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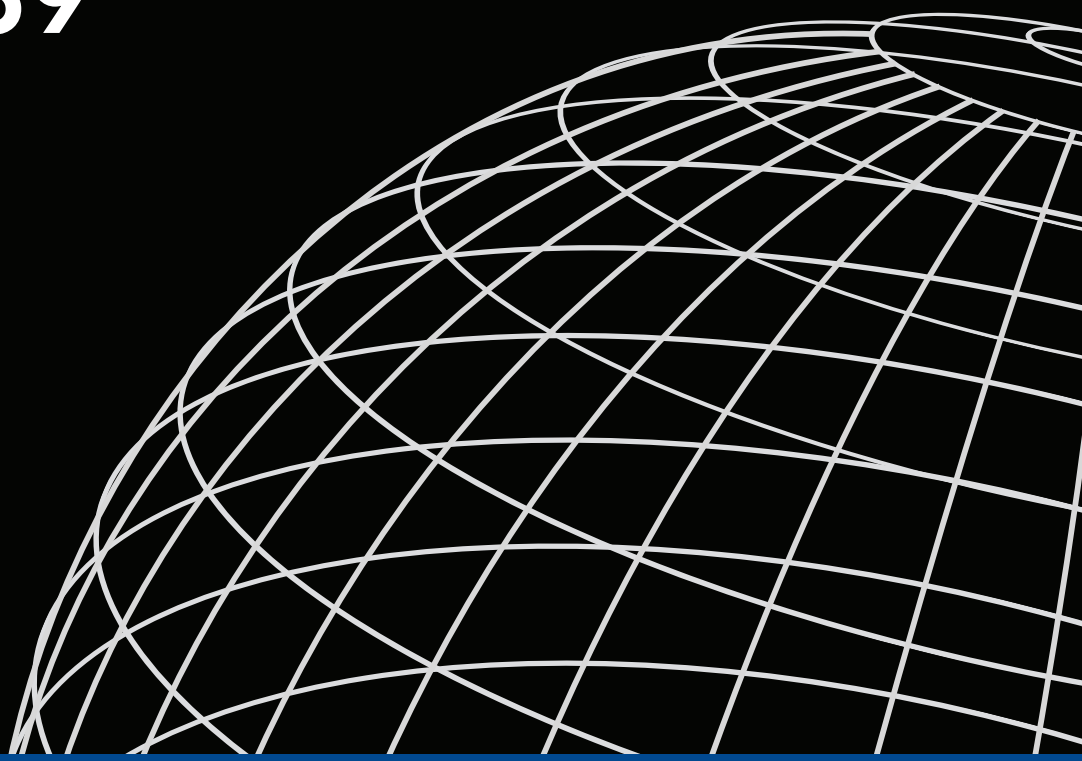

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Inequity in Effective Coverage by Urban Poverty Status

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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 United States 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

Previous research has established intra-urban disparities in intervention coverage and quality of care between the urban poor and non-poor. However, effective coverage (that is, combining measures of need for a health service with coverage and quality into one metric), is increasingly being used to evaluate the performance of urban health care systems. This study examined inequities in antenatal care (ANC) and sick child care effective coverage by urban poverty status in six countries: Afghanistan, Democratic Republic of the Congo (DRC), Ethiopia, Haiti, Nepal, and Tanzania. Inequalities were assessed using previously developed measures that combine data from Demographic and Health Surveys (DHS) and Service Provision Assessment surveys. Results showed that more than half of urban women of reproductive age in Afghanistan and Ethiopia, and more than half of urban children under 5 in Afghanistan and DRC, were living in urban poor clusters. In contrast, fewer than 6% of urban women of reproductive age and fewer than 12% of urban children under 5 in Haiti, Nepal, and Tanzania lived in urban poor clusters. When we calculated effective coverage, results differed between the ANC and sick child care cascades. For ANC, statistically significant disparities in quality-adjusted coverage (the last of four steps in the cascade) were found in DRC, Ethiopia, and Haiti. The differences in urban poor versus non-poor effective coverage were driven by statistically significant differences in two DHS component measures: service contact and receipt of complete intervention. No statistically significant disparities were found in sick child effective coverage by urban poverty status in any of the countries. Policymakers and program managers should consider approaches to disaggregating effective coverage measures by urban poverty status whenever possible to identify urban populations most at risk.

Key words: antenatal care, sick child care, effective coverage, quality of care, measurement, SPA, DHS, Afghanistan, DRC, Ethiopia, Haiti, Nepal, Tanzania

1 BACKGROUND

Although extensive progress has been made in maternal and child health over the past two decades, these gains have not been felt equally across sociodemographic groups.[1] On average, the poorest children in the world are still up to three times more likely to die before their fifth birthday than children in the richest quintile globally.[2] Evidence suggests further inequities by wealth status in both use of health services[3,4] and quality of care received through those services,[5–7] with poorer groups having lower use of services and lower quality of care. Although patterns of inequality across wealth quintiles are relatively consistent, disparities between urban and rural residents are more mixed. Rural residents have been shown to have lower levels of coverage for important services like health facility delivery, antenatal care, and postnatal care,[4,8] likely due to limited access to health services,[9] while urban residents experience higher rates of obesity and chronic diseases such as hypertension when compared with rural residents.[10,11]

Rapid urban growth over the past few decades has led to an increased focus on urban dwellers. Although studies often show higher coverage rates for urban residents than for rural ones, this type of comparison can mask intra-urban inequities between the poor and non-poor. A large proportion of the urban growth in low- and middle-income countries has been among the urban poor. This population may include migrants such as refuges or other external or displaced populations, or individuals who moved from rural to urban areas hoping for better access to health services, higher-quality education, and more employment opportunities.[12] However, once in urban areas, approximately half of new urban workers are employed in informal work,[13] leaving many without the economic lift they had anticipated. This in turn has led to increasing rates of poverty among urban residents. Natural population increases have also contributed, as fertility is higher in urban poor areas than in other urban areas.[14]

Because a portion of the urban poor are highly mobile, splitting time between urban and rural areas, identifying members of this group and determining their specific and diverse needs is challenging. As there is no global consensus on the definition of urban poverty or "urban poor,"[15] summarizing research findings in this population can also be difficult. However, high-level patterns are clear. The previously described urban advantage in coverage of health services and practices does not seem to apply to the urban poor in many aspects of clinical care. For example, when compared with urban non-poor areas, urban poor areas have lower health care accessibility and poorer quality of maternal and infant care in many countries.[15,16] These disparities have contributed to poorer health outcomes among the urban poor. Research has also found higher rates of stunting in "slum children"[*] than in other urban children in several regions of the world.[17] And, in countries with large disparities in child survival, urban poor children are 3–5 times more likely to die than urban non-poor children.[18]

Although many studies have assessed equity in specific coverage or quality of care indicators, only a handful have examined equity in *effective* coverage by wealth, urban-rural residence, or other gradients.[19–21] Effective coverage is an increasingly popular approach for gauging health system performance, by combining measures of need for a health service with measures of coverage and quality into one metric. This resulting metric is defined as the proportion of the population in need of a service that has a positive

[*] The terms "urban poor" and "slum dweller" are not interchangeable but do overlap significantly, with more research on slum populations. Therefore, in this background we describe research on both slum populations and the urban poor.

health outcome from that service.[22] In the case of this research, data on health outcomes is not available, therefore our effective coverage cascade stops short of measuring outcomes but focuses on receipt of quality services. Although using effective coverage as a measure of equity has some limitations and has led to some conflicting results,[23] patterns of lower effective coverage for the poorest groups (compared with wealthier groups) and for rural residents (compared with urban residents) have emerged.[19,21] A scan of the literature identified no research looking at effective coverage by urban poverty status.

This study sought to fill this gap in the literature by using data from Demographic and Health Surveys and Service Provision Assessment surveys to measure effective coverage cascades[24] (that is, coverage along the cascade from a patients' first point of service to their receipt of needed services) and apply these cascades to urban poor and non-poor populations. We focused on coverage for antenatal care and sick child care as essential aspects of primary health care in six countries.

2 DATA AND METHODS

Demographic and Health Surveys (DHS) and Service Provision Assessment (SPA) data were used to measure urban poverty as well as coverage and quality components of antenatal care (ANC) and sick child effective coverage in each country. These estimates were then combined to calculate effective coverage cascades and to identify disparities in effective coverage in urban poor versus urban non-poor populations.

2.1 Data

This analysis was based on DHS and SPA data from six countries: Afghanistan, Democratic Republic of the Congo (DRC), Ethiopia, Haiti, Nepal, and Tanzania (Table 1). For each country, we selected data from the most recent SPA survey and a corresponding DHS survey conducted within 2–3 years of the SPA survey. However, for the DRC, the most recent DHS survey was conducted 3–4 years before the most recent SPA survey. The SPA surveys were conducted in a sample of facilities in each country except for Haiti, where the SPA survey was a census of all facilities in the country. Only seven provinces were included in the Afghanistan SPA survey, namely Kabul, Nangarhar, Paktya, Kunduz, Balkh, Kandahar, and Herat. Therefore, for this analysis, DHS data were restricted to these provinces. In Ethiopia, Tigray region but not Sidama region was included in the DHS survey, and vice versa for the SPA survey. Therefore, for consistency, data from both Tigray and Sidama were excluded from analysis. Only urban areas were included in the analysis since we were focused on intra-urban disparities (and because urban-rural disparities were already largely established in the literature). In addition, the 2019 Ethiopia DHS survey was a mini-DHS and did not include the necessary data to calculate the sick child coverage measures. Therefore, only the ANC effective coverage analysis was performed for Ethiopia.

Table 1 Surveys included in the analysis

Country	DHS survey	SPA survey	Years between SPA and DHS
Afghanistan	2015	2018–19	3
DRC	2013–14	2017–18	3–4
Ethiopia	2019	2021–2022	2
Haiti	2016–17	2017–18	1
Nepal	2022	2021	1
Tanzania	2014–15	2015–16	1

DHS = Demographic and Health Surveys
SPA = Service Provision Assessment

2.2 Urban Poverty Measure

According to the United Nations Human Settlements Programme (UN-HABITAT),[25] a slum household lacks **one or more** of the following: durable housing of permanent nature, sufficient living space (that is, not crowded), safe water in sufficient amounts at affordable price, access to adequate sanitation by a reasonable number of people, and security of tenure that prevents from forced evictions. The DHS Program collects data on four out of these five items, all but security of tenure. Therefore, to identify what we define as an urban poor household in our study, the definition was modified to include households lacking **two or more** of the following variables:

1. A household made of durable material for floor, wall, and roof. This excludes materials made from natural or rudimentary materials such as earth/sand, mud, wood planks, or cardboard

2. Not more than three persons per sleeping room (that is, not crowded)

3. Access to improved water

4. Access to improved sanitation

The most recent definition for improved water and sanitation as defined by the DHS Guide to Statistics was used.[26] Improved sanitation no longer takes into account whether the facility is shared, as in the previous definition. Appendix Table 1 summarizes the percentages of households included in our analysis (based on DHS data) that were positive for each of these four variables.

