or expected to return to work. For the round 1 report, if a household head was in the labor force in either the LFS or round 1 of the cell phone survey, he was categorized as in the labor force in both rounds. This was done because both rounds of the survey were conducted within three months or less of the previous round and it is unlikely that someone who was working in the LFS suddenly decided to exit the labor force rather than become unemployed due to EVD. Such high frequency labor force surveys are contrary to most other employment surveys and thus necessitate different definitions of labor force participation. In this report, to be consistent with the round 1 report’s approach and because of the high frequency nature of these employment surveys, a household head was categorized as in the labor force in all three rounds of surveys if they were in the labor force in any one round. As a result, none of the changes observed in employment rates are due to changes in the composition of the labor force.

*Calculation for monthly wage earnings* – Most wage workers (83 percent) reporting earnings in monthly terms, and therefore results associated with wage earnings are reported this way. For respondents who report wage income in other time units, the analysis translates their wages into monthly terms under the assumption they work at a standard capacity, i.e., 8 hours a day, 22 days or 4.3 weeks a month, and 12 months a year. The earnings data was not collected in round 1 in a way that allowed direct comparison to the LFS, which is the reason only LFS and round 2 are compared. Since earnings data tend to be noisy and a few large outliers can have a big impact on average wages, the figures reported here exclude earnings for the highest 5 percent. As a robustness check, median earnings were also analyzed and the same trends held.

*Correction of outliers in household enterprise revenues* – Business revenues are noisy so the main results in the report have the top percentile of revenues trimmed. As LFS has the highest revenues a large fraction of the outliers are from LFS. An alternative approach is to drop the top 1 percent of revenues in each round which gives the following results: LFS 2,700,000 Leones, round 1 830,000 Leones, and round 2, 780,000 Leones (round 1 and round 2 are not significantly different from each other with this trim).

*Pregnancy definitions in the DHS* - In the DHS each woman in the household was interviewed individually whereas in the cell phone surveys the respondent was the household head. It is possible that the cell phone survey underreports utilization if household heads are not always aware of clinic visits made by household members. It is also possible that the cell phone survey over reports pregnancies if the household head misremembers dates of birth and include pregnancies and child births that took place more than 2 months prior to the interview. A final difference is that while the DHS reports on current pregnancies and births in the last 2 months the cell phone survey captures anyone who was pregnant in the last two months i.e., the cell phone survey also captures visits from those who had miscarriages or abortions in the last 2 months while these are not include in the DHS utilization figures.

## Regressions

The employment section includes a descriptive discussion of regression results that use the panel sample across the three rounds (LFS and rounds 1 and 2 of the cell phone survey) to better understand the types of household heads who were able to retain their jobs or the types of household heads that were unable to do so. The following five regressions were run (see the results in Table A4):

- (i) Among those not working in round 1 and have round 2 observations: Regression of the probability a household head entered work in round 2 as a function of age, male, urban, married, education, young children in household, working age adults in household, urban/rural, level of total Ebola cases and change since round 1 in Ebola cases
- (ii) Among those working in round 1 and have round 2 observations: Regression of the probability a household head is still working in round 2 as a function of age, male, urban, married, education, young children in household, working age adults in household, urban/rural, level of total Ebola cases and change since round 1 in Ebola cases
- (iii) Among those not working in LFS and have both round 1 and round 2 observations: Regression of the probability a household head worked in both rounds 1 and 2 as a function of age, male, urban, married, education, young children in household, working age adults in household, urban/rural, level of total Ebola cases and change since round 1 in Ebola cases
- (iv) Among those not working in LFS and have round 1 and round 2 observations: Regression of the probability a household head is not working in both rounds 1 and 2 as a function of age, male, urban, married, education, young children in household, working age adults in household, urban/rural, level of total Ebola cases and change since round 1 in Ebola cases
- (v) Among those working in LFS and have round 1 and round 2 observations: Regression of the probability a household head is working in both rounds 1 and 2 as a function of age, male, urban, married, education, young children in household, working age adults in household, urban/rural, level of total Ebola cases and change since round 1 in Ebola cases

