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URBAN POVERTY AND CHILD HEALTH INDICATORS IN SIX AFRICAN COUNTRIES WITH DHS DATA

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Urban Poverty and Child Health Indicators in Six African Countries with DHS Data

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PREFACE

The Demographic and Health Surveys (DHS) Program is one of the principal sources of international data on fertility, family planning, maternal and child health, nutrition, mortality, environmental health, HIV/AIDS, malaria, and provision of health services.

One of the objectives of The DHS Program is to analyze DHS data and provide findings that will be useful to policymakers and program managers in low- and middle-income countries. DHS Analytical Studies serve this objective by providing in-depth research on a wide range of topics, typically including several countries and applying multivariate statistical tools and models. These reports are also intended to illustrate research methods and applications of DHS data that may build the capacity of other researchers.

The topics in this series are selected by The DHS Program in consultation with the U.S. Agency for International Development.

It is hoped that the DHS Analytical Studies will be useful to researchers, policymakers, and survey specialists, particularly those engaged in work in low- and middle-income countries.

Sunita Kishor
Director, The DHS Program

ABSTRACT

There has been a rapid growth in urban areas, especially in low- and middle-income countries. The increasing urban population, as well as rural to urban migration, has led to the growth of urban poor areas and slums. Disparities between rural and urban populations in health outcomes and access to health services have been well documented. Less examined are the potential disparities within the urban populations. This report uses DHS data and a UN-HABITAT definition for slums to construct an urban poverty measure with three categories: urban poor, urban non-poor, and rural areas. Six countries were included in the analysis: Democratic Republic of the Congo (DRC), Ethiopia, Kenya, Nigeria, Tanzania, and Uganda. Several child health indicators were examined including health facility delivery, zero-dose children, feeding practices during diarrhea, underweight and overweight, and breastfeeding timing. The results show large disparities between urban poor and urban non-poor for health facility delivery in all countries, underweight in five countries (except Tanzania), and zero-dose children in two countries (DRC and Ethiopia). The remaining indicators did not show consistent differences between the urban poor and urban non-poor for all countries. However, in the DRC, there were significant differences between the urban poor and urban non-poor for all child health indicators, except for overweight or obese. Further analysis of the urban poverty measure revealed the lower availability of health facilities in urban poor areas compared to urban non-poor, regardless of the type of facility. In addition, mothers of urban poor children had lower education and lower cash earnings, and reported more problems accessing health care, especially due to costs and distance compared to the urban non-poor mothers. The results highlight the need for effective urban planning programs that ensure equitable access to health services, as well as improvements in infrastructure and economic opportunities for the urban poor.

Key words: urban poor, urban poverty, child health, facility delivery, immunization, nutrition, access to health facilities

1 BACKGROUND

The term *urbanization* is used broadly to refer to mass movement of populations from rural to urban settings and the consequent physical changes to urban settings (Kuddus, Tynan, and McBryde 2020). Most commonly, it is considered a "change in size, density, and heterogeneity of cities" (Vlahov and Galea 2002). Urban growth has rapidly expanded over the past several decades. In 2007, the estimate for the number of people living in urban areas surpassed that of rural areas for the first time (UN DESA 2008). The most recent UN World Urbanization Prospects Report indicates that roughly 55% of the world's 7.6 billion people live in urban areas; this share is expected to increase to 60% by 2030 and 68% by 2050 as the global population continues to grow (Awumbila 2017; UN DESA 2018). Most of the projected urban growth will occur in low- and middle-income countries (LMICs) across East Asia, South Asia, and Africa. These countries are expected to comprise 96% of urban growth in the next decade (UN-HABITAT 2020). Currently, about 6.6 billion people live in LMICs, which represents an already large majority of the global population. This number is projected to rise to 8.3 billion living in LMICs out of a world population of 9.7 billion by 2050 (Population Reference Bureau 2021). While Asian cities remain the fastest growing in terms of absolute numbers, Sub-Saharan Africa is regarded as the fastest urbanizing region in the world, with urbanization rates that continue to surpass initial estimates (Awumbila 2017; Saghir and Santoro 2018; UN-HABITAT 2018). The global share of African urban dwellers is expected to rise from 11.3% in 2010 to 20.2% by 2050, which demonstrates the rapid increase in African urban populations and the substantial proportion of the world's population that these individuals will comprise by in the coming decades (Obeng-Odoom 2014).

The increasing urbanization of the world, and especially in LMICs, occurs for various reasons. Previous literature has highlighted numerous "push and pull" factors that shape the mass migration of populations to urban areas. There are numerous negative factors that contribute to the "push" of urban migration such as civil disturbances, economic disaster, and, increasingly, climate-related catastrophes (Godfrey and Julien 2005). Increasing environmental degradation due to climate change has led to loss of income and job opportunities with the occurrences of major droughts, floods, and famines. These have led to greater rural-to-urban migration in order to seek economic opportunity in urban settings (Grote and Warner 2010; Raleigh, Jordan, and Salehyan 2008). Several scenarios have been outlined that demonstrate the interaction of migration with both environmental change and political conflict (Freeman 2017). However, there still exist many "pull" factors that demonstrate a positive perception of urban residence, such as an increase in economic opportunity, greater access to healthcare, and higher quality education. For example, a growing share of youth and adolescents migrate to cities in search of educational and employment opportunities (Mabala 2011). Thus, there remains a complex interplay of socioeconomic, political, and environmental factors that cause rural populations to migrate and further contribute to the rapid urban population growth.

In general, measures of urbanization are dichotomized with the urban-rural distinction. Using this categorization, health disparities between the urban and rural populations are frequently noted in the literature with mixed outcomes. The expansion of crowded informal settlements has created an infrastructure that promotes acute infectious illness. Urbanization is frequently linked with an increase in chronic disease that occurs as countries experience a demographic transition with aging populations and a shift to Western lifestyles. This includes an increase in chronic conditions such as hypertension and diabetes mellitus across Sub-Saharan Africa, which were formally considered rare conditions, but now contribute to

the overall increase in cardiovascular disease in the region (Kengne and Anderson 2006; Lekoubou et al. 2010; Mensah 2008). Thus, countries across Sub-Saharan Africa have faced a double burden of disease as a major consequence of urbanization, with both acute illness and chronic disease prevalent in the population. In addition, urban living promotes a sedentary lifestyle and an increase in the availability of highly processed, fast foods. As a result, overweight and obesity across Sub-Saharan Africa has been on the rise, giving way to a nutritional transition that accompanies the demographic transition and urbanization of the region (Steyn and Mchiza 2014). Previous studies have estimated a two- to five fold increase in the risk of obesity for urban residents compared to rural residents in Sub-Saharan Africa (Young et al. 2009). At the same time, childhood undernutrition remains highly prevalent across Sub-Saharan Africa. Thus, the double burden of disease also applies to malnutrition in countries across Sub-Saharan Africa as a result of rapid urbanization.

Despite the health consequences of urbanization, there are also advantages to urban living. Urbanization is linked frequently to an increase in access to and utilization of healthcare services. More densely populated areas have an urban advantage because they tend to have greater opportunities for care compared to rural areas where providers may be sparse or undertrained (Cyril, Oldroyd, and Renzaho 2013). For example, urban women in Sub-Saharan Africa are more likely to deliver their children in a health facility than rural women (Adde, Dickson, and Amu 2020; Dewau et al. 2021), which is an important factor in reducing maternal mortality (Musarandega et al. 2021). Moreover, women in rural areas are less likely to receive appropriate antenatal care (ANC) and postnatal care (PNC) (Yaya, Bishwajit, and Shah 2016). Access to maternity care is advantageous for both women and their children. Buisman et al. (2019) found that the incidence of childhood stunting fell in many countries across Sub-Saharan Africa in recent years and was largely attributed to the increase in access to maternity care.

Coupled with increasing urbanization and population growth is the growth of urban poverty. As previously noted, while urbanization is associated with greater overall poverty reduction, there has been a growth in the urban share of poverty, which was coined the “urbanization of poverty” (Lucci, Bhatkal, and Khan 2018; Ravallion, Chen, and Sangraula 2007). This growth in urban poverty can be attributed to two main factors: the natural increase in new births, and rural-urban migration. Natural increase accounts for the majority of the urban population growth in Sub-Saharan Africa, while migration accounts for the remaining portion (Beguy et al. 2017; Chen, Valente, and Zlotnik 1998; Ezeh, Kodzi, and Emina 2010). Fertility in urban poor areas remains higher than other urban areas. For example, previous estimates indicate that women in urban poor areas of Kenya demonstrated the largest gap between desired and observed fertility (Beguy et al. 2017). This is often attributed to the lack of access to reproductive health services and a high unmet need for family planning in urban poor settings. Ezeh, Kodzi, and Emina (2010) demonstrated that the poorest urban women were roughly 2.5 times less likely to use contraception compared to the richest urban women, and that between 40–64% of recent births among the urban poor were either mistimed or unwanted. Thus, the natural population growth among the urban poor remains higher than that of other urban dwellers, and contributes to the overall urbanization of poverty. In terms of migration, rural outmigrants seek greater economic opportunity in urban centers, and at times escape poverty, while at other times add to the share of poverty experienced in urban areas. It is estimated that roughly 50% of urban laborers are employed in informal work, which further perpetuates urban poverty (Raleigh 2014). Thus, rural-urban migration reduces overall poverty by reducing the share of rural poverty, while also increasing the burden of urban poverty.

The concept of urban poverty has been defined by various constructs and measures in the literature. At times, urban poverty has been understood as the lack of access to three basic amenities (electricity, flush toilet, and piped water), while at other times it has been operationalized as a composite wealth index value obtained from national surveys (Dodoo, Zulu, and Ezeh 2007; Ezeh, Kodzi, and Emina 2010). Other studies have included measures for food insecurity and subjective poverty to capture the dimensions of urban poverty that may be missed from wealth indices and asset accumulation (Fotso et al. 2012). Further, when urbanization occurs at a rate that is too rapid and unplanned, informal settlements and poor infrastructure give rise to slum communities among the urban poor (Godfrey and Julien 2005; Moore, Gould, and Keary 2003). A slum household is defined by the United Nations Human Settlements Program (UN-HABITAT) as a group of individuals under the same roof in an urban area who lack one or more of the following: a durable household, sufficient living space, access to improved water and sanitation, and security of tenure that prevents forced evictions (UN-HABITAT 2006).

It is important to note that while slum settlements are generally understood to be composed of the urban poor, urban poverty, as defined by various measures, might not necessarily refer to slum communities. While many households may fall into both the urban poor and slum definitions, the urban poor may also refer to those that live in other formal or informal settings that may be slum-like in nature, but not meet the UN-HABITAT definition of a slum community. The UN-HABITAT definition of a slum includes "lack of security of tenure that prevents forced evictions," which may not always be available or captured in datasets. Therefore, there remains a distinction between the urban poor and slum dwellers.

In the definition of a slum, households have a host of poor health exposures and outcomes, which include lack of clean water, unsanitary conditions, and an absence of overall security. It is estimated that roughly 1 billion people live in urban slums worldwide (UN-HABITAT 2020). In Sub-Saharan Africa, an estimated 56% of the urban population lives in slums, which represents a majority of the rapidly growing African urban population (UN-HABITAT 2020). Although the literature notes poor health outcomes from slum living, such as the increased incidence of respiratory health issues and exposure to rodent-borne diseases, there is also an existing body of literature that highlights the complex social environment of slums and potential health benefits. The rise of slums has created an environment of community cohesion and resilience, which has provided a system of social support for the urban poor. Community mobilization in African slums has been beneficial for health promotion activities, including the response to the HIV/AIDS pandemic, initiation of immunization programs, and environmental cleaning campaigns (Alaazi and Aganah 2020). Thus, as urban poverty rapidly expands, slums become both a natural consequence as well as an opportunity for social cohesion and health promotion among the urban poor.

Although the urban advantage has been well documented in previous literature on maternal and child health (MCH), there is evidence that this trend is fading, and that the advantage is not experienced equally by all urban dwellers. This is widely attributed to the failure of urban expansion to match the pace of rapid population growth in Sub-Saharan Africa, which has resulted in the rise of informal slum settlements that lack appropriate sanitation, health services, and livelihood opportunities (Fotso 2007). Gould (1998) noted that the urban-rural under-5 mortality gap in Kenya has substantially narrowed over time, and called this the re-emergence of the "urban penalty," which had previously been documented in industrial-era Europe. In at least nine countries in Sub-Saharan Africa, the under-5 mortality is significantly higher among the urban poor than among the rural poor (Van de Poel, O'Donnell, and Van Doorslaer 2007). Case studies in Kenya and Zambia have corroborated these findings by demonstrating a higher under-5 mortality in urban

poor than rural children (Fotso et al. 2007). Although traditional measures of urbanization rely on urban-rural dichotomization, more recent research seeks to explore the intra-urban difference in health in order to account for the growth of urban poverty.

Matthews et al. (2010) noted that the urban advantage is nearly nonexistent for the urban poor in terms of maternal and infant care utilization across Sub-Saharan Africa. This is attributed to a lack of healthcare accessibility in impoverished areas of cities and a lack of quality in existing facilities. Similarly, Fotso, Ezeh, and Oronje (2008) found that slum dwellers in Nairobi were less likely to achieve the recommended four ANC visits during pregnancy than rural residents and other urban dwellers. While slum dwellers were almost equally likely to attend a health facility for delivery as non-slum dwellers in Nairobi, the facilities generally did not meet minimum standards for obstetric care. In terms of service quality, the findings further support the claim that maternal healthcare in slums remains of lower quality than that of other urban healthcare providers, and that there are significant barriers that remain for the urban poor in obtaining care. While services may be proximally closer to the urban poor than rural populations, barriers to access may supersede this geographical advantage and, in turn, make care more inaccessible for the urban poor than both their rural and non-poor urban counterparts.

In addition, children living in slum settings have poorer overall health indicators/outcomes compared to children in other settings. A study of Nairobi slums found that these children were less likely to be fully vaccinated, and more likely to experience common childhood illnesses such as fever and diarrhea when compared to both rural and non-slum urban children (Magadi 2004). Fink, Günther, and Hill (2014) further noted that children living in the slum settlements of 73 LMICs were worse off than non-slum urban and rural children with respect to acute illness. Thiam et al. (2017) found that children under age 5 who were living in Senegalese slums had greater risks of waterborne and gastrointestinal conditions such as diarrhea due to a lack of safe water and sanitation, and Hotez (2017) noted the concentration of neglected tropical disease clusters in urban environments due to overcrowding. Thus, in terms of short-term morbidity such as diarrhea and infectious disease, the urban advantage is lost for slum children, who appear to be at a higher risk than both non-slum and rural children. These findings corroborate the existing research, which demonstrates that while an overall improvement in child health may be noted for the urban-rural dichotomy, the intra-urban differentials remain large between the urban poor and other urban residents.

These intra-urban health disparities in child health indicators have been further documented in the literature for nutrition outcomes as well. Menon, Ruel, and Morris (2000) demonstrated that within-urban differentials in childhood stunting were larger than urban-rural differentials in 11 countries across the globe. This was further confirmed by Fotso (2006) in 15 countries in Sub-Saharan Africa. Importantly, adjustments for community socioeconomic status (SES) and parental biodemographic variables in the latter study only modestly explained the inequalities in childhood stunting among urban residents. This indicated that the differentials in childhood malnutrition are not well understood or explained by socioeconomic factors. Assaf and Juan (2020a) further demonstrated that urban poor children had higher odds of both stunting and moderate to severe anemia when compared to non-poor urban children. This finding supported the existing literature on intra-urban disparities in childhood malnutrition that use a measure specific to urban poverty.

In addition, a systematic review found the rate of stunting in children to be higher among slum children than other urban or rural children in several distinct regions across the globe (Ezeh et al. 2017). However, Fink, Günther, and Hill (2014) noted that slum children still fare better than rural children for some long-

term outcomes that include stunting. The authors demonstrated that the urban advantage remains most prominent for long-term child health outcomes, such as mortality and stunting for both slum and non-slum urban children, which is likely to be due to closer proximity to resources. This is somewhat contrary to the aforementioned findings on stunting of urban poor children (Assaf and Juan 2020a; Ezeh et al. 2017). Given the large scope of the Fink, Günther, and Hill (2014) analysis, the country and regional contexts remain important in determining the effects of poverty on long-term health outcomes for children.

Focus of the Report

This report examines the within-urban disparities in child health indicators in six African countries. The child health indicators include several areas of focus such as service delivery, feeding practices during diarrhea, nutrition status, and breastfeeding timing after birth. The main objective is to highlight the differences in these indicators between children living in urban poor areas versus the urban non-poor areas. In addition, characteristics of urban poor areas are explored to provide insights into why possible disparities are present. This includes examining characteristics of mothers and availability of nearby health facilities.

2 DATA AND METHODS

2.1 Data

The DHS data from six USAID Maternal and Child Health (MCH) priority countries were selected for the analysis (see Table 1). The most recent DHS was selected except for Ethiopia. The Ethiopia 2019 DHS was not included because it did not contain information on diarrhea, which was needed for two indicators in the analysis.

Table 1 Surveys included in the analysis

Country	DHS survey
Democratic Republic of the Congo (DRC)	2013–2014
Ethiopia	2016
Kenya	2014
Nigeria	2018
Tanzania	2015–2016
Uganda	2016

2.2 Variables

2.2.1 Urban poverty cluster variable

The main variable of interest in this analysis is an urban poverty measure that classifies urban areas as urban poor and urban non-poor. We used the UN-HABITAT definition of a slum household as a guide for identifying an urban poor household from which the urban poverty cluster variable is constructed.

The UN-HABITAT definition of a slum household is one that lacks **one or more** of the following:

- Durable housing of permanent nature that protects against extreme climate conditions
- Sufficient living space, which means not more than three people sharing the same room
- Easy access to safe water in sufficient amounts at an affordable price
- Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people
- Security of tenure that prevents forced evictions (UN-HABITAT 2006)

The DHS data contain information about household characteristics that cover all of the above except for security of tenure. Therefore, to reduce the bias of misclassification of clusters as urban poor, using DHS data, an urban poor household is identified as a household in an urban area that is lacking **two or more** of the following:

- A household made of durable material for the floor, wall, and roof
- Not more than three persons per sleeping room

- Access to improved water
- Access to improved sanitation

Table 2 describes the definitions of each component. We then identify an urban poor cluster as an urban cluster with more than 50% of urban poor households, as was used by previous work (Assaf and Juan 2020b; Van de Poel, O'Donnell, and Van Doorslaer 2007). Therefore, the urban poverty variable was constructed at cluster level with three categories: urban poor, urban non-poor, and rural. Since this variable uses the UN-HABITAT definition of a slum, it is used to identify as closely as possible urban slum areas, but may also include urban-poor that do not necessarily live in slums. We cannot identify slum areas with complete certainty due to the DHS displacement procedures of urban and rural clusters, which displaces urban clusters up to 2 km (Burgert et al. 2013), and also because of the lack of information on secure tenure in DHS data. The DHS displacement of clusters locations is used to protect the identity of respondents. Code to construct the urban poverty variable can be found on the DHS Program GitHub site in the Analysis Code repository.[1]

Table 2 Variables used in the analysis

Variables used to construct urban poverty variable	Definition	Categories	Binary variable(s)
Place of residence	Urban or rural cluster based on the country's statistical office classification at the time of the survey.	▪ Urban ▪ Rural	
Household made of durable material	Households with durable floor, wall, and roof materials. This is country-specific.	Yes/No	
Improved sanitation	Households using an improved sanitation facility. This includes: a) flush—to piped sewer system, b) flush—to septic tank, c) flush—to pit latrine, d) flush—don't know where, e) pit latrine—ventilated improved pit, f) pit latrine—with slab, g) composting toilet	Yes/No	
Improved water	Households using an improved source of drinking water. This includes: a) piped into dwelling, piped to yard/plot, b) public tap/standpipe, c) piped to neighbor, d) tube well or borehole, e) protected well, f) protected spring, g) rainwater, h) tanker truck, cart with small tank, bottled water	Yes/No	
Crowded	Households with three or more people per sleeping room	Yes/No	
Urban poor household	Lacking two or more of the following: a household made of durable material; access to improved water; access to improved sanitation; and fewer than three persons per sleeping room.	▪ Urban poor household ▪ Urban non-poor household	
Urban poverty cluster	An urban poor cluster is an urban cluster with more than 50% of urban poor households. An Urban non-poor cluster is an urban cluster with less than or equal to 50% of urban poor households. Rural category was also included.	▪ Urban poor cluster ▪ Urban non-poor cluster ▪ Rural	

Continued…

[1] https://github.com/DHSProgram/DHS-Analysis-Code/tree/main/AS81_urbanpoverty

Table 2—*Continued*

Child health indicators	Definition	Categories	Binary variable(s)
Place of delivery	Percentage of live births in the last 5 years delivered in a health facility.	▪ Public facility ▪ Private facility ▪ Not in a health facility (home, other, don't know)	Health facility delivery
Food given with diarrhea	Percentage of children under age 5 with diarrhea at any time in the 2 weeks before the survey by the amount of foods given.	▪ More than usual ▪ Same as usual ▪ Less than usual ▪ None or don't know	Food less than usual or none or don't know
Liquids given with diarrhea	Percentage of children under age 5 with diarrhea at any time in the 2 weeks before the survey by the amount of liquids given.	▪ More than usual ▪ Same as usual ▪ Less than usual ▪ None or don't know	Liquid less than usual or none or don't know
Zero-dose children	Percentage of children age 12–23 months that have *not* received the DPT 1 vaccine. This is the pentavalent vaccine against diphtheria, pertussis, tetanus (DPT), hepatitis B (HepB), and Haemophilus influenza type b (Hib).	Yes/No	Yes/No
Breastfeeding timing after birth	Percentage of last-born children born in the past 2 years who started breastfeeding according to different times,	▪ Within 1 hour after birth ▪ 1–6 hours after birth ▪ 7–24 hours after birth ▪ 1 day or more after birth	Breastfed within 1 hour Breastfed 1–6 hours after Breastfed 7–24 hours after
Weight for age	Percentage of all de facto children in the household under age 5 who are categorized as underweight or not underweight according to the weight-for-age *z* score in comparison to the mean on the WHO Child Growth Standards scale.	▪ Underweight: *z* score is below -2 standard deviations below the mean ▪ Not underweight: *z* score is -2 standard deviations of the mean or above	Underweight
Weight for height	Percentage of all de facto children in the household under age 5 who are categorized as wasted, normal, or overweight according to the weight-for-height *z* score in comparison to the mean on the WHO Child Growth Standards scale.	▪ Wasted: *z* score is below -2 standard deviations below the mean ▪ Normal: *z* score is between -2 and +2 standard deviations of the mean ▪ Overweight or obese: *z* score is above +2 standard deviations above the mean	Overweight or obese

Note: Weight for age and weight for height are measured for all de facto children under age 5 living in the household, while the remaining measures are only available for children of interviewed de facto mothers.

2.2.2 Outcome variables

We examined several child health indicators: health facility delivery, feeding practices during diarrhea, immunization status of children, timing of breastfeeding initiation, and nutrition of children under age 5. The indicators described in Table 2 were used to construct the following binary variables: health facility delivery, less or no foods or liquids given to children during diarrhea, zero-dose children, three variables for breastfeeding timing after birth (within 1 hour, 6 hours, 7 to 24 hours), weight for age, and weight for height.

The code to construct these indicators, as well as the household characteristics, can be found on the DHS Program Code Share Library on GitHub.[2]

2.3 Methods

We describe the percentage distribution of the urban poverty variable overall and by region for each country. For Tanzania, regional zones were examined instead of region. We also describe the percentage distribution for each outcome. Crosstabulations were performed between each outcome and the urban poverty variable, the controls, and region. The controls include child's sex, child's age in months (<6, 6–8, 9–11, 12–17, 18–23, 24–35, 36–47, 48–59), birth order (1, 2–3, 4–5, 6+), and mother's education (none, primary, and secondary or more). For all crosstabulations, tests of association were performed to test if the variable was independent of the outcome.

To determine the magnitude of the associations, logit regressions were fit for each binary indicator for each country. Unadjusted regressions were fit between each indicator and the urban poverty variable, and adjusted regressions were fit to include all the controls with the urban poverty variable. Region, place of residence, and wealth index were not included in the models due to their high association with the urban poverty variable.

Further analysis of the urban poverty variable was performed to examine the characteristics of the urban poor. This was performed by taking the percentage distribution of children under age 5 within each urban poverty variable category (urban non-poor, urban poor, and rural) by the mother's characteristics, mother's problems accessing health care for self, and availability of health facilities within 5 km. The mother's characteristics included education (none, primary, secondary or more), type of earnings (not working, not paid, cash only, cash and in-kind, and in-kind only), and ethnicity. Only Tanzania did not contain information on ethnicity. Questions on problems accessing care asked women if they had a big problem or not in obtaining medical help for themselves due to obtaining permission to go, having money needed for treatment, distance to health facility, and not wanting to go alone. These binary variables were also combined for a variable on having at least one problem.

The availability of health facilities was obtained from an external data source that was linked to the DHS data at the cluster level for all surveys except for Nigeria, which was due to lack of data to correspond with the 2018 DHS survey. The health facility data was obtained from a national master health facility list from 50 countries in Sub-Saharan Africa (Maina et al. 2019). From this master list, we identified private and public facilities, as well as hospitals and non-hospitals such as health centers and health posts. The data included geographic locations that were linked to the geographic locations of the clusters in the DHS data. The data contained counts of health facilities within specific distances: 2 km, 5 km, 10 km, and 50 km. The

[2] https://github.com/DHSProgram/DHS-Indicators-Stata (see Chapters 2, 10, and 11 for variables in Table 2).

interest in this analysis is to identify the number of nearby facilities. Since the DHS Program displaces the geographic location of urban clusters by 2 km, we included the count of the number of facilities within 5 km. This would reduce the error of missing any facilities. The counts were recoded to at least one hospital within 5 km and at least two non-hospitals within 5 km. It is possible that using the 5 km buffer may identify more facilities that are available for the non-displaced cluster location. For example, if a cluster is displaced to the maximum of 2 km, the 5 km buffer applied to the displaced location may result in a facility that is 7 km from a non-displaced cluster. However, we prefer to introduce the error of possibly including more health facilities than missing health facilities if a smaller buffer were applied.

All analyses considered the sampling design and sampling weights, and were performed with Stata 17 software.

3 RESULTS

The results will begin with a discussion of the distribution of the urban poverty variable overall and by country regions in subsection 3.1. This is followed by a discussion of the results for each country separately, which includes a description of the indicators, crosstabulation of the indicators with the urban poverty variable, results from the logistic regression of each indicator with the urban poverty variable as the main indicator of interest, and description of the urban poverty variable by further variables. A summary in subsection 3.8 discusses the cross-cutting findings for the child health indicators.

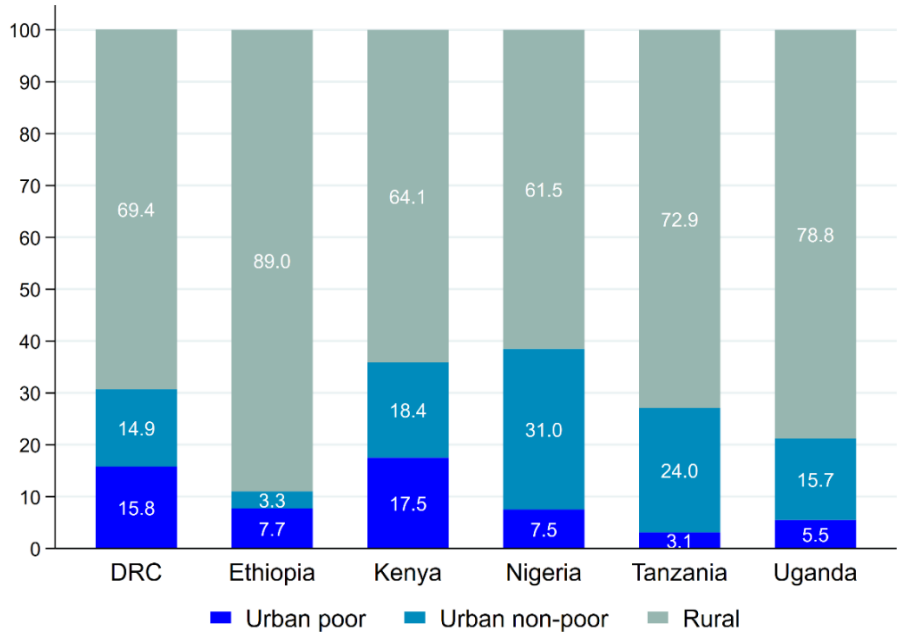
Although the rural category is presented to provide the complete distribution of the population in the results, the focus of this report is the comparison of urban poor to the urban non-poor. However, it is still important to note that rural children have shown consistently worse outcomes compared to urban children (whether urban poor or urban non-poor) for all countries and indicators examined in this analysis. In some cases, the disparities between rural and urban non-poor are very similar to the disparities between urban poor and urban non-poor. These occurrences are highlighted.

3.1 Urban Poverty

Appendix Table 1 summarizes the distribution of the main variables among the population and among children under age 5 for each country. Figure 1 shows the percentage distribution of the urban poverty cluster variable among children under age 5. All countries were mostly rural with the highest percentage of rural areas found in Ethiopia (89%) and the lowest in Nigeria (61.5%). Kenya and DRC had the highest percentage of urban poor clusters (17.5% and 15.8%, respectively), and Tanzania had the lowest (3.1%).

Kenya and DRC had the highest percentage of urban poor clusters (17.5% and 15.8%, respectively), and Tanzania had the lowest (3.1%).

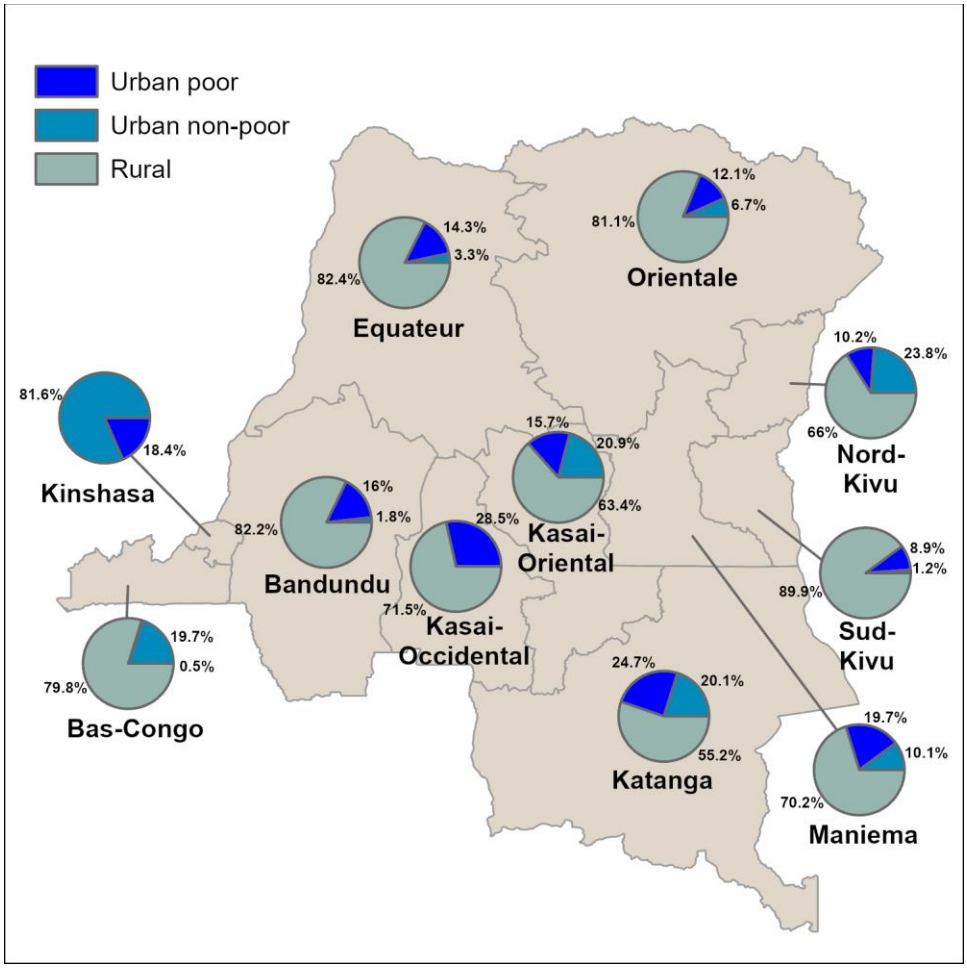
Figure 1 Percentage distribution of the urban poverty variable among children under age 5



Figures 2–7 show the percentage distribution of the urban poverty variable among children under age 5 for each region in each country. These estimates, with confidence intervals and tests of association, are also found in Appendix Table 2. Region was found to be significantly associated with the urban poverty variable in all countries. Due to the small sample size of children living in the urban poor areas, the confidence intervals shown in Appendix Table 2 are often wide.

In DRC (Figure 2), we see that urban poverty among children was the highest in the Kasai-Occidental and Katanga regions (28.5% and 24.7%, respectively). In Kasai-Occidental, all urban areas were found to be urban poor with no urban non-poor clusters. The lowest percentage of urban poverty was found in Bas-Congo (0.5%), which was also highly rural.

Figure 2 **Distribution of urban poverty variable for children under age 5 in each region, Democratic Republic of the Congo**



For Ethiopia (Figure 3), we see that approximately one-quarter to one-third of children under age 5 lived in urban poor clusters in Addis Ababa, Gambela, and Hariri (32.8%, 30.6%, and 25.1%, respectively). The lowest was found in Dire Dawa (2.1%), which was also highly urban. The region of Benishangul only had urban poor clusters (7.0%) with no urban non-poor and was also highly rural (93.0%).