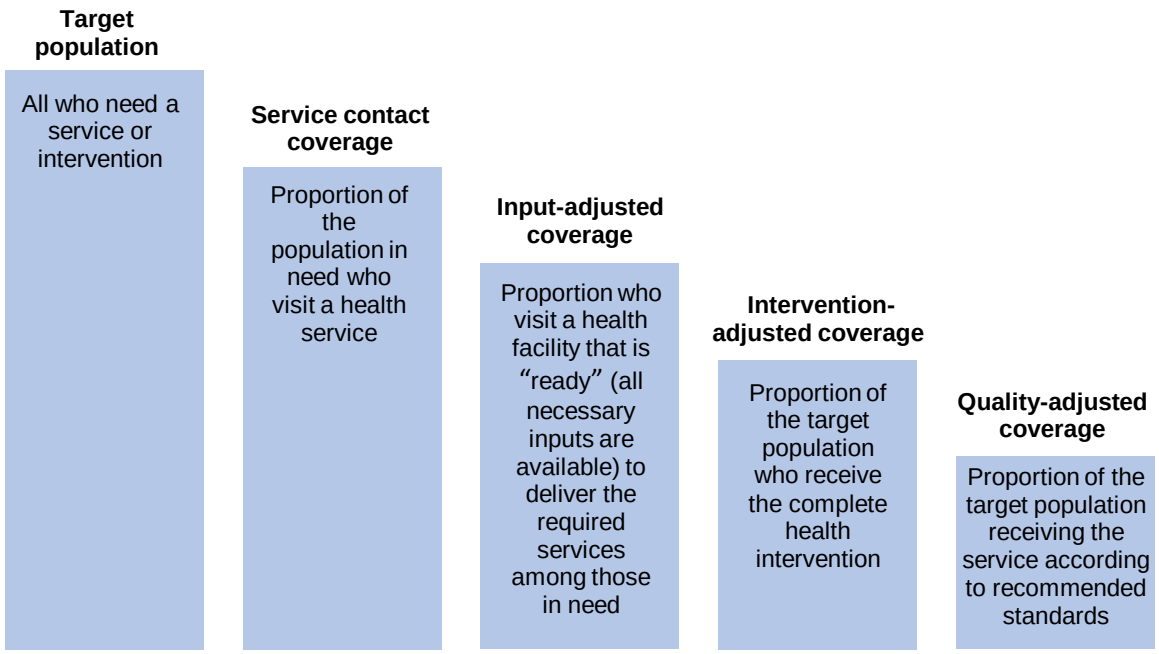
As we were concerned with urban poor areas rather than households, we used the cluster variable to identify urban poor clusters. An urban poor cluster was defined as an urban cluster in which more than 50% of the households were categorized as poor. Rural clusters were excluded from our analysis. Therefore, the resulting variable identified urban poor versus urban non-poor clusters. Several studies have also used this definition of urban poor clusters but included rural clusters as well to study the whole population.[15,27,28]

Our cluster-level urban poverty measure was constructed using household-level information on the previously mentioned urban poverty criteria, located in the household file for each survey. This measure was then integrated into the women's or children's files so that each woman or child was labeled as living in either an urban poor cluster or an urban non-poor cluster. Appendix Table 2 summarizes the percentages of women ages 15–49 and children under 5 who were, among both the total population and the urban population, living in urban poor clusters. For each country, urban poverty was estimated both nationally and by region to provide an understanding of the geographic distribution.

2.3 Effective Coverage Cascade Measures

Effective coverage is calculated by linking household survey data with health facility data at four steps along the effective coverage cascade. The cascade begins with identifying the proportion of individuals in need of a particular service (that is, the target population) who seek the service at a health facility (that is, service-contact coverage) (Figure 1). Each subsequent step in the cascade is measured, and its value is multiplied by the value of effective coverage at the previous step to account for different aspects of the service, such as the facility's readiness to provide the service (that is, whether it has the necessary infrastructure, equipment, and medicines to provide the service) and whether the patient received the minimum intervention required for the service.[22] The final step in the effective coverage cascade is quality-adjusted coverage, which accounts for the quality of care patients receive at the facilities providing the service as well as all previous aspects of the service received.

Figure 1 Effective coverage cascade



Source: Adapted from Amouzou et al. 2019[29]

Table 2 illustrates how we measured each step in the ANC and sick child care effective coverage cascades in our analysis. Input-adjusted coverage for ANC, for example, was the product of the service contact measure (% of women with at least one ANC visit with a skilled provider for the most recent birth among women who gave birth at least once in the previous 2 years) and the service readiness measure (average readiness across ANC facilities using the basic facility readiness index). In this way, input-adjusted coverage represented the proportion of women with at least one ANC visit with a skilled provider while accounting for the readiness of facilities providing ANC.

Table 3 shows how each step in the effective coverage cascade for sick child care was calculated. Quality-adjusted coverage was the product of the measures for service contact (% of children who sought care at a health facility among children under age 5 who had diarrhea or symptoms of acute respiratory infection in the past 2 weeks), service readiness (average readiness across sick child care facilities using the basic facility readiness index), receipt of complete intervention coverage (% of children who received appropriate treatment among children under age 5 who were diagnosed with diarrhea or pneumonia at a facility), and process quality (average process quality across sick child care facilities using the basic process quality index). In this way, quality-adjusted coverage represented coverage of sick child care among the population in need while accounting for the readiness of facilities, the receipt of the complete intervention, and the quality of care received.

Table 2 Calculation of antenatal care effective coverage cascade

Steps in effective coverage cascade	Measures							
	Service contact		Service readiness		Receipt of complete intervention		Process quality	
Service-contact	Women with at least one ANC visit with a skilled provider for the most recent birth among women who gave birth at least once in the previous 2 years							
Input-adjusted	Women with at least one ANC visit with a skilled provider for the most recent birth among women who gave birth at least once in the last 2 years	**X**	Average readiness across ANC facilities using the basic facility readiness index					
Intervention-adjusted	Women with at least one ANC visit with a skilled provider for the most recent birth among women who gave birth at least once in the last 2 years	**X**	Average readiness across ANC facilities using the basic facility readiness index	**X**	Women with 4+ ANC visits at a health facility among women who gave birth at least once in the last 2 years			
Quality-adjusted	Women with at least one ANC visit with a skilled provider for the most recent birth among women who gave birth at least once in the last 2 years	**X**	Average readiness across ANC facilities using the basic facility readiness index	**X**	Women with 4+ ANC visits at a health facility among women who gave birth at least once in the last 2 years	**X**	Average process quality across ANC facilities using the basic process quality index	

Note: Each coverage measure is the product of the previous measures, except for the service-contact coverage. Reference to "basic" facility readiness and process quality indices indicate that the basic readiness and process quality measures from Riese, Assaf, and Pullum 2021 were used in this analysis.[24] See Appendix Table 3 for list of items included in indices.

ANC = antenatal care

Table 3 Calculation of sick child care effective coverage cascade

Steps in effective coverage cascade	Measures							
	Service contact		Service readiness		Receipt of complete intervention		Process quality	
Service-contact	Children who sought care at a health facility among children under age 5 who had diarrhea or ARI symptoms in the last 2 weeks							
Input-adjusted	Children who sought care at a health facility among children under age 5 who had diarrhea or ARI symptoms in the last 2 weeks	X	Average readiness across sick child care facilities using the basic facility readiness index					
Intervention-adjusted	Children who sought care at a health facility among children under age 5 who had diarrhea or ARI symptoms in the last 2 weeks	X	Average readiness across sick child care facilities using the basic facility readiness index	X	Children under age 5 who received appropriate treatment among children under age 5 who were diagnosed with diarrhea or pneumonia at a facility			
Quality-adjusted	Children who sought care at a health facility among children under age 5 who had diarrhea or ARI symptoms in the last 2 weeks	X	Average readiness across sick child care facilities using the basic facility readiness index	X	Children under age 5 who received appropriate treatment among children under age 5 who were diagnosed with diarrhea or pneumonia at a facility	X	Average process quality across sick child care facilities using the basic process quality index	

Note: Each coverage measure is the product of the previous measures except for the service-contact coverage. Reference to "basic" facility readiness and process quality indices indicate that the basic readiness and process quality measures from Riese, Assaf, and Pullum 2021 were used in this analysis.[24] See Appendix Table 3 for list of items included in indices.
ARI = acute respiratory infection

Coverage measures

All measures of the individual components of coverage for ANC and sick child care, with the exception of sick child receipt of complete intervention, were assessed using DHS data; sick child receipt of complete intervention was assessed using SPA data. The ANC coverage measures were constructed for births in the 2 years before the survey. The sick child coverage measures were constructed for all live children under 5 years. Code to construct these indicators can be found on the DHS Program Code Share Library on GitHub.[*] Some adjustments to this standard code were made to account for country-specific definitions and analytical needs.

ANC service contact coverage

Using country-specific definitions and terms for skilled providers, we constructed a variable to identify women who had received at least one ANC visit from a skilled provider in the 2 years before the survey. For all countries, skilled providers included doctors, nurses, midwives, and auxiliary nurses/midwives. In Ethiopia, they also included health officers and health extension workers. In Tanzania, they included clinical officers, assistant clinical officers, assistant nurses, and maternal and child health aides (instead of auxiliary nurses/midwives).

[*] Chapters 9 and 10 of the DHS Program Code Share Library: https://github.com/DHSProgram/DHS-Indicators-Stata

Sick child service contact coverage

The proportion of children under age 5 who had symptoms of acute respiratory infection (possibly pneumonia), as well as the proportion who had diarrhea, in the 2 weeks before the survey and for whom advice or treatment was sought from a health facility were classified as care-seeking (that is, having made service contact). This excluded those seeking treatment from pharmacies, traditional healers, community health workers, or other providers not in a facility. This definition of "care-seeking" differs from that found in DHS final reports, so estimates reported here will not match those found in the final reports.

ANC receipt of complete intervention

A woman was considered to have complete intervention coverage if she had attended at least four ANC visits for her most recent birth in the past 2 years, as this was the World Health Organization recommendation for number of ANC visits at the time of the surveys.

Sick child receipt of complete intervention

This measure was defined as the proportion of children under age 5 who were diagnosed with diarrhea or pneumonia who received appropriate treatment at a facility.

Quality measures

Data from the SPA surveys were used to assess the remaining measures of service readiness and process quality. These indicators had been previously developed through literature review and feedback from subject matter experts at the United States Agency of International Development to define a broader range of effective coverage measures,[24] and the items comprising them were based on a consultative process in 2020 to identify quality of care measures in different health areas, including ANC and sick child care.[30] The readiness and process quality indicators for both ANC and sick child care have been shown to result in effective coverage cascades similar to those when readiness and process quality indicators composed of a longer list of items are used.[24] The specific items included in each measure are described below and in more detail in Appendix Table 3.

ANC service readiness

ANC readiness was assessed using a composite index measuring availability of three basic readiness items for ANC among facilities providing ANC. These items were power, soap and running water, and adequate sanitation facilities for clients.

Sick child service readiness

Sick child readiness was assessed using a composite index measuring availability of two basic readiness items for sick child care among facilities providing sick child care. These items were available zinc/oral rehydration salts and antibiotics for pneumonia.

ANC process quality

ANC process quality was measured using a composite index of provider adherence to three basic process quality items for ANC. These items were whether patients had their blood pressure checked, were counseled or prescribed daily iron and folic acid supplementation and had received breastfeeding counseling.

Sick child process quality

Sick child process quality was measured using a composite index of provider adherence to six basic process quality items for sick child care. These items were whether patients had their respirations counted for 60 seconds, their skin turgor checked, their weight checked, their palms or conjunctiva checked for pallor, their weight plotted on a growth chart, and their growth chart discussed.

2.4 Methods

Estimates of urban poverty, coverage measures, and quality measures were combined to examine disparities in effective coverage in urban poor versus urban non-poor clusters. As described above, urban poverty was measured using the DHS datasets, as the SPA datasets captured only whether a facility was located in an urban or rural area. Thus, both ANC coverage measures (service contact and receipt of completed intervention) and one sick child coverage measure (service contact) could be calculated separately for urban poor and urban non-poor. Sick child receipt of complete intervention could be calculated only for the total urban population since it was measured using SPA data. Similarly, all quality measures (service readiness and process quality), which were assessed using SPA data, were estimated only for the total urban population.

The statistical approach used to calculate confidence intervals for effective coverage has been previously described.[24] In brief, we calculated 95% confidence intervals for each step in the effective coverage cascade using the *nlcom* command in Stata; *nlcom* is a post-estimation command that uses a very general, automated application of the delta method described by Sauer et al. to estimate the standard errors.[43] The code for this analysis was adapted from earlier effective coverage analysis code, which is available on The DHS Program's Analysis GitHub site.[*]

Statistically significant differences between groups were defined as differences having nonoverlapping 95% confidence intervals. All analyses were conducted using Stata 18, using *svy* to account for sampling design and weights to calculate the estimates for each step in the effective coverage cascade.