Table A1: Geographical Distribution of LFS and Sample

	Labor Force Survey		% of LFS Found in Nov 2014	% of LFS Found in Jan-Feb 2015
	Freq.	Percent		
Kailahun	210	5	17.62	19.05
Kenema	420	10	50.95	49.76
Kono	420	10	58.10	55.95
Bombali	330	7.86	47.58	47.27
Kambia	181	4.31	32.60	37.57
Koinadugu	180	4.29	31.11	29.44
Port Loko	179	4.26	27.37	28.49
Tonkolili	180	4.29	25.56	25.56
Bo	421	10.03	43.94	44.66
Bonthe	269	6.41	42.01	37.92
Moyamba	180	4.29	34.44	40.00
Pujehun	180	4.29	24.44	28.33
Western Rural	288	6.86	51.74	37.85
Western Urban	761	18.12	63.21	64.26
Total	4,199	100	45.15	44.72

Table A2: Non-Response

	November 2014	January-February 2015
Survey Completed	1896	1878
Phone switched off	745	789
Incomplete	37	28
Wrong number	36	17
Mobile company no longer active	22	21
Call unanswered	13	0
Rescheduled but never completed	6	5
Refusal	5	16
Bad network/call drops off	4	10
Total	2764	2764

Table A3: Employment Status Distribution of LFS and Sample

	Employment Status in LFS		Employment Status in Nov 2014	Employment Status in Jan-Feb 2015
	Freq.	Percent	Percent	Percent
Employee regular	535	17.1	22.7	22.4
Employee, casual or seasonal	119	3.8	7.8	7.2
Self-employed, without regular employee	2,165	69.4	58.7	53.2
Self-employed, with regular employees	98	3.1	5.3	5.4
Member of producer's cooperative	7	0.2	0.1	0.1
Help without pay in own or another house	29	0.9	1.2	3.1
Help without pay in own or another house	137	4.4	2.5	6.3
Paid apprenticeship	30	1.0	0.7	1.2
Unpaid apprenticeship	2	0.1	1.4	1.0
Total	3,122	100	100	100

Table A4: Regression Results (Three Period Panel Sample)

	Entered work between 1 and 2	Worked in 1 and 2	Worked 1 and 2 but not in LFS	Not working LFS, 1 or 2	Working LFS, 1 and 2
Age	0.024*** (.0069)	-0.003 (.0035)	-0.017*** (.0054)	0.002 (.005)	-0.003 (.0057)
Age Squared (x 100)	-0.020*** (.0064)	0.004 (.0036)	0.013** (.0051)	0.000 (.0047)	0.001 (.0058)
Male	0.082 (.053)	0.048* (.025)	0.118* (.063)	-0.078 (.058)	0.119*** (.033)
Urban	-0.155*** (.053)	-0.077*** (.025)	-0.132** (.057)	0.032 (.053)	-0.157*** (.033)
Married	-0.175*** (.057)	0.028 (.033)	0.229*** (.062)	0.091 (.057)	0.004 (.046)
Education (8 years of education or more)	-0.219*** (.077)	0.026 (.039)	-0.183* (.098)	0.076 (.09)	0.048 (.05)
Can read and write	0.037 (.076)	-0.017 (.036)	0.143 (.097)	-0.093 (.089)	-0.141*** (.046)
Children Under Age 5	-0.022 (.027)	0.018** (.0092)	0.005 (.024)	-0.027 (.022)	0.035*** (.013)
Children Aged 5 to 9	0.109*** (.025)	0.005 (.0096)	0.072*** (.024)	-0.102*** (.022)	-0.005 (.013)
Working Age Adults	-0.000 (.012)	0.013*** (.0048)	0.027** (.011)	-0.023** (.011)	0.020*** (.0067)
District Level Ebola Cases Rd 1 (X1,000)	-0.009 (.036)	0.001 (.02)	-0.096** (.038)	0.139*** (.035)	0.019 (.026)
Change in Ebola Cases Rd 1-Rd2 (percent)	0.057 (.051)	0.003 (.017)	0.141*** (.052)	-0.089* (.048)	0.008 (.024)
Constant	0.026 (.18)	0.837*** (.083)	0.621*** (.15)	0.341** (.13)	0.747*** (.14)
R-squared	0.138	0.035	0.200	0.160	0.080
N	473	1,007	384	384	1,096

Note: \*p<0.10; \*\* p<0.05; \*\*\* p<0.01.