Figure 3 Distribution of urban poverty variable for children under age 5 in each region, Ethiopia

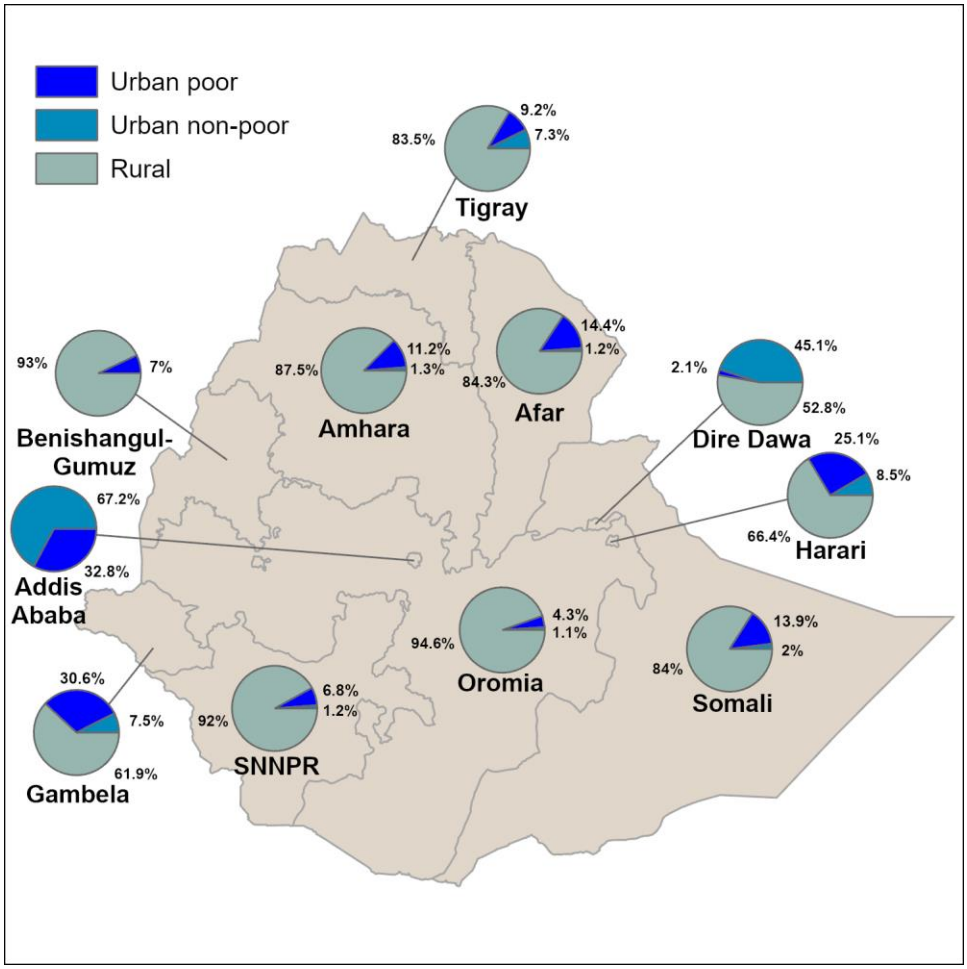
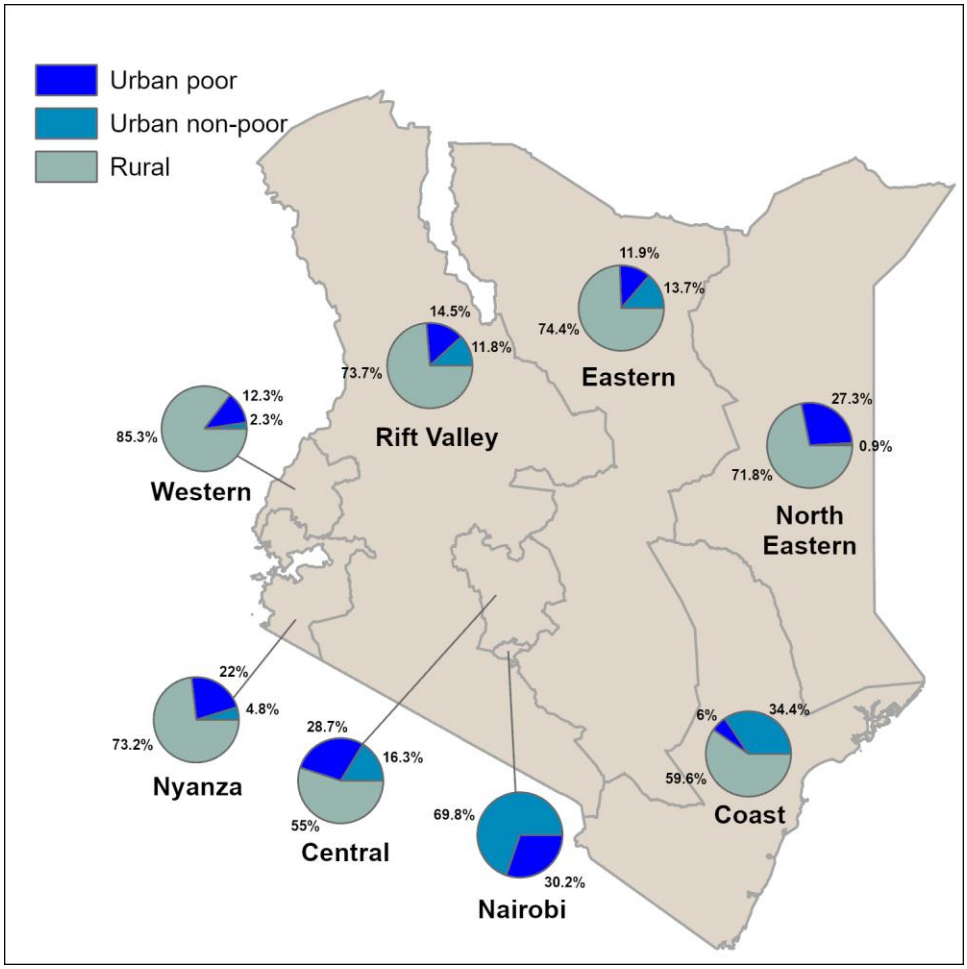


Figure 4 shows the percentage distribution of the urban poverty variable by region for Kenya, the country with the highest percentage of children living in urban poor clusters (as shown in Figure 1). The figure shows that the highest percentage of children living in urban poor areas was found in the capital, Nairobi at 30.2%, followed by the Central Region (28.7%) and the North Eastern Region (27.3%). The Coast had the lowest percentage of urban poverty (6%).

Figure 4 **Distribution of urban poverty variable for children under age 5 in each region, Kenya**



In Figure 5, we see that the South East Region in Nigeria had a much higher percentage of urban poor areas compared to the other regions. Approximately 18% of children in this region lived in urban poor areas compared to less than 10% for the remaining regions.

Figure 5 Distribution of urban poverty variable for children under age 5 in each region, Nigeria

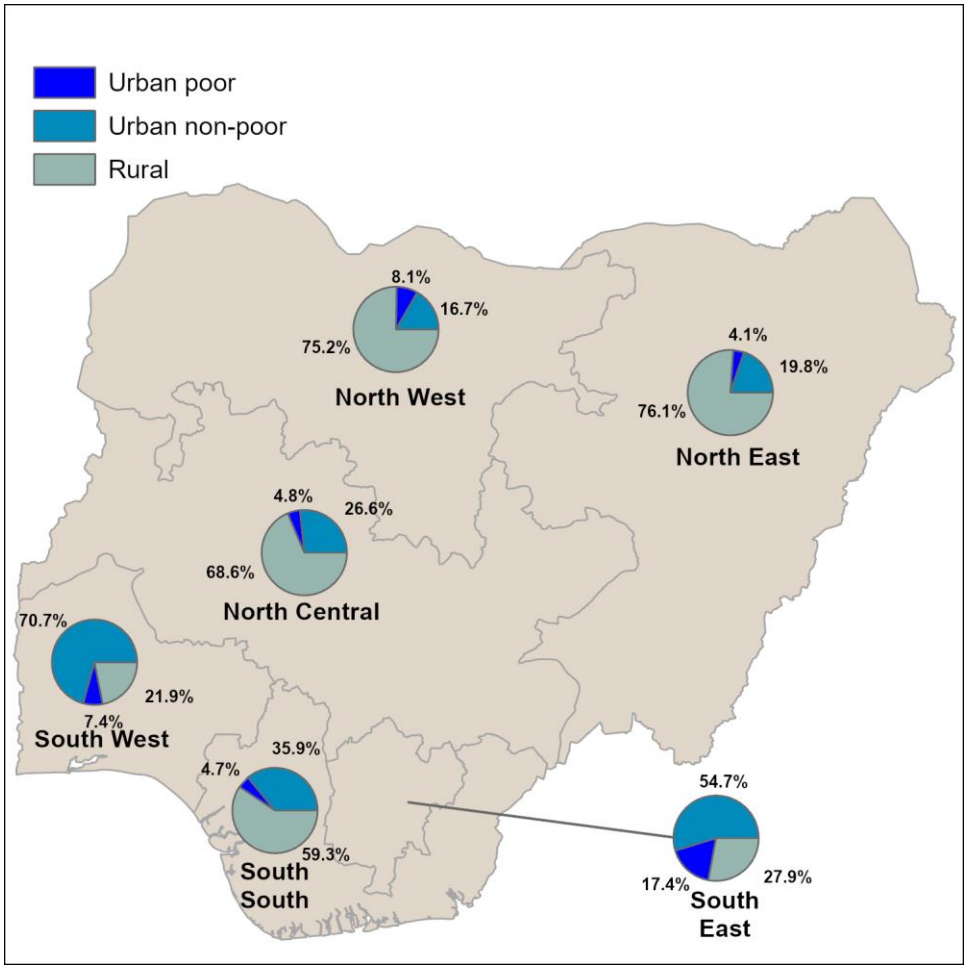
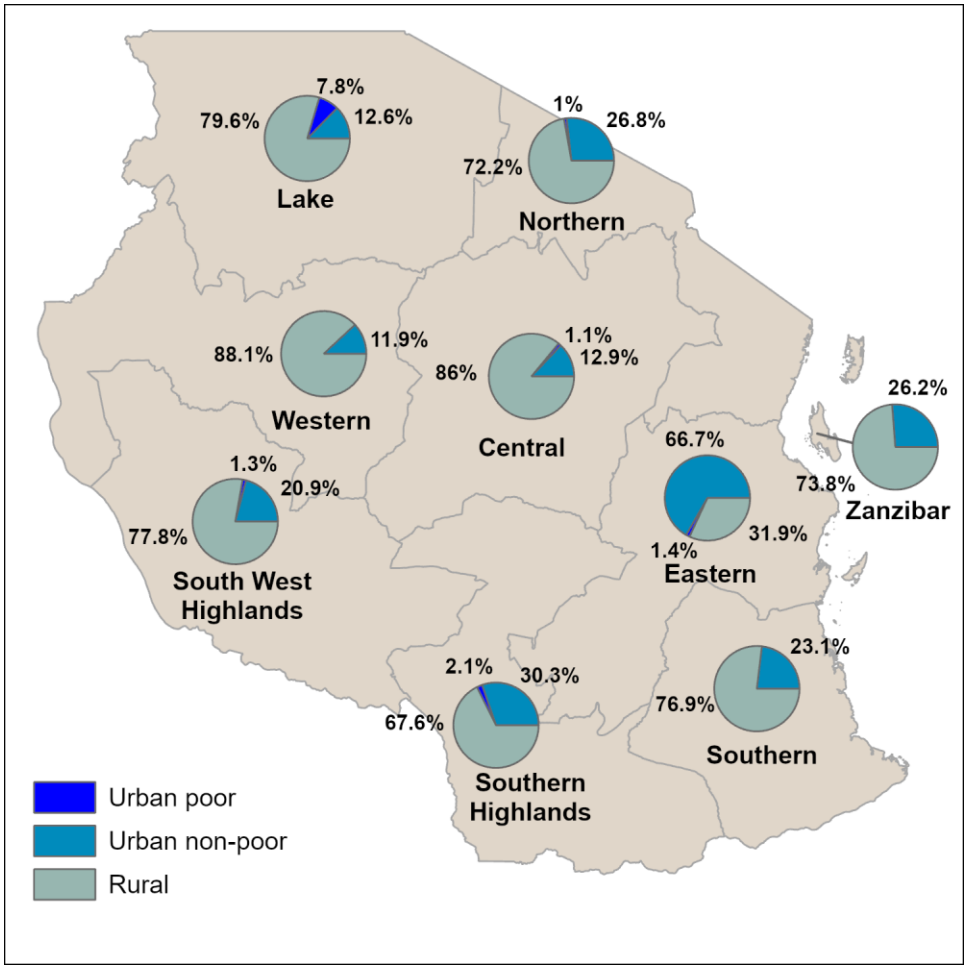


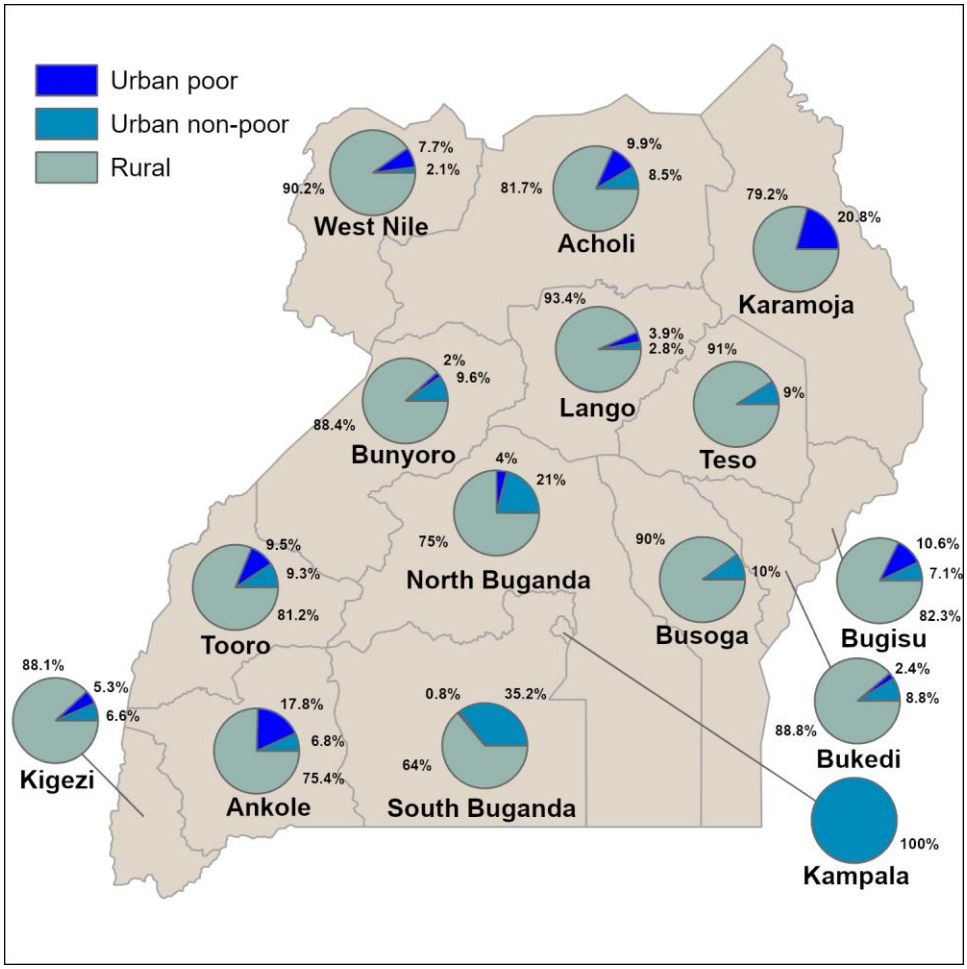
Figure 6 shows the distribution of urban poverty by regional zones for Tanzania. Tanzania also had the lowest percentage of children living in urban poor areas (as shown in Figure 1). The Lake zone had the highest percentage of children living in urban poor areas compared to the other zones – 7.8% compared with 0–2% in other zones. This was also a highly rural zone. Three zones – Western, Southern, and Zanzibar – had no urban poor areas.

Figure 6 Distribution of urban poverty variable for children under age 5 in each regional zone, Tanzania



In Figure 7, we see the urban poverty variable distribution in Uganda according to its 15 regions. The highest percentage of children living in urban poor area was in Karamoja Region (20.8%), which was also highly rural (79.2%). This region also had no urban non-poor areas. This was followed by Ankole Region (17.8%). Two regions, Kampala and Teso, had no urban poor areas. Kampala was 100% urban non-poor, while Teso was highly rural (91%) with 9% who were urban non-poor.

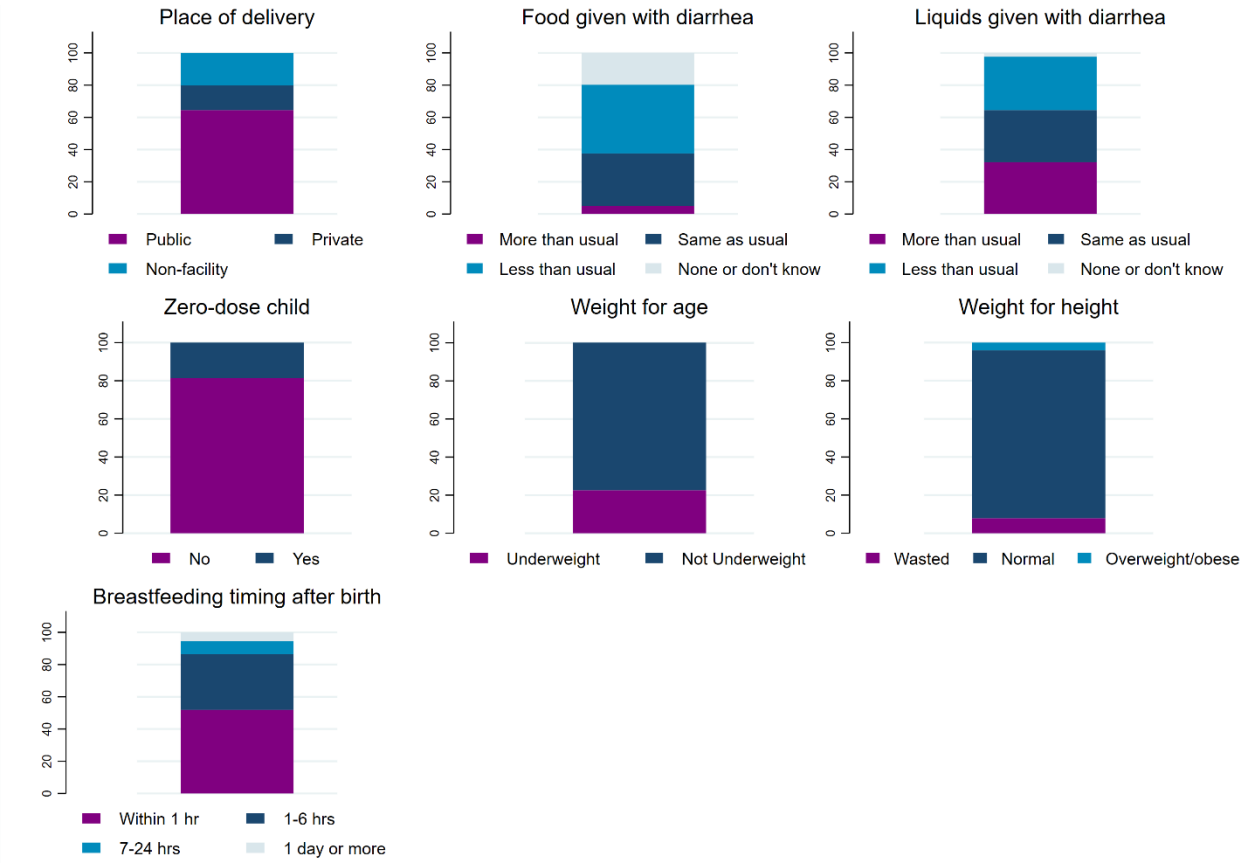
Figure 7 Distribution of urban poverty variable for children under age 5 in each region, Uganda



3.2 Democratic Republic of the Congo

The distribution of the child health indicators for all the countries in the analysis is found in Appendix Table 3. Figure 8 shows these distributions for DRC. Approximately 80% of births of children under age 5 were delivered in a health facility, with 65% delivered in a public health facility. More than half (62%) of children with symptoms of diarrhea in the last two weeks were given less or no food, while 36% were given less or no liquids. Approximately every one in five (19%) children age 12 to 23 months were zero-dose children. Almost a quarter of children under age 5 were underweight for their age and 4% were overweight or obese for their height. More than half (52%) of children under age 2 were breastfed within 1 hour after birth and a further 35% between 1 to 6 hours after birth.

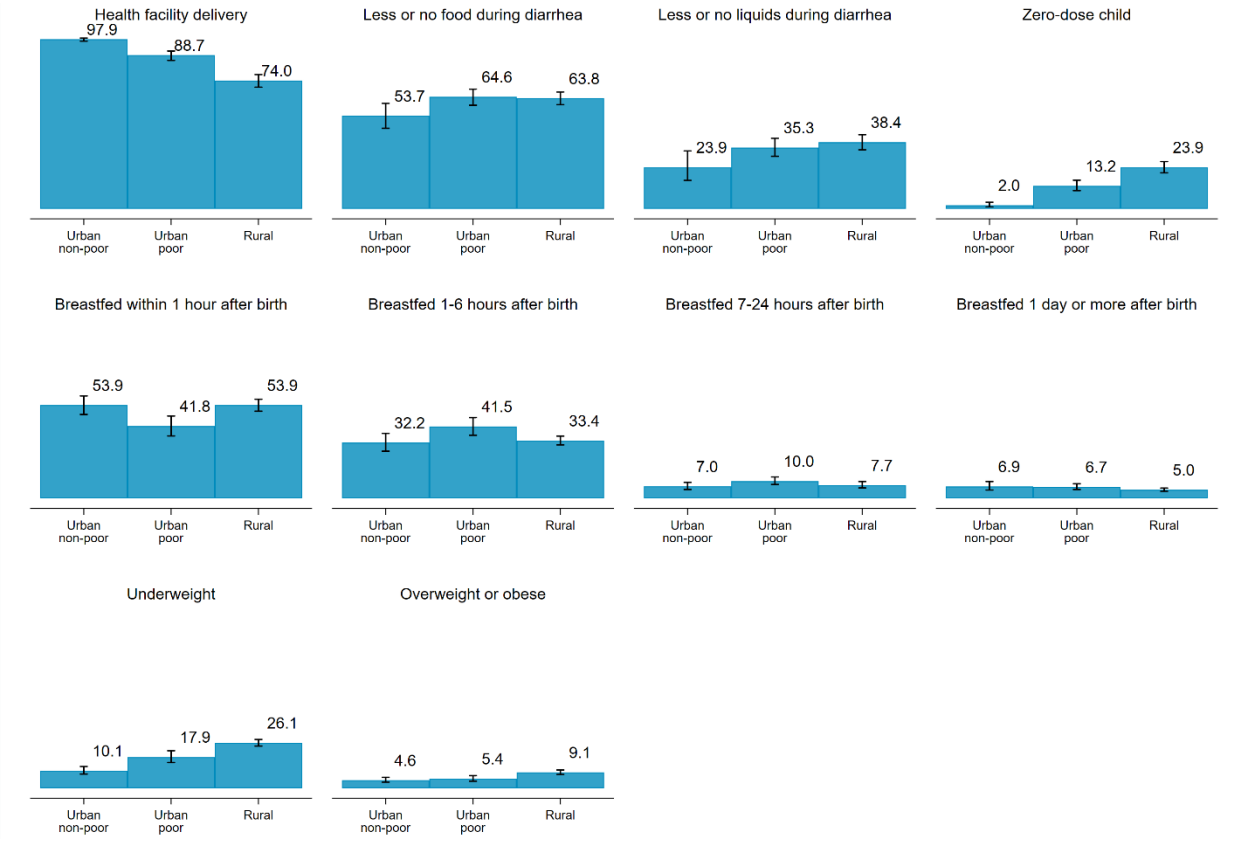
Figure 8 Distribution of the child health indicators, Democratic Republic of the Congo



Appendix Table 4 shows the crosstabulation of each indicator with the urban poverty variable, the controls, and the region variable. In this table, we see that the urban poverty variable was significantly associated with all the child health indicators except for being breastfed between 7 to 24 hours after birth. However, the significance with less or no food given during diarrhea and being breastfed between 1 to 6 hours after birth was marginal ($p < .05$). Region was the only variable that was significantly associated with all the indicators in DRC.

Figure 9 highlights the crosstabulation results with the urban poverty variable. We see large differences in the health facility delivery by urban poverty with 89% of children from urban poor areas that are delivered in a health facility compared with 98% for urban non-poor. The percentage of zero-dose children was higher among urban poor children age 12 to 23 months (13%) compared with the urban non-poor children (2%). The percentage of children under age 5 who were considered underweight for their age was also higher among urban poor children (18%) compared with urban non-poor children (10%). The differences between urban poor and urban non-poor children for the remaining indicators were relatively small and with overlapping confidence intervals (as shown in the figure and in Appendix Table 4).

Figure 9 Crosstabulation of each outcome with the urban poverty variable, Democratic Republic of the Congo



Appendix Table 5 summarizes the results from the unadjusted and adjusted regression results for each outcome. Figure 10 shows the adjusted regression results for the urban poverty variable after adjusting for the controls. Although in the appendix table we see that urban poor was significantly different than urban non-poor in the unadjusted and adjusted models for all indicators except overweight, Figure 10 shows more clearly that the magnitude of the coefficients and strength of association was highest for the health facility and zero-dose child indicators.

- In DRC, children from urban poor areas had 80% lower odds of health facility delivery compared to the urban non-poor.
- Urban poor children had six times the odds of urban non-poor children to have zero-dose children.
- Urban poor children had almost twice the odds of being underweight compared to urban non-poor children in DRC.

Children from urban poor areas were less likely to be delivered in a health facility compared to urban non-poor children ($\beta = -1.6$, $OR = 0.2$, $p < .001$). This is 80% lower odds of health facility delivery for urban poor compared to the urban non-poor. Urban poor children had six times the odds of urban non-poor children to be zero-dose children ($\beta = 1.8$, $OR = 6.2$, $p < .001$). Another strong association was found with the underweight outcome. The urban poor children had almost twice the odds of being underweight compared to urban non-poor children in DRC ($\beta = 0.6$, $OR = 1.9$, $p < .001$). For these three indicators, the mother's secondary education was also an important factor (as shown in Appendix Table 5).

Urban poor children were also given less food or liquids during diarrhea compared to urban non-poor children. Urban poor children had 1.6 ($\beta = 0.5$, $OR = 1.6$, $p < .01$) and 1.7 ($\beta = 0.6$, $OR = 1.7$, $p < .01$) higher odds to be given less or no foods or liquids, respectively, compared to urban non-poor children. These differences were very similar to the differences between rural and urban non-poor.

Urban poor children were also less likely to be breastfed within one hour compared to urban non-poor children ($\beta = -0.5$, $OR = 0.6$, $p < .01$). However, urban poor children were more likely to be breastfed between 1 to 6 hours and 7 to 24 hours after birth, although this significance was weaker ($p < .05$).

Figure 10 **Adjusted coefficients for the urban poverty variable from the logit regression for each outcome, Democratic Republic of the Congo, urban non-poor is the reference**

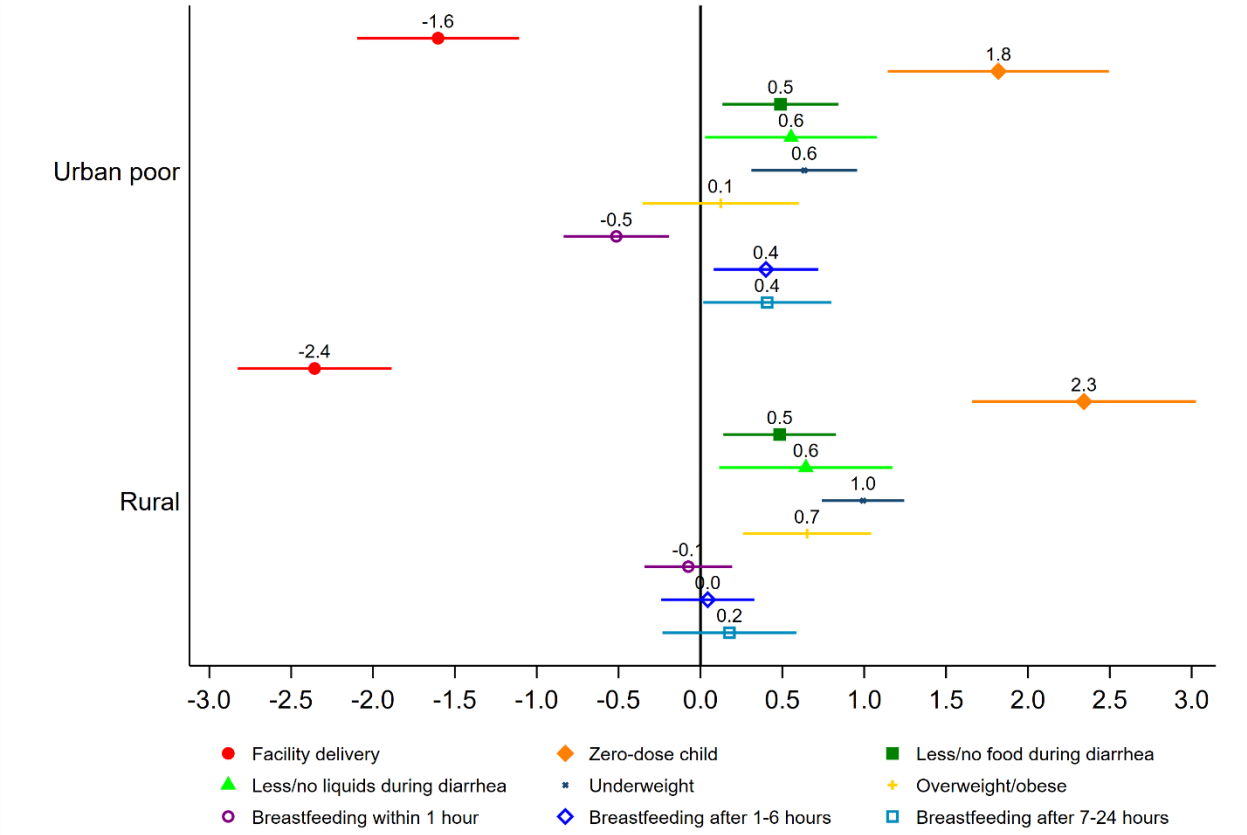


Table 3 shows the percentage distribution of children under age 5 within each urban poverty category by mother's characteristics, problems accessing health care, and availability of health facilities. The results indicate that urban poor children have a lower percentage of mothers with secondary or higher education and with less cash earnings compared to urban non-poor. The distribution by mother's ethnicity among urban poor children is similar to the urban non-poor children except for a lower percentage of mothers from the Bakongo ethnicity (3%) compared with urban non-poor (18%). Among the variables that measure problems accessing health care, the largest gap between urban poor and urban non-poor children was in having great difficulties in obtaining money needed for treatment for their mothers – 68% for urban poor and 55% in urban non-poor. There was also a disparity between urban poor and urban non-poor children in the availability of health facilities within 5 km. Approximately 64% of urban poor children had at least one public hospital within 5 km compared with 92% for urban non-poor. There were no private hospitals available. We observe more equitable availability of public non-hospitals between urban poor and urban non-poor with above 90% of children in urban areas having at least two non-hospitals (such as health centers or posts) regardless of poverty status. However, urban poor children had much less access to private non-hospitals, with only 37% of urban poor having at least two non-hospitals within 5 km compared with 72% for urban non-poor. It is important to note the very large disparity among rural children that have a much lower availability of health facilities within 5 km compared to children living in urban areas.

Table 3 Percentage distribution of children under age 5 by mother's characteristics, mother's problems accessing care, and availability of health facilities within each urban poverty category, Democratic Republic of the Congo

	Urban non-poor		Urban poor		Rural		Total		
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	*p* value
Mother's characteristics									
Education									<.001
None	2.5	[1.6,3.7]	6.3	[4.4,8.9]	25.1	[22.4,27.9]	18.8	[16.9,20.8]	
Primary	20.0	[16.7,23.8]	37.4	[33.5,41.5]	50.5	[48.0,53.0]	43.9	[41.7,46.1]	
Secondary+	77.5	[73.7,80.9]	56.3	[51.4,61.0]	24.4	[21.8,27.2]	37.3	[34.9,39.8]	
Type of earning									<.001
Not working	38.5	[33.7,43.6]	34.1	[29.6,38.9]	19.1	[15.9,22.7]	24.3	[21.8,27.1]	
Not paid	1.9	[1.1,3.3]	3.2	[2.0,5.1]	3.5	[2.4,5.1]	3.2	[2.4,4.4]	
Cash only	50.3	[45.3,55.2]	40.7	[36.0,45.6]	18.4	[16.0,21.1]	26.7	[24.3,29.1]	
Cash and in-kind	7.7	[5.2,11.3]	17.8	[14.2,22.1]	46.4	[41.6,51.4]	36.2	[32.5,40.0]	
In-kind only	1.6	[0.8,3.2]	4.2	[2.6,6.7]	12.6	[9.5,16.4]	9.6	[7.4,12.4]	
Ethnicity									<.001
Bakongo Nord and Sud	18.2	[12.2,26.2]	3.1	[1.4,6.5]	5.4	[3.6,8.0]	6.9	[5.3,8.9]	
Bas-Kasai Et Kwilu-Kwngo	16.5	[10.8,24.4]	21.6	[14.5,31.1]	17.3	[13.2,22.4]	17.9	[14.6,21.7]	
Cuvette Central	3.5	[1.9,6.4]	7.5	[3.6,14.9]	10.1	[6.8,14.9]	8.7	[6.2,12.1]	
Ubangi Et Itimbiri	4.5	[2.3,8.4]	9.8	[6.3,14.9]	13.4	[10.1,17.7]	11.5	[9.0,14.6]	
Uele Lac Albert	3.6	[1.7,7.5]	6.1	[3.3,11.0]	7.5	[5.6,10.0]	6.7	[5.3,8.5]	
Basele-K , Man. Et Kivu	16.6	[9.7,26.9]	14.2	[7.6,25.0]	22.2	[17.4,27.9]	20.1	[16.4,24.4]	
Kasai, Katanga, Tanganika	34.1	[26.2,43.1]	34.5	[25.9,44.3]	23.0	[18.6,28.2]	26.5	[22.9,30.4]	
Lunda	1.5	[0.5,4.4]	2.3	[0.9,6.1]	0.3	[0.2,0.7]	0.8	[0.5,1.4]	
Pygmy	0.1	[0.0,0.6]	0.4	[0.1,2.0]	0.2	[0.1,0.5]	0.2	[0.1,0.5]	
Foreign/Non-Congolese	1.4	[0.9,2.3]	0.4	[0.1,2.3]	0.4	[0.2,1.1]	0.6	[0.3,1.0]	
Problems accessing health care, big problem in:									
Getting permission to go	25.3	[19.7,31.9]	32.5	[27.3,38.2]	34.5	[30.7,38.6]	32.8	[29.9,35.9]	.045
Getting money needed for treatment	54.9	[47.7,61.8]	68.7	[64.6,72.4]	75.7	[71.8,79.3]	71.5	[68.6,74.3]	<.001
Distance to health facility	21.7	[17.2,27.1]	29.0	[24.0,34.7]	47.8	[43.4,52.3]	41.0	[37.8,44.2]	<.001
Not wanting to go alone	17.6	[13.5,22.6]	17.7	[14.2,21.8]	27.6	[24.7,30.8]	24.6	[22.3,26.9]	<.001
At least one problem	62.1	[55.9,67.9]	75.6	[72.0,78.9]	83.1	[79.6,86.2]	78.8	[76.2,81.2]	<.001
Availability of health facilities within 5 km									
Hospitals									
At least one public hospital	92.3	[82.8,96.7]	64.4	[51.6,75.4]	8.2	[4.9,13.3]	31.1	[26.6,36.1]	<.001
At least one private hospital	0.0		0.0		0.0		0.0		NA
Non-hospitals									
At least two public non-hospitals	98.9	[95.4,99.7]	90.8	[82.2,95.4]	43.4	[35.8,51.2]	60.2	[54.8,65.4]	<.001
At least two private non-hospitals	72.3	[62.0,80.6]	36.6	[24.8,50.3]	1.4	[0.6,3.5]	18.8	[15.5,22.6]	<.001

3.3 Ethiopia

As shown in Figure 11 and Appendix Table 3, Ethiopia had a very low percentage of health facility delivery. Only 26% of births were delivered in a health facility, most of which were in a public facility (25%). Three-quarters (75%) of children with diarrhea symptoms were given less or no food and 64% were given less or no liquids. Ethiopia also had the second highest (at 27%) zero-dose children age 12 to 23 months compared to the other countries in the analysis, with the highest being Nigeria. Ethiopia also had one of the highest percentages of underweight children compared to other countries in this analysis with almost a quarter (24%) of children under age 5 who are underweight. Approximately 3% of children under age 5 were found to be overweight or obese. Almost three quarters of last-born children under age 2 were breastfed within 1 hour after birth and a further 17% between 1 to 6 hours after birth.