[*] Original effective coverage code: https://github.com/DHSProgram/DHS-Analysis-Code/tree/main/Effective Coverage

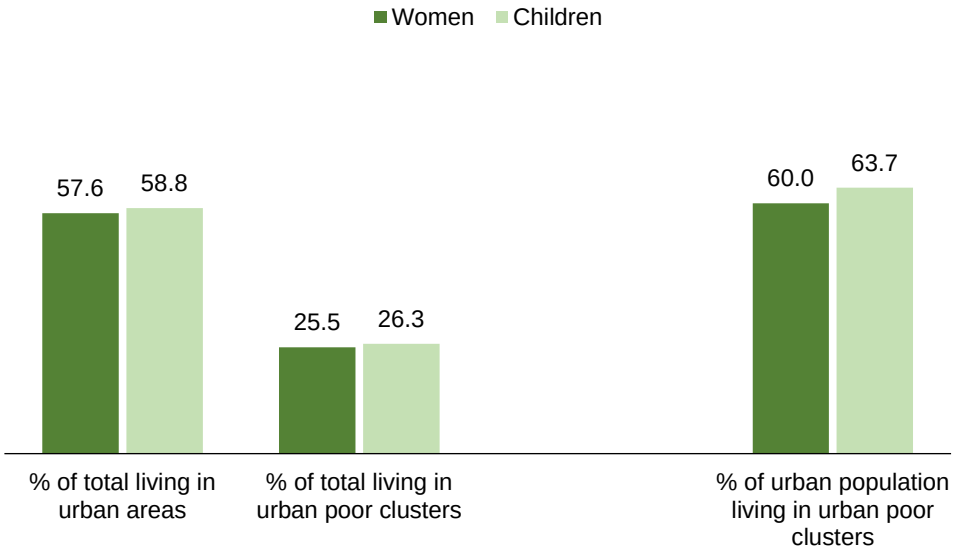
3 RESULTS

Within each country, we present the prevalence and geographic distribution of urban poverty at both the national and regional levels, followed by effective coverage cascades for antenatal care (ANC) and sick child care. Measurements for each individual component of the cascades are also shown to provide additional insights and mathematical reasons for any identified disparities in effective coverage by urban poverty status. Following the country-specific results is an overall cross-country comparison of effective coverage results for both ANC and sick child care.

3.1 Afghanistan

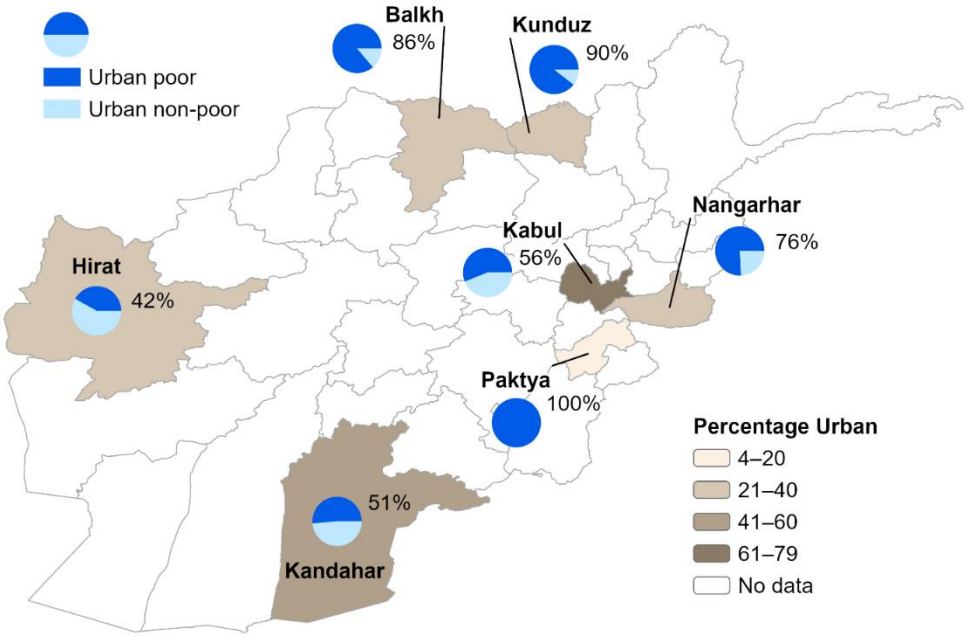
More than half (57.6% of women of reproductive age and 58.8% of children under 5) of the overall population of Afghanistan included in this analysis lived in urban areas (Figure 2 and Appendix Table 2). Approximately one quarter (25.5% of women of reproductive age and 26.3% of children under 5) of the overall population and more than half (60.0% of women of reproductive age and 63.7% of children under 5) of the urban population included in this analysis lived in urban poor clusters.

Figure 2 Distribution of urban and urban poverty variables for women and children, Afghanistan



Most provinces included in this analysis had a large proportion of households living in urban poor clusters—only Hirat had less than 50% of the urban population living in an urban poor cluster (Figure 3). Although Figure 3 shows the distribution of *households* living in urban areas and urban poor clusters in each region, the distributions for women and children would presumably be very similar, as they are at the national level.

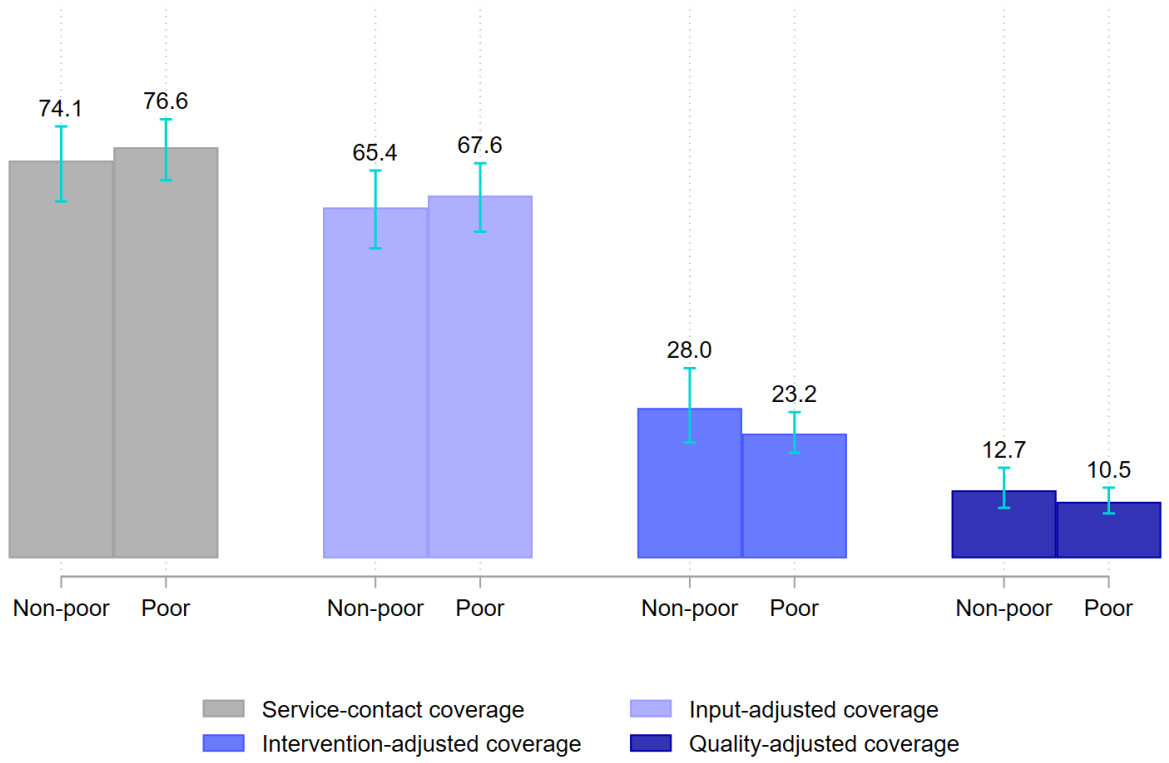
Figure 3 **Distribution of urban and urban poverty variables for households in each region included in analysis, Afghanistan**



3.1.1 Antenatal care

Figure 4 shows the effective coverage cascades for ANC in Afghanistan by urban poverty status (values also provided in Appendix Table 4). The cascades for the urban poor and the urban non-poor were nearly identical and not statistically significantly different at any step along the cascade. Service-contact coverage was slightly higher among urban poor women than urban non-poor women (76.6% versus 74.1%), and this was maintained for input-adjusted coverage. However, after adjusting for receipt of complete intervention (at least four ANC visits), intervention-adjusted coverage for urban non-poor women increased to above that of urban poor women (28.0% versus 23.2%). Quality-adjusted coverage was slightly higher for urban non-poor women than for urban poor women (12.7% versus 10.5%).

Figure 4 **Antenatal care effective coverage cascades for urban poor and urban non-poor women, Afghanistan**



As seen in Table 4, the individual urban poor and urban non-poor service-contact measures were similar to the overall urban service-contact measure, with 74.1% of urban non-poor women, 76.6% of urban poor women, and 75.7% of all urban women receiving at least one ANC visit. When these values were multiplied by the service readiness measure, which was not available at an individual level, they stay similar (Figure 4). The receipt of complete intervention measures for urban poor and urban non-poor were further apart but still not significantly different, with 34.4% of urban poor women and 42.8% of urban non-poor receiving at least four ANC visits. Average process quality at the hospitals in Afghanistan was 45.3%. Interestingly, Afghanistan had the highest overall ANC service readiness score (87.0%) but the lowest overall ANC process quality score of any of the six countries in this analysis.

Table 4 Components of antenatal care and sick child care effective coverage overall and for urban poor versus non-poor, Afghanistan

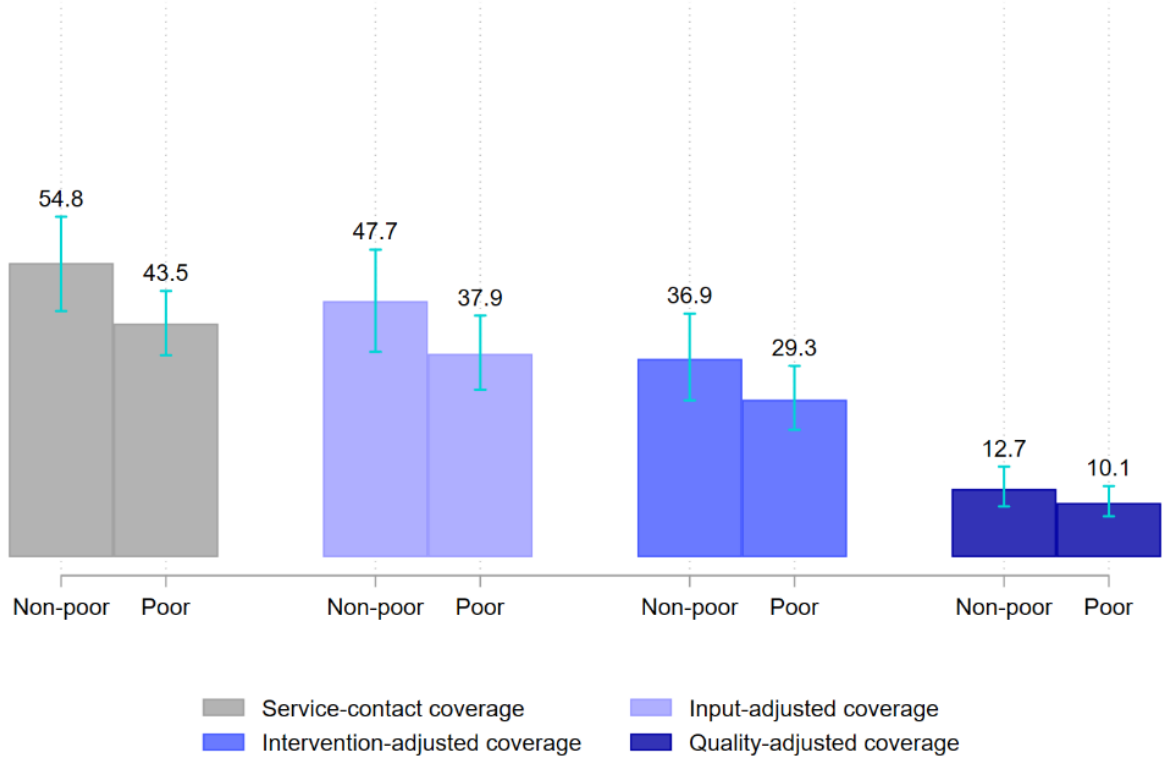
	Service contact		Service readiness		Receipt of complete intervention		Process quality	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Antenatal care								
All	0.757	[0.712, 0.797]	0.882	[0.821, 0.924]	0.375	[0.330, 0.421]	0.453	[0.382, 0.525]
Urban non-poor	0.741	[0.665, 0.805]		NA	0.428	[0.344, 0.516]		NA
Urban poor	0.766	[0.705, 0.818]		NA	0.344	[0.299, 0.392]		NA
Sick child care								
All	0.471	[0.419, 0.524]	0.870	[0.735, 0.942]	0.775	[0.685, 0.845]	0.344	[0.281, 0.412]
Urban non-poor	0.548	[0.459, 0.634]		NA		NA		NA
Urban poor	0.435	[0.376, 0.496]		NA		NA		NA

Note: Estimates are for each individual component of effective coverage, which were then combined to determine effective coverage cascades.
CI = confidence interval
NA = not available

3.1.2 Sick child care

The Afghanistan sick child effective coverage cascades (Figure 5) showed a different pattern (values also provided in Appendix Table 4). Here, effective coverage was consistently lower for urban poor children than for urban non-poor children, although none of the differences were statistically significant. Service-contact coverage was more than 10 percentage points higher in urban non-poor children than in urban poor children (54.8% versus 43.5%). When service readiness of the facilities was factored in, this disparity decreased slightly, with lower input-adjusted coverage (below 50%, for both groups). This pattern continued, with both the disparity between the groups and the overall measures decreasing at each step, with only a 2-percentage point difference in quality-adjusted coverage between urban non-poor children (12.7%) and urban poor children (10.1%).

Figure 5 Sick child effective coverage cascades for urban poor and urban non-poor children, Afghanistan

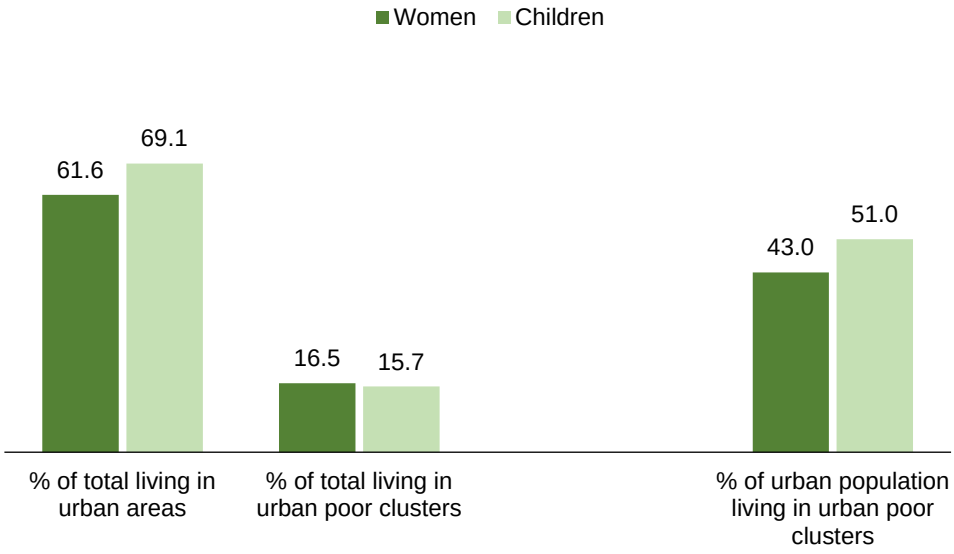


Of the four individual components of the cascade, only service contact was assessed using DHS data and could be disaggregated by urban poverty status. For that measure, a higher proportion of urban non-poor children than urban poor children sought care for symptoms in the past 2 weeks (54.8% versus 43.5%), although this difference was not statistically significant. Similar to the ANC results, Afghanistan had the highest sick child care service readiness score (87.0%) and close to the lowest sick child care process quality score (34.4%) of any of the six countries in this analysis.

3.2 Democratic Republic of the Congo

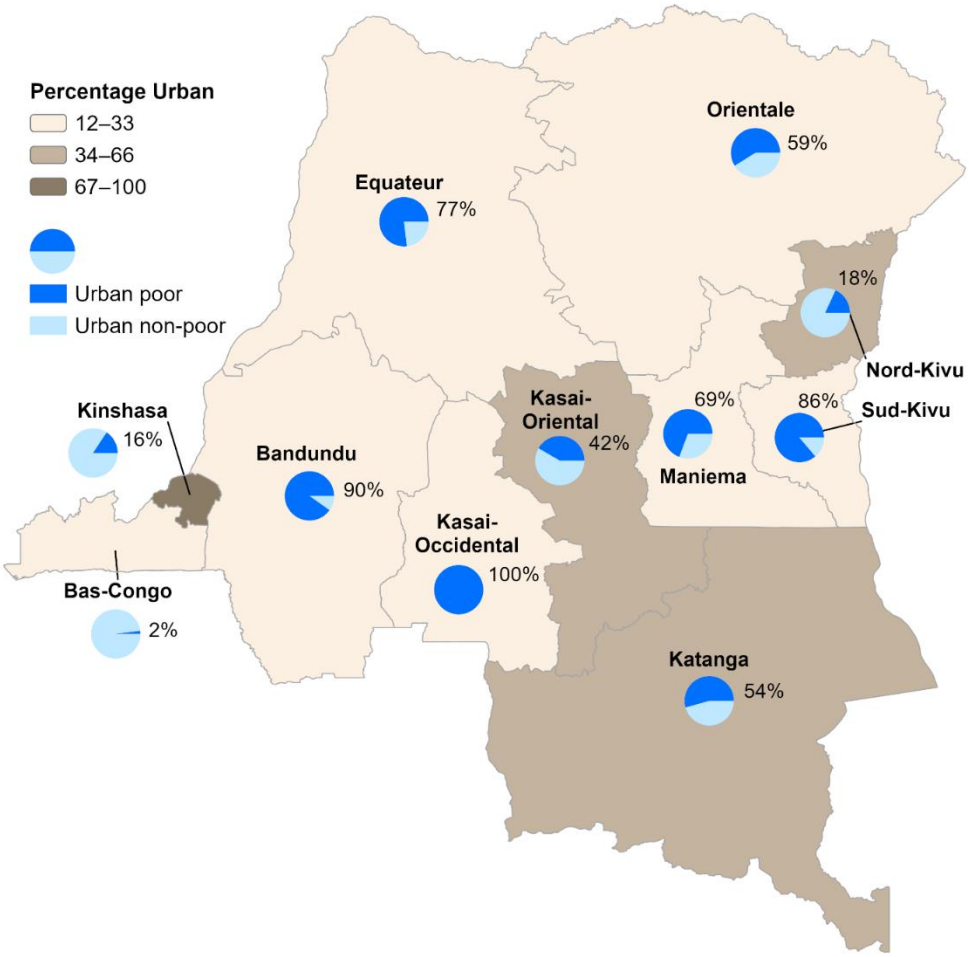
Approximately two-thirds (61.6% of women of reproductive age and 69.1% of children under 5) of the overall population of DRC included in this analysis lived in urban areas (Figure 6 and Appendix 2). Fewer than one in five (16.5% of women of reproductive age and 15.7% of children under 5) of the overall population and approximately half (43.0% of women of reproductive age and 51.0% of children under 5) of the urban population lived in urban poor clusters.

Figure 6 Distribution of urban and urban poverty variables for women and children, DRC



Of the eleven provinces included in this analysis, only four—Kinshasa, Bas-Congo, Kasai-Oriental, and Nord-Kivu—had less than 50% of urban households living in urban poor clusters (Figure 7). Although Figure 7 shows the distribution of *households* living in urban areas and urban poor clusters, the distributions for women and children would presumably be very similar.

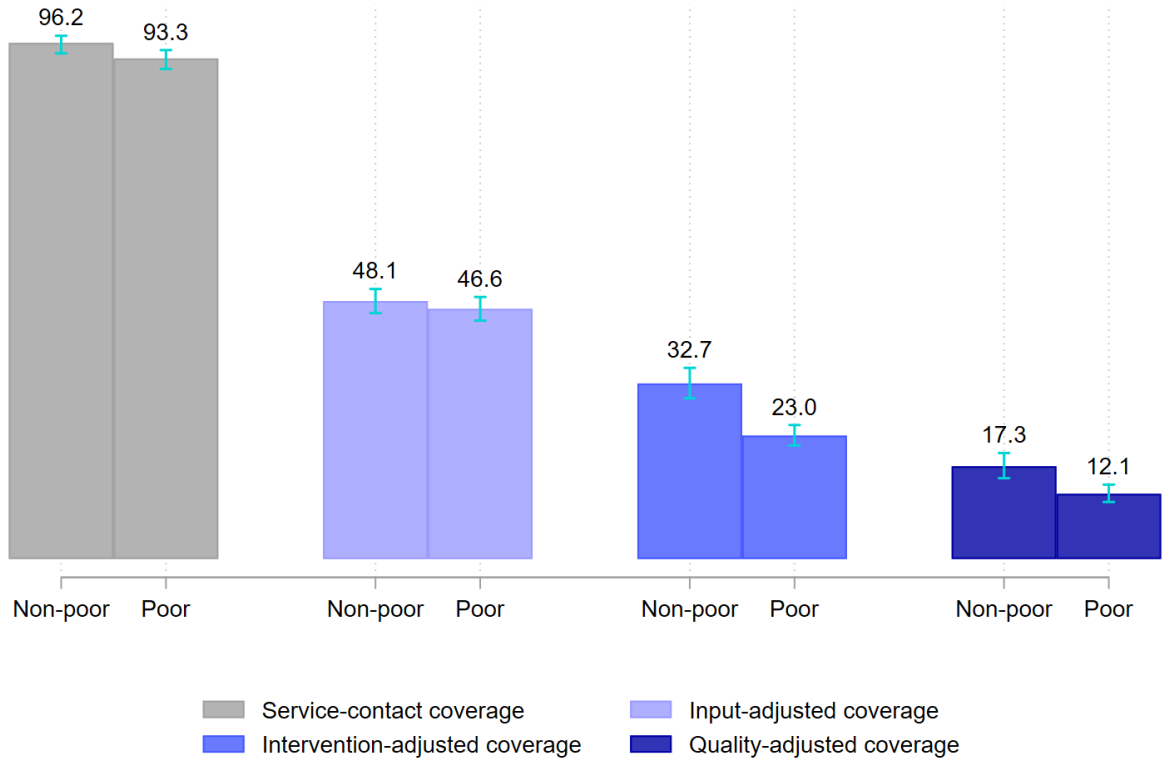
Figure 7 **Distribution of urban and urban poverty variables for households in each region included in analysis, DRC**



3.2.1 Antenatal care

The first two steps of the ANC effective coverage cascade (service-contact coverage and input-adjusted coverage) were similar, but intervention-adjusted coverage and quality-adjusted coverage were significantly different, between urban poor and non-poor women in DRC (Figure 8 and Appendix Table 4). Although service-contact coverage was nearly 100% for both groups, input-adjusted coverage dropped to below 50% (48.1% for urban non-poor women and 46.6% for urban poor women) when service readiness was taken into account. Disparities emerged at the next step in the cascade, with intervention-adjusted coverage of 32.7% for urban non-poor women and 23.0% for urban poor women. This disparity persisted with quality-adjusted coverage (17.3% for urban non-poor women versus 12.1% for urban poor women).