Figure 11 Distribution of the child health indicators, Ethiopia

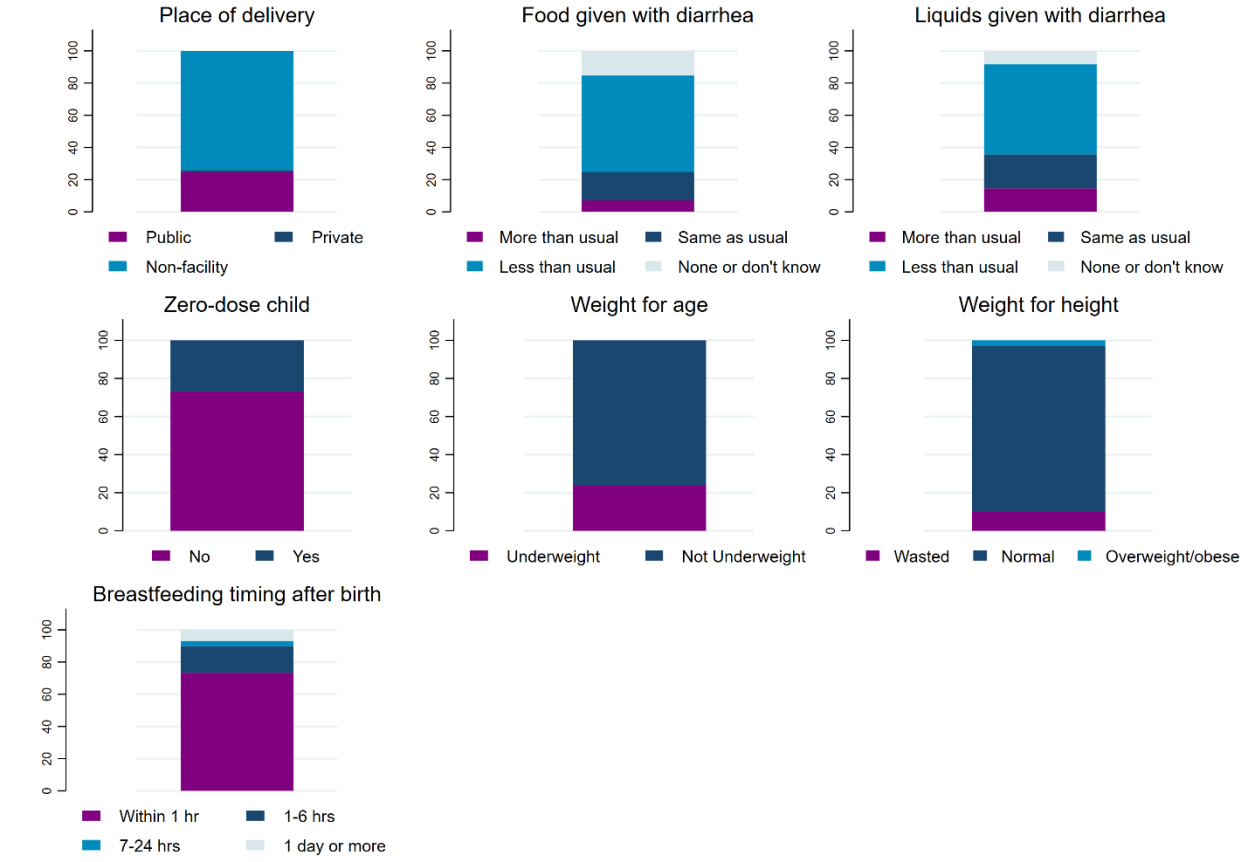
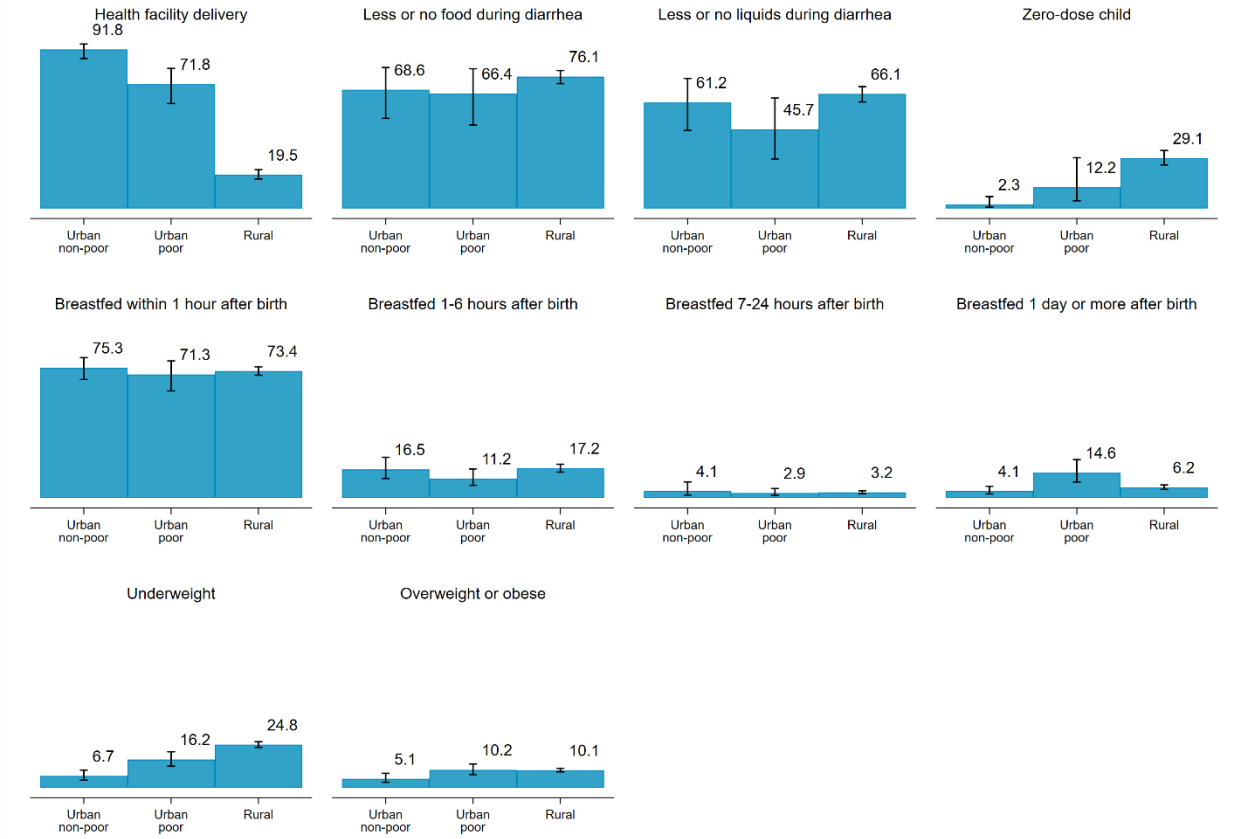


Figure 12 summarizes the crosstabulation results with the urban poverty variable in Ethiopia. We observe a very large disparity in the health facility delivery with a very low percentage among rural (20%), but also a significantly lower percentage among urban poor (72%) compared with urban non-poor (92%). While we also observe large differences in zero-dose children with 12% among urban poor compared with 2% in urban non-poor, the overlapping confidence intervals between these two categories indicate that these differences are not significant. The remaining outcome with large and significant differences by urban poverty was underweight among children under age 5. Approximately 16% of urban poor children were underweight compared with 7% for urban non-poor. This was also relatively high among rural children with almost a quarter being underweight. The differences in the remaining indicators between urban poor and urban non-poor were not significant and had overlapping confidence intervals (as shown in Appendix Table 6).

Figure 12 Crosstabulation of each outcome with the urban poverty variable, Ethiopia



Appendix Table 7 summarizes the unadjusted and adjusted regression results for each outcome, and Figure 13 summarizes the adjusted regression results for the urban poverty variable. Urban poor children had significant differences compared to urban non-poor for the health facility, zero-dose children, underweight, and overweight or obese indicators. This significance was found in both the unadjusted and adjusted regression models. The largest disparities between urban poor and urban non-poor were found for the health facility and zero-dose child indicators. Urban poor children had 70% lower odds ($\beta = -1.1$, $OR = 0.3$, $p < .001$) of being delivered in a health facility compared to urban non-poor children.

- The largest disparities between urban poor and urban non-poor were found for the health facility and zero-dose child indicators.
- Urban poor children had 70% lower odds being delivered in a health facility compared to urban non-poor children.
- Urban poor children had approximately six times greater odds of having zero-dose children compared to the urban non-poor.
- Urban poor children also had almost twice the odds of being underweight and overweight or obese compared to urban non-poor children.

While the crosstabulation results did not indicate a significant difference between urban poor and urban non-poor in zero-dose children, significant differences were found in the regression, but at the $p < .05$ level and with very wide confidence intervals. Urban poor children had approximately six times greater odds of having zero-dose children compared to the urban non-poor ($\beta = 1.7$, $OR = 5.7$, $p < 0.05$). Urban poor children also had almost twice the odds of being underweight ($\beta = 0.8$, $OR = 2.3$, $p < 0.01$) and overweight or obese ($\beta = 0.6$, $OR = 1.9$, $p < 0.05$) compared to urban non-poor children, although the significance was weaker for overweight or obese. The differences observed in Figure 13 between urban poor and urban non-poor for zero-dose child, underweight, and overweight indicators were similar to the differences between rural and urban non-poor. As shown in Appendix Table 7, urban poverty was not significantly associated with having less or no liquids or foods during diarrhea or with the timing of breastfeeding in both the unadjusted and adjusted models.

Figure 13 **Adjusted coefficients for the urban poverty variable from the logit regression for each outcome, Ethiopia (urban non-poor is the reference)**

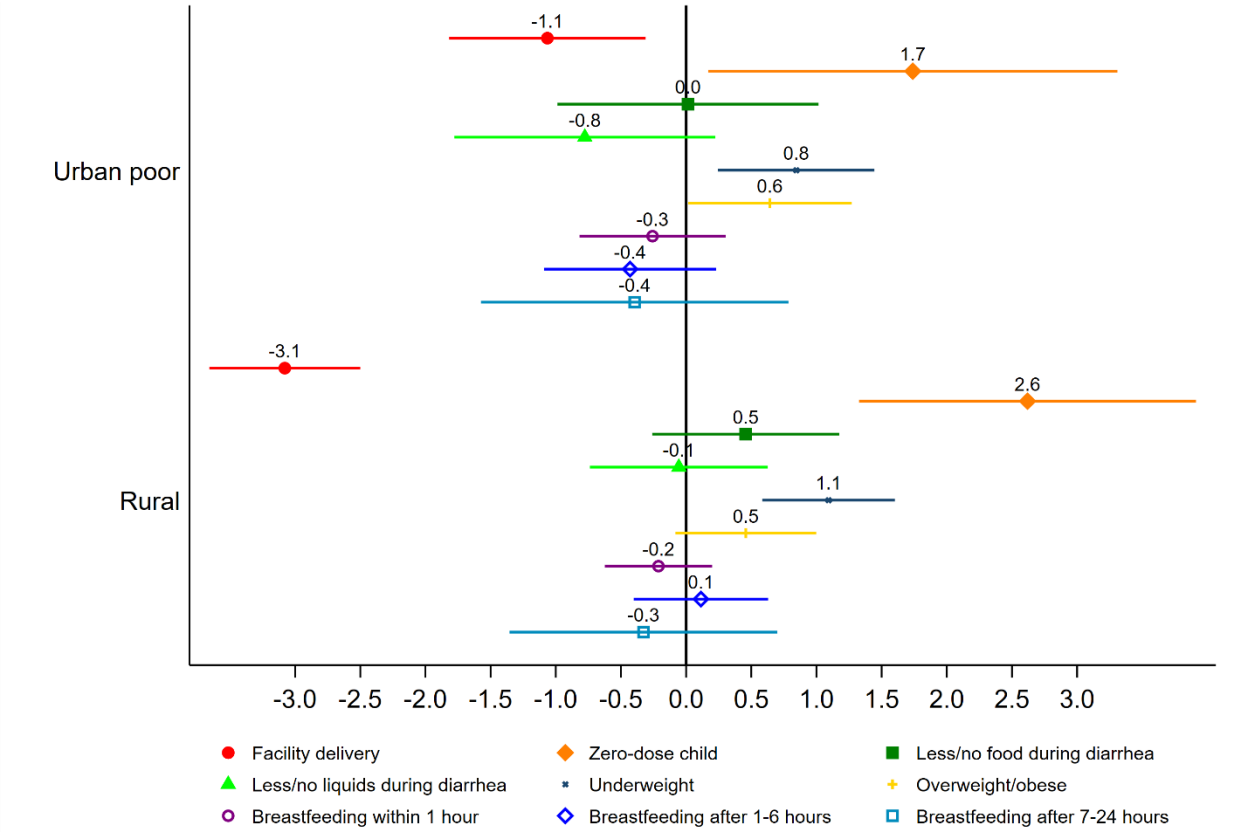


Table 4 shows the results of the percentage distribution of children under age 5 within each urban poverty category by additional variables. Approximately one third of urban poor children had mothers with no education compared with 12% among urban non-poor children. Few differences were found between urban poor and urban non-poor children by their mother's type of earnings, although we do see a large percentage of non-working mothers in rural areas. Urban non-poor children had higher percentages of mothers from the Tigray and Guragie ethnicities, and rural children had higher percentages of mothers from the Oromo ethnicity compared to the urban areas. Availability of health facilities was much lower in the urban poor compared to urban non-poor. Only 26% of urban poor children had at least one public hospital available within 5 km, as compared with 62% of urban non-poor children. This was only 2% for rural children. There were no private hospitals in Ethiopia. Similarly, only 25% of urban poor children had at least two non-hospital health facilities nearby compared with 57% among urban non-poor. There was a low number of private non-hospitals in all of Ethiopia.

- Availability of health facilities was much lower in the urban poor compared to urban non-poor.
- Only 26% of urban poor children had at least one public hospital available within 5 km, as compared to 62% of urban non-poor children. This was only 2% for rural children.
- Only 25% of urban poor children had at least two non-hospital health facilities nearby compared to 57% among urban non-poor.

Table 4 Percentage distribution of children under age 5 by mother's characteristics, mother's problems accessing care, and availability of health facilities within each urban poverty category, Ethiopia

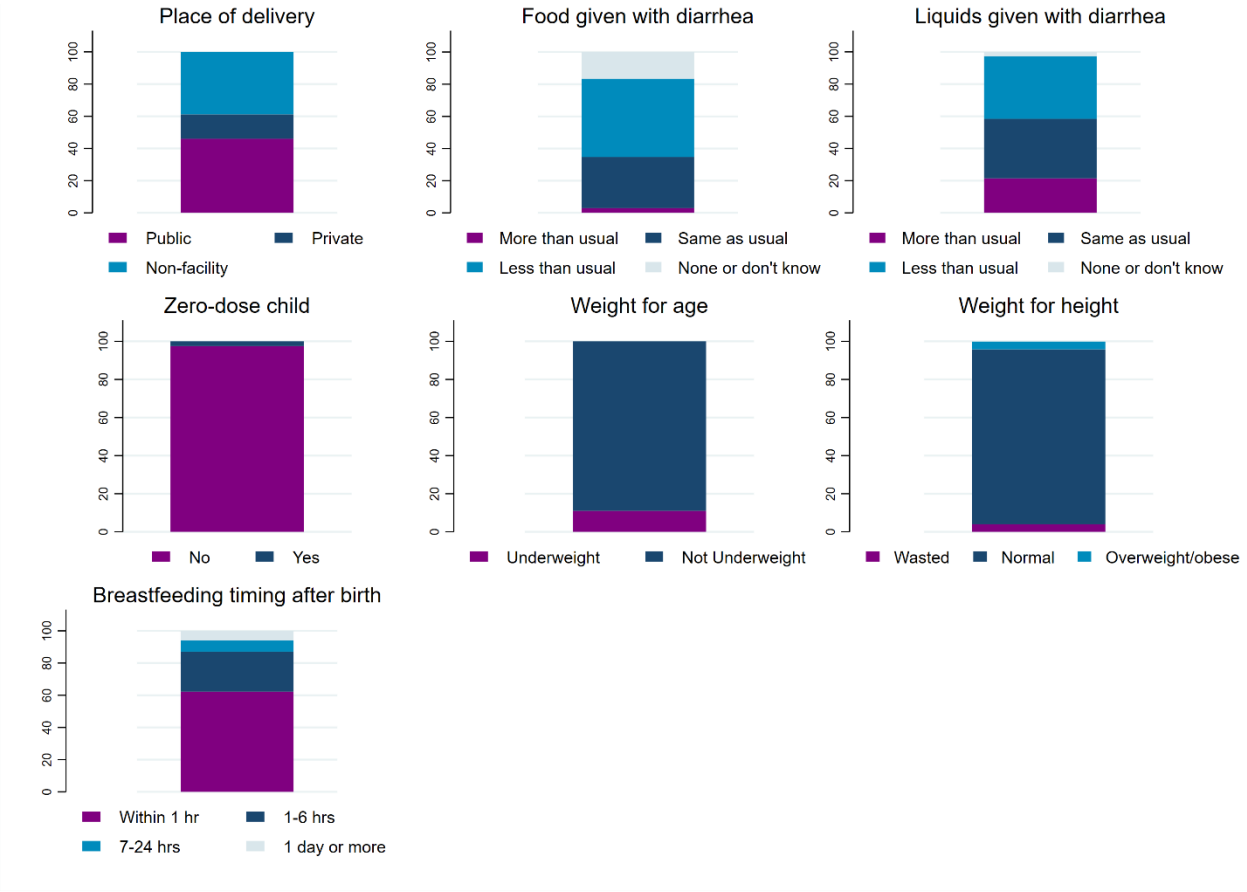
	Urban non-poor		Urban poor		Rural		Total		
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	*p* value
Mother's characteristics									
Education									<.001
None	12.0	[8.6,16.5]	33.2	[26.2,41.0]	70.9	[68.2,73.5]	66.1	[63.4,68.7]	
Primary	33.3	[27.8,39.4]	31.5	[26.3,37.2]	26.1	[23.8,28.6]	26.8	[24.6,29.0]	
Secondary+	54.7	[48.3,60.9]	35.4	[29.5,41.8]	2.9	[2.3,3.8]	7.1	[6.2,8.3]	
Type of earning									<.001
Not working	54.3	[48.0,60.4]	51.2	[44.5,57.8]	75.5	[73.0,77.8]	72.9	[70.5,75.1]	
Not paid	8.4	[5.2,13.4]	9.4	[6.0,14.5]	10.6	[9.1,12.3]	10.4	[9.1,11.9]	
Cash only	33.5	[26.6,41.2]	34.9	[29.5,40.8]	9.2	[7.5,11.1]	12.0	[10.3,13.8]	
Cash and in-kind	3.1	[1.4,6.6]	3.3	[1.0,10.0]	2.0	[1.4,3.0]	2.2	[1.5,3.1]	
In-kind only	0.8	[0.1,4.9]	1.2	[0.3,4.2]	2.8	[1.9,4.1]	2.6	[1.8,3.8]	
Ethnicity									<.001
Affar	0.0	[0.0,0.3]	0.8	[0.3,2.7]	1.1	[0.8,1.4]	1.0	[0.8,1.3]	
Amhara	35.1	[25.7,45.9]	35.7	[26.1,46.7]	19.8	[17.3,22.5]	21.5	[19.2,24.0]	
Guragie	11.1	[7.1,16.9]	3.9	[2.0,7.7]	1.5	[0.7,2.8]	2.0	[1.2,3.1]	
Hadiya	0.4	[0.1,1.4]	2.5	[0.5,12.1]	2.5	[1.3,4.7]	2.4	[1.3,4.4]	
Oromo	20.9	[15.3,27.9]	22.1	[12.3,36.5]	44.2	[39.9,48.5]	41.7	[37.8,45.7]	
Sidama	0.0		0.4	[0.1,1.7]	3.9	[2.4,6.3]	3.5	[2.1,5.6]	
Somali	3.4	[1.2,8.9]	7.5	[4.6,12.1]	4.2	[3.4,5.1]	4.4	[3.7,5.3]	
Tigray	21.3	[14.0,31.0]	8.1	[3.8,16.1]	6.0	[5.1,7.0]	6.6	[5.8,7.7]	
Welaita	3.6	[0.6,17.8]	0.7	[0.1,3.1]	3.2	[1.7,5.9]	3.0	[1.7,5.4]	
Other	4.2	[2.5,6.9]	18.2	[9.2,32.9]	13.8	[10.9,17.3]	13.8	[11.0,17.1]	
Problems accessing health care, big problem in:									
Getting permission to go	13.8	[9.2,20.3]	15.7	[9.9,24.1]	41.8	[38.4,45.3]	38.8	[35.7,42.1]	<.001
Getting money needed for treatment	26.2	[20.5,32.7]	37.9	[31.4,45.0]	65.7	[62.7,68.6]	62.2	[59.4,65.0]	<.001
Distance to health facility	13.0	[8.8,18.8]	19.4	[13.1,27.8]	65.9	[62.0,69.6]	60.6	[56.8,64.2]	<.001
Not wanting to go alone	15.9	[10.7,22.9]	18.2	[12.7,25.2]	50.5	[46.7,54.4]	46.9	[43.3,50.5]	<.001
At least one problem	35.9	[29.9,42.3]	47.8	[40.6,55.0]	81.0	[78.4,83.4]	77.0	[74.4,79.4]	<.001
Availability of health facilities within 5 km									
Hospitals									
At least one public hospital	62.2	[46.9,75.4]	25.7	[15.0,40.3]	1.7	[0.8,3.7]	5.7	[4.2,7.5]	<.001
At least one private hospital	0.0		0.0		0.0		0.0		NA
Non-hospitals									
At least two public non-hospitals	56.6	[41.9,70.3]	25.2	[13.8,41.5]	14.3	[10.2,19.9]	16.6	[12.6,21.6]	<.001
At least two private non-hospitals	2.1	[0.5,8.5]	0.8	[0.5,1.2]	1.6	[0.5,5.2]	1.6	[0.5,4.6]	.533

Note: Private for Ethiopia was classified as other, NGO, or mixture of private and public partnership in the dataset.

3.4 Kenya

Figure 14 and Appendix Table 3 show that more than half (61%) of births for children under age 5 in Kenya were in a health facility, most of which were in a public health facility (46%). More than half of children with diarrhea symptoms were given less or no food and 42% were given less or no liquids. Kenya had the lowest percentage of zero-dose children age 12 to 23 months (3%) compared with the other countries in the analysis. Approximately 1 in 10 children under age 5 in Kenya were underweight and 4% were found to be overweight or obese for their height. In addition, 62% of last-born children under age 2 were breastfed within 1 hour after birth and a further 25% between 1 to 6 hours after birth.

Figure 14 Distribution of the child health indicators, Kenya



In Figure 15, we see notable differences in urban poverty by health facility delivery, liquids given during diarrhea, and underweight. Approximately 76% of urban poor children were delivered in a health facility, compared with 88% of urban non-poor. Only 50% of rural children were delivered in a health facility. Approximately 39% of urban poor children were given less or no liquids during diarrhea compared with 26% of urban non-poor children. Finally, 9% of urban poor children were found to be underweight, compared with 5% of urban non-poor children. The differences in the remaining indicators were not significant except for a marginally significant difference in food given during diarrhea (see Appendix Table 8).

Figure 15 Crosstabulation of each outcome with the urban poverty variable, Kenya

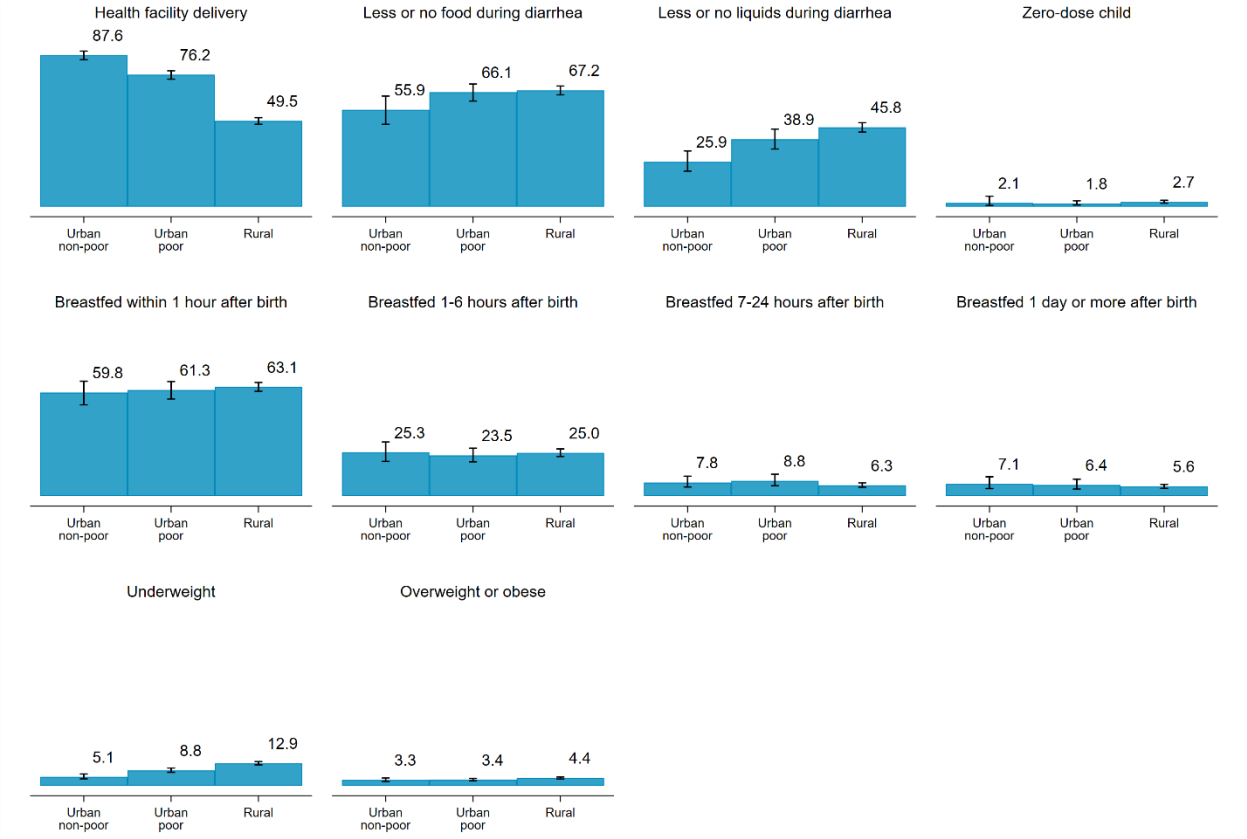


Figure 16 and Appendix Table 9 summarize the regression results for Kenya. Urban poor children in Kenya had 40% lower odds of being delivered in a health facility compared to urban non-poor (β = −0.5, *OR* = 0.6, $p < .001$). In Appendix Table 9, we see that the urban poor were significantly more likely to have less or no food during diarrhea compared to urban non-poor in the unadjusted model, although this significance was lost in the adjusted model. However, urban poor children had almost twice the odds of being given less or no liquids during diarrhea compared to urban non-poor (β = 0.6, *OR* = 1.8, $p < .05$). Finally, urban poor children had 50% greater odds of being underweight compared to urban non-poor (β = 0.41, *OR* = 1.5, $p < .05$). As shown in Figure 16, urban poverty was not significantly associated with zero-dose children or any of the breastfeeding timing indicators, both in the unadjusted and the adjusted models.

- Urban poor children in Kenya had 40% lower odds of being delivered in a health facility compared to urban non-poor
- Urban poor children had almost twice the odds of being given less or no liquids during diarrhea compared to urban non-poor.
- Urban poor children had 50% greater odds of being underweight compared to urban non-poor.

Figure 16 **Adjusted coefficients for the urban poverty variable from the logit regression for each outcome, Kenya, urban non-poor the reference**

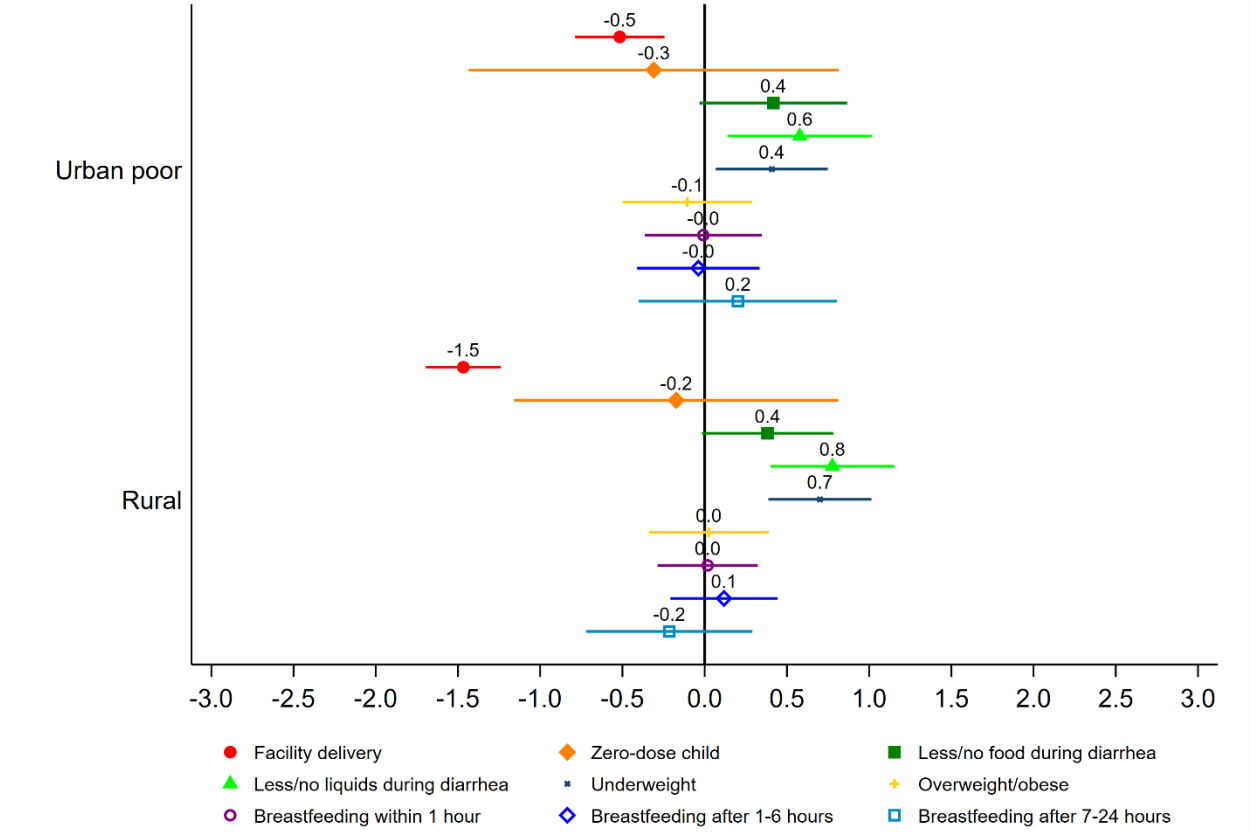


Table 5 shows that among urban poor children, 41% had mothers with secondary or higher education compared with 58% among urban non-poor children. Mothers in the urban poor areas were less likely to have cash earnings and had a higher percentage of being unpaid compared to urban non-poor. The differences by the mother's ethnicity between urban poor and non-poor were not large. However, more urban poor mothers reported a big problem in accessing health care for themselves due to money and distance, as compared to urban non-poor. While the availability of at least one public hospital with 5 km was similar between urban poor and urban non-poor, urban poor children had less availability of private hospitals nearby. Approximately 37% of urban poor children had at least one private hospital within 5 km compared with 60% of urban non-poor children. Urban poor children also had less availability of both public and private non-hospitals compared to the urban non-poor children (as shown in Table 5).

Table 5 Percentage distribution of children under age 5 by mother's characteristics, mother's problems accessing care, and availability of health facilities within each urban poverty category, Kenya

	Urban non-poor		Urban poor		Rural		Total		
	%	95 CI	%	95 CI	%	95 CI	%	95 CI	*p* value
Mother's characteristics									
Education									<.001
None	3.2	[2.0,5.0]	7.7	[6.1,9.7]	15.4	[13.8,17.0]	11.8	[10.7,13.0]	
Primary	39.2	[34.6,44.1]	51.1	[47.7,54.4]	62.4	[60.5,64.2]	56.1	[54.5,57.8]	
Secondary+	57.6	[52.6,62.4]	41.2	[37.8,44.7]	22.3	[20.9,23.7]	32.1	[30.6,33.6]	
Type of earning									<.001
Not working	37.7	[32.9,42.8]	39.7	[35.7,43.8]	35.0	[32.9,37.0]	36.3	[34.6,38.1]	
Not paid	3.1	[2.0,4.9]	7.9	[6.3,9.9]	15.5	[13.9,17.4]	11.9	[10.8,13.2]	
Cash only	51.8	[46.5,57.1]	45.1	[41.3,48.9]	35.2	[33.1,37.4]	40.0	[38.2,41.8]	
Cash and in-kind	6.9	[4.9,9.8]	6.0	[4.3,8.4]	10.3	[9.0,11.8]	8.9	[7.9,10.0]	
In-kind only	0.4	[0.1,1.5]	1.3	[0.8,2.2]	3.9	[3.0,5.1]	2.8	[2.2,3.6]	
Ethnicity									<.001
Embu	1.8	[1.1,3.0]	0.5	[0.2,1.3]	0.6	[0.4,0.9]	0.8	[0.6,1.1]	
Kalenjin	5.2	[3.6,7.3]	7.4	[5.5,9.9]	17.7	[15.8,19.7]	13.6	[12.3,15.0]	
Kamba	15.9	[12.7,19.9]	11.3	[8.8,14.5]	8.1	[7.1,9.2]	10.1	[9.2,11.2]	
Kikuya	27.6	[22.6,33.2]	23.7	[19.2,28.9]	11.2	[10.0,12.6]	16.4	[14.9,18.0]	
Kisii	5.5	[3.9,7.7]	6.0	[4.3,8.2]	4.8	[3.8,6.1]	5.2	[4.4,6.1]	
Luhya	12.8	[10.1,16.1]	16.8	[12.8,21.6]	16.8	[14.9,18.8]	16.0	[14.5,17.7]	
Luo	10.3	[7.8,13.6]	18.6	[15.4,22.4]	11.3	[10.0,12.6]	12.4	[11.3,13.5]	
Maasai	1.7	[0.5,5.2]	0.2	[0.1,0.6]	4.4	[3.3,5.7]	3.1	[2.4,4.1]	
Meru	3.8	[2.9,5.0]	2.3	[1.5,3.6]	4.9	[4.0,6.0]	4.3	[3.6,5.0]	
Mijikenda/Swahili	7.0	[5.3,9.4]	1.7	[0.8,3.7]	7.1	[5.8,8.6]	6.1	[5.2,7.2]	
Somali	2.5	[1.2,5.0]	5.6	[4.1,7.6]	3.8	[3.0,4.8]	3.9	[3.2,4.7]	
Taita/Taveta	1.7	[1.2,2.4]	0.3	[0.1,0.9]	0.5	[0.3,0.7]	0.7	[0.5,0.8]	
Turkana	0.2	[0.1,0.5]	2.1	[1.4,3.1]	2.7	[1.7,4.1]	2.1	[1.5,3.1]	
Samburu	0.0	[0.0,0.2]	0.4	[0.1,1.2]	1.0	[0.8,1.3]	0.7	[0.6,1.0]	
Other	3.9	[2.6,5.8]	2.9	[2.2,3.8]	5.2	[4.2,6.4]	4.6	[3.8,5.4]	
Problems accessing health care, big problem in:									
Getting permission to go	1.4	[0.9,2.1]	3.4	[2.6,4.4]	3.9	[3.4,4.5]	3.4	[3.0,3.8]	<.001
Getting money needed for treatment	11.7	[9.5,14.3]	16.7	[14.8,18.7]	23.2	[22.2,24.3]	20.0	[19.1,20.9]	<.001
Distance to health facility	4.1	[2.9,5.7]	9.8	[8.2,11.7]	16.8	[15.6,18.0]	13.2	[12.4,14.1]	<.001
Not wanting to go alone	3.5	[2.4,5.2]	5.0	[3.9,6.4]	6.2	[5.5,7.0]	5.5	[4.9,6.1]	<.001
At least one problem	15.2	[12.9,17.9]	22.0	[19.8,24.3]	28.7	[27.4,30.0]	25.0	[24.0,26.1]	<.001
Availability of health facilities within 5 km									
Hospitals									
At least one public hospital	66.5	[57.1,74.7]	61.2	[53.6,68.3]	18.5	[15.6,21.8]	34.8	[32.0,37.8]	<.001
At least one private hospital	60.1	[52.6,67.1]	37.1	[30.0,44.7]	6.1	[4.5,8.1]	21.5	[19.3,23.7]	<.001
Non-hospitals									
At least two public non-hospitals	92.0	[87.8,94.8]	85.7	[80.7,89.5]	61.8	[58.1,65.3]	71.5	[68.8,74.0]	<.001
At least two private non-hospitals	83.6	[77.7,88.2]	58.7	[52.1,65.1]	16.9	[14.3,19.8]	36.5	[34.0,39.0]	<.001

3.5 Nigeria

Figure 17 and Appendix Table 3 show that less than half (39%) of births for children under age 5 in Nigeria were in a health facility, and most are in a public health facility (26%). Nigeria has the second lowest proportion of health facility delivery among all countries in this analysis after Ethiopia. More than half of children with diarrhea symptoms were given less or no food (61%), and just under half (49%) were given less or no liquids. Nigeria had the highest percentage of zero-dose children age 12 to 23 months (35%) compared to the other countries in the analysis. Most children born in the last 5 years in Nigeria were of normal weight (91%), while only 7% were underweight and 2% were overweight or obese for their height. In addition, 42% of last-born children under age 2 were breastfed within one hour after birth and a further 36% between 1 to 6 hours after birth.

Figure 17 Distribution of the child health indicators, Nigeria

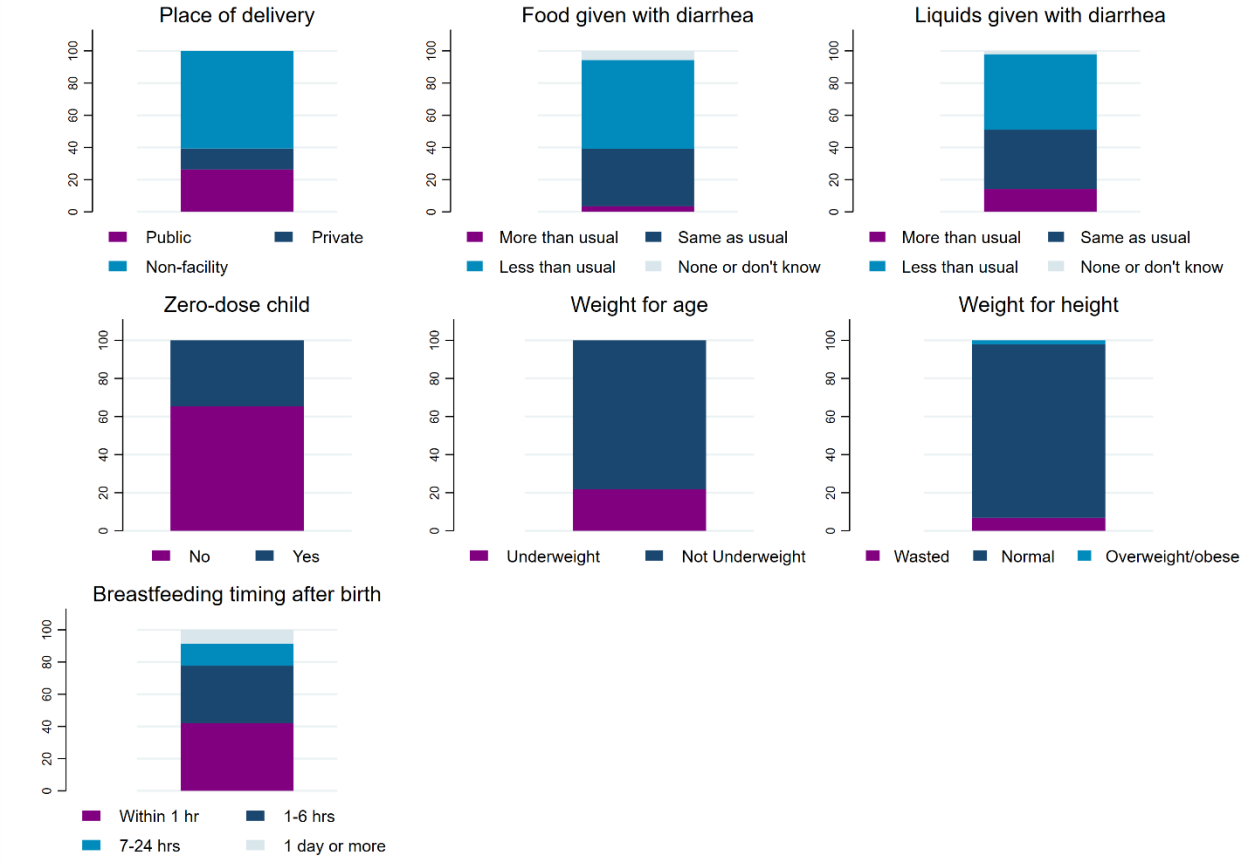


Figure 18 summarizes the crosstabulation results for the urban poverty variable in Nigeria. We observe a very large disparity in the health facility delivery with low percentages among rural (26%) and urban poor (35%) compared with the urban non-poor (68%). We also observed large differences in zero-dose children, with 35% among urban poor children age 12–23 months compared with 15% in urban non-poor. The remaining outcome with large and significant differences by urban poverty was underweight among children under age 5. Approximately 25% of urban poor children were underweight compared with 13% for urban non-poor. This was also relatively high among rural children with over a quarter being underweight. Differences were also observed in overweight, with 9% of urban poor children being overweight compared with 5% of urban non-poor. The differences in the remaining indicators between the urban poor and urban non-poor were not significant and had overlapping confidence intervals (as shown in Appendix Table 10).

Figure 18 Crosstabulation of each outcome with the urban poverty variable, Nigeria

Figure 19 and Appendix Table 11 summarize the regression results in Nigeria. Urban poor children had over 50% lower odds of being delivered in a health facility compared to urban non-poor ($\beta = -0.8$, $OR = 0.45$, $p < .001$). In Appendix Table 11, we see that urban poor were significantly more likely to have zero-dose children compared to urban non-poor in the unadjusted model, although this significance was lost in the adjusted model. Urban poor children had 40% greater odds of being underweight compared to urban non-poor ($\beta = 0.76$, $OR = 1.4$, $p < .05$) and 80% greater odds of being overweight or obese compared to the urban non-poor ($\beta = 0.59$, $OR = 1.8$, $p < .01$). As shown in Figure 19, urban poverty was not significantly associated with any of the diarrhea-related indicators or any of the breastfeeding timing indicators, both in the unadjusted and the adjusted models.

- Urban poor children had over 50% lower odds of being delivered in a health facility compared to urban non-poor.
- Urban poor children had 40% greater odds of being underweight compared to urban non-poor and 80% greater odds of being overweight or obese compared to the urban non-poor.

Figure 19 **Adjusted coefficients for the urban poverty variable from the logit regression for each outcome, Nigeria, urban non-poor the reference**

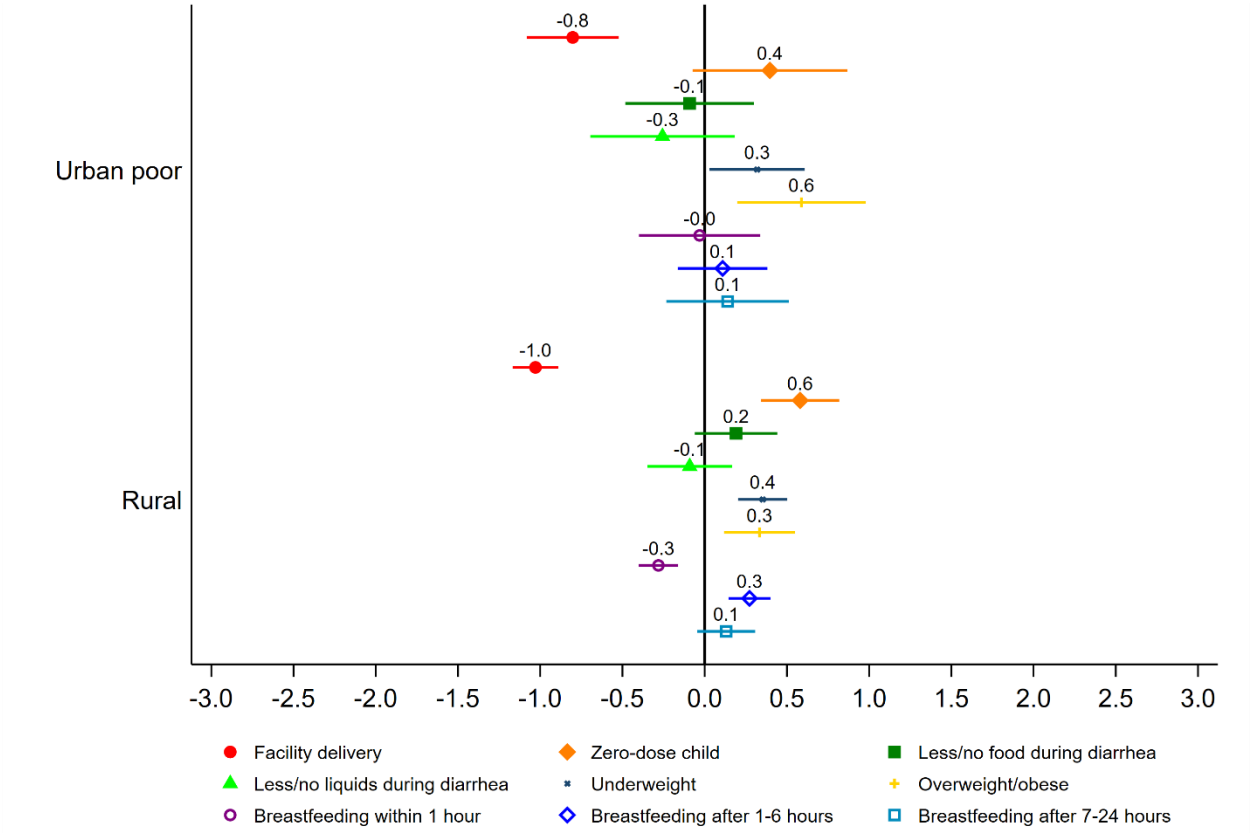


Table 6 shows that there were large differences in secondary or higher level of education between urban poor mothers (30%) and urban non-poor (71%). Mothers in urban poor areas also had lower levels of cash earnings and had a higher percentage of earning cash and in-kind earnings compared to the urban non-poor mothers. Urban non-poor children had higher percentages of mothers from the Ibibio and Tiv ethnicities, as well as the other ethnicities, while urban poor children had higher percentages of mothers from the Hausa ethnicity compared to urban areas. Among the variables that measure specific problems accessing health care, there were large gaps between urban poor and urban non-poor in two variables: first, having a significant problem in obtaining money needed for treatment, with 49% for urban poor and 36% in urban non-poor, and second, distance to health facility, with 30% for urban poor and 14% for urban non-poor.

Table 6 Percentage distribution of children under age 5 by mother's characteristics and problems accessing care within each urban poverty category, Nigeria

	Urban non-poor		Urban poor		Rural		Total		
	%	95 CI	%	95 CI	%	95 CI	%	95 CI	*p* value
Mother's characteristics									
Education									<.001
None	16.2	[14.2,18.4]	45.9	[36.2,56.0]	61.7	[59.5,63.8]	46.4	[44.5,48.3]	
Primary	13.3	[12.0,14.6]	24.0	[18.8,30.0]	14.6	[13.6,15.8]	14.9	[14.0,15.9]	
Secondary+	70.5	[67.9,73.0]	30.1	[24.3,36.7]	23.7	[22.1,25.4]	38.7	[37.0,40.4]	
Type of earning									<.001
Not working	27.2	[25.3,29.3]	25.5	[20.9,30.8]	35.9	[34.3,37.4]	32.4	[31.2,33.6]	
Not paid	6.0	[5.1,7.0]	7.1	[4.1,11.9]	11.9	[10.6,13.2]	9.7	[8.8,10.6]	
Cash only	62.2	[59.7,64.5]	51.2	[45.5,57.0]	43.8	[42.1,45.6]	50.1	[48.8,51.4]	
Cash and in-kind	4.2	[3.4,5.0]	15.4	[12.1,19.3]	7.8	[7.0,8.7]	7.2	[6.7,7.9]	
In-kind only	0.4	[0.3,0.8]	0.8	[0.4,1.7]	0.6	[0.5,0.9]	0.6	[0.4,0.8]	
Ethnicity									<.001
Ekoi	0.1	[0.0,0.2]	0.0		0.6	[0.4,0.8]	0.4	[0.3,0.5]	
Fulani	3.4	[2.7,4.3]	7.0	[4.0,11.9]	11.0	[9.1,13.2]	8.3	[7.1,9.7]	
Hausa	22.6	[19.2,26.5]	41.0	[30.4,52.5]	45.0	[41.8,48.2]	37.7	[35.4,40.1]	
Ibibio	1.1	[0.7,1.7]	0.1	[0.0,0.3]	1.5	[1.1,1.9]	1.3	[1.0,1.6]	
Igala	0.6	[0.3,1.2]	0.9	[0.2,3.4]	0.8	[0.5,1.2]	0.7	[0.5,1.1]	
Igbo	23.7	[21.0,26.7]	23.2	[16.3,31.9]	5.8	[4.9,6.9]	12.7	[11.6,13.8]	
Ijaw/Izon	1.6	[1.0,2.3]	2.3	[1.0,5.5]	1.2	[0.9,1.6]	1.4	[1.1,1.7]	
Kanuri/Beriberi	3.8	[2.5,5.7]	1.8	[0.4,7.7]	2.3	[1.6,3.4]	2.7	[2.1,3.6]	
Tiv	1.2	[0.6,2.3]	0.1	[0.0,0.4]	3.2	[2.4,4.1]	2.3	[1.8,2.9]	
Yoruba	24.7	[22.1,27.5]	14.5	[6.7,28.7]	3.6	[3.1,4.2]	11.0	[9.8,12.2]	
Other	17.2	[15.2,19.4]	9.2	[5.5,15.1]	25.2	[22.9,27.6]	21.5	[20.0,23.2]	
Problems accessing health care, big problem in:									
Getting permission to go	7.8	[6.7,9.1]	7.8	[5.3,11.3]	14.3	[13.1,15.6]	11.8	[10.9,12.7]	<.001
Getting money needed for treatment	36.2	[33.8,38.6]	48.5	[43.0,54.1]	55.0	[53.2,56.8]	48.7	[47.2,50.1]	<.001
Distance to health facility	13.8	[12.1,15.6]	29.6	[24.0,35.9]	35.1	[32.8,37.5]	28.1	[26.5,29.8]	<.001
Not wanting to go alone	8.6	[7.4,10.1]	9.7	[6.9,13.4]	19.9	[18.3,21.7]	15.7	[14.5,16.8]	<.001
At least one problem	38.7	[36.3,41.1]	55.4	[49.5,61.1]	61.5	[59.5,63.4]	53.9	[52.4,55.4]	<.001

Note: No data on health facility availability.

3.6 Tanzania

Figure 20 and Appendix Table 3 show the distributions of the child health indicators for Tanzania. Nearly two-thirds (63%) of births of children under age 5 were delivered in a health facility with just over half (51%) delivered in a public health facility. Half (50%) of the children with diarrhea symptoms in the last two weeks were given less or no food and 29% were given less or no liquids. Tanzania had the second lowest level (3%) of zero-dose children age 12 to 23 months. Just over 1 in 10 (14%) children under age 5 were underweight for their age, with only 1% overweight or obese for their height. More than half (51%) of children under age 2 were breastfed within 1 hour after birth and a further 36% between 1 to 6 hours after birth.

Figure 20 Distribution of the child health indicators, Tanzania

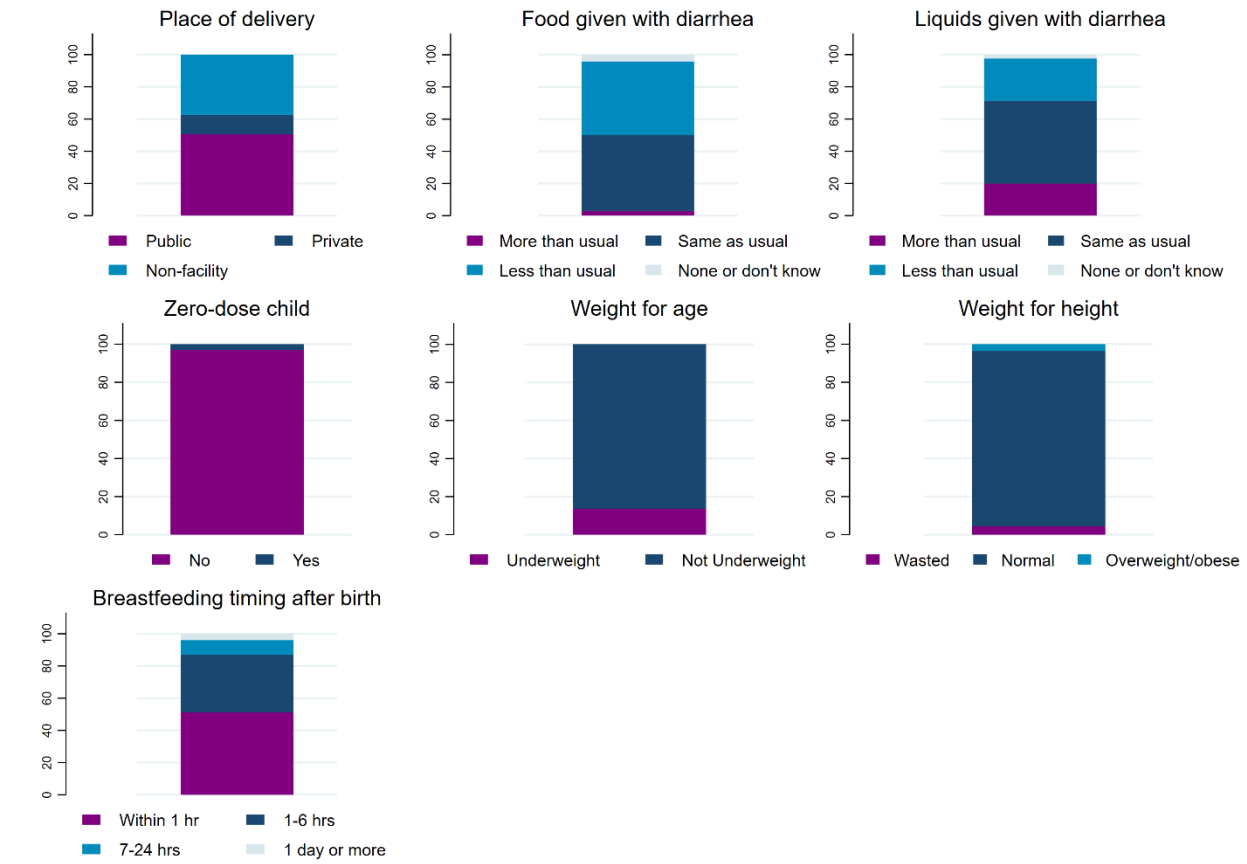
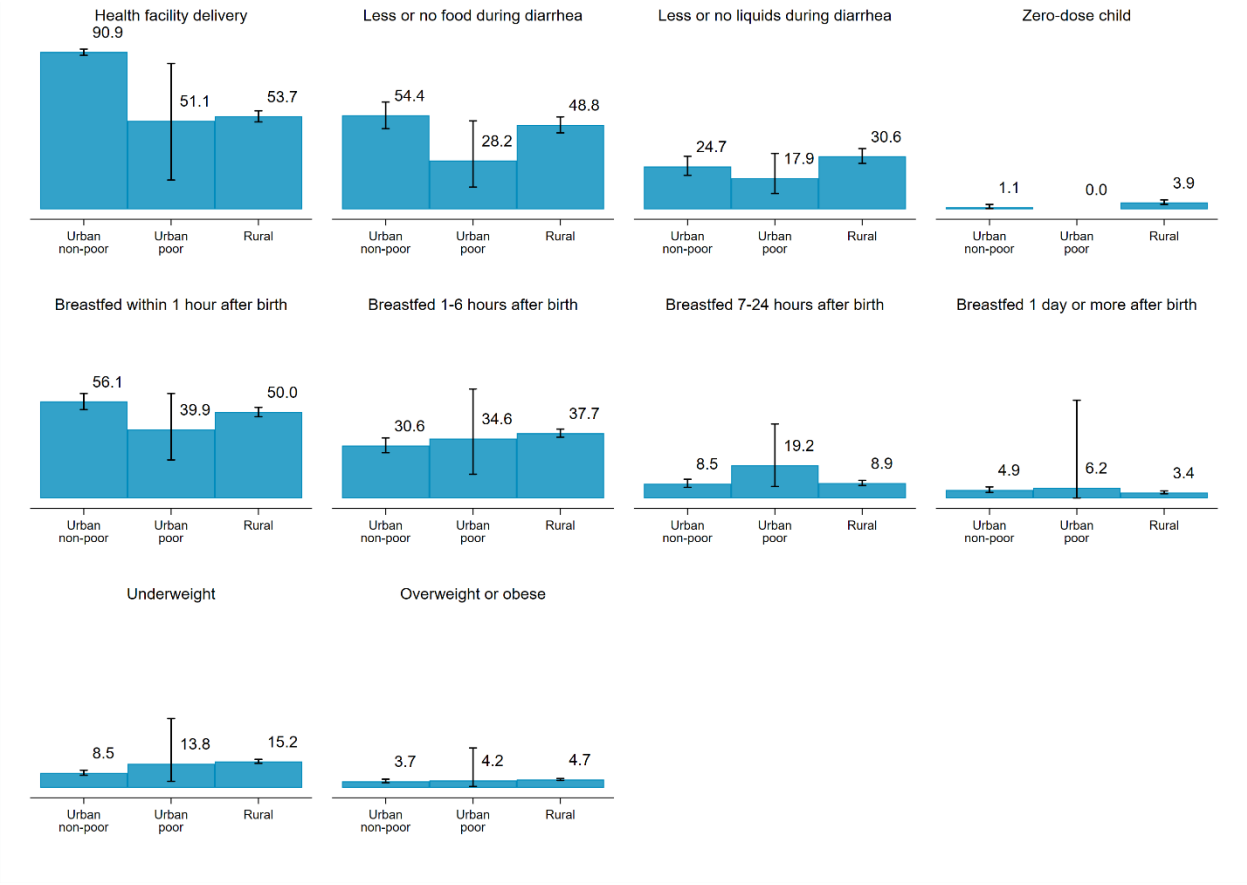


Figure 21 summarizes the crosstabulation results with the urban poverty variable in Tanzania. We observe a very large disparity in the health facility delivery with the lowest percentage among urban poor (51%) and rural women (54%). Urban non-poor have the highest percentage (91%) of health facility delivery among the three groups. Since there were no cases of zero-dose children among the urban poor in Tanzania, this group cannot be compared to the urban non-poor. The differences in all remaining child health indicators between urban poor and urban non-poor were not significant and had overlapping confidence intervals (as shown in Appendix Table 12). The wide confidence intervals observed in Figure 21 among the urban poor is due to the low number of observations in this category. As shown in Figure 1, Tanzania had the lowest percentage of urban poor among the countries in the analysis.

Figure 21 Crosstabulation of each outcome with the urban poverty variable, Tanzania



Appendix Table 13 summarizes the unadjusted and adjusted regression results for each outcome. Figure 22 summarizes the adjusted regression results for the urban poverty variable. Urban poor had significant differences compared to urban non-poor for health facility delivery, feeding children less or no food during diarrhea, and breastfeeding within 1 hour and breastfeeding 7 to 24 hours after birth indicators. In all cases, there was significance in both the unadjusted and adjusted regression models. The largest disparities between urban poor and urban non-poor were found for the health facility delivery and breastfeeding indicators. Urban poor children had 90% lower odds ($\beta = -1.9$, $OR = 0.1$, $p < .001$) of being delivered in a health facility compared to urban non-poor children. In the other direction, urban poor children had approximately twice the odds of being breastfed 7 to 24 hours after birth ($\beta = 0.8$, $OR = 2.2$, $p < 0.01$) compared to urban non-poor children. Looking at breastfeeding indicators within 1 hour after birth, urban poor children had 40% lower odds compared to urban non-poor ($\beta = -0.5$, $OR = 0.6$, $p < .05$). The last statistically significant outcome was children receiving less or no food during diarrhea, where the urban poor had 70% lower odds compared to the urban non-poor ($\beta = -1.2$, $OR = 0.3$, $p < .05$). None of the other indicators had statistically significant differences between the urban poor and non-poor.

- Urban poor children had 90% lower odds of being delivered in a health facility compared to urban non-poor children.
- Looking at breastfeeding indicators within 1 hour after birth, urban poor children had 40% lower odds compared to urban non-poor.

Figure 22 **Adjusted coefficients for the urban poverty variable from the logit regression for each outcome, Tanzania, urban non-poor is the reference**

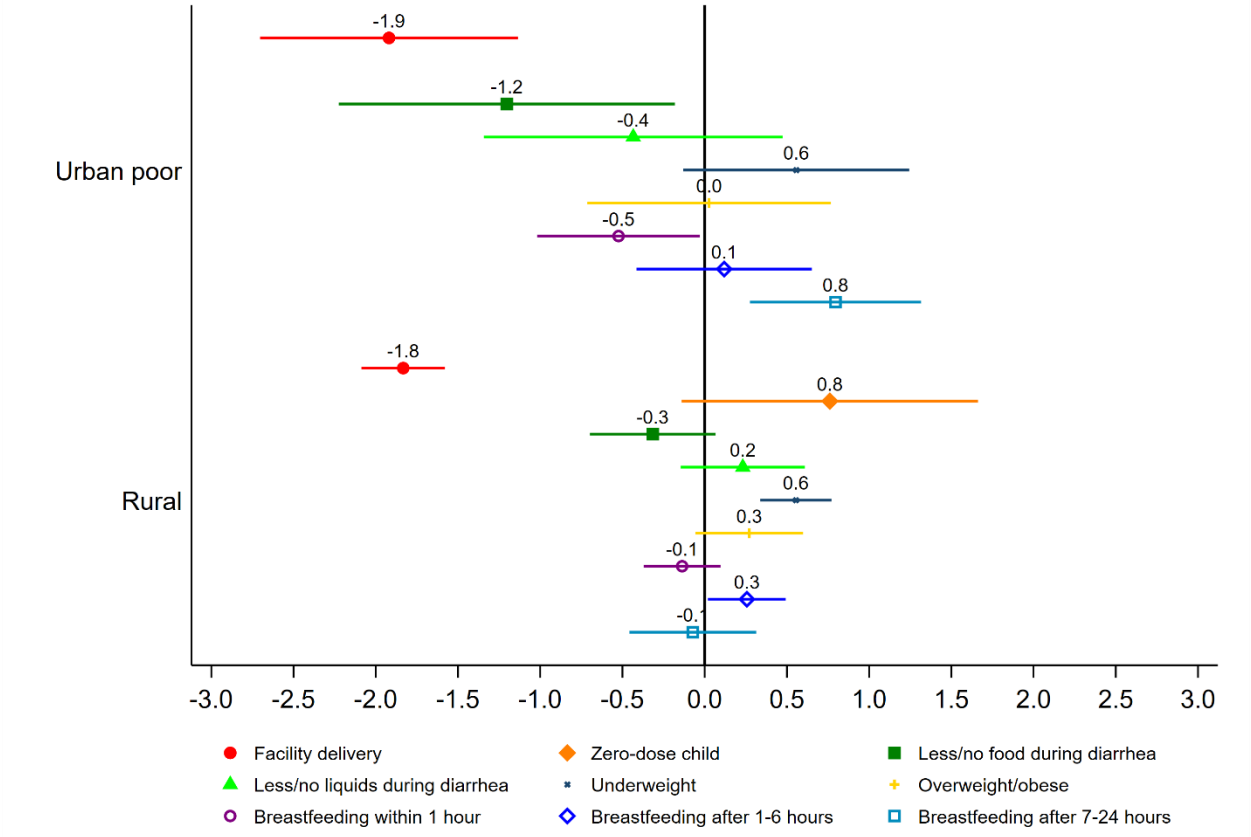


Table 7 shows the percentage distribution of children under age 5 within each urban poverty category by mother's characteristics, mother's problems accessing health care, and availability of health facilities in Tanzania. The results indicate that the urban poor children have a lower percentage of mothers with secondary or higher education compared to urban non-poor children and even lower than the total population. Urban poor children also have a lower percentage of working mothers with cash earnings compared to the urban non-poor.

Among the variables that measure problems accessing health care, the largest gap between urban poor and urban non-poor was in mothers having problems in obtaining money needed for treatment and permission to seek care. There was also a disparity between urban poor and urban non-poor children in the availably of health facilities within 5 km. Only 12% of urban poor children had at least one public hospital within 5 km compared with 70% for urban non-poor. This disparity was also seen for private hospitals, with 4% of urban poor children having at least one private hospital within 5 km compared with 34% in the urban non-poor, although these confidence intervals slightly overlap and are very wide for both estimates. There was slightly more equitable availability of public non-hospitals between urban poor and urban non-poor children with 67% of urban poor children having at least two non-hospitals nearby compared with 84% of urban non-poor children, although the confidence intervals of these estimates also overlap. Large disparities were also seen in the distribution of private non-hospitals, with only 7% of urban poor children having access to at least two private non-hospitals within 5 km compared with 66% of the urban non-poor children. It is also important to note the very large disparity among the rural children that have a much lower availability of any type of health facility, public or private, hospital or non-hospital, within 5 km compared to urban children.

Only 12% of urban poor children had at least one public hospital within 5 km compared to 70% for urban non-poor. This disparity was also seen for private hospitals, with 4% of urban poor children having at least one private hospital within 5 km compared to 34% in the urban non-poor.

Table 7 Percentage distribution of children under age 5 by mother's characteristics, mother's problems accessing care, and availability of health facilities within each urban poverty category, Tanzania

	Urban non-poor		Urban poor		Rural		Total		
	%	95 CI	%	95 CI	%	95 CI	%	95 CI	*p* value
Mother's characteristics									
Education									<.001
None	7.5	[5.8,9.7]	23.1	[18.4,28.6]	25.3	[22.9,27.8]	20.9	[19.1,22.9]	
Primary	59.6	[56.1,63.0]	69.9	[64.3,75.0]	66.3	[64.0,68.6]	64.8	[62.9,66.7]	
Secondary+	32.9	[29.4,36.6]	7.0	[3.7,12.7]	8.4	[7.4,9.6]	14.2	[13.0,15.6]	
Type of earning									<.001
Not working	30.5	[27.3,33.8]	35.5	[16.4,60.7]	17.7	[16.1,19.4]	21.3	[19.6,23.2]	
Not paid	7.1	[5.4,9.3]	28.5	[11.9,54.1]	45.3	[42.9,47.6]	35.6	[33.5,37.7]	
Cash only	59.0	[55.3,62.6]	31.3	[22.8,41.2]	27.5	[25.5,29.6]	35.2	[33.3,37.1]	
Cash and in-kind	3.0	[2.2,4.3]	3.8	[1.1,12.1]	8.6	[7.4,10.0]	7.1	[6.2,8.2]	
In-kind only	0.3	[0.1,0.9]	0.9	[0.3,3.0]	0.9	[0.6,1.4]	0.8	[0.5,1.1]	
Problems accessing health care, big problem in:									
Getting permission to go	13.9	[11.9,16.3]	21.9	[17.0,27.9]	13.8	[12.4,15.4]	14.1	[12.9,15.4]	.027
Getting money needed for treatment	44.7	[40.8,48.6]	53.7	[47.3,59.9]	56.3	[54.0,58.6]	53.4	[51.5,55.3]	<.001
Distance to health facility	33.1	[29.4,37.0]	35.7	[24.6,48.5]	51.9	[48.7,55.1]	46.9	[44.3,49.5]	<.001
Not wanting to go alone	24.4	[21.1,28.0]	23.6	[18.0,30.4]	33.9	[31.3,36.6]	31.3	[29.2,33.5]	<.001
At least one problem	58.5	[54.5,62.5]	61.4	[54.9,67.5]	73.8	[71.5,75.9]	69.7	[67.8,71.6]	<.001
Availability of health facilities within 5 km									
Hospitals									
At least one public hospital	70.1	[60.9,78.0]	12.4	[1.4,59.0]	3.1	[1.6,5.7]	19.5	[16.7,22.6]	<.001
At least one private hospital	33.8	[26.0,42.7]	4.0	[0.5,26.7]	2.3	[1.2,4.5]	10.0	[7.8,12.6]	<.001
Non-hospitals									
At least two public non-hospitals	83.7	[77.2,88.6]	66.9	[27.4,91.5]	31.6	[26.6,37.1]	45.2	[40.7,49.8]	<.001
At least two private non-hospitals	65.8	[57.7,73.0]	6.6	[1.3,27.7]	3.7	[2.2,6.0]	18.7	[16.1,21.6]	<.001

3.7 Uganda

Figure 23 and Appendix Table 3 show that Uganda had the second highest percentage of health facility delivery of children born in the last 5 years among the countries in the analysis after DRC. Just under three-quarters (73%) of births were delivered in a health facility. Most births (57%) were in public health facilities. Over half (58%) of children with diarrhea symptoms were given less or no food and 46% were given less or no liquids. Along with Kenya and Tanzania, Uganda also had a low percentage (5%) zero-dose children age 12 to 23 months compared to the other countries in the analysis. Along with Kenya, Uganda had the lowest percentage of underweight children compared to other countries in this analysis with only 11% of children under age 5 found to be underweight for their age. Approximately 4% of children in Uganda under age 5 were found to be overweight or obese for their height. Two-thirds of last-born children under age 2 were breastfed within 1 hour after birth and a further 26% between 1 to 6 hours after birth.

Figure 23 Distribution of the child health indicators, Uganda

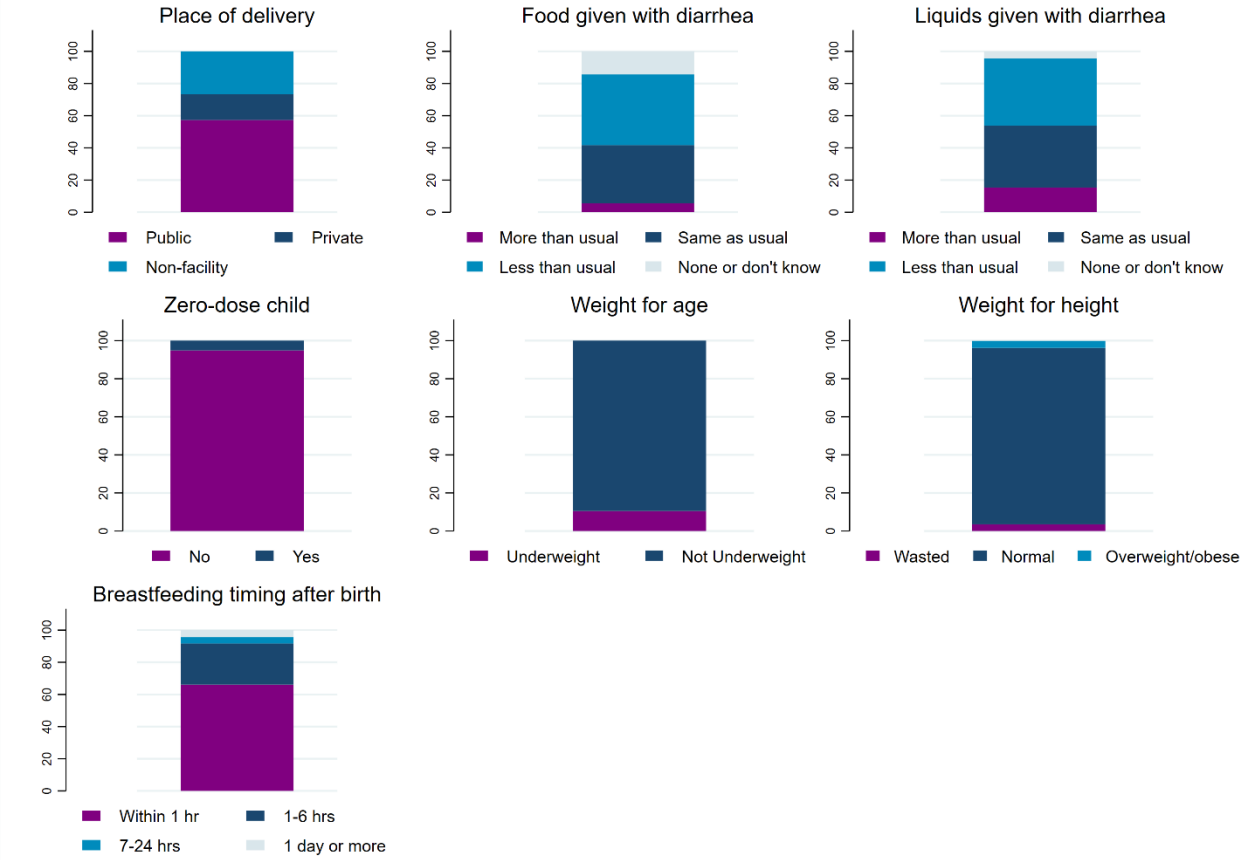


Figure 24 summarizes the crosstabulation results with the urban poverty variable in Uganda. We observe disparities in health facility delivery with lower percentages among rural (70%) and urban poor (78%) compared with urban non-poor (91%). The only remaining outcome with large and significant differences by urban poverty was underweight among children under age 5. Approximately 13% of urban poor children were underweight compared with 5% for urban non-poor. This was also relatively high among rural children with over 1 in 10 being underweight. The differences in the remaining indicators between urban poor and urban non-poor were not significant and had overlapping confidence intervals (as shown in Appendix Table 14).