Figure 8 Antenatal care effective coverage cascades for urban poor and urban non-poor women, DRC



Measurements for the individual components of the cascade showed that the service contact, measured as the proportion of pregnant women who received at least one ANC visit for their most recent pregnancy, was not statistically significantly different between urban poor (93.3%) and urban non-poor (96.2%) women (Table 5). However, receipt of complete intervention was statistically significantly different between the two groups, with a nearly 20 percentage point difference (49.3% for urban poor and 68.1% for urban non-poor).

Table 5 Components of antenatal care and sick child care effective coverage overall and for urban poor versus non-poor, DRC

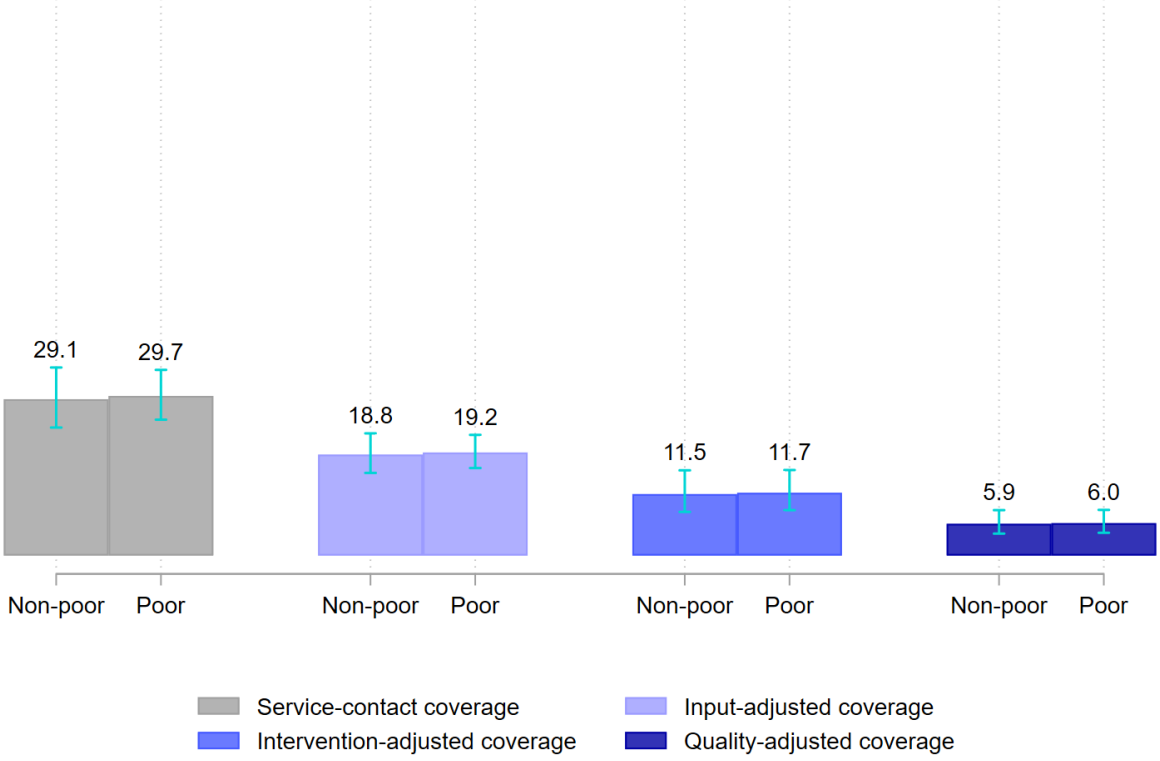
	Service contact		Service readiness		Receipt of complete intervention		Process quality	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Antenatal care								
All	0.947	[0.935, 0.957]	0.500	[0.478, 0.521]	0.584 *	[0.551, 0.615]	0.528	[0.472, 0.583]
Urban non-poor	0.962	[0.942, 0.975]		NA	0.681	[0.636, 0.722]		NA
Urban poor	0.933	[0.913, 0.948]		NA	0.493	[0.459, 0.528]		NA
Sick child care								
All	0.295	[0.261, 0.331]	0.646	[0.620, 0.670]	0.609	[0.429, 0.763]	0.516	[0.433, 0.598]
Urban non-poor	0.291	[0.239, 0.350]		NA		NA		NA
Urban poor	0.297	[0.253, 0.346]		NA		NA		NA

* Statistically significant difference between urban poor and non-poor
Note: Estimates are for each individual component of effective coverage, which were then combined to determine effective coverage cascades.
CI = confidence interval
NA = not available

3.2.2 Sick child care

No significant differences were found in the sick child care effective coverage cascade between urban poor and non-poor children in DRC (Figure 9 and Appendix 4). Coverage started out very low and decreased over time, with no differences based on urban poverty status.

Figure 9 Sick child effective coverage cascades for urban poor and urban non-poor children, DRC

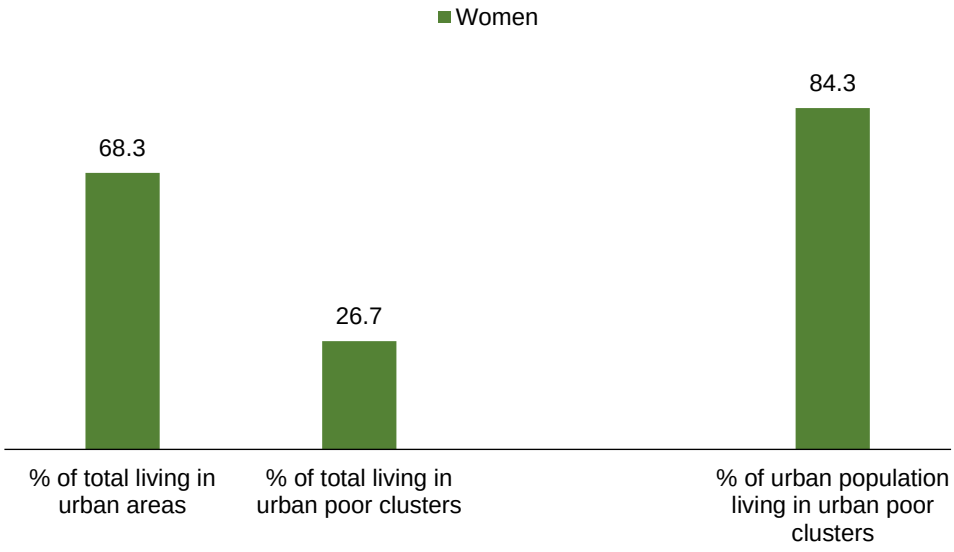


As mentioned earlier, service contact was the only individual measurement within the sick child care cascade that could be disaggregated by urban poverty status. As shown in Table 5, service contact scores were similar between the urban poor (29.7%) and the urban non-poor (29.1%).

3.3 Ethiopia

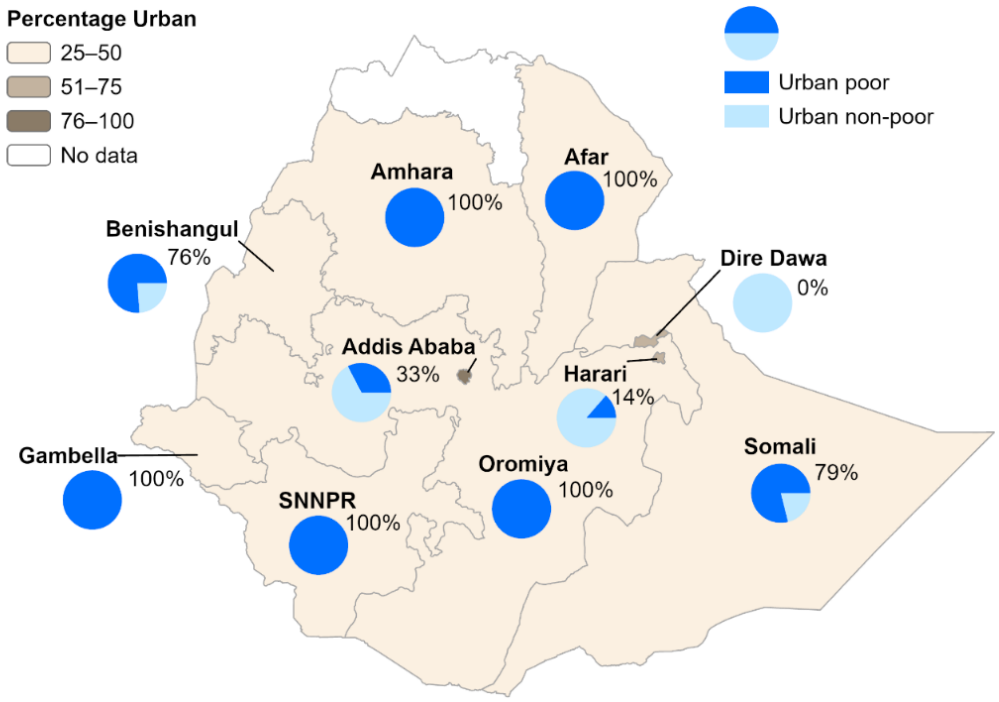
More than two-thirds (68.3%) of the overall population of women of reproductive age in Ethiopia included in this analysis lived in urban areas (Figure 10 and Appendix Table 2). Just over one quarter (26.7%) of the overall population and more than 80% (84.3%) of the urban population of women of reproductive age included in this analysis lived in urban poor clusters. Children under 5 were not included for Ethiopia, as the data needed for the sick child care effective coverage cascade were not available.

Figure 10 Distribution of urban and urban poverty variables for women, Ethiopia



Of the 10 regions included in this analysis, only three—Harari, Addis Ababa, and Dire Dawa—had less than 50% of urban households living in urban poor clusters (Figure 11). Although Figure 11 shows the distribution of *households* living in urban areas and urban poor clusters, the distributions for women and children would presumably be very similar.

Figure 11 Distribution of urban and urban poverty variables for households in each region included in analysis, Ethiopia



3.3.1 Antenatal care

Significant disparities were found between urban poor and non-poor women at three of the four steps in Ethiopia's ANC effective coverage cascade (all but input-adjusted coverage) (Figure 12 and Appendix 4). Service-contact coverage was nearly 13 percentage points higher for urban non-poor women than for urban poor women (94.8% versus 82.0%). After service readiness of the facilities was taken into account, the difference in coverage between the groups was no longer statistically significant, although urban non-poor women still had higher input-adjusted coverage (57.5%) than urban poor women (49.8%). A significant disparity emerged again with intervention-adjusted coverage, which was nearly two times higher in urban non-poor women than in urban poor women (49.9% versus 27.0%).