Figure 24 Crosstabulation of each outcome with the urban poverty variable, Uganda

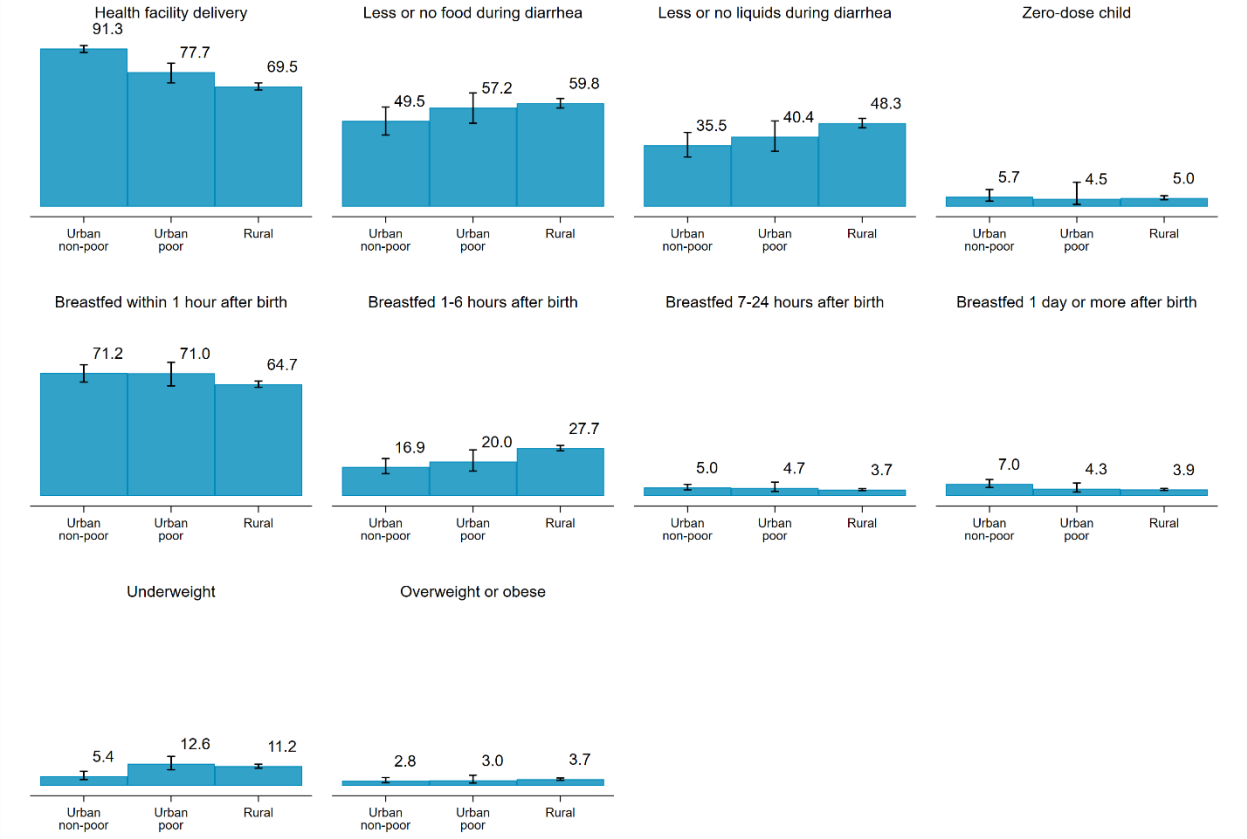


Figure 25 and Appendix Table 15 summarize the regression results in Uganda. Urban poor children had 50% lower odds of being delivered in a health facility compared to urban non-poor ($\beta = -0.7$, $OR = 0.5$, $p < 0.01$). In Appendix Table 15, we see that urban poor children had significantly higher odds of being underweight in the unadjusted and adjusted models ($\beta = 0.7$, $OR = 2.1$, $p < 0.05$). As shown in Figure 25 and Appendix Table 15, urban poverty was not significantly associated with either diarrhea indicators, zero-dose children, or any of the breastfeeding timing indicators in the unadjusted and adjusted models.

- Urban poor children had 50% lower odds of being delivered in a health facility compared to urban non-poor.
- In Appendix Table 15, we see that urban poor children had significantly higher odds of being underweight in the unadjusted and adjusted models.

Figure 25 Adjusted coefficients for the urban poverty variable from the logit regression for each outcome, Uganda (urban non-poor is the reference)

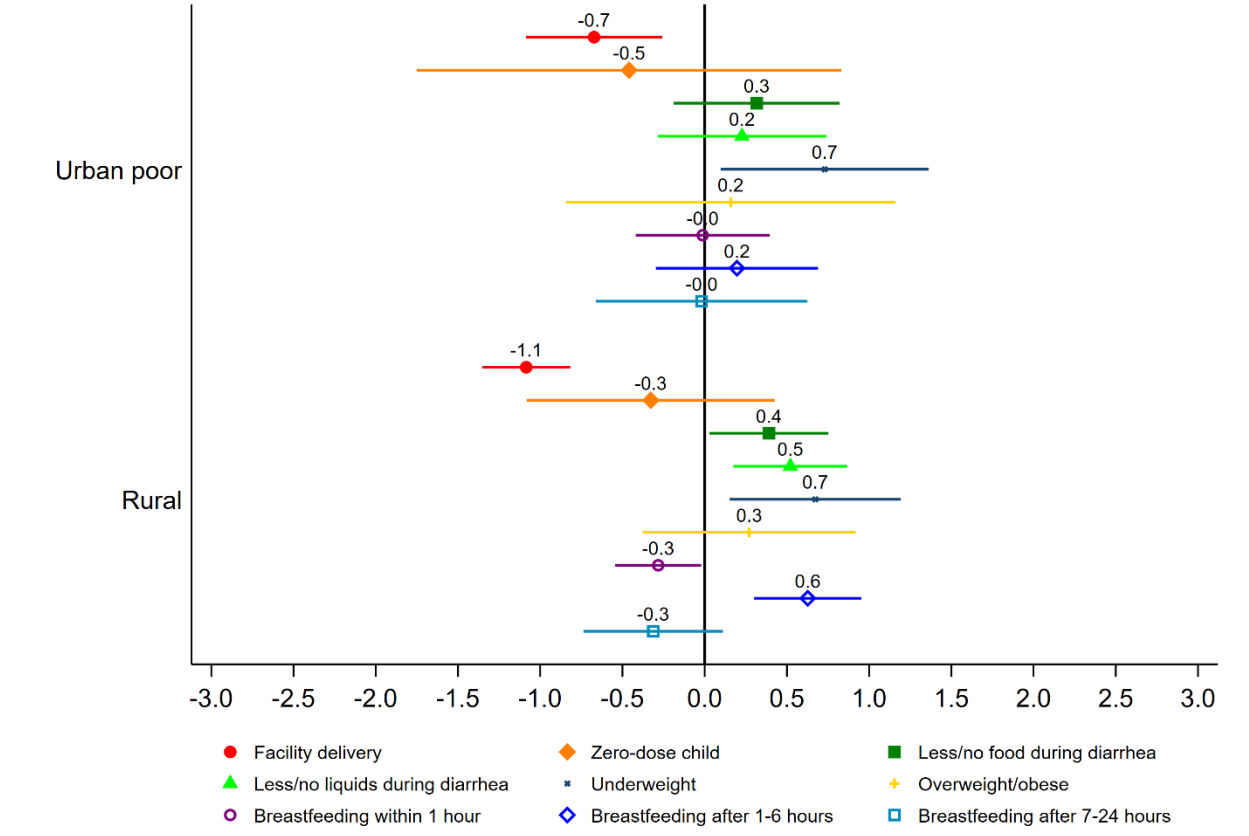


Table 8 shows large disparities among children under age 5 in their mother's education by poverty status. Among urban poor mothers, 23% had secondary or higher education compared with 64% among urban non-poor. Mothers in urban poor areas were also less likely to have cash earnings and had a higher percentage of being unpaid compared to urban non-poor mothers. Mothers of the Baganda, Banyoro, and Iteso ethnicity were less likely to be among the urban poor population compared to the urban non-poor, while mothers of the Banyankore ethnicity were more likely to be among the urban poor population compared to the urban non-poor. More urban poor mothers reported problems in accessing health care for themselves due to permissions, money, and distance compared to urban non-poor. Availability of health facilities was much lower among the urban poor compared to urban non-poor. Only 13% of urban poor children had at least one public hospital available within 5 km compared with 47% of urban non-poor children; this was only 5% for rural children. Similarly, only 4% of urban poor children had at least one private hospital available within 5 km compared with 53% among urban non-poor (as shown in Table 8). Accessibility to non-hospital facilities was also much higher among the urban non-poor (as shown in the table).

Only 13% of urban poor children had at least one public hospital available within 5 km compared to 47% of urban non-poor children; this was only 5% for rural children. Similarly, only 4% of urban poor children had at least one private hospital available within 5 km compared to 53% among urban non-poor.

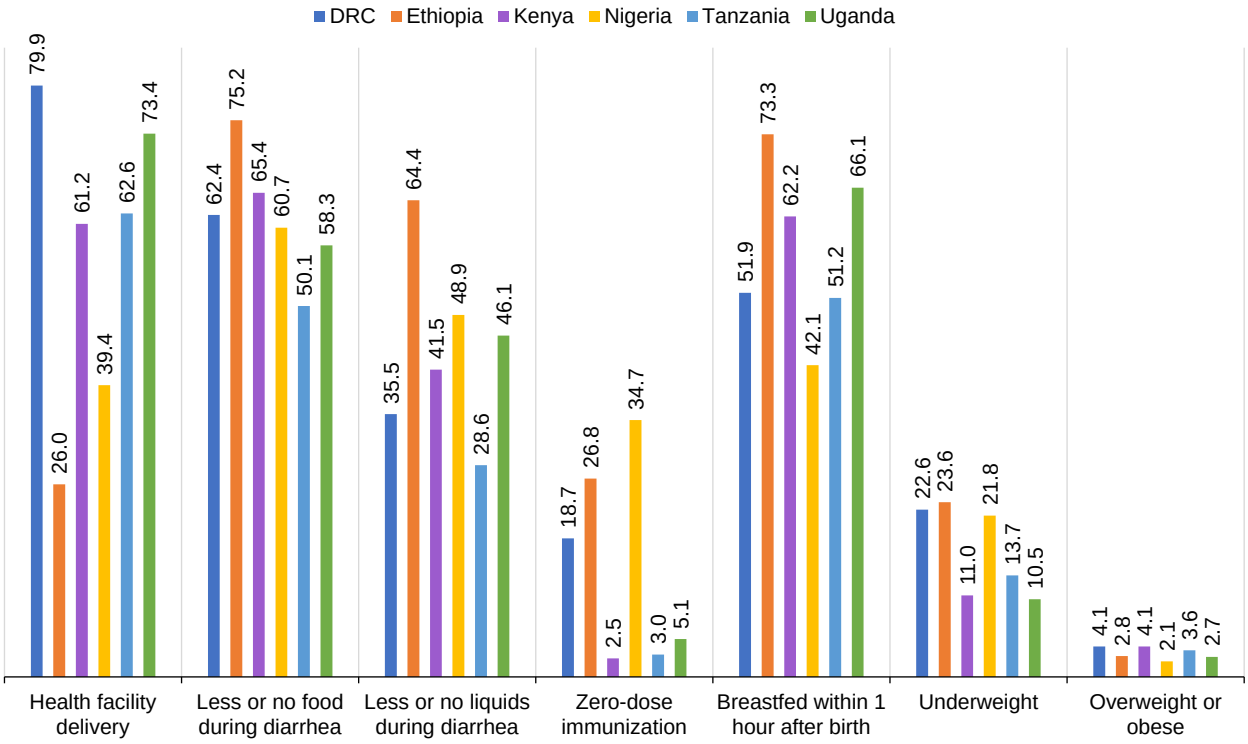
Table 8 Percentage distribution of children under age 5 by mother's characteristics, mother's problems accessing care, and availability of health facilities within each urban poverty category, Uganda

	Urban non-poor		Urban poor		Rural		Total		
	%	95 CI	%	95 CI	%	95 CI	%	95 CI	*p* value
Mother's characteristics									
Education									<.001
None	2.9	[1.9,4.6]	15.8	[8.8,26.7]	12.3	[11.2,13.4]	11.0	[10.0,12.1]	
Primary	32.8	[28.8,37.1]	61.5	[54.3,68.1]	67.2	[65.5,68.9]	61.5	[59.8,63.2]	
Secondary+	64.3	[59.9,68.4]	22.7	[18.3,27.9]	20.5	[18.9,22.2]	27.5	[25.8,29.3]	
Type of earning									<.001
Not working	35.8	[32.4,39.5]	17.2	[13.4,21.9]	18.8	[17.3,20.4]	21.4	[20.1,22.8]	
Not paid	3.1	[1.9,5.0]	20.2	[14.6,27.3]	19.6	[18.1,21.1]	17.0	[15.8,18.3]	
Cash only	50.9	[47.5,54.4]	35.9	[30.1,42.0]	33.3	[31.5,35.2]	36.2	[34.6,37.9]	
Cash and in-kind	9.2	[7.0,12.0]	24.9	[18.4,32.9]	24.5	[22.8,26.3]	22.1	[20.7,23.7]	
In-kind only	0.9	[0.4,2.2]	1.8	[0.9,3.6]	3.8	[3.3,4.4]	3.2	[2.8,3.7]	
Ethnicity									<.001
Acholi	2.8	[1.4,5.6]	8.5	[3.8,18.0]	4.7	[4.1,5.4]	4.6	[4.1,5.3]	
Alur	0.8	[0.4,1.6]	1.7	[0.3,7.7]	3.6	[2.3,5.6]	3.1	[2.0,4.6]	
Baganda	38.4	[32.4,44.8]	5.2	[2.3,11.5]	10.2	[8.8,11.9]	14.4	[12.8,16.1]	
Bagisu	4.7	[3.1,7.1]	9.7	[5.1,17.6]	4.8	[4.0,5.8]	5.1	[4.4,5.9]	
Bakiga	2.6	[1.6,4.2]	7.4	[3.5,14.8]	7.6	[6.2,9.4]	6.8	[5.7,8.2]	
Bakonzo	2.5	[0.9,6.9]	1.1	[0.2,6.1]	2.9	[1.8,4.6]	2.7	[1.8,4.1]	
Banyankore	9.7	[6.7,13.8]	23.4	[15.9,33.1]	9.5	[8.0,11.2]	10.3	[9.0,11.7]	
Banyoro	4.2	[3.0,5.7]	0.3	[0.0,1.9]	2.7	[2.0,3.8]	2.8	[2.2,3.6]	
Basoga	9.1	[7.0,11.6]	2.0	[0.5,7.8]	8.6	[7.2,10.2]	8.3	[7.1,9.6]	
Batoro	2.8	[1.4,5.4]	7.0	[2.9,16.1]	2.3	[1.6,3.4]	2.7	[2.0,3.6]	
Iteso	5.4	[3.4,8.4]	0.2	[0.0,0.8]	9.0	[7.6,10.7]	8.0	[6.8,9.4]	
Lango	1.2	[0.6,2.8]	4.2	[1.8,9.7]	6.2	[5.4,7.1]	5.3	[4.7,6.0]	
Lugbara	2.4	[1.0,5.6]	1.3	[0.5,3.7]	3.1	[2.2,4.3]	2.9	[2.1,3.9]	
Other	13.4	[10.9,16.4]	28.1	[18.2,40.7]	24.5	[22.2,27.1]	23.0	[21.0,25.1]	
Problems accessing health care, big problem in:									
Getting permission to go	2.7	[1.9,3.8]	5.5	[3.4,8.8]	6.0	[5.3,6.8]	5.4	[4.8,6.1]	<.001
Getting money needed for treatment	31.8	[28.5,35.4]	55.5	[47.8,62.9]	50.0	[48.4,51.6]	47.5	[46.1,48.9]	<.001
Distance to health facility	17.6	[14.1,21.7]	32.2	[25.2,40.0]	46.2	[44.1,48.4]	41.0	[39.0,42.9]	<.001
Not wanting to go alone	12.7	[10.5,15.3]	16.7	[12.1,22.7]	23.8	[22.4,25.2]	21.7	[20.5,22.9]	<.001
At least one problem	41.8	[37.5,46.2]	63.5	[55.8,70.5]	65.6	[63.9,67.3]	61.7	[60.2,63.3]	<.001
Availability of health facilities within 5 km									
Hospitals									
At least one public hospital	47.3	[37.1,57.7]	12.8	[5.9,25.7]	4.5	[2.8,6.9]	11.6	[9.4,14.3]	<.001
At least one private hospital	52.6	[42.0,62.9]	3.5	[0.5,21.6]	3.5	[2.2,5.4]	11.2	[9.1,13.7]	<.001
Non-hospitals									
At least two public non-hospitals	93.8	[86.1,97.4]	41.4	[26.3,58.3]	51.9	[47.0,56.7]	57.9	[53.8,62.0]	<.001
At least two private non-hospitals	75.3	[65.3,83.2]	21.8	[11.2,38.0]	11.6	[8.8,15.1]	22.1	[19.0,25.6]	<.001

3.8 Summary

Figure 26 shows a summary of the distribution of the child health indicators for all countries in the analysis. Except for the overweight or obese outcome, which ranged between 2–4% for all countries, we see very different levels in the remaining indicators. Health facility delivery ranged from a low of 25% in Ethiopia to 80% in DRC. However, this was above 60% in four of the six countries. Almost 50% or more of children with diarrhea symptoms received less or no foods during diarrhea; this ranged from a low of 50% in Tanzania to a high of 75% in Ethiopia. Approximately 30% or more of children with diarrhea symptoms received less or no liquids during diarrhea; this ranged from 29% in Tanzania to 64% in Ethiopia. The percentage of zero-dose children age 12 to 23 months differed greatly by the countries in the analysis. This was 5% or less for Kenya, Tanzania, and Uganda, but reached 35% in Nigeria. In all countries except Nigeria, more than half of children under age 2 were breastfed within 1 hour after birth; this ranged from 42% in Nigeria to 73% in Ethiopia. In DRC, Ethiopia, and Nigeria, approximately one in five children under age 5 were underweight, and for the remaining countries, between 11% and 14%.

Figure 26 Description of child health indicators for the countries in the analysis



Note: Only the breastfed within 1 hour outcome is shown in this figure.

In Figure 1, we compared the distribution of the urban poverty variable for all countries in the analysis among the analytical sample of all children under age 5 including rural children. In Figure 27, we compare only the urban poor category across the countries in the analysis for the entire sample as in Figure 1 and among urban areas. This figure highlights the magnitude of the urban poor within urban areas. As shown in the figure, Kenya and DRC had the highest levels of urban poor (18% and 16% respectively) among the population. In addition, approximately half of urban children under age 5 in these two countries are living in urban poor areas. In Ethiopia, while 8% of the children under age 5 live in urban poor areas among the population, approximately 70% of urban children are urban poor. Ethiopia and Nigeria had similar levels of urban poor (8%) among the population, but very different levels of urban poor within urban areas. This is partially due to the large percentage of rural areas in Ethiopia (as shown in Figure 1). Tanzania had the lowest percentages of urban poor overall and within urban areas.

Figure 27 Percentage of urban poor for the countries in the analysis

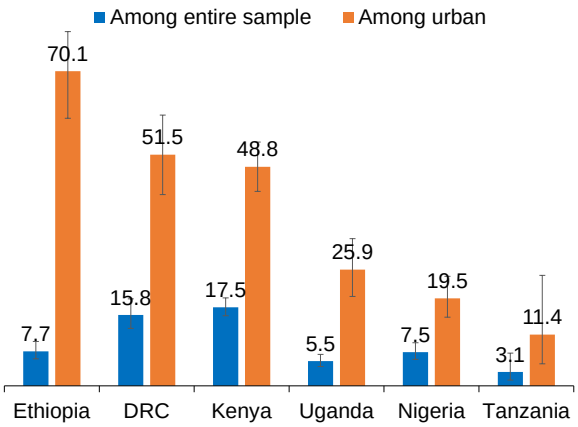


Table 9 summarizes the adjusted regression results for the urban poverty variable for all countries in the analysis. The table shows the estimates for the significant findings. The two indicators found to be consistently significant with urban poverty were health facility delivery and underweight. For all countries, urban poor and rural children were less likely to be delivered in a health facility compared to urban non-poor. For some countries, the disparities were very large. For example, in DRC and Tanzania, urban poor children had 0.20 (80%) and 0.15 (85%) lower odds, respectively, of being delivered in a health facility compared to urban non-poor. For the remaining countries, this was between approximately 0.35 (65%) and 0.59 (41%) lower odds. The disparities between rural children and urban non-poor are even greater with rural children in DRC and Ethiopia having more than 95% lower odds of being delivered in a health facility.

Urban poor children were more likely to be underweight compared to urban non-poor children in all countries except for Tanzania. The disparities were larger for some countries than for others. For example, in DRC, Ethiopia, and Uganda, urban poor children had approximately twice the odds of being underweight compared to urban non-poor children.

- The two indicators found to be consistently significant with urban poverty were health facility delivery and underweight. For all countries, urban poor and rural children were less likely to be delivered in a health facility compared to urban non-poor. For some countries, the disparities were very large.
- Urban poor children were more likely to be underweight compared to urban non-poor children in all countries except for Tanzania. The disparities were larger for some countries than for others.
- While urban poor were significantly more likely to have zero-dose children compared to urban non-poor only in DRC and Ethiopia, the disparities were very large.

Rural children had even higher disparities in underweight compared to urban non-poor, which reached approximately three times higher odds in Ethiopia. We do not observe the same consistency for the overweight or obese outcome as the underweight outcome. Only in Ethiopia and Nigeria do we observe almost twice the odds of being overweight or obese for urban poor children compared to urban non-poor. This was not significant among rural children in Ethiopia.

While urban poor were significantly more likely to have zero-dose children compared to urban non-poor only in DRC and Ethiopia, the disparities were very large. For both countries, urban poor children had approximately 6 times higher odds of having zero-dose children compared to urban non-poor. For rural children, this was more than 10 times higher odds compared to urban non-poor.

Only in DRC did we observe higher (*OR* = 1.6) odds of less or no food given among urban poor children with diarrhea compared to urban non-poor children. This was also similar to the disparity between rural and urban non-poor. In Tanzania, urban poor children were less likely (*OR* = 0.3) to be given less or no food during diarrhea compared to urban non-poor. Urban poor children in DRC and Kenya had approximately 1.7 times the odds of being given less or no liquids during diarrhea compared to urban non-poor children.

Only DRC and Tanzania showed significant findings for the breastfeeding timing indicators. In both countries, urban poor children under age 2 had approximately 0.6 lower odds of being breastfed within 1 hour after birth compared to the urban non-poor children. In DRC, urban poor children had a higher odds of being breastfed at later times compared to urban non-poor children, and this was significantly higher in Tanzania for being breastfed 7 to 24 hours after birth.

Table 9 Summary of adjusted regression results (significant odds ratios) of the urban poverty variable for all the countries in the analysis

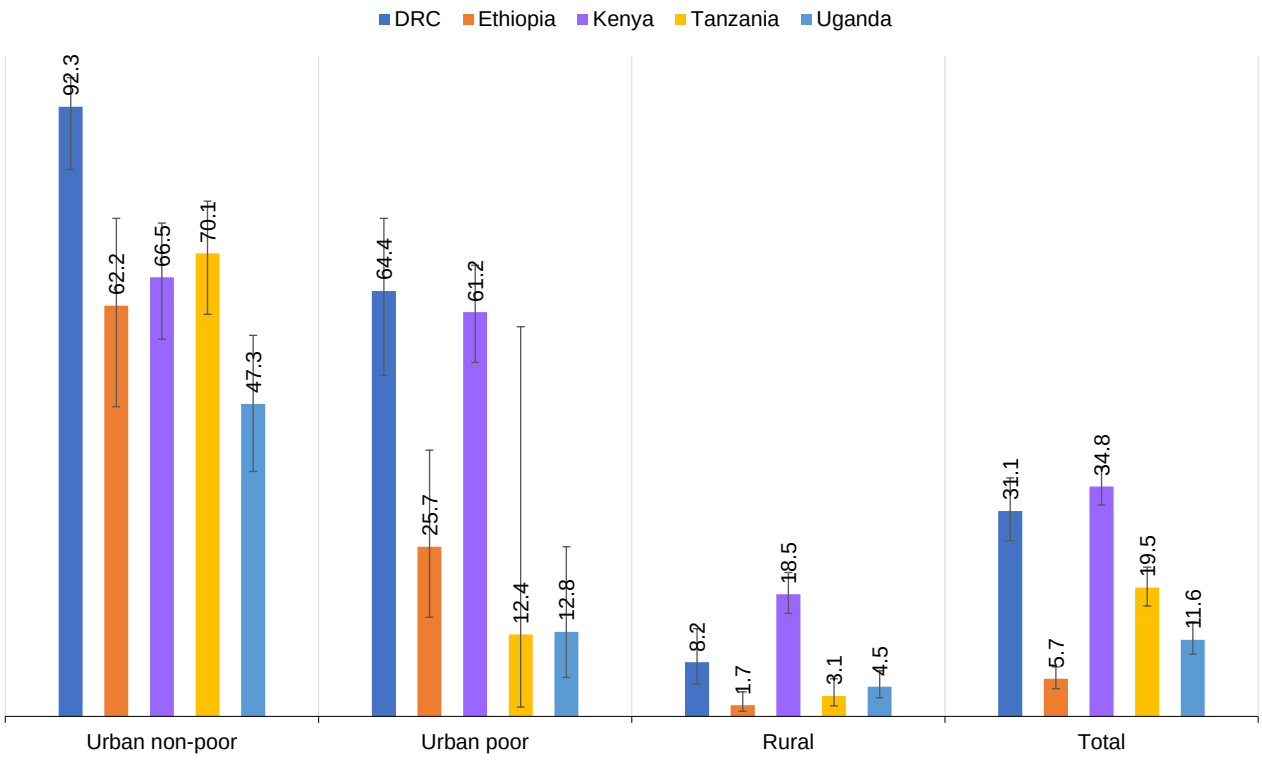
Urban poor	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	Within 1 hour after birth	1–6 hours after birth	7–24 hours after birth	Underweight	Overweight or obese
DRC	0.20	1.63	1.73	6.17	0.60	1.49	1.51	1.88	
Ethiopia	0.35			5.70				2.32	1.90
Kenya	0.59		1.79					1.51	
Nigeria	0.45							1.38	1.80
Tanzania	0.15	0.30			0.59		2.23		
Uganda	0.51							2.08	

Rural	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	Within 1 hour after birth	1–6 hours after birth	7–24 hours after birth	Underweight	Overweight or obese
DRC	0.09	1.62	1.90	10.38				2.69	1.92
Ethiopia	0.05			13.74				2.97	
Kenya	0.23		2.18					2.01	
Nigeria	0.36			1.79	0.76	1.31		1.42	1.39
Tanzania	0.16					1.30		1.73	
Uganda	0.34	1.48	1.68		0.76	1.88		1.95	

Tables 2–7 summarize the percentage distribution of children under age 5 for all countries by mother's characteristics, mother's problems accessing health care, and availability of health facilities within each category of the urban poverty variable. The results indicate that in general, urban poor mothers had lower education and cash earnings, and had greater problems accessing health care for themselves, especially due to distance and money. We also observed lower availability of health facilities among urban poor children compared to urban non-poor children. This is also illustrated in Figures 28 and 29 for all countries for comparison. Figure 28 shows the availability of at least one public hospital within 5 km and Figure 29 shows the availability of at least two public non-hospitals within 5 km. Figure 28 shows that overall, the availability of public hospitals within 5 km is not high in these countries and ranged from 6% total in Ethiopia to 35% in Kenya. There is lower availability of public hospitals for urban poor children compared to urban non-poor children, although this difference may not be significant in Kenya and Tanzania due to overlapping confidence intervals.

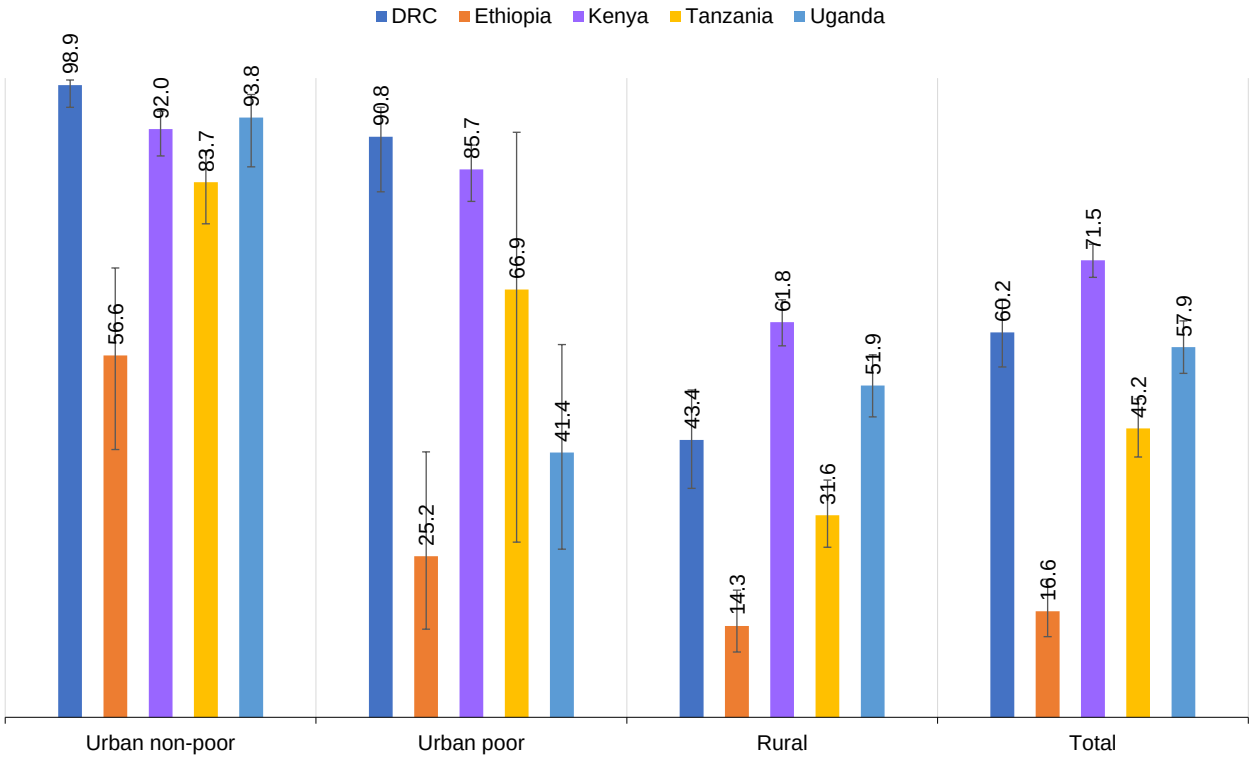
The results indicate that in general, urban poor mothers had lower education and cash earnings, and had greater problems accessing health care for themselves, especially due to distance and money. We also observed lower availability of health facilities among urban poor children compared to urban non-poor children.

Figure 28 Availability of at least one public hospital within 5 km



As expected, there are more non-hospital facilities available. However, as shown in Figure 29, this number is still relatively low for a few countries. In Ethiopia, only 17% of children had access to at least two non-hospitals within 5 km. This was also relatively low in Tanzania at 45% and was over 50% in the remaining countries. Urban poor children had lower access to non-hospital facilities, although this was not significantly different in Tanzania.

Figure 29 Availability of at least two public non-hospitals within 5 km



DISCUSSION

The analysis in this report has highlighted the disparities between urban poor and urban non-poor for a selection of child health indicators. Some findings were more consistent across the countries than others, but even for the country-specific findings, we observe large disparities within urban areas. As the world's population continues to grow, urban populations are also expected to grow and reach an estimated two-thirds of the world's population in 2050 with even higher rates in LMICs (Cyril, Oldroyd, and Renzaho 2013; DESA 2018; World Health Organization and UN-Habitat 2016). Without addressing the disparities discussed in this report, these within-urban inequalities could grow further and become less manageable.

Some findings were more consistent across the countries than others, but even for the country-specific findings, we observe large disparities within urban areas.

One of the main findings observed across all countries is lower health facility delivery among urban poor compared to the urban non-poor. As expected, we found much lower health facility delivery among rural births compared to urban non-poor. The rural/urban disparity in health facility delivery, with higher rates in urban areas, has been documented in the literature (Doctor, Nkhana-Salimu, and Abdulsalam-Anibilowo 2018; Moyer and Mustafa 2013). However, this is one of the few studies underscoring urban disparities in health facility delivery across several countries. Women may face several obstacles to delivering in a health facility from both the demand and supply side, and this can include awareness, affordability, access, availability of health facilities and skilled birth attendants, and quality of care (Ensor and Cooper 2004). Further analysis of the urban poverty variable among children has shown less availability of nearby hospitals among urban poor compared to urban non-poor. Low levels of health facility delivery overall in Ethiopia and Nigeria reflect the poor healthcare infrastructure, which has created a challenging environment for service delivery and access (Assefa et al. 2017; Kruk et al. 2010; Olonade et al. 2019).

The analysis has shown higher rates of urban poor women reporting problems accessing care due to distance and money compared to the urban non-poor women. This has also been found in a study among slum residents in Nairobi, Kenya, which found difficulties in affordability of transportation, which indicated access can be a major concern for urban poor residents (Salon and Gulyani 2010). While certain countries have eliminated delivery costs in public facilities such as Kenya, Tanzania, and Uganda (Dzakpasu, Powell-Jackson, and Campbell 2014; Gitobu, Gichangi, and Mwanda 2018; Konje et al. 2020; Masaba and Mmusi-Phetoe 2020), this may not actually be enforced at health facilities and there may be other costs associated with delivery in a health facility.

Lack of awareness and education on the importance of health facility delivery is another factor. In the regression results found in the Appendix tables, we observe that health facility delivery increases with increasing level of education. Lower rates of ANC visits among urban poor (Assaf and Juan 2020b) also contribute to lower health facility delivery (Moyer and Mustafa 2013). Antenatal care attendance has been shown to be an important intervention to increase health facility delivery (Berhan and Berhan 2014). Another issue may be the quality of care provided in health facilities. For example, in Nigeria, only 4.2% of public facilities have demonstrated internationally acceptable standards for obstetric care (Olonade et al. 2019). It is possible that perceived low quality of care at facilities discourages women from facility

deliveries, as noted in both the Kenyan and Tanzanian contexts (Izugbara, Kabiru, and Zulu 2009; Konje et al. 2020). In summary, there are many factors that contribute to lower facility delivery among the urban poor. Programs that target improvements in health facility delivery would need to consider these factors and include a multifactor approach that considers access, quality, and women's socioeconomic status.

We also found that urban poor children experience higher rates of underweight compared to their urban non-poor counterparts for all the countries in the analysis except one. In the literature, several variables are directly linked to urban poverty, such as household wealth and lack of access to improved water and sanitation, and are found to be significantly associated with underweight in children (Akombi et al. 2017). In addition, children who have had repeated episodes of diarrhea, which is linked to lack of access to improved water and sanitation, are more likely to be underweight (Akombi et al. 2017). Poor infrastructure and sanitation, a characteristic of urban poor areas, promote diseases that can lead to higher malnutrition and poor health outcomes (Almeida, Cota, and Rodrigues 2020). In addition, urban poor areas have lower access to nutritious foods, lower food diversity, and higher food insecurity compared to the urban non-poor, and high household crowding among urban poor also indicates less availability of foods for all household members (Akter 2009; Kimani-Murage et al. 2014; Mohiddin, Phelps, and Walters 2012; Vilar-Compte et al. 2021a).

Our results also show evidence of a double burden of underweight and overweight children in urban poor areas of Ethiopia and Nigeria. Increased overweight among urban poor children can also be attributed to a lack of nutritious food and greater availability of unhealthy and energy dense foods that are more affordable (Mudogo 2017; Vilar-Compte et al. 2021b). Previous research notes a lack of policy across Sub-Saharan Africa that focuses on the whole spectrum of malnutrition from underweight to overweight, especially for urban poor women and children (Mudogo 2017). While we found even larger disparities in underweight between rural and urban non-poor, food programs should not focus only on the rural areas and should not implement the same programs designed for rural areas and farmers for the urban poor. For example, USAID has six active nutrition projects in DRC, but these are focused primarily on farmers and rural areas (USAID 2021). Moreover, interventions that target urban poor populations should be multifaceted and focus not only on improving nutritional status, but also on the safety and sanitation of the surrounding environment. As an example, the ongoing Effective Water, Sanitation, and Hygiene Services in Nigeria (E-WASH), in partnership with USAID, aims to provide three million urban poor Nigerians with access to clean, piped water, which will improve the built environment of urban poor areas while reducing both infectious disease and malnutrition (USAID 2022).