Figure 12 Antenatal care effective coverage cascades for urban poor and urban non-poor women, Ethiopia

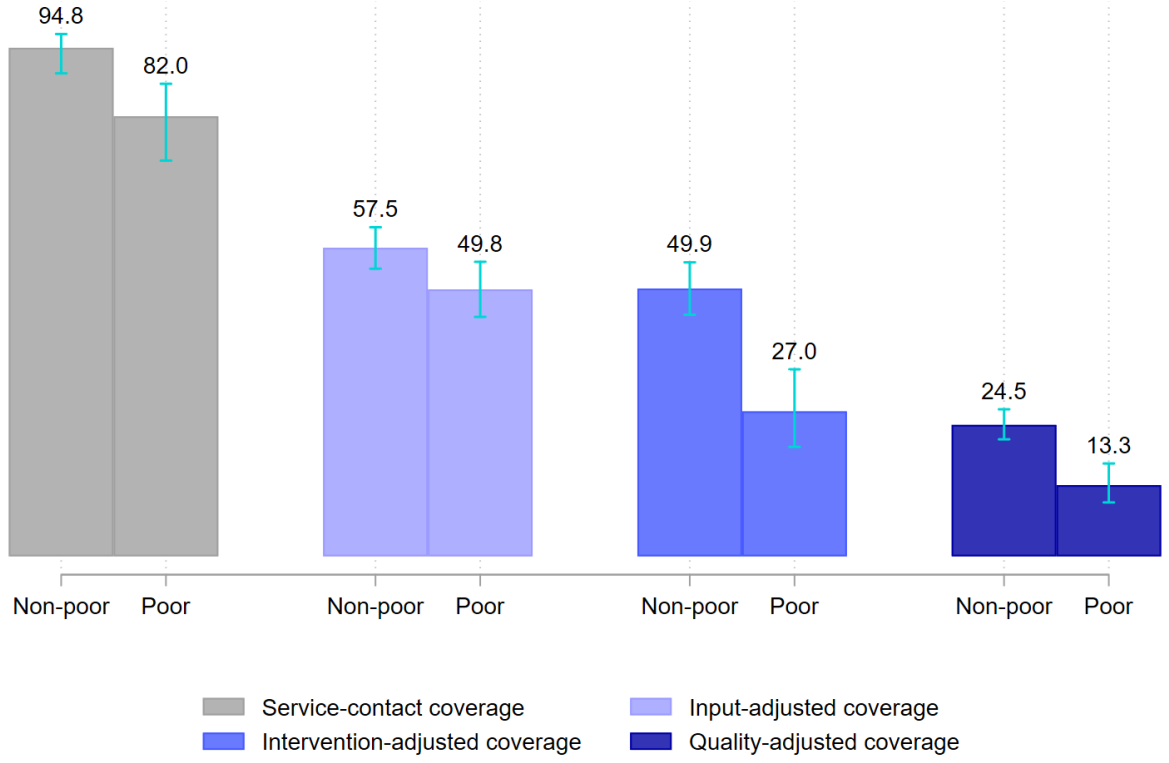


Table 6 Components of antenatal care effective coverage overall and for urban poor versus non-poor, Ethiopia

	Service contact		Service readiness		Receipt of complete intervention		Process quality	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
				Antenatal care				
All	0.835 *	[0.759, 0.890]	0.607	[0.573, 0.640]	0.577 *	[0.478, 0.671]	0.491	[0.461, 0.521]
Urban non-poor	0.948	[0.900, 0.974]		NA	0.868	[0.804, 0.913]		NA
Urban poor	0.820	[0.738, 0.881]		NA	0.543	[0.437, 0.645]		NA

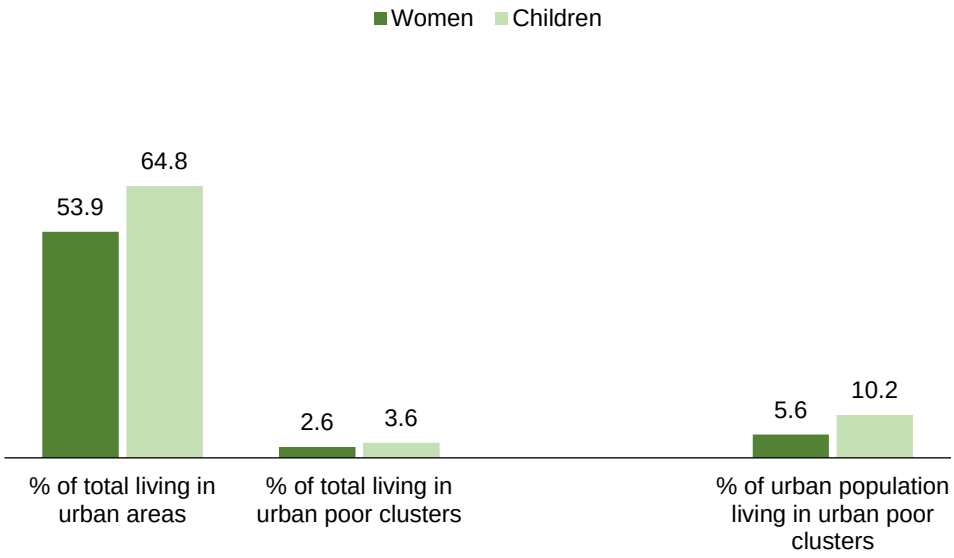
*Statistically significant difference between urban poor and non-poor
Note: Estimates are for each individual component of effective coverage, which were then combined to determine effective coverage cascades.
CI = confidence interval
NA = not available

Only the individual measures of service contact and receipt of complete intervention could be disaggregated by urban poverty status. For both measures, statistically significant differences were found between urban poor and urban non-poor women, with lower scores among the urban poor. The score for receipt of complete intervention was more than 30 percentage points lower for urban poor women than for urban non-poor women.

3.4 Haiti

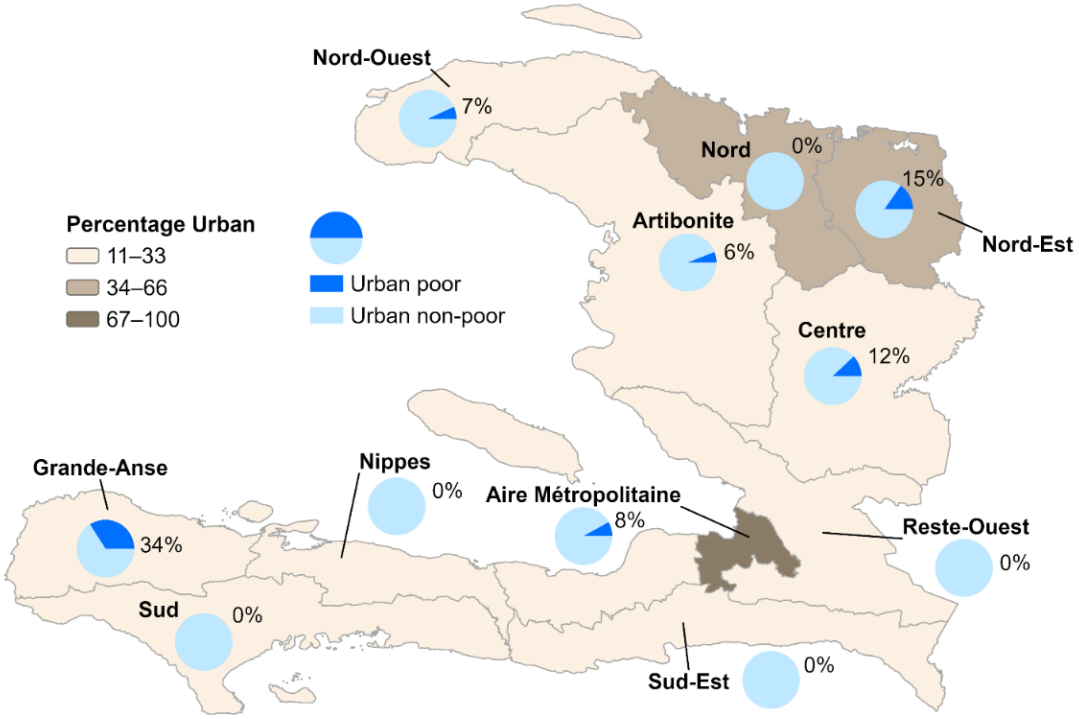
More than half (53.9% of women of reproductive age and 64.8% of children under 5) of the overall population of Haiti included in this analysis lived in urban areas (Figure 13 and Appendix Table 2). A very small percentage (2.6% of women of reproductive age and 3.6% of children under 5) of the overall population and a slightly larger proportion (5.6% of women of reproductive age and 10.2% of children under 5) of the urban population lived in urban poor clusters.

Figure 13 Distribution of urban and urban poverty variables for women and children, Haiti



Of the 11 regions included in this analysis, five—Rest-Ouest, Sud-Est, Nord, Sud, and Nippes—had 0% of urban households living in urban poor clusters (Figure 14). The region with the highest proportion of urban households living in an urban poor cluster was Grand-Anse (33.7%). Although Figure 14 shows the distribution of *households* living in urban areas and urban poor clusters, the distributions for women and children would presumably be very similar.

Figure 14 Distribution of urban and urban poverty variables for households in each region included in analysis, Haiti



3.4.1 Antenatal care

Haiti was the only country for which significant differences were found between urban poor and urban non-poor women at every step of the ANC effective coverage cascade (with urban poor women having lower coverage) (Figure 15 and Appendix Table 4). Service-contact coverage was nearly 10 percentage points lower for urban poor women (85.1%) than for urban non-poor women (94.5%). When service readiness of the ANC facilities was taken into account, the disparity narrowed (66.2% for urban non-poor women versus 59.6% for urban poor women) but remained statistically significant. The gap between the urban poor and non-poor widened again for intervention-adjusted coverage, with values for urban non-poor women nearly 20 percentage points higher than for urban poor women (50.6 versus 31.7%). At the final step in the cascade, quality-adjusted coverage was 29.3% for urban non-poor women and 18.4% for urban poor women.

Figure 15 Antenatal care effective coverage cascades for urban poor and urban non-poor women, Haiti

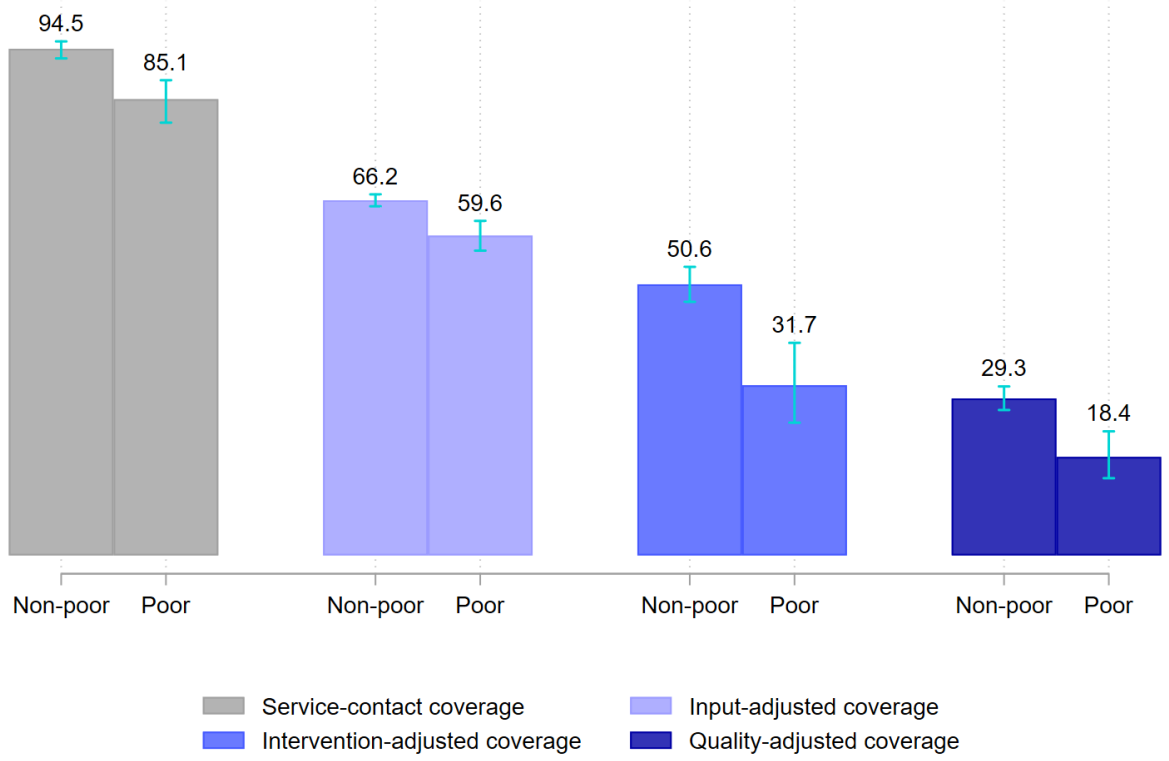


Table 7 shows measurements for the individual components of the ANC effective coverage cascade. Levels of service contact and receipt of complete coverage (the two measures that were able to be disaggregated), were significantly higher in the urban non-poor group than in the urban poor one. The largest difference, of more than 20 percentage points, was in receipt of complete intervention (76.3% for urban non-poor women versus 53.2% for urban poor women).

Table 7 Components of antenatal care and sick child effective coverage overall and for urban poor versus non-poor, Haiti

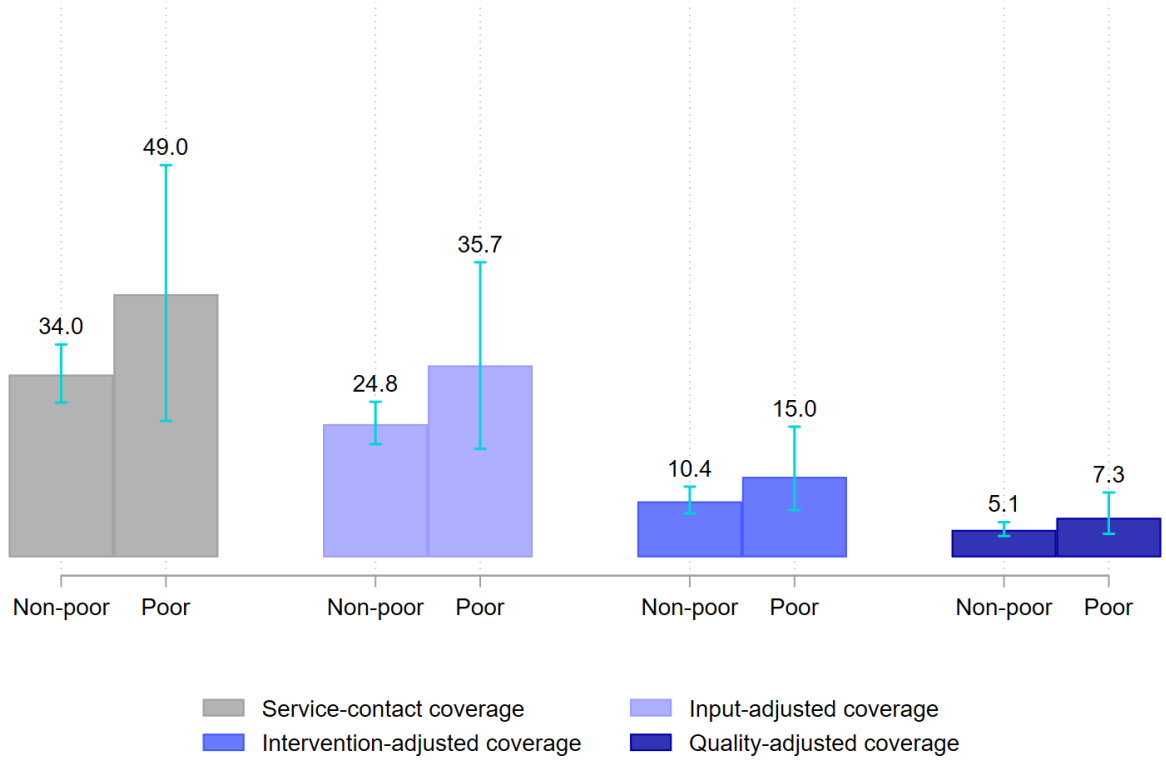
	Service contact		Service readiness		Receipt of complete intervention		Process quality	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
				Antenatal care				
All	0.935	[0.917, 0.950]	0.701	[0.701, 0.701]	0.739	[0.693, 0.780]	0.579	[0.557, 0.601]
	*				*			
Urban non-poor	0.945	[0.927, 0.959]		NA	0.763	[0.719, 0.803]		NA
Urban poor	0.851	[0.807, 0.886]		NA	0.532	[0.406, 0.654]		NA
				Sick child care				
All	0.362	[0.305, 0.423]	0.729	[0.729, 0.729]	0.419	[0.346, 0.496]	0.490	[0.445, 0.536]
Urban non-poor	0.340	[0.288, 0.396]		NA		NA		NA
Urban poor	0.490	[0.254, 0.730]		NA		NA		NA

*Statistically significant difference between urban poor and non-poor
Note: Estimates are for each individual component of effective coverage, which were then combined to determine effective coverage cascades.
CI = confidence interval
NA = not available

3.4.2 Sick child care

Figure 16 shows the sick child care effective coverage cascades for Haiti. At each step in the cascades, effective coverage was higher for the urban poor than for the urban non-poor, though none of the differences were statistically significant (values also provided in Appendix Table 4). The largest differences, of 15 and 11 percentage points, respectively, were for service-contact coverage (49.0% versus 34.0%) and input-adjusted coverage (35.7% versus 24.8%). Due to only a small number of children under 5 living in urban poor clusters, as well as a small proportion of those children having symptoms in the past 2 weeks, the confidence intervals for the urban poor cascade were wide (Figure 16).

Figure 16 Sick child effective coverage cascades for urban poor and urban non-poor children, Haiti



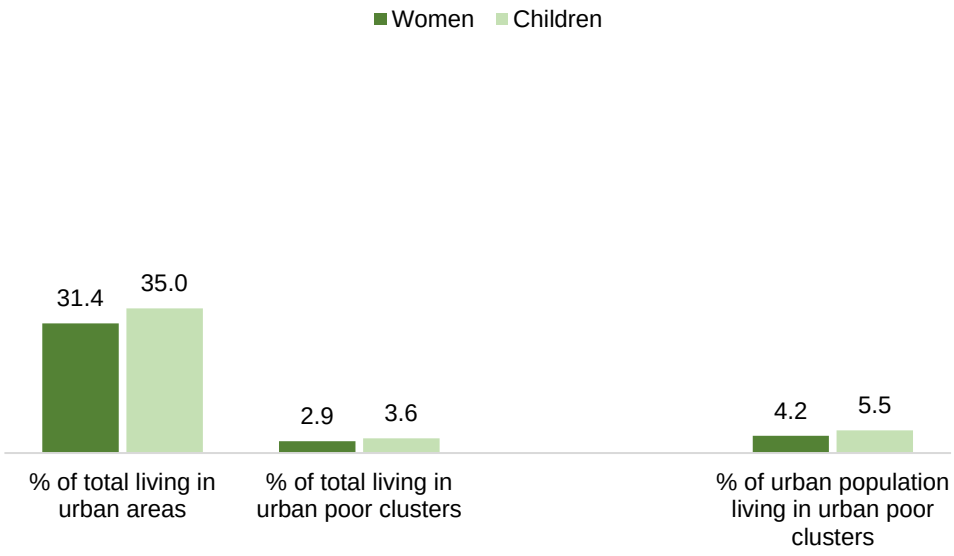
Measurements of the individual components of the cascade in Haiti found that fewer than 50% of children under 5 with symptoms in the past 2 weeks sought care at a health facility (Table 7). A larger proportion of urban poor children (49.0%) than urban non-poor children (34.0%) sought care, although the difference was not statistically significant, perhaps due to the large confidence interval around the urban poor estimate. Data for all other components were collected from the SPA, so were available only for all urban facilities together. Of note, Haiti had the lowest receipt of complete intervention score (41.9%) of all countries in the analysis.

3.5 Nepal

Approximately one-third (31.4% of women of reproductive age and 35.0% of children under 5) of the overall population of Nepal included in this analysis lived in urban areas (Figure 17 and Appendix Table 2). A very small proportion (2.9% of women of reproductive age and 3.6% of children under 5) of the

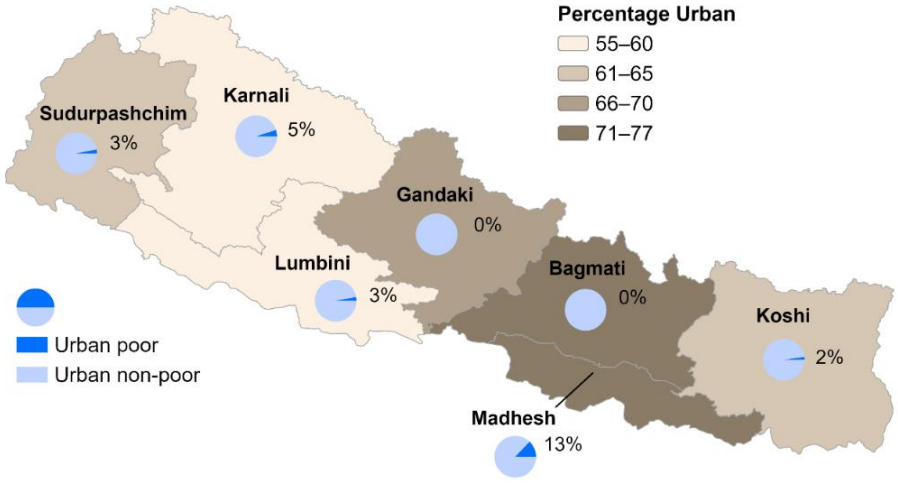
overall population and only a slightly higher proportion (4.2% of women of reproductive age and 5.5% of children under 5) of the urban population lived in urban poor clusters.

Figure 17 Distribution of urban and urban poverty variables for women and children, Nepal



Of the seven provinces included in this analysis, all but one had fewer than 10% of urban households living in urban poor clusters. The exception was Madhesh, in which 12.9% of urban households were living in an urban poor cluster (Figure 18). Although Figure 18 shows the distribution of *households* living in urban areas and urban poor clusters, the distributions for women and children would presumably be very similar.

Figure 18 Distribution of urban and urban poverty variables for households in each region included in analysis, Nepal



3.5.1 Antenatal care

The first step in Nepal's ANC effective coverage cascade (Figure 19) had very high coverage, with nearly 100% of both urban poor and urban non-poor women receiving at least one ANC visit (values also provided

in Appendix Table 4). Effective coverage decreased for both poor and non-poor women at each subsequent step, with no statistically significantly differences between the two groups. ANC quality-adjusted coverage (37.4% for urban non-poor women and 34.1% for urban poor women) was the highest of any of the six countries included in the analysis. One potential reason for this was the small number of women of reproductive age living in urban poor areas in Nepal, resulting in large confidence intervals for the urban poor ANC effective coverage estimates.