Urban poor children were less likely to be immunized compared to urban non-poor in only two countries, DRC and Ethiopia. However, in these countries the disparities were very large. While no previous studies have looked at intra-urban differences in immunization rates, previous evidence shows large urban-rural disparities, as well as household wealth disparities, in immunization rates (Cata-Preta et al. 2021). In addition, research among urban poor populations has found mistrust for government health facilities, as well as lack of access to or long wait times at facilities (Crocker-Buque et al. 2017; JSI 2022; Mekonnen, et al. 2021). This aligns with our findings of lower availability of non-hospitals (such as health centers and health posts) among urban poor compared to urban non-poor, since non-hospitals are where one would expect vaccinations to occur. Delivery at a health facility has also been seen as a positive entry point into child vaccination (Moyer, Benyas, and Rominski 2016). This was observed in Ethiopia, which had the lowest rate of facility delivery and the highest rate of zero-dose children of all the study countries. However,

DRC has high rates of facility delivery and comparatively high zero-dose children. The rapid rural-urban migration observed in DRC may be contributing to the high level of zero-dose children (World Bank 2018). Qualitative research conducted in DRC slums has identified a perception of high out-of-pocket costs, as well as rumors of harmful consequences from vaccination as major barriers (Maketa et al. 2013). Both DRC and Ethiopia have a focus on immunization service delivery. Currently, DRC Ministry of Health and Expanded Program on Immunization is testing and implementing strategies to effectively reach marginalized urban communities and increase vaccine coverage rates among the population (JSI 2022). Given the country's policy emphasis on the management and care of childhood illness, the implementation of vaccination programs among the urban poor of the country further serves to attenuate the overall disease prevalence and childhood mortality.

Ethiopia's Urban Health Extension Program (UHEP), launched in 2009, aims to improve health outcomes among the urban population through the use of health extension workers (HEWs) to promote specific health interventions, one of which is immunization (JSI 2013). Access to a UHEP and the HEWs has been associated with increased likelihood of utilizing health services, which makes it a valuable strategy for addressing low immunization rates (Molla, Tsehay, and Gebremedhin 2020). The most recent final report from the project that supported the implementation of the UHEP showed that immunization was one of the services most utilized by the community members (Okello et al. 2019). The extension worker strategy may help address the barriers to accessing health facilities by bringing services to the people. Our analysis did not include trends. Although we identified large intra-urban disparities in immunization rates in 2016, we cannot determine if these disparities have improved over the course of the implementation of the UHEP. There is evidence that there were no significant improvements in percentage of zero-dose children from 2005 to 2016 in Ethiopia among urban children overall (Central Statistical Agency - CSA/Ethiopia and ICF 2017; Central Statistical Agency/Ethiopia and ORC Macro 2006). It is also important to note that Ethiopia's immunization rates have long been a point of discussion, with DHS estimates consistently showing lower numbers than EPI surveys (Pond et al. 2021).

Only DRC had significant intra-urban differences in inappropriate feeding practices during diarrhea episodes for both food and liquids with lower feeding among urban poor. In Kenya, urban poor children were more likely to be given less liquids during diarrhea, while in Tanzania urban poor children were less likely to be given less food during diarrhea. Similar patterns were seen when comparing the urban non-poor to the rural population within a country. While engagement with the health care systems through ANC and/or PNC is somewhat consistently associated with appropriate feeding practices, associations with other sociodemographic variables such as maternal education, urban/rural, and wealth quintiles vary (Eshetu et al. 2022; Kishore et al. 2021; Tsehay et al. 2021). This evidence may indicate that without proper health education, traditional beliefs and norms about feeding during diarrhea may prevail despite the wealth status or location of a household.

The timing of initiation of breastfeeding variables showed limited intra-urban differences in this analysis. This is consistent with previous research that showed an early start to breastfeeding to be one of the most equitable maternal, newborn, and child health interventions, and in many countries shows higher levels among the poorest populations (Barros et al. 2012). Research from different settings has shown inconsistent patterns of sociodemographic influences on early initiation of breastfeeding, and points to context-specific influences on this important health intervention (Berde and Yalçin 2016; Finnie, Peréz-Escamilla, and Buccini 2020; Hernández-Vásquez and Chacón-Torrico 2019; Karim et al. 2019).

Limitations

The analysis includes some limitations that begin with the urban poverty measure. To construct the urban poverty measure, the first step is using the place of residence variable available in the DHS data to identify rural and urban clusters. In DHS surveys, place of residence is usually determined by the statistical agency with the most recent census for the country. The information can be out of date, especially if there is a long period of time between the census and the survey (Fish et al. 2020). This may cause some misclassification of clusters as rural or urban. It is also possible that the definition used for the urban poverty measure may miss some areas that would be considered urban poor or a slum.

Another limitation was the sample size for a few countries or indicators, which gives lower power to detect differences. In Tanzania, for example, the small proportion of urban poor areas resulted in very wide confidence intervals in the crosstabulations and omissions for the regression analysis. This was also true of using the zero-dose child indicator, which had small proportions in several countries, but by definition was limited to the smallest population group, which was only children age 12 to 23 months. Finally, reporting bias may have affected the findings for the breastfeeding and liquid and food intake during diarrhea indicators. Mothers may not recall or want to disclose that they are giving their children less food or liquids during diarrhea. Mothers may also not recall the exact time they initiated breastfeeding, especially making the distinction between specific intervals of less than 1 hour after birth, 1–6 hours, and 7–24 hours. For this analysis, focusing on breastfeeding indicators that align with program interventions, such as within 6 hours after birth, may have masked this bias.

RECOMMENDATIONS AND CONCLUSIONS

The growth of the urban population will impose demands on expanding infrastructure, availability of services (such as health facilities), housing, water, and sanitation amenities that are essential for the development of healthy cities. To be successful, urban planning programs should consider the characteristics of urban poor and slums, which have been found to be heterogenous, highly mobile, and with strong social networks, (McNab et al. 2022). Certain interventions that may have worked for rural areas may not be successful with the urban poor. For example, moving people from slums to public housing would break social networks that contribute to better health outcomes and may not be successful in all settings (Alaazi and Aganah 2020; McNab et al. 2022). Workers in the Ethiopian Urban Extension Program, which is designed to improve access and quality of services to the urban community (Tafesse, Gesessew, and Kidane 2019), have found that they often cannot find women at home during the day to implement their programs (McNab et al. 2022). This is linked to the women working long hours and jobs with high turnover. One solution, which was tested in Bangladesh by Marie Stopes, to reaching more women for maternal and newborn health programs was extending hours of clinics. However, this was not successful because the women and staff did not feel safe or want to be out at night (McNab et al. 2022). In addition to being different from rural areas in general, each urban poor context is different, and requires focused interventions tailored to the specific population and context (Bakibinga et al. 2022). Further research is needed to better understand the urban poor context in relation to the MCH indicators and outcomes (Mutisya et al. 2021).

Maternal and child health interventions, which generally occur within a health facility, have been shown to be the most inequitable (Barros et al. 2012), with a lack of access to facilities contributing to these inequities. This analysis has also shown evidence of low availability of public and private facilities in urban poor areas. In their analysis, McNab et al. (2022) have also found that urban poor settings or slums have very little public health presence and are low quality if available. Other studies also provide evidence of low quality of health care among the urban poor (Magadi, Zulu, and Brockerhoff 2003). This has meant that slum dwellers may seek other informal types of health care that include traditional healers, drug sellers, and unlicensed clinics (Fotso and Mukiira 2011). Therefore, programs should also consider increasing the availability of health facilities in urban poor settings that provide high-quality services.

The analysis has shown large disparities between urban poor and urban non-poor in several child health indicators. With the growing urban poor population, these disparities may grow even further without effective policies and programs. Urban poverty is currently a major concern for several countries, especially DRC, Ethiopia, and Kenya, where approximately half or more of the urban child population under age 5 live in urban poor areas. For the remaining countries, continued population growth, urbanization, and rural-to-urban migration are expected to increase the proportion of urban poor. Improvements are needed in the overall infrastructure in urban poor areas, as well as increasing economic opportunities and the number of health facilities with good quality of care. The need for multisectoral approaches that bring together actors who work in different areas of urban health are needed to truly overcome the drivers of intra-urban disparities (HEARD Project 2021; Shawar and Crane 2017; WHO and UN-HABITAT 2016). Further studies that use comparative measures of urban poverty are needed to monitor these disparities and track changes over time.

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APPENDIX TABLES

Appendix Table 1 Description of the sample among the population and among children under age 5 with 95% Confidence Intervals (CI)

	DRC			Ethiopia			Kenya			Nigeria			Tanzania			Uganda		
	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N
AMONG DE FACTO POPULATION																		
Place of residence																		
Urban	34.3	[30.7,38.1]	32,483	15.5	[14.2,16.8]	11,691	34.4	[33.2,35.7]	47,445	43.5	[41.9,45.1]	81,686	29.2	[27.6,31.0]	17,447	21.9	[20.6,23.3]	19,294
Rural	65.7	[61.9,69.3]	62,198	84.5	[83.2,85.8]	63,860	65.6	[64.3,66.8]	90,335	56.5	[54.9,58.1]	106,288	70.8	[69.0,72.4]	42,210	78.1	[76.7,79.4]	68,635
Total	100.0		94,681	100.0		75,551	100.0		137,780	100.0		187,974	100.0		59,657	100.0		87,929
Urban poverty cluster																		
Urban non-poor	18.1	[14.9,21.9]	17,177	5.6	[4.3,7.4]	4,256	17.4	[15.6,19.5]	24,038	35.9	[33.9,38.0]	67,541	26.9	[24.9,29.0]	16,046	15.9	[14.2,17.8]	14,010
Urban poor	16.2	[13.1,19.8]	15,306	9.8	[7.9,12.2]	7,435	17.0	[15.3,18.8]	23,407	7.5	[5.8,9.7]	14,145	2.3	[1.1,4.9]	1,402	6.0	[4.7,7.6]	5,284
Rural	65.7	[61.9,69.3]	62,198	84.5	[83.2,85.8]	63,860	65.6	[64.3,66.8]	90,335	56.5	[54.9,58.1]	106,288	70.8	[69.0,72.4]	42,210	78.1	[76.7,79.4]	68,635
Total	100.0		94,681	100.0		75,551	100.0		137,780	100.0		187,974	100.0		59,657	100.0		87,929
Improved sanitation																		
No	58.7	[54.9,62.4]	55,545	87.2	[85.8,88.5]	65,888	52.2	[50.7,53.7]	71,930	46.5	[44.8,48.3]	87,404	27.2	[25.4,29.1]	16,216	64.3	[62.3,66.3]	56,561
Yes	41.3	[37.6,45.1]	39,131	12.8	[11.5,14.2]	9,663	47.8	[46.3,49.3]	65,807	53.5	[51.7,55.2]	100,570	72.8	[70.9,74.6]	43,441	35.7	[33.7,37.7]	31,368
Total	100.0		94,676	100.0		75,551	100.0		137,737	100.0		187,974	100.0		59,657	100.0		87,929
Improved water source																		
No	49.4	[45.3,53.5]	46,737	37.9	[34.1,41.9]	28,648	31.7	[30.0,33.4]	43,613	27.4	[25.5,29.5]	51,549	38.4	[35.4,41.5]	22,915	21.5	[19.4,23.8]	18,943
Yes	50.6	[46.5,54.7]	47,924	62.1	[58.1,65.9]	46,903	68.3	[66.6,70.0]	94,156	72.6	[70.5,74.5]	136,425	61.6	[58.5,64.6]	36,741	78.5	[76.2,80.6]	68,986
Total	100.0		94,661	100.0		75,551	100.0		137,769	100.0		187,974	100.0		59,657	100.0		87,929
Household made of durable material																		
No	82.2	[79.6,84.4]	77,795	95.8	[95.0,96.5]	72,392	96.8	[95.9,97.5]	133,344	42.8	[41.1,44.5]	80,367	62.3	[60.2,64.4]	37,164	69.3	[67.3,71.2]	60,921
Yes	17.8	[15.6,20.4]	16,887	4.2	[3.5,5.0]	3,159	3.2	[2.5,4.1]	4,436	57.2	[55.5,58.9]	107,607	37.7	[35.6,39.8]	22,493	30.7	[28.8,32.7]	27,008
Total	100.0		94,681	100.0		75,551	100.0		137,780	100.0		187,974	100.0		59,657	100.0		87,929
Three or more people living in the same room																		
No	47.6	[45.5,49.7]	44,875	23.6	[22.1,25.2]	17,821	47.5	[46.3,48.6]	65,280	54.5	[53.4,55.6]	102,484	60.5	[58.9,62.1]	36,082	49.9	[48.7,51.1]	43,876
Yes	52.4	[50.3,54.5]	49,446	76.4	[74.8,77.9]	57,699	52.5	[51.4,53.7]	72,198	45.5	[44.4,46.6]	85,490	39.5	[37.9,41.1]	23,561	50.1	[48.9,51.3]	44,053
Total	100.0		94,321	100.0		75,520	100.0		137,477	100.0		187,974	100.0		59,643	100.0		87,929
AMONG CHILDREN UNDER AGE 5																		
Urban poverty cluster																		
Urban non-poor	14.9	[11.9,18.4]	2,732	3.3	[2.5,4.4]	363	18.4	[16.2,20.8]	3,599	31.0	[28.9,33.2]	10,606	24.0	[21.8,26.4]	2,415	15.7	[13.9,17.7]	2,397
Urban poor	15.8	[12.8,19.4]	2,904	7.7	[6.0,9.9]	852	17.5	[15.6,19.6]	3,425	7.5	[5.9,9.6]	2,564	3.1	[1.3,7.3]	312	5.5	[4.3,7.0]	836
Rural	69.4	[65.6,72.9]	12,754	89.0	[87.2,90.5]	9,807	64.1	[62.4,65.8]	12,540	61.5	[59.6,63.3]	21,023	72.9	[70.4,75.2]	7,325	78.8	[77.2,80.4]	12,038
Total	100.0		18,390	100.0		11,023	100.0		19,564	100.0		34,193	100.0		10,052	100.0		15,270
Sex																		
Male	49.7	[48.7,50.7]	9,146	51.9	[50.5,53.3]	5,725	50.8	[49.9,51.7]	9,937	50.9	[50.3,51.6]	17,420	50.7	[49.6,51.8]	5,098	50.4	[49.5,51.3]	7,695
Female	50.3	[49.3,51.3]	9,244	48.1	[46.7,49.5]	5,298	49.2	[48.3,50.1]	9,626	49.1	[48.4,49.7]	16,773	49.3	[48.2,50.4]	4,954	49.6	[48.7,50.5]	7,576
Total	100.0		18,390	100.0		11,023	100.0		19,564	100.0		34,193	100.0		10,052	100.0		15,270
Age in months																		
<6	11.2	[10.6,11.8]	2,058	11.1	[10.2,12.2]	1,229	8.9	[8.4,9.5]	1,749	10.0	[9.7,10.4]	3,429	10.4	[9.8,11.1]	1,048	10.1	[9.6,10.7]	1,545
6–8	5.4	[5.0,5.8]	992	5.4	[4.8,6.0]	592	5.0	[4.6,5.4]	974	5.2	[5.0,5.5]	1,789	5.4	[4.9,6.0]	548	5.5	[5.1,5.9]	842
9–11	4.8	[4.4,5.3]	891	4.8	[4.2,5.4]	525	5.1	[4.7,5.5]	996	4.6	[4.3,4.9]	1,573	4.9	[4.4,5.5]	494	5.3	[5.0,5.7]	811
12–17	10.4	[9.8,11.0]	1,916	10.7	[9.7,11.8]	1,182	10.6	[10.0,11.2]	2,071	11.1	[10.7,11.5]	3,801	11.6	[10.9,12.3]	1,161	9.8	[9.3,10.4]	1,498
18–23	9.2	[8.6,9.7]	1,689	8.5	[7.8,9.3]	941	9.6	[9.0,10.1]	1,873	8.3	[7.9,8.6]	2,828	10.7	[10.0,11.5]	1,076	9.8	[9.3,10.4]	1,501
24–35	20.3	[19.5,21.1]	3,725	18.7	[17.6,19.8]	2,061	20.1	[19.4,20.8]	3,938	19.2	[18.8,19.7]	6,573	19.1	[18.2,20.1]	1,925	19.8	[19.1,20.6]	3,031
36–47	19.9	[19.1,20.8]	3,668	19.5	[18.6,20.5]	2,153	21.0	[20.2,21.8]	4,101	20.6	[20.1,21.1]	7,041	18.8	[17.9,19.7]	1,891	19.7	[19.0,20.4]	3,006
48–59	18.8	[18.1,19.4]	3,452	21.2	[20.2,22.3]	2,340	19.7	[19.0,20.5]	3,862	20.9	[20.4,21.4]	7,159	19.0	[18.1,19.9]	1,909	19.9	[19.3,20.5]	3,036
Total	100.0		18,390	100.0		11,023	100.0		19,564	100.0		34,193	100.0		10,052	100.0		15,270

Continued…

Appendix Table 1—*Continued*

	DRC			Ethiopia			Kenya			Nigeria			Tanzania			Uganda		
	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N
Birth order																		
1	19.3	[18.4,20.2]	3,543	18.7	[17.3,20.1]	2,058	26.1	[25.1,27.1]	5,104	19.4	[18.8,19.9]	6,625	24.6	[23.5,25.8]	2,475	21.9	[21.1,22.8]	3,347
2–3	32.4	[31.4,33.3]	5,950	30.5	[28.8,32.2]	3,359	39.2	[38.2,40.2]	7,669	33.6	[33.0,34.3]	11,504	34.1	[32.8,35.3]	3,423	33.8	[32.8,34.7]	5,154
4–5	23.5	[22.5,24.5]	4,319	23.6	[22.3,25.0]	2,604	19.5	[18.7,20.3]	3,813	23.0	[22.4,23.7]	7,872	21.2	[20.1,22.2]	2,126	21.4	[20.6,22.3]	3,275
6+	24.9	[23.8,26.0]	4,578	27.2	[25.2,29.4]	3,001	15.2	[14.4,16.1]	2,978	24.0	[23.1,24.8]	8,191	20.2	[18.8,21.6]	2,027	22.9	[21.8,24.0]	3,494
Total	100.0		18,390	100.0		11,023	100.0		19,564	100.0		34,193	100.0		10,052	100.0		15,270
Mother's education level																		
None	18.8	[16.9,20.8]	3,449	66.1	[63.4,68.7]	7,284	11.8	[10.7,13.0]	2,307	46.4	[44.5,48.3]	15,858	20.9	[19.1,22.9]	2,103	11.0	[10.0,12.1]	1,680
Primary	43.9	[41.7,46.1]	8,073	26.8	[24.6,29.0]	2,951	56.1	[54.5,57.8]	10,979	14.9	[14.0,15.9]	5,103	64.8	[62.9,66.7]	6,517	61.5	[59.8,63.2]	9,391
Secondary+	37.3	[34.9,39.8]	6,868	7.1	[6.2,8.3]	788	32.1	[30.6,33.6]	6,277	38.7	[37.0,40.4]	13,231	14.2	[13.0,15.6]	1,432	27.5	[25.8,29.3]	4,200
Total	100.0		18,390	100.0		11,023	100.0		19,564	100.0		34,193	100.0		10,052	100.0		15,270
Region																		
1	7.1	[5.8,8.6]	1,306	6.5	[5.6,7.6]	716	10.3	[9.3,11.5]	2,023	13.5	[12.5,14.6]	4,619	12.2	[10.2,14.5]	1,225	3.8	[3.1,4.6]	580
2	16.2	[12.8,20.2]	2,979	1.0	[0.8,1.3]	114	3.3	[2.8,4.0]	650	18.2	[16.9,19.6]	6,213	9.3	[8.2,10.6]	935	12.3	[10.8,14.0]	1,881
3	4.6	[3.1,6.7]	846	18.8	[16.8,21.0]	2,072	11.9	[10.9,13.0]	2,321	36.7	[34.7,38.8]	12,558	11.0	[9.8,12.4]	1,111	10.8	[9.7,11.9]	1,645
4	14.3	[11.5,17.5]	2,622	44.0	[40.5,47.6]	4,851	9.2	[8.5,9.9]	1,796	10.0	[9.1,11.0]	3,428	5.4	[4.7,6.2]	542	10.0	[8.2,12.1]	1,527
5	7.4	[5.5,10.0]	1,369	4.6	[3.8,5.5]	508	29.0	[27.4,30.6]	5,677	8.7	[7.9,9.5]	2,968	3.9	[3.3,4.6]	392	6.9	[6.3,7.6]	1,060
6	10.8	[8.4,13.7]	1,983	1.1	[0.9,1.3]	122	11.5	[10.4,12.8]	2,255	12.9	[11.7,14.2]	4,407	9.7	[8.2,11.4]	974	5.0	[4.4,5.6]	763
7	11.0	[8.8,13.7]	2,020	20.8	[18.7,23.1]	2,296	14.3	[13.2,15.5]	2,790	100.0		34,193	31.8	[29.3,34.3]	3,194	6.2	[5.5,7.0]	948
8	3.3	[2.0,5.3]	608	0.2	[0.2,0.3]	27	10.5	[9.1,12.1]	2,051				14.1	[12.6,15.7]	1,415	2.8	[2.2,3.6]	432
9	8.0	[5.9,10.7]	1,464	0.2	[0.2,0.3]	26							2.6	[2.4,2.9]	264	5.2	[4.7,5.8]	799
10	9.0	[7.3,11.1]	1,661	2.2	[1.8,2.6]	244							100.0		10,052	4.9	[4.3,5.4]	741
11	8.3	[5.3,12.8]	1,533	0.4	[0.3,0.5]	47										7.0	[6.2,7.9]	1,067
12	100.0		18,390	100.0		11,023										5.9	[5.0,7.0]	905
13																7.9	[7.1,8.9]	1,210
14																7.9	[7.1,8.8]	1,209
15																3.3	[2.9,3.7]	506
16																100.0		15,270

Region codes	DRC	Ethiopia	Kenya	Nigeria	Tanzania	Uganda
1	Kinshasa	Tigray	Coast	North Central	Western	Kampala
2	Bandundu	Afar	North Eastern	North East	Northern	South Buganda
3	Bas-Congo	Amhara	Eastern	North West	Central	North Buganda
4	Equateur	Oromia	Central	South East	Southern Highlands	Busoga
5	Kasai-Occidental	Somali	Rift Valley	South South	Southern	Bukedi
6	Kasai-Oriental	Benishangul	Western	South West	South West Highlands	Bugisu
7	Katanga	SNNPR	Nyanza		Lake	Teso
8	Maniema	Gambela	Nairobi		Eastern	Karamoja
9	Nord-Kivu	Harari			Zanzibar	Lango
10	Orientale	Addis Ababa				Acholi
11	Sud-Kivu	Dire Dawa				West Nile
12						Bunyoro
13						Tooro
14						Ankole
15						Kigezi

Appendix Table 2 Percentage distribution of the urban poverty cluster variable by region among children under age 5

	Urban non-poor	Urban poor	Rural	
	% [CI]	% [CI]	% [CI]	*p* value
Democratic Republic of the Congo				***
Kinshasa	81.6 [60.5,92.8]	18.4 [7.2,39.5]	0.0	
Bandundu	1.8 [0.5,5.8]	16.0 [9.7,25.3]	82.2 [73.9,88.3]	
Bas-Congo	19.7 [8.5,39.3]	0.5 [0.1,4.6]	79.8 [61.1,90.8]	
Equateur	3.3 [0.6,16.1]	14.3 [8.3,23.6]	82.4 [73.6,88.7]	
Kasai-Occidental	0.0	28.5 [19.1,40.4]	71.5 [59.6,80.9]	
Kasai-Oriental	20.9 [14.0,30.1]	15.7 [9.6,24.5]	63.4 [52.2,73.2]	
Katanga	20.1 [7.8,42.7]	24.7 [12.8,42.4]	55.2 [42.7,67.0]	
Maniema	10.1 [3.5,26.3]	19.7 [8.6,39.1]	70.2 [51.2,84.1]	
Nord-Kivu	23.8 [10.8,44.6]	10.2 [1.5,45.9]	66.0 [47.5,80.7]	
Orientale	6.7 [2.8,15.3]	12.1 [6.1,22.5]	81.1 [72.9,87.3]	
Sud-Kivu	1.2 [0.1,9.3]	8.9 [3.2,22.2]	89.9 [77.1,95.9]	
Ethiopia				***
Tigray	7.3 [3.9,13.5]	9.2 [4.3,18.8]	83.5 [77.4,88.1]	
Afar	1.2 [0.3,5.4]	14.4 [7.4,26.1]	84.3 [74.1,91.0]	
Amhara	1.3 [0.3,6.4]	11.2 [7.7,16.1]	87.5 [83.9,90.3]	
Oromia	1.1 [0.4,3.0]	4.3 [2.1,8.5]	94.6 [91.5,96.6]	
Somali	2.0 [0.5,7.9]	13.9 [8.7,21.7]	84.0 [77.6,88.9]	
Benishangul	0.0	7.0 [4.3,11.0]	93.0 [89.0,95.7]	
SNNPR	1.2 [0.3,4.7]	6.8 [3.3,13.5]	92.0 [86.8,95.3]	
Gambela	7.5 [2.3,21.8]	30.6 [20.4,43.2]	61.9 [53.5,69.6]	
Harari	8.5 [4.2,16.4]	25.1 [17.3,34.9]	66.4 [59.5,72.7]	
Addis Ababa	67.2 [51.5,79.9]	32.8 [20.1,48.5]	0.0	
Dire Dawa	45.1 [34.3,56.4]	2.1 [0.3,14.4]	52.8 [42.2,63.2]	
Kenya				***
Coast	34.4 [29.1,40.1]	6.0 [3.7,9.7]	59.6 [54.3,64.7]	
North Eastern	0.9 [0.2,3.8]	27.3 [20.1,35.8]	71.8 [63.7,78.8]	
Eastern	13.7 [9.2,20.0]	11.9 [8.6,16.2]	74.4 [70.0,78.4]	
Central	16.3 [9.9,25.7]	28.7 [22.0,36.4]	55.0 [50.9,59.0]	
Rift Valley	11.8 [9.1,15.1]	14.5 [11.8,17.8]	73.7 [71.3,76.0]	
Western	2.3 [1.2,4.6]	12.3 [9.5,15.9]	85.3 [82.4,87.8]	
Nyanza	4.8 [2.7,8.2]	22.0 [18.3,26.2]	73.2 [69.9,76.3]	
Nairobi	69.8 [54.2,81.9]	30.2 [18.1,45.8]	0.0	
Nigeria				***
North Central	26.6 [22.7,31.0]	4.8 [2.4,9.3]	68.6 [64.5,72.5]	
North East	19.8 [16.0,24.2]	4.1 [2.1,7.9]	76.1 [72.7,79.2]	
North West	16.7 [13.2,20.8]	8.1 [5.3,12.4]	75.2 [71.8,78.3]	
South East	54.7 [47.9,61.3]	17.4 [12.3,24.1]	27.9 [24.1,32.0]	
South South	35.9 [30.3,41.9]	4.7 [2.2,9.9]	59.3 [54.4,64.1]	
South West	70.7 [63.5,76.9]	7.4 [2.7,18.9]	21.9 [18.9,25.3]	
Tanzania				***
Western	11.9 [7.8,17.7]	0.0	88.1 [82.3,92.2]	
Northern	26.8 [20.2,34.6]	1.0 [0.1,7.0]	72.2 [64.9,78.5]	
Central	12.9 [8.6,18.9]	1.1 [0.1,7.8]	86.0 [81.8,89.4]	
Southern Highlands	30.3 [21.9,40.2]	2.1 [0.3,14.3]	67.6 [59.3,74.9]	
Southern	23.1 [14.6,34.5]	0.0	76.9 [65.5,85.4]	
South West Highlands	20.9 [15.9,27.0]	1.3 [0.2,9.0]	77.8 [72.0,82.7]	
Lake	12.6 [9.3,17.0]	7.8 [2.6,20.7]	79.6 [73.3,84.7]	
Eastern	66.7 [61.2,71.8]	1.4 [0.4,5.0]	31.9 [27.2,37.1]	
Zanzibar	26.2 [21.4,31.5]	0.0	73.8 [68.5,78.6]	

Continued…

Appendix Table 2—*Continued*

	Urban non-poor	Urban poor	Rural	
	% [CI]	% [CI]	% [CI]	*p* value
Uganda				***
Kampala	100.0	0.0	0.0	
South Buganda	35.2 [27.7,43.5]	0.8 [0.1,5.6]	64.0 [56.3,71.1]	
North Buganda	21.0 [15.0,28.7]	4.0 [1.1,13.6]	75.0 [70.6,79.0]	
Busoga	10.0 [7.1,13.9]	0.0	90.0 [86.1,92.9]	
Bukedi	8.8 [5.4,14.0]	2.4 [0.3,16.2]	88.8 [86.2,91.0]	
Bugisu	7.1 [2.6,18.3]	10.6 [5.0,21.2]	82.3 [79.1,85.0]	
Teso	9.0 [5.5,14.2]	0.0	91.0 [85.8,94.5]	
Karamoja	0.0	20.8 [9.2,40.5]	79.2 [59.5,90.8]	
Lango	2.8 [0.8,9.2]	3.9 [1.4,10.1]	93.4 [90.9,95.2]	
Acholi	8.5 [3.4,19.8]	9.9 [4.2,21.5]	81.7 [76.4,86.0]	
West Nile	2.1 [0.3,14.5]	7.7 [3.4,16.6]	90.2 [84.3,94.0]	
Bunyoro	9.6 [6.4,14.3]	2.0 [0.3,13.7]	88.4 [85.0,91.1]	
Tooro	9.3 [3.3,23.8]	9.5 [5.2,16.6]	81.2 [75.6,85.8]	
Ankole	6.8 [2.3,18.7]	17.8 [11.2,27.0]	75.4 [70.5,79.7]	
Kigezi	6.6 [3.1,13.5]	5.3 [1.4,17.6]	88.1 [84.4,91.0]	

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$ for tests of association between the urban poverty cluster variable and region.
Note: Numbers in brackets represent 95% confidence intervals.

Appendix Table 3 Percentage distribution of the outcome variables

	Population group	DRC			Ethiopia			Kenya			Nigeria			Tanzania			Uganda		
		%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N
Place of delivery																			
Health facility delivery		79.9	[77.2,82.3]	14,687	26.0	[23.3,28.8]	2,861	61.2	[59.7,62.7]	11,969	39.4	[37.8,41.0]	13,462	62.6	[59.8,65.3]	6,291	73.4	[71.6,75.1]	11,203
Public health facility	Children born in	64.5	[61.4,67.5]	11,862	24.8	[22.2,27.6]	2,734	46.0	[44.6,47.4]	9,000	26.4	[25.2,27.6]	9,012	50.6	[48.0,53.2]	5,089	57.3	[55.5,59.1]	8,748
Private health facility	the last 5 years	15.4	[13.3,17.7]	2,824	1.1	[0.9,1.5]	126	15.2	[14.1,16.3]	2,969	13.0	[12.1,14.0]	4,450	12.0	[10.5,13.5]	1,202	16.1	[14.8,17.4]	2,455
Non-facility delivery		20.1	[17.7,22.8]	3,704	74.0	[71.2,76.7]	8,162	38.8	[37.3,40.3]	7,595	60.6	[59.0,62.2]	20,730	37.4	[34.7,40.2]	3,761	26.6	[24.9,28.4]	4,068
		100.0		18,390	100.0		11,023	100.0		19,564	100.0		34,193	100.0		10,052	100.0		15,270
Food given with diarrhea	Children born in																		
More than usual	the last 5 years	4.9	[3.8,6.4]	141	7.2	[5.1,10.1]	89	3.0	[2.2,4.1]	85	3.5	[2.9,4.2]	140	2.9	[1.9,4.2]	32	5.6	[4.4,7.1]	158
Same as usual	with diarrhea	32.7	[30.1,35.4]	929	17.6	[14.6,21.0]	215	31.7	[29.6,33.9]	901	35.8	[33.5,38.1]	1,412	47.1	[43.1,51.0]	528	36.1	[33.9,38.5]	1,024
Less than usual	symptoms in	42.6	[39.2,46.1]	1,212	60.0	[55.7,64.1]	737	48.7	[46.2,51.1]	1,382	55.0	[52.7,57.2]	2,173	45.9	[42.0,49.9]	515	43.9	[41.4,46.4]	1,242
None or don't know	the last two	19.8	[17.1,22.7]	562	15.2	[12.2,18.8]	186	16.7	[14.9,18.6]	474	5.7	[4.9,6.7]	225	4.2	[3.0,5.8]	47	14.4	[13.0,16.0]	408
	weeks	100.0		2,844	100.0		1,227	100.0		2,841	100.0		3,950	100.0		1,122	100.0		2,832
Liquids given with diarrhea	Children born in																		
More than usual	the last 5 years	32.1	[28.6,35.8]	913	14.6	[11.8,17.9]	179	21.5	[19.6,23.6]	612	14.2	[12.8,15.8]	562	19.9	[17.2,23.1]	224	15.3	[13.6,17.2]	433
Same as usual	with diarrhea	32.4	[29.2,35.7]	922	21.0	[17.5,25.0]	258	36.9	[34.4,39.5]	1,049	36.8	[34.6,39.1]	1,455	51.4	[47.8,55.1]	577	38.5	[36.2,40.9]	1,092
Less than usual	symptoms in	33.2	[29.9,36.7]	945	56.1	[51.7,60.4]	689	38.9	[36.6,41.3]	1,106	46.9	[44.6,49.3]	1,854	26.3	[23.2,29.7]	295	41.8	[39.4,44.4]	1,185
None or don't know	the last two	2.3	[1.7,3.2]	66	8.3	[6.3,10.9]	102	2.6	[2.0,3.5]	75	2.0	[1.4,2.8]	79	2.3	[1.4,3.6]	26	4.3	[3.5,5.3]	122
	weeks	100.0		2,846	100.0		1,227	100.0		2,841	100.0		3,950	100.0		1,122	100.0		2,832
Zero-dose children																			
No	Children age	81.3	[78.8,83.5]	2,736	73.2	[69.3,76.8]	1,467	97.5	[96.7,98.2]	3,684	65.3	[63.3,67.3]	4,013	97.0	[95.8,97.8]	2,069	94.9	[93.7,95.9]	2,713
Yes	12–23 months	18.7	[16.5,21.2]	631	26.8	[23.2,30.7]	537	2.5	[1.8,3.3]	93	34.7	[32.7,36.7]	2,130	3.0	[2.2,4.2]	65	5.1	[4.1,6.3]	146
		100.0		3,366	100.0		2,004	100.0		3,777	100.0		6,143	100.0		2,134	100.0		2,859
Breastfeeding timing after birth																			
Within 1 hour after birth	Last born	51.9	[49.2,54.6]	3,722	73.3	[71.0,75.6]	3,159	62.2	[60.0,64.4]	2,205	42.1	[40.8,43.5]	5,451	51.2	[48.8,53.5]	2,133	66.1	[64.4,67.7]	3,899
1–6 hours after birth	children born in	34.5	[32.5,36.6]	2,474	16.6	[14.7,18.8]	717	24.8	[23.0,26.8]	879	35.7	[34.5,37.0]	4,623	35.8	[33.8,37.9]	1,494	25.6	[24.2,27.0]	1,509
7–24 hours after birth	the last 2 years	8.0	[6.7,9.5]	573	3.2	[2.6,4.1]	140	7.0	[5.9,8.2]	248	13.5	[12.6,14.4]	1,746	9.1	[7.9,10.5]	379	4.0	[3.5,4.6]	235
1 day or more after birth		5.6	[4.8,6.4]	399	6.8	[5.6,8.2]	292	6.0	[5.0,7.1]	212	8.6	[8.0,9.3]	1,115	3.9	[3.2,4.7]	161	4.4	[3.8,5.0]	258
		100.0		7,168	100.0		4,308	100.0		3,544	100.0		12,935	100.0		4,167	100.0		5,901
Weight for age	Children born in																		
Underweight	the last 5 years	22.6	[21.1,24.1]	2,036	23.6	[22.1,25.1]	2488	11.0	[10.3,11.7]	2,086	21.8	[20.8,22.9]	2,767	13.7	[12.7,14.7]	1,350	10.5	[9.5,11.6]	539
Not underweight		77.4	[75.9,78.9]	6,993	76.4	[74.9,77.9]	8064	89.0	[88.3,89.7]	16,901	78.2	[77.1,79.2]	9,928	86.3	[85.3,87.3]	8,535	89.5	[88.4,90.5]	4,598
		100.0		9,030	100.0		10552	100.0		18,986	100.0		12,695	100.0		9,886	100.0		5,136
Weight for height																			
Wasted	Children born in	7.9	[7.0,8.9]	710	9.9	[9.0,10.9]	1,034	4.0	[3.6,4.5]	768	6.8	[6.3,7.4]	860	4.5	[4.0,5.0]	440	3.5	[3.0,4.2]	184
Normal	the last 5 years	88.0	[86.8,89.1]	7,947	87.3	[86.2,88.3]	9,086	91.8	[91.3,92.4]	17,438	91.1	[90.5,91.7]	11,528	91.9	[91.2,92.5]	9,013	92.7	[91.8,93.5]	4,813
Overweight or obese		4.1	[3.5,4.8]	372	2.8	[2.3,3.5]	293	4.1	[3.7,4.5]	780	2.1	[1.8,2.4]	261	3.6	[3.2,4.1]	358	3.7	[3.2,4.4]	194
		100.0		9,030	100.0		10,412	100.0		18,986	100.0		12,649	100.0		9,811	100.0		5,191

Note: Weight for age and weight for height are measured for all de facto children under age 5 living in the household, while the remaining measures are only available for children of interviewed de facto mothers. Numbers in brackets represent 95% confidence intervals.

Appendix Table 4 Crosstabulations of the urban poverty cluster variable and sociodemographic variables with the child health, Democratic Republic of Congo

	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	Breastfed			Underweight	Overweight or obese
					within 1 hour after birth	1–6 hours after birth	7–24 hours after birth		
Urban poverty cluster	***	*	**	***	**	*		***	***
Urban non-poor	97.9 [96.8,98.6]	53.7 [46.5,60.9]	23.9 [16.4,33.4]	2.0 [1.1,3.8]	53.9 [48.5,59.2]	32.2 [27.3,37.6]	7.0 [5.2,9.3]	10.1 [8.1,12.5]	4.6 [3.4,6.2]
Urban poor	88.7 [85.7,91.1]	64.6 [59.8,69.1]	35.3 [30.3,40.7]	13.2 [10.5,16.5]	41.8 [36.1,47.6]	41.5 [36.5,46.7]	10.0 [8.1,12.4]	17.9 [14.8,21.6]	5.4 [4.0,7.2]
Rural	74.0 [70.2,77.5]	63.8 [60.1,67.4]	38.4 [34.1,42.8]	23.9 [20.8,27.3]	53.9 [50.4,57.3]	33.4 [30.9,36.0]	7.7 [6.1,9.8]	26.1 [24.3,28.1]	9.1 [7.9,10.5]
Sex		*						***	**
Male	80.0 [77.2,82.5]	60.2 [56.5,63.8]	34.2 [30.9,37.6]	18.8 [15.9,22.0]	50.7 [47.7,53.7]	34.8 [32.4,37.3]	8.8 [7.4,10.4]	24.7 [22.7,26.8]	9.1 [7.8,10.6]
Female	79.8 [77.1,82.2]	64.8 [61.2,68.3]	37.1 [32.5,41.8]	18.7 [16.3,21.4]	53.2 [49.9,56.4]	34.3 [31.7,36.9]	7.2 [5.8,9.0]	20.4 [18.8,22.2]	6.6 [5.5,7.9]
Age in months		*						***	***
<6	82.0 [78.8,84.8]	70.8 [56.6,81.8]	47.0 [39.2,54.8]	NA	52.5 [48.2,56.8]	33.9 [30.8,37.2]	9.0 [6.3,12.6]	9.9 [7.6,12.7]	12.3 [9.6,15.6]
6–8	80.8 [76.6,84.4]	60.7 [54.0,66.9]	37.5 [28.6,47.2]	NA	50.2 [45.2,55.2]	35.1 [31.2,39.1]	7.6 [5.5,10.3]	17.0 [12.2,23.3]	11.2 [7.3,16.8]
9–11	80.4 [76.0,84.2]	74.6 [67.1,80.9]	40.4 [32.0,49.5]	NA	55.7 [51.1,60.2]	33.4 [29.2,38.0]	6.0 [4.2,8.6]	18.7 [14.3,24.0]	12.3 [7.6,19.3]
12–17	78.8 [75.4,81.9]	64.4 [59.2,69.2]	36.1 [30.1,42.7]	18.6 [16.1,21.3]	53.4 [50.3,56.5]	34.6 [31.8,37.4]	7.6 [6.1,9.4]	18.4 [15.2,22.1]	8.5 [6.4,11.3]
18–23	79.7 [75.9,83.1]	60.2 [53.5,66.6]	30.9 [25.2,37.1]	18.9 [15.8,22.5]	48.2 [44.4,52.1]	35.5 [32.0,39.3]	8.6 [6.9,10.7]	20.5 [16.8,24.6]	8.1 [5.9,11.0]
24–35	80.5 [77.4,83.3]	58.0 [50.5,65.2]	30.5 [25.3,36.1]	NA	NA	NA	NA	22.2 [19.6,25.0]	7.1 [5.5,9.2]
36–47	79.2 [76.2,81.9]	58.5 [51.3,65.3]	36.2 [29.6,43.4]	NA	NA	NA	NA	28.3 [25.1,31.6]	6.9 [5.4,8.8]
48–59	78.8 [75.8,81.6]	57.0 [49.4,64.4]	36.0 [28.4,44.3]	NA	NA	NA	NA	29.4 [26.1,32.8]	4.8 [3.6,6.4]
Birth order	***				**		**		
1	83.1 [80.2,85.8]	61.2 [56.6,65.6]	39.0 [34.0,44.4]	15.8 [12.4,20.0]	45.9 [42.0,49.8]	33.4 [30.2,36.7]	12.0 [9.8,14.6]	NA	NA
2–3	81.7 [79.2,84.1]	62.5 [58.1,66.8]	35.7 [31.1,40.5]	19.2 [16.0,22.7]	53.0 [49.4,56.5]	35.6 [32.6,38.7]	6.2 [5.1,7.6]	NA	NA
4–5	78.0 [74.9,80.8]	61.2 [55.6,66.4]	35.4 [31.0,40.2]	18.3 [14.8,22.3]	55.0 [50.9,59.0]	34.7 [31.1,38.5]	6.2 [4.3,8.9]	NA	NA
6+	76.7 [73.3,79.7]	64.2 [59.3,68.8]	32.8 [26.7,39.6]	20.9 [17.3,25.1]	52.3 [48.3,56.1]	33.8 [30.7,37.0]	8.9 [6.5,12.1]	NA	NA
Mother's education level	***			***	*			***	*
None	67.2 [62.7,71.5]	61.2 [55.4,66.7]	37.7 [30.5,45.5]	25.7 [21.0,31.1]	55.5 [50.7,60.2]	34.3 [30.3,38.6]	6.0 [4.2,8.6]	27.6 [24.9,30.5]	7.3 [5.7,9.3]
Primary	76.1 [72.9,79.1]	62.7 [58.0,67.2]	37.1 [33.0,41.5]	24.4 [20.9,28.2]	53.1 [49.7,56.4]	34.4 [31.7,37.2]	8.3 [6.4,10.8]	25.9 [23.9,28.0]	9.3 [7.8,10.9]
Secondary+	90.6 [88.4,92.4]	62.5 [58.6,66.2]	32.7 [28.2,37.7]	9.5 [7.0,12.7]	49.1 [45.7,52.5]	34.7 [32.0,37.6]	8.5 [7.1,10.2]	15.5 [13.7,17.5]	6.6 [5.4,8.1]
Region	***	*	*	***	***	***	**	***	***
Kinshasa	97.9 [95.9,98.9]	52.9 [44.5,61.2]	19.1 [12.0,29.1]	2.2 [0.4,10.0]	51.3 [42.4,60.0]	29.9 [23.1,37.8]	6.9 [4.6,10.3]	5.5 [3.5,8.6]	3.5 [2.2,5.7]
Bandundu	84.2 [73.9,90.9]	64.6 [57.3,71.2]	43.8 [32.8,55.4]	12.5 [7.7,19.8]	54.8 [46.7,62.7]	30.9 [25.3,37.2]	8.4 [6.0,11.7]	25.3 [22.0,29.0]	9.8 [7.8,12.1]
Bas-Congo	94.2 [88.5,97.2]	35.7 [26.7,45.9]	20.9 [11.0,36.1]	6.5 [3.4,12.1]	57.6 [47.3,67.3]	34.9 [27.7,42.8]	4.8 [2.4,9.5]	27.3 [18.3,38.7]	11.1 [7.2,16.8]
Equateur	60.2 [53.5,66.5]	61.8 [55.6,67.7]	37.8 [25.9,51.3]	31.3 [24.9,38.6]	42.0 [37.1,47.0]	40.5 [36.3,44.8]	11.1 [8.8,13.8]	19.4 [16.2,22.9]	6.0 [4.2,8.3]
Kasai-Occidental	84.0 [77.3,88.9]	69.6 [61.7,76.4]	42.9 [35.6,50.5]	17.8 [12.0,25.7]	60.1 [51.4,68.1]	33.0 [25.7,41.2]	3.6 [1.8,7.0]	30.5 [24.1,37.7]	7.2 [4.5,11.5]
Kasai-Oriental	72.2 [61.8,80.6]	68.1 [59.1,75.9]	35.4 [26.4,45.7]	23.3 [16.8,31.3]	60.0 [55.0,64.7]	31.1 [27.1,35.5]	5.6 [3.6,8.7]	25.6 [21.7,29.8]	7.6 [5.4,10.7]
Katanga	63.2 [51.9,73.2]	66.4 [58.4,73.6]	40.5 [31.8,49.8]	32.7 [24.7,41.9]	39.0 [32.0,46.4]	47.1 [41.0,53.2]	9.0 [6.3,12.8]	20.3 [16.8,24.3]	8.2 [6.2,10.7]
Maniema	88.0 [81.2,92.6]	66.0 [52.5,77.3]	15.4 [8.5,26.4]	26.2 [14.1,43.4]	44.5 [31.6,58.2]	42.6 [32.6,53.3]	6.8 [4.3,10.4]	31.9 [25.5,39.0]	22.7 [14.5,33.6]
Nord-Kivu	91.6 [84.9,95.4]	62.2 [52.8,70.7]	32.8 [24.9,41.7]	5.6 [2.8,10.7]	72.1 [64.6,78.5]	23.6 [17.5,31.1]	2.9 [1.6,5.0]	21.4 [17.9,25.4]	4.7 [2.6,8.4]
Orientale	82.7 [76.0,87.8]	60.6 [38.1,79.4]	37.4 [26.3,50.0]	29.4 [21.4,38.7]	42.9 [34.8,51.5]	40.5 [33.7,47.6]	8.0 [5.8,10.9]	20.2 [15.9,25.4]	7.2 [5.1,10.1]
Sud-Kivu	92.6 [86.0,96.2]	57.7 [51.0,64.1]	30.6 [24.0,38.1]	4.9 [2.5,9.2]	54.0 [40.2,67.2]	24.5 [17.5,33.3]	15.8 [7.9,28.9]	26.0 [19.3,34.1]	7.2 [4.5,11.2]

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$ for tests of association between each variable and the outcome.

Appendix Table 5 Unadjusted (U) and adjusted (A) coefficients of the logit regression of each outcome, Democratic Republic of the Congo

			Diarrhea						Breastfed									
	Health facility delivery		Less or no food		Less or no liquids		Zero-dose child		within 1 hour after birth		1–6 hours after birth		7–24 hours after birth		Underweight		Overweight or obese	
Variable	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A
Urban poverty cluster																		
Urban non-poor (Ref.)																		
Urban poor	-1.78***	-1.60***	0.45*	0.49**	0.55*	0.55*	1.99***	1.82***	-0.49**	-0.51**	0.40*	0.40*	0.40*	0.41*	0.67***	0.63***	0.17	0.12
Rural	-2.79***	-2.36***	0.42*	0.48**	0.68**	0.64*	2.71***	2.34***	0.00	-0.07	0.05	0.04	0.12	0.18	1.15***	0.99***	0.73***	0.65**
Sex																		
Male (Ref.)																		
Female		-0.02		0.20*		0.14		0.02		0.10		-0.02		-0.21		-0.30***		-0.38**
Age in months																		
<6 (Ref.)																		
6–8		-0.09		-0.45		-0.38		-		-0.09		0.05		-0.18		0.64*		-0.07
9–11		-0.01		0.20		-0.29		-		0.13		-0.02		-0.45*		0.72**		0.02
12–17 (Ref. for zero-dose)		-0.21*		-0.27		-0.45*				0.04		0.03		-0.20		0.74***		-0.42*
18–23		-0.16		-0.47		-0.67**		0.04		-0.16		0.06		-0.05		0.89***		-0.44
24–35		-0.07		-0.53		-0.71***		-		-		-		-		0.98***		-0.63**
36–47		-0.12		-0.52		-0.45*		-		-		-		-		1.28***		-0.62**
48–59		-0.14		-0.60		-0.47*		-		-		-		-		1.31***		-1.14***
Birth order																		
1 (Ref.)																		
2–3		0.03		0.09		-0.18		0.11		0.27**		0.10		-0.72***		-		-
4–5		-0.11		0.01		-0.26		-0.07		0.35***		0.05		-0.72***		-		-
6+		-0.14		0.14		-0.37*		0.03		0.22*		0.01		-0.33		-		-
Mother's education level																		
None (Ref.)																		
Primary		0.33***		0.11		-0.01		0.04		-0.06		-0.02		0.33		0.01		0.33*
Secondary+		1.01***		0.23		-0.10		-0.74**		-0.16		-0.04		0.30		-0.41***		0.10
Observations	18,716	18,716	2,814	2,814	2,816	2,816	3,443	3,443	7,322	7,322	7,322	7,322	7,322	7,322	8,884	8,184	8,884	8,184

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$

Appendix Table 6 **Crosstabulations of the urban poverty cluster variable and sociodemographic variables with the child health indicators with 95% Confidence Intervals (CI), Ethiopia**

					Breastfed				
	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	within 1 hour after birth	1–6 hours after birth	7–24 hours after birth	Underweight	Overweight or obese
Urban poverty cluster	***		*	**				***	
Urban non-poor	91.8 [86.6,95.0]	68.6 [52.1,81.4]	61.2 [45.1,75.1]	2.3 [0.8,6.9]	75.3 [68.5,81.1]	16.5 [11.3,23.5]	4.1 [1.7,9.3]	6.7 [4.3,10.1]	5.1 [3.1,8.3]
Urban poor	71.8 [60.6,80.9]	66.4 [48.2,80.7]	45.7 [28.6,63.8]	12.2 [4.4,29.3]	71.3 [61.9,79.2]	11.2 [7.3,16.8]	2.9 [1.5,5.5]	16.2 [12.4,20.7]	10.2 [7.5,13.6]
Rural	19.5 [17.0,22.4]	76.1 [72.1,79.7]	66.1 [61.5,70.4]	29.1 [25.1,33.5]	73.4 [70.9,75.8]	17.2 [15.0,19.5]	3.2 [2.5,4.2]	24.8 [23.2,26.5]	10.1 [9.1,11.1]
Sex								**	
Male	25.5 [22.9,28.4]	74.9 [69.1,79.9]	65.5 [59.8,70.8]	26.5 [22.7,30.7]	71.3 [68.2,74.3]	17.0 [14.5,19.9]	3.7 [2.8,5.0]	25.2 [23.2,27.2]	10.2 [9.0,11.5]
Female	26.4 [23.3,29.8]	75.5 [69.8,80.5]	63.2 [57.1,68.9]	27.0 [21.9,32.8]	75.2 [71.7,78.4]	16.3 [13.7,19.2]	2.8 [2.0,3.9]	21.9 [20.1,23.8]	9.6 [8.4,11.0]
Age in months	***							***	***
<6	36.1 [30.6,42.0]	76.6 [59.5,88.0]	59.8 [42.5,75.0]	NA	70.4 [66.0,74.4]	19.4 [16.1,23.3]	3.2 [2.1,4.9]	12.3 [9.5,15.8]	15.4 [12.5,18.8]
6–8	37.7 [31.7,44.1]	67.6 [53.2,79.2]	63.9 [48.7,76.8]	NA	73.2 [67.3,78.4]	16.7 [12.4,22.3]	4.0 [2.1,7.2]	12.7 [8.9,17.9]	15.4 [11.1,21.0]
9–11	44.3 [37.1,51.8]	77.6 [63.7,87.3]	65.6 [51.8,77.1]	NA	73.7 [67.7,78.9]	14.4 [10.9,18.9]	4.6 [2.5,8.2]	17.8 [13.2,23.5]	11.0 [7.4,16.2]
12–17	33.7 [28.7,39.1]	79.3 [69.8,86.4]	67.2 [56.4,76.4]	24.4 [20.1,29.3]	75.7 [71.6,79.5]	14.7 [11.7,18.2]	2.7 [1.7,4.5]	22.6 [19.0,26.7]	14.7 [11.9,18.1]
18–23	33.6 [28.3,39.4]	76.8 [66.5,84.7]	52.0 [40.5,63.2]	29.8 [24.8,35.4]	74.2 [69.2,78.5]	16.6 [13.0,20.9]	2.7 [1.6,4.5]	25.3 [21.2,30.0]	10.6 [7.5,14.6]
24–35	24.5 [21.1,28.2]	77.0 [68.4,83.9]	70.3 [60.6,78.4]	NA	NA	NA	NA	25.9 [23.0,29.0]	8.9 [7.1,11.0]
36–47	18.1 [15.4,21.2]	70.3 [59.8,79.0]	66.2 [55.5,75.4]	NA	NA	NA	NA	25.6 [22.7,28.8]	6.8 [5.4,8.5]
48–59	15.0 [12.7,17.7]	74.0 [57.8,85.5]	63.3 [47.1,77.0]	NA	NA	NA	NA	29.4 [26.4,32.5]	6.7 [5.4,8.4]
Birth order	***			*	*				
1	47.4 [43.3,51.6]	79.6 [71.0,86.1]	65.9 [56.3,74.4]	26.4 [20.1,33.8]	67.6 [62.2,72.5]	18.4 [14.6,23.0]	4.5 [2.9,6.9]	NA	NA
2–3	28.8 [25.6,32.2]	72.3 [64.5,78.9]	61.2 [53.2,68.6]	21.8 [16.8,27.9]	76.1 [72.6,79.3]	15.6 [12.8,19.0]	2.7 [1.7,4.1]	NA	NA
4–5	18.3 [15.6,21.4]	76.4 [67.5,83.5]	70.6 [61.6,78.3]	23.1 [16.8,31.0]	73.9 [69.0,78.3]	17.8 [14.0,22.4]	2.6 [1.6,4.4]	NA	NA
6+	14.7 [12.1,17.7]	74.1 [67.1,80.1]	61.1 [53.0,68.5]	35.2 [28.5,42.5]	74.1 [69.9,77.8]	15.5 [12.6,19.1]	3.5 [2.3,5.3]	NA	NA
Mother's education level	***			**				***	
None	15.8 [13.7,18.2]	74.7 [69.3,79.4]	66.5 [60.6,71.9]	31.6 [27.0,36.6]	73.4 [70.6,76.1]	16.8 [14.5,19.3]	3.0 [2.2,4.1]	27.5 [25.7,29.3]	10.7 [9.5,12.1]
Primary	36.3 [32.5,40.3]	76.8 [69.3,82.9]	64.1 [54.9,72.5]	20.4 [15.0,26.9]	74.1 [70.0,77.9]	16.4 [13.3,20.2]	3.9 [2.6,5.8]	18.0 [15.6,20.7]	9.1 [7.5,10.9]
Secondary+	80.8 [75.1,85.4]	73.4 [56.6,85.3]	48.3 [35.4,61.4]	12.9 [5.3,28.2]	69.8 [62.7,76.1]	16.5 [12.0,22.4]	2.7 [1.6,4.4]	11.1 [8.1,15.0]	7.3 [5.1,10.3]
Region	***	*	***	***	***	***	***	***	***
Tigray	56.8 [49.2,64.1]	67.7 [55.5,77.9]	53.6 [42.3,64.4]	7.7 [3.5,15.9]	63.0 [56.5,69.1]	27.5 [21.8,34.1]	5.5 [3.4,8.7]	23.0 [20.2,26.1]	11.1 [9.1,13.4]
Afar	14.0 [10.4,18.6]	85.0 [72.7,92.4]	77.7 [62.5,88.0]	52.9 [39.3,66.1]	42.0 [34.5,49.9]	32.9 [26.9,39.6]	12.1 [9.1,16.0]	36.2 [30.8,42.1]	17.7 [14.3,21.8]
Amhara	26.9 [22.7,31.7]	67.5 [56.8,76.7]	42.1 [32.9,51.8]	19.2 [13.2,27.1]	66.0 [59.6,71.9]	16.7 [12.8,21.5]	5.1 [3.2,8.1]	28.4 [25.1,31.9]	9.8 [8.0,11.9]
Oromia	18.6 [14.1,24.0]	78.9 [72.3,84.2]	75.2 [68.3,81.1]	35.2 [28.4,42.6]	76.7 [72.9,80.2]	16.5 [13.3,20.4]	2.1 [1.3,3.5]	22.5 [20.1,25.2]	10.6 [9.0,12.4]
Somali	17.4 [12.6,23.5]	83.7 [71.2,91.4]	73.5 [56.5,85.5]	38.4 [29.3,48.4]	78.2 [71.6,83.6]	6.1 [3.7,10.1]	4.4 [2.6,7.2]	28.7 [24.7,33.0]	22.7 [18.2,27.9]
Benishangul	25.4 [18.9,33.2]	47.4 [31.7,63.6]	52.7 [35.6,69.2]	18.1 [10.2,30.1]	71.7 [65.8,77.0]	16.1 [11.9,21.3]	4.7 [2.6,8.4]	34.3 [28.5,40.6]	11.5 [8.4,15.5]
SNNPR	25.3 [21.0,30.2]	78.7 [71.8,84.3]	71.3 [61.1,79.7]	23.3 [16.2,32.3]	77.1 [71.6,81.8]	14.8 [10.9,19.8]	1.9 [1.0,3.8]	21.1 [17.8,24.8]	6.0 [4.7,7.6]
Gambela	39.9 [32.3,48.1]	70.5 [57.4,80.9]	47.6 [37.6,57.9]	26.9 [16.4,40.9]	67.1 [60.5,73.1]	15.5 [11.0,21.4]	5.3 [3.1,9.0]	19.4 [15.7,23.6]	14.1 [10.7,18.4]
Harari	48.6 [39.5,57.7]	69.2 [53.0,81.7]	86.4 [77.4,92.2]	21.2 [14.5,29.8]	89.4 [84.3,92.9]	5.6 [3.4,9.3]	1.2 [0.4,3.8]	20.0 [16.2,24.5]	10.7 [7.5,14.8]
Addis Ababa	93.6 [90.3,95.9]	62.8 [42.4,79.4]	25.8 [11.7,47.7]	2.5 [0.6,10.3]	67.5 [60.3,73.9]	15.4 [10.7,21.7]	7.5 [3.7,14.4]	5.0 [2.7,9.1]	3.5 [2.1,5.6]
Dire Dawa	56.2 [45.8,66.1]	90.5 [79.0,96.0]	71.8 [54.7,84.3]	1.8 [0.4,7.0]	90.5 [86.4,93.5]	2.5 [1.0,5.9]	1.2 [0.4,3.8]	26.2 [21.5,31.5]	9.7 [6.8,13.8]

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$ for tests of associations between each variable and the outcome.

Appendix Table 7 Unadjusted (U) and adjusted (A) coefficients of the logit regression of each outcome, Ethiopia

			Diarrhea						Breastfed									
	Health facility delivery		Less or no food		Less or no liquids		Zero-dose child		within 1 hour after birth		1–6 hours after birth		7–24 hours after birth		Underweight		Overweight or obese	
Variable	**U**	**A**	**U**	**A**	**U**	**A**	**U**	**A**	**U**	**A**	**U**	**A**	**U**	**A**	**U**	**A**	**U**	**A**
Urban poverty cluster																		
Urban non-poor (Ref.)																		
Urban poor	-1.48***	-1.06**	-0.10	0.01	-0.63	-0.78	1.77*	1.74*	-0.20	-0.26	-0.45	-0.43	-0.36	-0.40	0.99***	0.84**	0.74*	0.64*
Rural	-3.83***	-3.08***	0.38	0.46	0.21	-0.06	2.86***	2.62***	-0.10	-0.21	0.04	0.11	-0.23	-0.33	1.53***	1.09***	0.73**	0.46
Sex																		
Male (Ref.)																		
Female		0.01		0.02		-0.06		0.06		0.19		-0.04		-0.28		-0.17*		-0.10
Age in months																		
<6 (Ref.)																		
6–8		0.08		-0.41		0.20		-		0.12		-0.17		0.19		0.04		-0.00
9–11		0.40*		0.09		0.30		-		0.15		-0.34		0.37		0.47		-0.35
12–17 (Ref. for zero-dose)		-0.01		0.16		0.30				0.26		-0.33		-0.16		0.70***		-0.09
18–23		-0.00		0.04		-0.34		0.31		0.15		-0.18		-0.16		0.87***		-0.43
24–35		-0.55***		0.03		0.39		-		-		-		-		0.87***		-0.61***
36–47		-0.96***		-0.27		0.27		-		-		-		-		0.86***		-0.93***
48–59		-1.24***		-0.11		-0.01		-		-		-		-		1.03***		-0.98***
Birth order																		
1 (Ref.)																		
2–3		-0.60***		-0.35		-0.22		-0.55*		0.42**		-0.20		-0.51		-		-
4–5		-0.82***		-0.19		0.07		-0.68*		0.33		-0.07		-0.48		-		-
6+		-0.94***		-0.32		-0.36		-0.12		0.33*		-0.24		-0.19		-		-
Mother's education level																		
None (Ref.)																		
Primary		0.65***		0.07		-0.12		-0.64**		0.12		-0.05		0.19		-0.46***		-0.27*
Secondary+		1.73***		0.01		-0.69		-0.52		-0.07		0.07		-0.32		-0.74***		-0.53*
Observations	10,641	10,641	1,090	1,090	1,090	1,090	1,929	1,929	4,081	4,081	4,081	4,081	4,081	4,081	9,657	9,260	9,596	9,153

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$

Appendix Table 8 Crosstabulations of the urban poverty cluster variable and sociodemographic variables with the child health indicators with 95% Confidence Intervals (CI), Kenya

	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	Breastfed within 1 hour after birth	Breastfed 1–6 hours after birth	Breastfed 7–24 hours after birth	Underweight	Overweight or obese
Urban poverty cluster	***	*	***					***	
Urban non-poor	87.6 [84.9,89.9]	55.9 [47.6,63.9]	25.9 [20.5,32.2]	2.1 [0.7,6.1]	59.8 [52.8,66.4]	25.3 [20.1,31.3]	7.8 [5.3,11.5]	5.1 [3.9,6.7]	3.3 [2.4,4.4]
Urban poor	76.2 [73.7,78.5]	66.1 [61.0,70.9]	38.9 [33.3,44.8]	1.8 [1.0,3.4]	61.3 [56.1,66.2]	23.5 [19.8,27.7]	8.8 [6.0,12.7]	8.8 [7.7,10.2]	3.4 [2.8,4.2]
Rural	49.5 [47.6,51.4]	67.2 [64.6,69.7]	45.8 [43.1,48.5]	2.7 [2.0,3.7]	63.1 [60.6,65.7]	25.0 [22.9,27.3]	6.3 [5.1,7.7]	12.9 [12.0,13.9]	4.4 [3.8,5.0]
Sex	**	*	*	*				***	
Male	62.3 [60.5,64.0]	62.5 [59.1,65.8]	38.7 [35.6,41.9]	1.7 [1.2,2.6]	62.3 [59.5,65.1]	23.9 [21.4,26.6]	7.1 [5.6,9.0]	12.1 [11.2,13.1]	4.4 [3.8,5.0]
Female	60.0 [58.3,61.7]	68.5 [65.0,71.7]	44.8 [41.2,48.4]	3.2 [2.2,4.8]	62.1 [58.9,65.2]	25.8 [22.9,28.8]	6.8 [5.4,8.7]	9.8 [9.0,10.7]	3.7 [3.2,4.3]
Age in months	***	***						***	***
<6	67.8 [65.1,70.3]	84.4 [78.2,89.1]	39.2 [32.1,46.8]	NA	59.9 [54.9,64.8]	26.2 [22.5,30.2]	7.6 [5.5,10.3]	3.7 [2.8,5.0]	3.7 [2.8,5.0]
6–8	66.3 [62.5,69.8]	69.4 [61.2,76.5]	42.2 [35.4,49.3]	NA	61.9 [56.6,66.9]	26.0 [21.6,30.9]	6.4 [4.0,10.0]	8.0 [6.0,10.6]	6.5 [4.6,9.1]
9–11	67.9 [64.5,71.1]	76.4 [70.7,81.3]	47.1 [40.0,54.4]	NA	63.7 [57.9,69.2]	22.7 [18.3,27.9]	7.4 [4.8,11.4]	8.8 [6.9,11.1]	6.5 [4.8,8.9]
12–17	63.5 [60.8,66.2]	70.7 [65.0,75.9]	46.3 [40.8,51.9]	2.0 [1.5,2.7]	65.3 [61.3,69.1]	23.1 [19.6,27.0]	5.6 [3.9,7.9]	11.1 [9.4,12.9]	5.5 [4.4,6.8]
18–23	62.6 [59.5,65.5]	67.4 [60.4,73.7]	44.4 [37.9,51.1]	3.0 [1.9,4.5]	60.2 [55.6,64.6]	25.9 [21.8,30.4]	8.1 [6.0,11.0]	11.8 [10.1,13.7]	4.7 [3.7,6.0]
24–35	61.7 [59.5,63.9]	56.4 [51.1,61.6]	36.6 [32.1,41.4]	NA	NA	NA	NA	12.5 [11.3,13.9]	3.0 [2.4,3.7]
36–47	58.5 [56.2,60.7]	52.7 [46.5,58.7]	38.9 [32.8,45.4]	NA	NA	NA	NA	12.2 [10.9,13.5]	3.3 [2.8,4.0]
48–59	55.6 [53.2,57.9]	58.2 [49.9,66.0]	38.7 [31.3,46.8]	NA	NA	NA	NA	12.1 [10.6,13.7]	3.7 [2.8,5.0]
Birth order	***		**	**	***		**		
1	78.6 [76.9,80.2]	64.9 [59.9,69.5]	41.7 [37.0,46.6]	2.2 [1.1,4.6]	54.3 [49.5,59.0]	28.3 [24.5,32.4]	10.6 [8.0,14.1]	NA	NA
2–3	66.1 [64.3,67.9]	63.6 [59.6,67.4]	37.5 [34.1,41.1]	1.5 [1.0,2.3]	66.1 [62.8,69.3]	23.0 [20.3,25.9]	5.5 [4.2,7.1]	NA	NA
4–5	47.7 [45.3,50.1]	65.4 [60.2,70.3]	42.5 [37.9,47.2]	2.6 [1.7,4.0]	63.1 [58.7,67.3]	26.0 [22.3,30.2]	4.9 [3.3,7.4]	NA	NA
6+	35.8 [32.9,38.8]	70.3 [64.9,75.1]	50.5 [45.2,55.9]	5.3 [3.0,9.2]	64.3 [59.3,69.0]	22.1 [18.4,26.3]	7.4 [4.8,11.2]	NA	NA
Mother's education level	***		***	***	***	***		***	***
None	24.9 [22.0,28.1]	70.9 [65.6,75.7]	47.2 [41.8,52.6]	8.6 [6.4,11.4]	76.0 [71.2,80.3]	11.3 [8.5,14.7]	9.6 [6.4,14.2]	20.6 [18.5,22.7]	10.2 [8.7,12.0]
Primary	55.5 [53.7,57.4]	65.2 [62.2,68.0]	43.8 [40.9,46.8]	1.7 [1.1,2.8]	61.4 [58.6,64.1]	26.2 [23.8,28.8]	6.3 [5.0,7.9]	11.5 [10.6,12.4]	3.4 [2.9,3.9]
Secondary+	84.4 [82.9,85.8]	63.5 [58.3,68.3]	34.7 [30.5,39.2]	1.6 [0.7,3.7]	58.8 [54.4,63.0]	27.2 [23.8,31.0]	7.2 [5.3,9.8]	5.6 [4.8,6.5]	3.0 [2.4,3.6]
Region	***	***	***	**	***	***		***	***
Coast	57.7 [52.9,62.3]	72.3 [66.8,77.3]	39.5 [32.2,47.3]	2.8 [1.2,6.6]	62.1 [54.1,69.4]	18.2 [13.7,23.8]	9.9 [6.8,14.3]	13.6 [11.6,15.9]	4.5 [3.5,5.8]
North Eastern	29.2 [23.6,35.6]	91.6 [84.5,95.6]	83.4 [75.5,89.0]	12.3 [8.0,18.4]	80.8 [73.2,86.7]	13.8 [8.7,21.2]	1.7 [0.5,5.6]	19.0 [16.4,21.9]	13.3 [11.3,15.6]
Eastern	62.7 [58.7,66.5]	69.5 [62.4,75.8]	49.7 [42.4,57.1]	1.0 [0.4,2.7]	64.9 [59.3,70.1]	28.5 [23.6,33.8]	3.4 [1.8,6.4]	12.2 [10.4,14.2]	4.4 [3.5,5.5]
Central	90.2 [88.2,91.9]	69.2 [59.6,77.4]	36.3 [29.0,44.3]	0.6 [0.2,2.0]	48.1 [40.6,55.6]	36.8 [29.2,45.0]	10.4 [6.5,16.2]	5.3 [4.1,6.9]	2.3 [1.5,3.3]
Rift Valley	50.2 [47.4,53.1]	64.1 [60.2,67.9]	38.9 [34.9,43.0]	2.6 [1.8,3.7]	69.4 [65.6,72.9]	16.7 [13.9,20.0]	7.8 [6.0,10.0]	15.3 [13.7,17.0]	5.7 [4.6,7.0]
Western	47.0 [43.2,50.8]	67.9 [62.1,73.2]	46.1 [41.2,51.1]	3.2 [1.2,8.4]	52.8 [46.7,58.8]	34.7 [29.9,39.8]	7.0 [4.1,11.6]	9.0 [7.6,10.8]	1.9 [1.4,2.7]
Nyanza	64.8 [61.0,68.4]	67.0 [62.3,71.4]	49.5 [44.8,54.3]	1.5 [0.6,3.4]	58.4 [53.4,63.2]	33.0 [28.9,37.4]	5.3 [3.2,8.5]	7.4 [6.3,8.8]	2.0 [1.5,2.7]
Nairobi	88.7 [83.3,92.5]	42.5 [31.3,54.4]	18.1 [9.4,32.1]	2.7 [0.6,10.5]	60.8 [49.6,70.9]	21.7 [14.3,31.4]	6.8 [3.2,14.2]	3.8 [2.2,6.6]	2.5 [1.4,4.3]

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$ for tests of associations between each variable and the outcome.

Appendix Table 9 Unadjusted (U) and adjusted (A) coefficients of the logit regression of each outcome, Kenya

			Diarrhea						Breastfed									
	Health facility delivery		Less or no food		Less or no liquids		Zero-dose child		within 1 hour after birth		1–6 hours after birth		7–24 hours after birth		Underweight		Overweight or obese	
Variable	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A
Urban poverty cluster																		
Urban non-poor (Ref.)																		
Urban poor	-0.79***	-0.52***	0.43*	0.42	0.60**	0.58*	-0.12	-0.31	0.06	-0.01	-0.10	-0.04	0.13	0.20	0.59***	0.41*	0.04	-0.11
Rural	-1.98***	-1.47***	0.48*	0.38	0.88***	0.78***	0.28	-0.17	0.14	0.02	-0.01	0.12	-0.24	-0.22	1.01***	0.70***	0.30	0.02
Sex																		
Male (Ref.)																		
Female		-0.11**		0.24*		0.25*		0.64*		-0.04		0.11		0.00		-0.25***		-0.19
Age in months																		
<6 (Ref.)																		
6–8		-0.13		-0.87**		0.19		-		0.07		0.02		-0.23		0.78***		0.54*
9–11		-0.01		-0.50		0.39		-		0.14		-0.17		-0.01		0.94***		0.57*
12–17 (Ref. for zero-dose)		-0.23*		-0.79**		0.38				0.22		-0.15		-0.33		1.18***		0.35
18–23		-0.34***		-0.92***		0.33		0.49		0.02		-0.03		0.08		1.30***		0.29
24–35		-0.33***		-1.41***		-0.01		-		-		-		-		1.30***		-0.25
36–47		-0.50***		-1.56***		0.11		-		-		-		-		1.22***		-0.21
48–59		-0.60***		-1.34***		0.08		-		-		-		-		1.24***		-0.04
Birth order																		
1 (Ref.)																		
2–3		-0.44***		-0.05		-0.27*		-0.50		0.46***		-0.23		-0.77***		-		-
4–5		-0.87***		-0.02		-0.17		-0.22		0.26		-0.01		-0.91**		-		-
6+		-1.13***		0.17		0.09		0.41		0.25		-0.17		-0.51		-		-
Mother's education level																		
None (Ref.)																		
Primary		1.13***		-0.23		-0.02		-1.63***		-0.69***		1.05***		-0.56*		-0.65***		-1.18***
Secondary+		2.15***		-0.16		-0.22		-1.65***		-0.72***		1.12***		-0.71*		-1.29***		-1.32***
Observations	20,964	20,964	2,950	2,950	2,950	2,950	4,052	4,052	3,821	3,821	3,821	3,821	3,821	3,821	20,524	18,979	20,524	18,979

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$

Appendix Table 10 Crosstabulations of the urban poverty cluster variable and sociodemographic variables with the child health indicators with 95% Confidence Intervals (CI), Nigeria

	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	Breastfed			Underweight	Overweight or obese
					within 1 hour after birth	1–6 hours after birth	7–24 hours after birth		
Urban poverty cluster	***	*		***	***	***	**	***	***
Urban non-poor	67.5 [64.9,70.0]	55.8 [50.7,60.7]	47.6 [42.5,52.7]	15.0 [12.6,17.7]	50.4 [48.4,52.5]	29.7 [27.8,31.8]	10.6 [9.3,12.0]	13.2 [11.9,14.6]	4.5 [3.9,5.3]
Urban poor	34.5 [28.9,40.5]	55.6 [47.6,63.4]	44.4 [35.9,53.2]	34.8 [25.1,45.8]	45.4 [36.7,54.5]	34.4 [29.2,40.0]	14.1 [10.6,18.5]	24.6 [20.2,29.7]	9.4 [6.9,12.6]
Rural	25.8 [24.2,27.5]	62.8 [60.1,65.5]	49.8 [47.0,52.6]	45.0 [42.5,47.5]	37.6 [36.0,39.2]	38.9 [37.2,40.6]	14.9 [13.7,16.1]	27.0 [25.6,28.5]	8.0 [7.2,8.8]
Sex	**							**	***
Male	40.3 [38.6,42.1]	59.6 [56.9,62.3]	47.6 [44.7,50.5]	34.8 [32.5,37.3]	42.3 [40.7,43.9]	35.3 [33.8,37.0]	13.8 [12.7,15.0]	23.1 [21.8,24.5]	8.0 [7.2,8.8]
Female	38.4 [36.6,40.1]	61.8 [58.8,64.7]	50.3 [47.3,53.3]	34.5 [32.1,37.0]	42.0 [40.0,44.0]	36.2 [34.5,37.9]	13.2 [12.1,14.3]	20.4 [19.1,21.8]	5.6 [4.9,6.3]
Age in months	***	**	**	***				***	***
<6	38.6 [36.0,41.3]	59.1 [52.7,65.3]	40.9 [34.6,47.5]	NA	41.1 [38.9,43.3]	35.8 [33.8,37.9]	13.7 [12.3,15.3]	16.8 [14.4,19.5]	7.0 [5.4,9.1]
6–8	40.2 [37.4,43.1]	63.7 [57.9,69.2]	56.3 [50.3,62.1]	NA	41.9 [39.3,44.7]	36.0 [33.3,38.7]	14.0 [12.2,16.0]	18.3 [15.0,22.1]	12.4 [9.4,16.2]
9–11	44.0 [40.7,47.3]	63.1 [56.6,69.2]	49.3 [42.6,56.1]	NA	42.5 [39.3,45.8]	37.9 [34.7,41.3]	12.4 [10.6,14.4]	20.8 [17.3,24.8]	14.7 [11.6,18.4]
12–17	40.1 [37.9,42.5]	65.9 [61.7,69.8]	53.9 [49.6,58.1]	37.6 [35.2,40.1]	41.7 [39.6,43.8]	35.9 [34.1,37.8]	13.6 [12.3,15.0]	26.5 [23.6,29.6]	13.7 [11.3,16.4]
18–23	43.8 [41.3,46.3]	65.5 [60.7,70.0]	48.1 [43.3,52.9]	30.8 [28.5,33.1]	44.1 [41.8,46.4]	33.9 [31.8,36.1]	13.4 [12.0,14.9]	23.6 [20.9,26.6]	8.1 [6.3,10.3]
24–35	40.0 [38.0,42.1]	55.4 [51.4,59.4]	47.4 [43.7,51.1]	NA	NA	NA	NA	25.1 [23.1,27.2]	5.3 [4.3,6.4]
36–47	37.7 [35.9,39.6]	56.4 [51.5,61.2]	46.1 [41.4,50.9]	NA	NA	NA	NA	21.6 [19.5,23.8]	3.1 [2.4,4.0]
48–59	37.4 [35.4,39.4]	58.6 [52.4,64.5]	47.6 [41.7,53.6]	NA	NA	NA	NA	18.9 [17.3,20.7]	3.9 [3.1,4.9]
Birth order	***			***	***	**	***		
1	52.3 [50.2,54.4]	59.1 [55.1,63.1]	49.0 [44.7,53.4]	26.9 [24.1,30.0]	40.1 [37.5,42.8]	32.9 [30.7,35.2]	14.6 [12.9,16.5]	NA	NA
2–3	45.0 [43.0,47.0]	60.9 [57.5,64.2]	47.5 [44.3,50.8]	29.0 [26.5,31.6]	44.7 [42.8,46.5]	35.2 [33.5,37.0]	12.1 [10.9,13.4]	NA	NA
4–5	37.2 [35.3,39.1]	57.9 [53.5,62.0]	47.1 [43.0,51.2]	36.0 [32.9,39.2]	43.8 [41.2,46.5]	36.4 [34.1,38.7]	12.1 [10.6,13.7]	NA	NA
6+	23.1 [21.7,24.7]	63.5 [60.1,66.9]	51.8 [47.8,55.7]	48.3 [45.0,51.6]	38.6 [36.3,40.9]	38.1 [35.9,40.3]	15.9 [14.4,17.5]	NA	NA
Mother's education level	***	**	***	***	***	***	***	***	***
None	13.8 [12.7,15.1]	63.1 [60.1,66.0]	52.8 [49.8,55.7]	60.1 [57.2,63.0]	34.2 [32.3,36.2]	40.2 [38.2,42.3]	16.9 [15.5,18.4]	34.1 [32.4,35.9]	9.5 [8.4,10.6]
Primary	40.5 [38.3,42.7]	61.9 [57.1,66.5]	45.3 [40.4,50.2]	27.3 [23.4,31.6]	44.4 [41.2,47.7]	35.9 [33.4,38.6]	12.9 [11.0,15.0]	18.9 [17.0,21.0]	5.5 [4.2,7.2]
Secondary+	69.5 [67.8,71.2]	55.1 [50.9,59.2]	43.0 [39.0,47.2]	11.4 [10.1,13.0]	50.0 [48.2,51.8]	30.8 [29.2,32.4]	10.0 [9.0,11.0]	12.0 [10.9,13.2]	5.1 [4.5,5.8]
Region	***	***	***	***	***	***	***	***	***
North Central	49.2 [45.9,52.5]	42.7 [36.8,48.8]	35.9 [29.9,42.4]	29.6 [24.7,34.9]	60.3 [57.2,63.3]	27.4 [24.3,30.7]	5.8 [4.8,7.1]	14.8 [12.6,17.2]	5.6 [4.5,6.9]
North East	25.4 [22.5,28.5]	67.1 [62.7,71.2]	49.4 [45.0,53.8]	44.8 [41.0,48.7]	27.4 [24.6,30.3]	46.3 [43.3,49.4]	15.5 [13.6,17.6]	29.9 [27.4,32.5]	9.7 [8.4,11.3]
North West	15.6 [13.6,17.7]	66.4 [63.2,69.4]	60.4 [57.0,63.7]	55.5 [51.7,59.2]	32.4 [30.0,34.9]	41.7 [39.3,44.2]	19.0 [17.2,20.9]	34.7 [32.3,37.3]	9.0 [7.8,10.4]
South East	81.8 [78.5,84.7]	44.3 [37.6,51.1]	26.1 [20.2,33.1]	7.8 [5.5,10.8]	39.4 [36.7,42.1]	33.5 [30.7,36.5]	15.2 [12.8,17.9]	10.4 [8.7,12.4]	4.5 [3.6,5.5]
South South	50.2 [46.2,54.2]	50.5 [42.0,59.0]	30.3 [23.0,38.8]	15.0 [11.9,18.7]	55.4 [51.8,58.9]	23.8 [20.7,27.3]	9.2 [7.3,11.6]	10.0 [8.2,12.1]	4.3 [3.2,5.7]
South West	76.3 [73.2,79.2]	43.9 [34.7,53.6]	30.7 [22.7,40.0]	11.3 [8.4,14.9]	63.3 [59.4,67.1]	23.2 [20.6,26.0]	5.3 [4.0,7.0]	14.8 [12.6,17.4]	4.9 [3.8,6.4]

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$ for tests of associations between each variable and the outcome.

Appendix Table 11 Unadjusted (U) and adjusted (A) coefficients of the logit regression of each outcome, Nigeria

			Diarrhea						Breastfed									
	Health facility delivery		Less or no food		Less or no liquids		Zero-dose child		within 1 hour after birth		1–6 hours after birth		7–24 hours after birth		Underweight		Overweight or obese	
Variable	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A
Urban poverty cluster																		
Urban non-poor (Ref.)																		
Urban poor	-1.37***	-0.80***	-0.00	-0.09	-0.13	-0.26	1.11***	0.40	-0.20	-0.03	0.21	0.11	0.33	0.14	0.76***	0.32*	0.78***	0.59**
Rural	-1.79***	-1.03***	0.29*	0.19	0.09	-0.09	1.54***	0.58***	-0.52***	-0.28***	0.41***	0.27***	0.39***	0.13	0.89***	0.35***	0.60***	0.33**
Sex																		
Male (Ref.)																		
Female		-0.08*		0.09		0.11		0.00		-0.01		0.03		-0.06		-0.15**		-0.35***
Age in months																		
<6 (Ref.)																		
6–8		0.16		0.20		0.60***		-		0.06		0.00		0.00		0.03		0.61**
9–11		0.14		0.20		0.37		-		0.03		0.11		-0.09		0.38*		0.88***
12–17 (Ref. for zero-dose)		0.08		0.28		0.51**				0.03		0.01		-0.02		0.60***		0.71***
18–23		0.15		0.29		0.29		-0.25***		0.10		-0.07		-0.01		0.52***		0.16
24–35		0.08		-0.17		0.22		-		-		-		-		0.53***		-0.30
36–47		-0.02		-0.14		0.17		-		-		-		-		0.32*		-0.89***
48–59		0.02		-0.07		0.21		-		-		-		-		0.13		-0.69***
Birth order																		
1 (Ref.)																		
2–3		-0.30***		0.08		-0.06		-0.01		0.21**		0.09		-0.24*		-		-
4–5		-0.32***		-0.09		-0.14		0.04		0.26***		0.09		-0.32**		-		-
6+		-0.52***		0.10		-0.01		0.06		0.19*		0.08		-0.13		-		-
Mother's education level																		
None (Ref.)																		
Primary		1.28***		-0.02		-0.31**		-1.28***		0.36***		-0.13*		-0.29**		-0.75***		-0.57***
Secondary+		2.18***		-0.30*		-0.44***		-2.19***		0.56***		-0.29***		-0.55***		-1.20***		-0.56***
Observations	33,924	33,924	3,956	3,956	3,956	3,956	6,059	6,059	12,818	12,818	12,818	12,818	12,818	12,818	12,478	11,639	12,434	11,590

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$

Appendix Table 12 Crosstabulations of the urban poverty cluster variable and sociodemographic variables with the child health indicators with 95% Confidence Intervals (CI), Tanzania

	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	Breastfed			Underweight	Overweight or obese
					within 1 hour after birth	1–6 hours after birth	7–24 hours after birth		
Urban poverty cluster	***				*	*	**	***	
Urban non-poor	90.9 [89.0,92.6]	54.4 [46.6,62.0]	24.7 [19.6,30.6]	1.1 [0.4,2.8]	56.1 [51.4,60.7]	30.6 [26.5,35.0]	8.5 [6.4,11.1]	8.5 [7.2,10.1]	3.7 [2.9,4.9]
Urban poor	51.1 [16.9,84.3]	(28.2) [12.8,51.1]	(17.9) [9.1,32.3]	0	39.9 [22.3,60.7]	34.6 [14.0,63.3]	19.2 [6.9,43.1]	13.8 [3.7,40.0]	4.2 [0.7,23.0]
Rural	53.7 [50.5,56.9]	48.8 [44.2,53.4]	30.6 [26.5,35.1]	3.9 [2.8,5.4]	50.0 [47.3,52.7]	37.7 [35.4,40.1]	8.9 [7.5,10.5]	15.2 [14.1,16.4]	4.7 [4.2,5.3]
Sex	*								**
Male	63.9 [60.9,66.9]	50.2 [45.3,55.0]	26.1 [22.0,30.5]	2.8 [1.8,4.2]	50.2 [47.3,53.1]	36.5 [34.0,38.9]	9.2 [7.6,11.0]	14.1 [12.9,15.4]	5.2 [4.5,6.0]
Female	61.2 [58.2,64.1]	50.0 [44.5,55.5]	31.2 [26.4,36.5]	3.4 [2.3,4.9]	52.3 [49.2,55.3]	35.2 [32.4,38.1]	9.0 [7.5,10.9]	13.2 [12.1,14.5]	3.8 [3.2,4.5]
Age in months		*						***	***
<6	64.6 [60.1,68.9]	70.5 [56.3,81.6]	36.5 [23.3,52.2]	NA	47.2 [43.1,51.4]	37.4 [33.9,41.0]	10.7 [8.4,13.6]	6.4 [4.9,8.4]	9.4 [7.5,11.7]
6–8	63.6 [58.1,68.8]	48.7 [37.8,59.7]	29.5 [20.2,41.0]	NA	55.8 [50.2,61.3]	31.6 [26.6,37.0]	8.4 [5.8,12.0]	8.7 [6.4,11.8]	4.6 [2.9,7.2]
9–11	62.6 [56.7,68.1]	57.6 [46.9,67.7]	34.8 [24.7,46.4]	NA	50.3 [44.4,56.2]	34.5 [29.2,40.3]	11.4 [8.1,15.9]	14.6 [11.0,19.2]	9.7 [6.4,14.4]
12–17	65.9 [62.0,69.6]	53.3 [46.0,60.4]	27.5 [21.7,34.2]	2.7 [1.7,4.0]	52.3 [48.5,56.1]	37.1 [33.7,40.7]	7.5 [6.0,9.3]	14.1 [11.8,16.7]	5.7 [4.4,7.4]
18–23	65.4 [61.1,69.5]	44.5 [36.2,53.2]	24.9 [19.0,31.9]	3.5 [2.3,5.1]	52.0 [48.1,55.8]	35.8 [32.5,39.3]	8.5 [6.6,10.9]	16.2 [13.7,19.1]	4.8 [3.5,6.6]
24–35	60.9 [57.5,64.2]	41.9 [33.6,50.8]	31.0 [24.1,39.0]	NA	NA	NA	NA	14.6 [12.9,16.6]	3.0 [2.2,4.1]
36–47	61.8 [57.8,65.8]	47.3 [37.2,57.6]	23.9 [16.3,33.8]	NA	NA	NA	NA	14.4 [12.3,16.8]	2.8 [2.0,3.8]
48–59	59.9 [56.3,63.5]	52.8 [36.3,68.7]	25.6 [13.5,43.0]	NA	NA	NA	NA	15.1 [13.2,17.3]	3.1 [2.3,4.3]
Birth order	***			**	***	**	*		
1	77.4 [74.8,79.7]	51.7 [44.6,58.7]	29.4 [23.8,35.7]	1.6 [0.7,3.5]	50.3 [46.7,53.8]	36.2 [32.9,39.6]	9.4 [7.6,11.5]	NA	NA
2–3	65.9 [62.7,69.0]	48.0 [42.1,53.9]	25.8 [20.7,31.8]	2.9 [1.7,4.9]	56.0 [52.7,59.3]	33.0 [29.8,36.4]	7.5 [5.9,9.4]	NA	NA
4–5	55.1 [51.1,59.0]	49.3 [41.3,57.3]	33.1 [25.6,41.7]	2.8 [1.5,4.9]	55.8 [51.6,59.8]	33.6 [29.9,37.6]	8.2 [6.1,10.9]	NA	NA
6+	46.7 [42.8,50.7]	52.5 [44.2,60.7]	28.4 [21.8,36.1]	5.9 [3.9,8.8]	39.1 [34.7,43.8]	42.6 [38.2,47.2]	12.6 [9.9,15.9]	NA	NA
Mother's education level	***			***	*	*		***	
None	40.8 [36.5,45.2]	55.8 [47.6,63.6]	32.5 [25.0,41.0]	8.3 [5.5,12.5]	46.5 [41.5,51.5]	41.3 [36.5,46.3]	8.9 [6.7,11.7]	16.3 [14.3,18.5]	5.1 [4.1,6.4]
Primary	63.7 [61.0,66.4]	48.9 [44.4,53.4]	28.9 [25.1,33.0]	1.9 [1.2,3.1]	51.7 [48.9,54.4]	34.8 [32.4,37.2]	9.6 [8.1,11.4]	14.2 [13.1,15.5]	4.9 [4.2,5.6]
Secondary+	89.4 [87.4,91.1]	49.1 [40.4,57.8]	24.0 [18.7,30.3]	1.2 [0.4,3.8]	54.7 [50.3,59.0]	33.8 [29.9,37.9]	7.4 [5.5,9.9]	7.0 [5.5,8.8]	3.7 [2.7,5.0]
Region	***	**	*		***	***	***	*	
Western	49.7 [39.5,59.8]	55.8 [43.4,67.5]	28.8 [18.7,41.5]	6.6 [3.6,12.1]	45.0 [37.0,53.3]	45.1 [38.3,52.2]	7.2 [4.3,12.0]	14.1 [11.1,17.8]	4.6 [3.6,5.9]
Northern	67.0 [56.0,76.4]	50.9 [35.6,66.0]	27.3 [14.4,45.5]	1.6 [0.4,6.2]	73.2 [67.6,78.1]	21.3 [16.9,26.5]	3.8 [2.2,6.5]	14.6 [10.9,19.2]	4.4 [3.0,6.6]
Central	60.1 [52.2,67.4]	38.7 [29.0,49.4]	24.5 [15.9,35.8]	1.9 [0.5,7.1]	72.1 [66.6,77.0]	24.3 [19.8,29.5]	2.6 [1.3,5.0]	15.4 [12.7,18.6]	5.5 [4.3,7.2]
Southern Highlands	87.9 [80.9,92.6]	65.4 [50.2,78.0]	42.1 [26.2,59.9]	0.6 [0.1,4.1]	64.4 [58.1,70.2]	26.8 [21.9,32.4]	6.8 [4.2,10.8]	12.2 [9.6,15.3]	2.6 [1.4,4.7]
Southern	81.1 [72.3,87.5]	32.2 [20.0,47.5]	28.3 [17.1,43.1]	0.8 [0.1,6.1]	48.1 [40.4,55.9]	36.7 [29.9,44.0]	7.8 [4.5,13.0]	12.9 [9.7,16.9]	2.3 [1.0,5.1]
South West Highlands	62.0 [52.9,70.4]	64.5 [52.7,74.7]	45.2 [33.8,57.2]	3.4 [1.7,6.6]	51.0 [44.4,57.5]	33.2 [26.6,40.5]	11.4 [6.9,18.3]	15.7 [13.5,18.4]	4.7 [3.5,6.3]
Lake	49.8 [45.4,54.1]	47.7 [39.8,55.6]	24.7 [19.6,30.7]	3.4 [1.8,6.2]	34.9 [31.1,38.9]	45.0 [41.4,48.7]	15.0 [12.3,18.1]	14.2 [12.5,16.1]	4.2 [3.5,5.0]
Eastern	86.7 [82.4,90.1]	45.0 [36.0,54.3]	22.4 [15.2,31.8]	2.2 [0.8,5.7]	57.0 [50.4,63.3]	31.1 [25.4,37.4]	6.6 [4.4,9.8]	8.9 [6.7,11.6]	5.1 [3.4,7.6]
Zanzibar	66.0 [61.6,70.1]	63.1 [54.5,70.9]	25.0 [19.3,31.8]	3.0 [1.4,6.6]	46.8 [42.8,50.9]	39.6 [35.3,43.9]	9.0 [6.6,12.2]	13.8 [11.6,16.3]	7.1 [5.7,8.7]

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$ for tests of associations between each variable and the outcome.

Appendix Table 13 Unadjusted (U) and adjusted (A) coefficients of the logit regression of each outcome, Tanzania

			Diarrhea						Breastfed									
	Health facility delivery		Less or no food		Less or no liquids		Zero-dose child		within 1 hour after birth		1–6 hours after birth		7–24 hours after birth		Underweight		Overweight or obese	
Variable	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A
Urban poverty cluster																		
Urban non-poor (Ref.)																		
Urban poor	-2.26***	-1.92***	-1.11*	-1.20*	-0.41	-0.43	empty	empty	-0.65*	-0.52*	0.18	0.12	0.94**	0.80**	0.54	0.56	0.13	0.03
Rural	-2.16***	-1.83***	-0.23	-0.32	0.30	0.23	1.29*	0.76	-0.25*	-0.14	0.32**	0.26*	0.06	-0.07	0.65***	0.55***	0.25	0.27
Sex																		
Male (Ref.)																		
Female		-0.10		-0.03		0.26		0.19		0.09		-0.06		-0.00		-0.08		-0.31*
Age in months																		
<6 (Ref.)																		
6–8		0.01		-0.92*		-0.38		-		0.37**		-0.28*		-0.27		0.33		-0.76**
9–11		-0.15		-0.60		-0.17		-		0.10		-0.12		0.11		0.95***		0.05
12–17 (Ref. for zero-dose)		0.04		-0.74*		-0.48				0.20		-0.01		-0.38*		0.86***		-0.56**
18–23		0.01		-1.13**		-0.62		0.29		0.16		-0.05		-0.20		1.10***		-0.65**
24–35		-0.13		-1.22***		-0.31		-		-		-		-		0.94***		-1.24***
36–47		-0.06		-0.99**		-0.64		-		-		-		-		0.88***		-1.21***
48–59		-0.12		-0.76		-0.61		-		-		-		-		0.92***		-1.10***
Birth order																		
1 (Ref.)																		
2–3		-0.46***		-0.20		-0.26		0.46		0.26**		-0.15		-0.31*		-		-
4–5		-0.60***		-0.13		0.05		0.13		0.27*		-0.17		-0.17		-		-
6+		-0.79***		0.00		-0.23		0.82		-0.37**		0.18		0.28		-		-
Mother's education level																		
None (Ref.)																		
Primary		0.70***		-0.38		-0.10		-1.35***		0.15		-0.22		0.12		-0.09		-0.05
Secondary+		1.65***		-0.49		-0.36		-1.46*		0.18		-0.17		-0.12		-0.71***		-0.34
Observations	10,233	10,233	1,125	1,125	1,125	1,125	2,102	2,102	4,219	4,219	4,219	4,219	4,219	4,219	10,239	9,230	10,150	9,135

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$

Appendix Table 14 Crosstabulations of the urban poverty cluster variable and sociodemographic variables with the child health indicators with 95% Confidence Intervals (CI), Uganda

	Health facility delivery	Less or no food during diarrhea	Less or no liquids during diarrhea	Zero-dose child	Breastfed within 1 hour after birth	Breastfed 1–6 hours after birth	Breastfed 7–24 hours after birth	Underweight	Overweight or obese
Urban poverty cluster	***	*	**		*	***		**	
Urban non-poor	91.3 [89.1,93.1]	49.5 [41.4,57.6]	35.5 [28.7,42.9]	5.7 [3.2,9.9]	71.2 [65.9,75.9]	16.9 [13.0,21.7]	5.0 [3.6,6.8]	5.4 [3.5,8.3]	2.8 [1.7,4.7]
Urban poor	77.7 [71.5,82.9]	57.2 [48.2,65.7]	40.4 [32.0,49.5]	4.5 [1.3,14.1]	71.0 [63.7,77.3]	20.0 [14.5,26.7]	4.7 [2.7,8.1]	12.6 [9.2,16.9]	3.0 [1.5,6.0]
Rural	69.5 [67.4,71.5]	59.8 [57.0,62.5]	48.3 [45.6,51.0]	5.0 [4.0,6.3]	64.7 [62.9,66.5]	27.7 [26.2,29.3]	3.7 [3.2,4.4]	11.2 [10.1,12.4]	3.7 [3.1,4.4]
Sex								*	
Male	72.9 [70.9,74.8]	57.4 [54.1,60.6]	45.6 [42.6,48.6]	4.8 [3.5,6.5]	66.1 [64.0,68.1]	25.4 [23.5,27.3]	4.0 [3.3,4.9]	11.4 [10.1,13.0]	4.1 [3.3,5.1]
Female	73.9 [71.9,75.7]	59.3 [55.8,62.7]	46.8 [43.4,50.3]	5.4 [4.1,7.2]	66.0 [63.7,68.3]	25.8 [23.8,27.9]	3.9 [3.2,4.8]	9.5 [8.3,10.9]	3.0 [2.4,3.8]
Age in months	***	***							***
<6	76.6 [73.3,79.6]	73.8 [68.0,78.9]	38.2 [32.6,44.3]	NA	68.0 [65.1,70.9]	23.0 [20.6,25.5]	4.1 [3.2,5.3]	10.0 [7.2,13.7]	7.6 [5.3,10.6]
6–8	77.8 [74.2,81.1]	62.5 [55.9,68.7]	46.8 [40.3,53.3]	NA	67.4 [63.5,71.0]	25.9 [22.7,29.3]	4.1 [2.8,5.8]	10.3 [6.9,15.2]	7.1 [4.4,11.3]
9–11	74.4 [70.0,78.4]	54.7 [47.9,61.3]	47.7 [41.2,54.3]	NA	64.9 [61.0,68.5]	26.3 [23.0,29.9]	3.4 [2.2,5.2]	14.4 [10.4,19.7]	10.5 [6.9,15.6]
12–17	76.3 [73.2,79.0]	58.6 [53.1,63.8]	47.8 [42.6,53.1]	5.5 [4.2,7.2]	63.3 [60.0,66.4]	27.3 [24.6,30.2]	4.5 [3.3,5.9]	13.5 [10.4,17.4]	6.0 [4.0,9.0]
18–23	77.2 [74.3,79.9]	55.5 [49.5,61.4]	43.6 [37.7,49.7]	4.7 [3.5,6.2]	66.7 [63.4,69.9]	26.1 [23.2,29.1]	3.7 [2.7,4.9]	10.1 [7.5,13.5]	2.5 [1.4,4.5]
24–35	72.3 [69.8,74.6]	54.1 [49.5,58.7]	48.0 [43.3,52.8]	NA	NA	NA	NA	11.3 [9.4,13.6]	2.3 [1.5,3.5]
36–47	72.2 [69.8,74.4]	55.8 [48.8,62.5]	47.0 [40.9,53.2]	NA	NA	NA	NA	10.1 [8.3,12.4]	1.9 [1.2,2.8]
48–59	69.1 [66.7,71.5]	54.9 [47.3,62.3]	47.9 [41.0,55.0]	NA	NA	NA	NA	7.9 [6.3,9.9]	1.6 [0.9,2.6]
Birth order	***			*	**		***		
1	85.5 [83.6,87.1]	57.6 [52.9,62.1]	46.1 [41.6,50.6]	3.6 [2.3,5.6]	61.6 [58.4,64.6]	25.7 [23.1,28.4]	6.5 [5.2,8.2]	NA	NA
2–3	75.7 [73.6,77.7]	57.6 [53.6,61.5]	45.2 [41.4,49.0]	5.6 [3.9,7.8]	67.3 [64.7,69.9]	25.8 [23.5,28.2]	3.5 [2.7,4.5]	NA	NA
4–5	68.7 [66.1,71.3]	58.3 [54.0,62.4]	45.9 [41.5,50.4]	3.9 [2.6,5.9]	69.0 [65.9,71.9]	25.3 [22.6,28.2]	2.3 [1.7,3.3]	NA	NA
6+	62.6 [60.0,65.1]	60.4 [55.4,65.2]	48.4 [43.6,53.2]	7.5 [5.3,10.5]	65.8 [62.5,69.0]	25.4 [22.5,28.5]	3.8 [2.7,5.3]	NA	NA
Mother's education level	***				***	***		***	
None	61.3 [57.5,64.9]	57.9 [52.3,63.4]	41.3 [35.2,47.8]	7.8 [4.8,12.3]	73.0 [68.8,76.9]	20.9 [17.6,24.7]	2.7 [1.6,4.5]	16.1 [12.9,19.9]	3.9 [2.4,6.2]
Primary	68.4 [66.4,70.4]	59.7 [56.8,62.6]	48.3 [45.5,51.1]	5.1 [4.0,6.6]	63.7 [61.7,65.6]	27.8 [26.1,29.6]	4.2 [3.5,5.0]	11.1 [9.8,12.7]	3.9 [3.2,4.8]
Secondary+	89.2 [87.6,90.6]	55.2 [49.9,60.3]	43.0 [38.0,48.2]	4.3 [2.9,6.2]	68.7 [65.6,71.6]	22.5 [20.0,25.2]	4.0 [3.1,5.2]	5.5 [4.2,7.3]	3.1 [2.0,4.6]
Region	***	***	***	**	***	***	***	***	***
Kampala	94.3 [91.5,96.3]	44.9 [30.3,60.4]	30.3 [19.6,43.6]	5.2 [2.7,9.9]	70.2 [62.3,77.0]	20.2 [14.1,28.0]	2.5 [1.1,5.4]	7.0 [3.4,13.9]	3.9 [1.8,8.3]
South Buganda	81.1 [74.8,86.1]	47.7 [38.7,56.8]	37.9 [29.9,46.7]	9.1 [5.0,15.8]	70.9 [64.7,76.4]	19.4 [14.5,25.5]	5.0 [3.2,7.7]	7.5 [4.6,12.0]	1.1 [0.3,3.4]
North Buganda	74.7 [68.3,80.2]	44.3 [36.2,52.7]	35.6 [27.3,44.8]	8.0 [4.5,13.9]	69.1 [62.7,74.9]	20.7 [16.5,25.6]	4.3 [2.6,7.2]	7.5 [5.1,10.9]	2.3 [0.9,5.6]
Busoga	76.5 [71.2,81.1]	74.1 [66.3,80.7]	62.0 [54.4,69.0]	6.9 [3.6,12.8]	70.2 [63.7,76.0]	23.3 [18.8,28.4]	2.5 [1.3,4.9]	9.4 [7.0,12.4]	3.6 [2.2,5.9]
Bukedi	66.0 [59.6,71.9]	66.3 [59.0,72.9]	70.4 [62.2,77.5]	4.4 [2.6,7.6]	50.3 [45.0,55.5]	42.9 [37.5,48.4]	2.9 [1.5,5.5]	12.0 [8.0,17.5]	2.8 [1.4,5.4]
Bugisu	56.2 [47.9,64.1]	58.6 [49.4,67.2]	29.7 [20.7,40.6]	2.1 [0.8,5.7]	58.3 [51.5,64.8]	27.6 [22.5,33.4]	8.8 [6.2,12.3]	14.9 [10.0,21.5]	5.0 [2.4,10.1]
Teso	73.9 [67.4,79.5]	79.9 [74.9,84.1]	65.8 [59.6,71.5]	2.1 [0.9,5.0]	57.8 [51.8,63.5]	36.9 [31.7,42.4]	2.6 [1.6,4.2]	4.0 [2.4,6.8]	2.2 [1.1,4.4]
Karamoja	71.2 [62.8,78.3]	60.9 [52.9,68.4]	39.4 [34.9,44.2]	1.5 [0.4,4.7]	93.4 [90.4,95.5]	4.1 [2.2,7.5]	0.7 [0.2,3.4]	25.8 [19.9,32.9]	10.0 [5.5,17.7]
Lango	66.3 [58.5,73.3]	71.6 [64.6,77.6]	56.1 [47.3,64.6]	4.5 [1.4,13.1]	44.8 [39.0,50.8]	38.3 [33.4,43.5]	10.5 [7.8,14.0]	7.5 [4.6,12.2]	5.0 [2.6,9.5]
Acholi	84.1 [79.4,87.9]	53.9 [45.5,62.0]	31.0 [24.1,38.7]	1.3 [0.3,5.2]	57.2 [50.0,64.1]	34.0 [27.4,41.3]	4.8 [2.9,7.7]	15.4 [11.2,20.8]	3.9 [2.2,6.9]
West Nile	78.2 [71.4,83.7]	60.3 [49.7,70.0]	43.4 [35.5,51.7]	2.4 [1.0,5.7]	42.4 [36.3,48.7]	48.9 [44.1,53.8]	5.7 [3.7,8.8]	16.7 [12.7,21.7]	10.4 [7.4,14.5]
Bunyoro	56.9 [46.5,66.7]	41.6 [29.4,54.9]	31.9 [21.5,44.6]	5.6 [3.0,10.2]	75.4 [69.7,80.3]	15.3 [10.8,21.3]	3.1 [1.6,5.8]	9.1 [6.3,12.8]	2.3 [0.9,6.0]
Tooro	73.6 [67.3,79.2]	51.6 [41.9,61.1]	45.4 [37.2,53.9]	6.3 [3.7,10.8]	79.1 [74.1,83.4]	13.5 [10.0,17.9]	2.2 [1.0,4.5]	13.3 [9.3,18.5]	3.4 [2.2,5.2]
Ankole	70.6 [63.9,76.4]	46.2 [37.9,54.7]	31.6 [24.2,40.2]	3.1 [1.3,7.0]	80.3 [76.1,84.0]	15.2 [11.7,19.6]	1.9 [0.8,4.2]	9.9 [7.2,13.6]	1.8 [0.8,3.9]
Kigezi	69.7 [61.9,76.4]	40.8 [31.8,50.5]	36.6 [28.3,45.8]	1.7 [0.5,5.7]	75.6 [69.5,80.9]	22.2 [17.4,27.7]	1.8 [0.6,5.2]	9.8 [6.9,13.6]	3.7 [1.8,7.5]

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$ for tests of associations between each variable and the outcome.

Appendix Table 15 Unadjusted (U) and adjusted (A) coefficients of the logit regression of each outcome, Uganda

			Diarrhea						Breastfed									
	Health facility delivery		Less or no food		Less or no liquids		Zero-dose child		within 1 hour after birth		1–6 hours after birth		7–24 hours after birth		Underweight		Overweight or obese	
Variable	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A	U	A
Urban poverty cluster																		
Urban non-poor (Ref.)																		
Urban poor	-1.10***	-0.67**	0.31	0.32	0.21	0.23	-0.25	-0.46	-0.01	-0.01	0.20	0.20	-0.05	-0.02	0.93**	0.73*	0.05	0.16
Rural	-1.53***	-1.09***	0.42*	0.39*	0.53**	0.52**	-0.13	-0.33	-0.30*	-0.28*	0.63***	0.63***	-0.29	-0.31	0.79***	0.67*	0.28	0.27
Sex																		
Male (Ref.)																		
Female		0.03		0.09		0.06		0.11		-0.01		0.03		-0.02		-0.14		-0.40*
Age in months																		
<6 (Ref.)																		
6–8		0.04		-0.55**		0.35		-		-0.04		0.17		0.01		0.08		-0.03
9–11		-0.21		-0.85***		0.42*		-		-0.16		0.22		-0.21		0.49		0.41
12–17 (Ref. for zero-dose)		-0.09		-0.68***		0.42*				-0.22*		0.26**		0.06		0.30		-0.20
18–23		-0.03		-0.79***		0.28		-0.21		-0.09		0.21		-0.12		0.00		-1.17**
24–35		-0.25**		-0.89***		0.40*		-		-		-		-		0.02		-1.42***
36–47		-0.24**		-0.82***		0.36*		-		-		-		-		-0.05		-1.60***
48–59		-0.40***		-0.87***		0.40*		-		-		-		-		-0.33		-1.64***
Birth order																		
1 (Ref.)																		
2–3		-0.58***		0.02		-0.05		0.45		0.25**		0.00		-0.66***		-		-
4–5		-0.79***		0.01		-0.06		0.07		0.35***		-0.06		-1.07***		-		-
6+		-0.86***		0.08		0.06		0.69*		0.21		-0.07		-0.54*		-		-
Mother's education level																		
None (Ref.)																		
Primary		0.15		0.10		0.32*		-0.37		-0.41***		0.37**		0.35		-0.43**		-0.04
Secondary+		1.13***		0.02		0.25		-0.56		-0.23		0.22		0.12		-1.04***		-0.28
Observations	15,522	15,522	2,923	2,923	2,923	2,923	2,922	2,922	5,992	5,992	5,992	5,992	5,992	5,992	5,179	4,536	5,229	4,516

* Significant at $p < .05$; ** significant at $p < .01$; *** significant at $p < .001$