Figure 19 Antenatal care effective coverage cascades for urban poor and urban non-poor women, Nepal

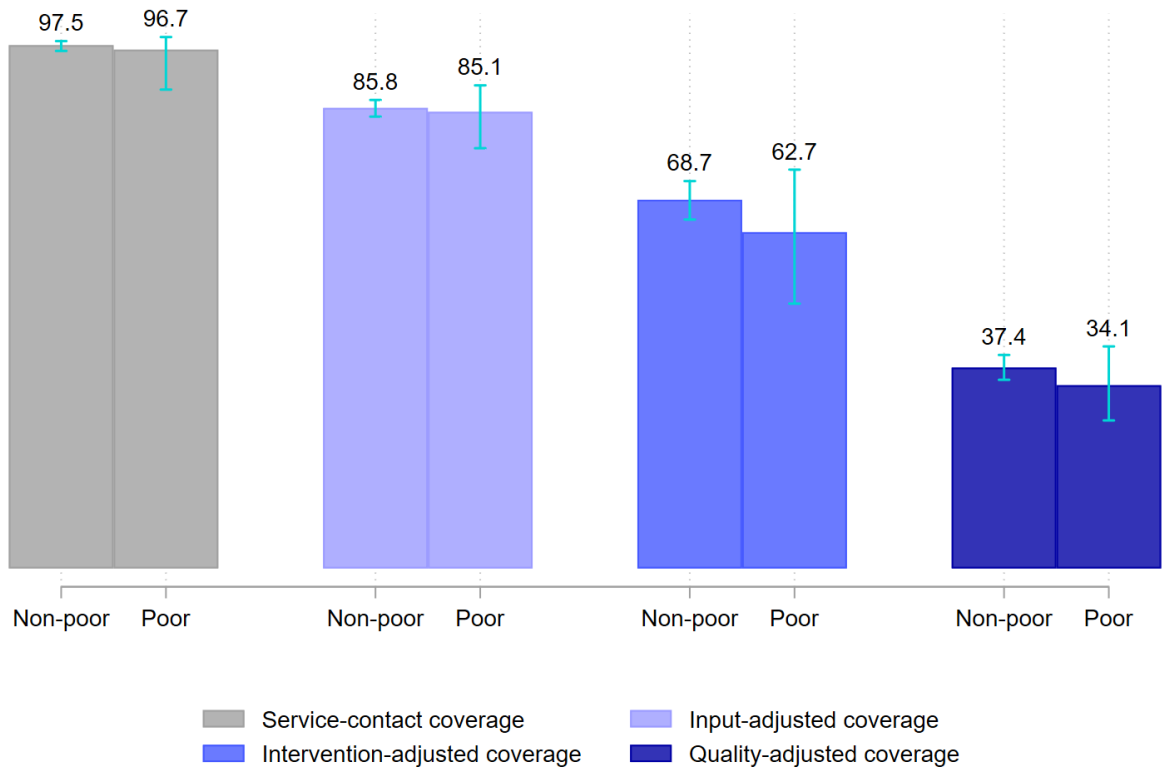


Table 8 shows measurements for the individual components of Nepal's ANC effective coverage cascade. Neither service contact nor receipt of complete intervention (the two measures that could be disaggregated) differed significantly between the urban poor and non-poor groups, likely due to large confidence intervals for the estimates in the urban poor population.

Table 8 Components of antenatal care and sick child effective coverage overall and for urban poor versus non-poor, Nepal

	Service contact		Service readiness		Receipt of complete intervention		Process quality	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Antenatal care								
All	0.975	[0.964, 0.982]	0.880	[0.866, 0.893]	0.797	[0.761, 0.830]	0.545	[0.526, 0.563]
Urban non-poor	0.975	[0.964, 0.983]		NA	0.801	[0.762, 0.834]		NA
Urban poor	0.967	[0.892, 0.990]		NA	0.736	[0.612, 0.832]		NA
Sick child care								
All	0.158	[0.118, 0.207]	0.796	[0.778, 0.814]	0.650	[0.567, 0.726]	0.396	[0.345, 0.450]
Urban non-poor	0.161	[0.120, 0.212]		NA		NA		NA
Urban poor	0.087	[0.021, 0.299]		NA		NA		NA

Note: Estimates are for each individual component of effective coverage, which were then combined to determine effective coverage cascades.
CI = confidence interval
NA = not available

3.5.2 Sick child care

Nepal's sick child effective coverage cascades (Figure 20 and Appendix Table 4) began with the lowest service-contact coverage (16.1% for urban non-poor and 8.7% for urban poor) of any of the six countries included in the analysis. Nepal also had the lowest coverage of all six countries at each subsequent step in the cascade. No statistically significant differences were found between urban poor and urban non-poor at any of the steps. One potential reason for this was the small number of children living in urban poor areas in Nepal, resulting in large confidence intervals for the urban poor sick child care effective coverage estimates.

Figure 20 Sick child effective coverage cascades for urban poor and urban non-poor children, Nepal

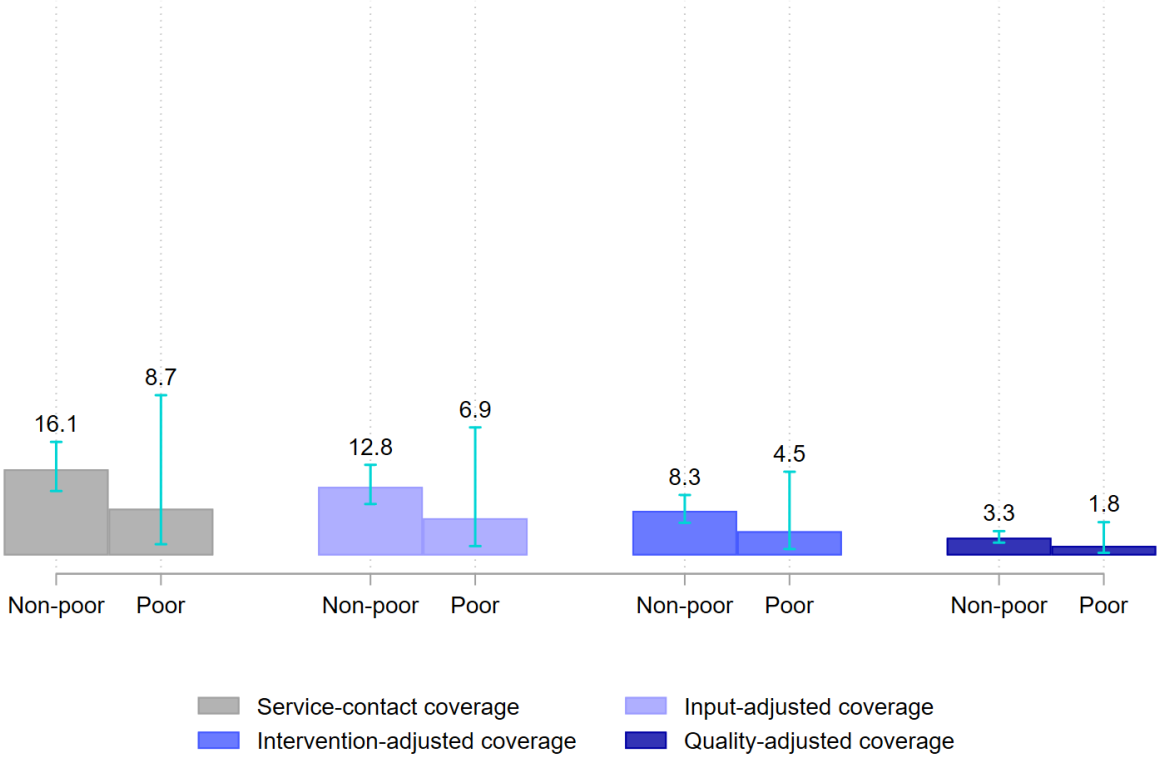
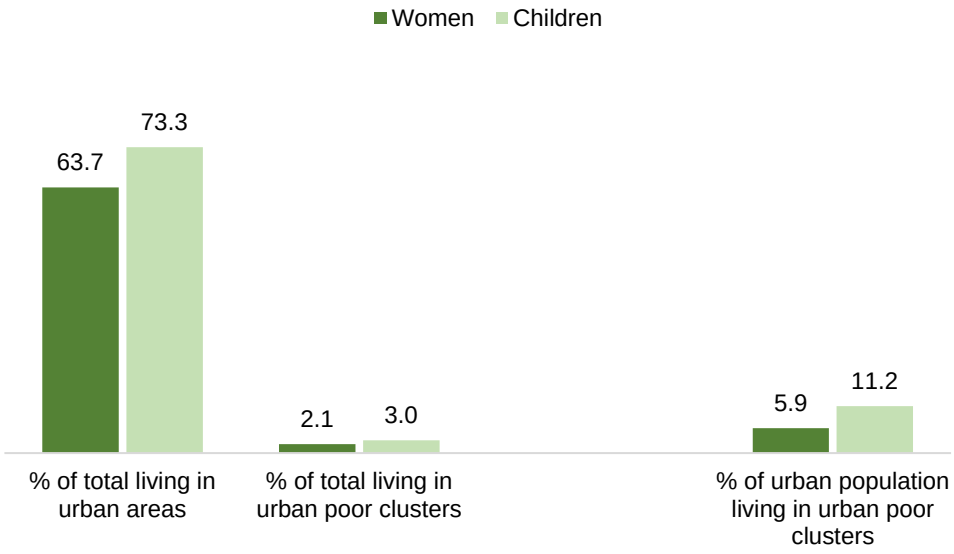


Table 8 shows the values of the individuals components of the sick child care effective coverage cascade. As implied earlier, the service contact value was the lowest of all six countries. The sick child service readiness score among facilities in Nepal was one of the highest, at 79.6%. Receipt of complete intervention was high, as nearly two-thirds of symptomatic children who sought care at a facility (65.0%) received treatment. However, process quality was low (39.6%).

3.6 Tanzania

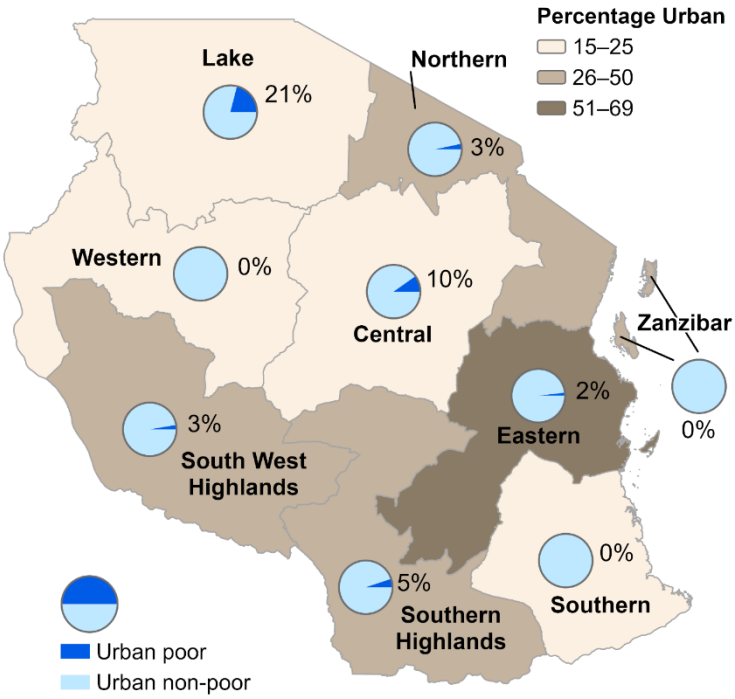
More than two-thirds (63.7% of women of reproductive age and 73.3% of children under 5) of the overall population of Tanzania included in this analysis lived in urban areas (Figure 21 and Appendix Table 2). A very small percentage of the overall population (2.1% of women of reproductive age and 3.0% of children under 5) and a slightly higher proportion of the urban population (5.9% of women of reproductive age and 11.2% of children under 5) lived in urban poor clusters.

Figure 21 Distribution of urban and urban poverty variables for women and children, Tanzania



In all seven provinces included in this analysis, fewer than 10% of urban households were living in urban poor clusters, with the highest proportion (9.8%) in Central Region (Figure 22). Although Figure 22 shows the distribution of *households* living in urban areas and urban poor clusters, the distributions for women and children would presumably be very similar.

Figure 22 Distribution of urban and urban poverty variables for households in each region included in analysis, Tanzania



3.6.1 Antenatal care

Figure 23 shows Tanzania's ANC effective coverage cascade by urban poverty status (values also provided in Appendix Table 4). Service-contact coverage (98.5%) and input-adjusted coverage (54.4%) were each identical for urban poor and urban non-poor women. Differences between the two groups emerged at step three of the cascade, intervention-adjusted coverage (35.5% for urban non-poor women and 23.8% for urban poor women), and persisted in quality-adjusted coverage, with a nearly seven percentage point difference between urban poor and non-poor women (20.9% for urban non-poor women and 14.0% for urban poor women). However, neither of these differences were statistically significant.

Figure 23 Antenatal care effective coverage cascades for urban poor and urban non-poor women, Tanzania

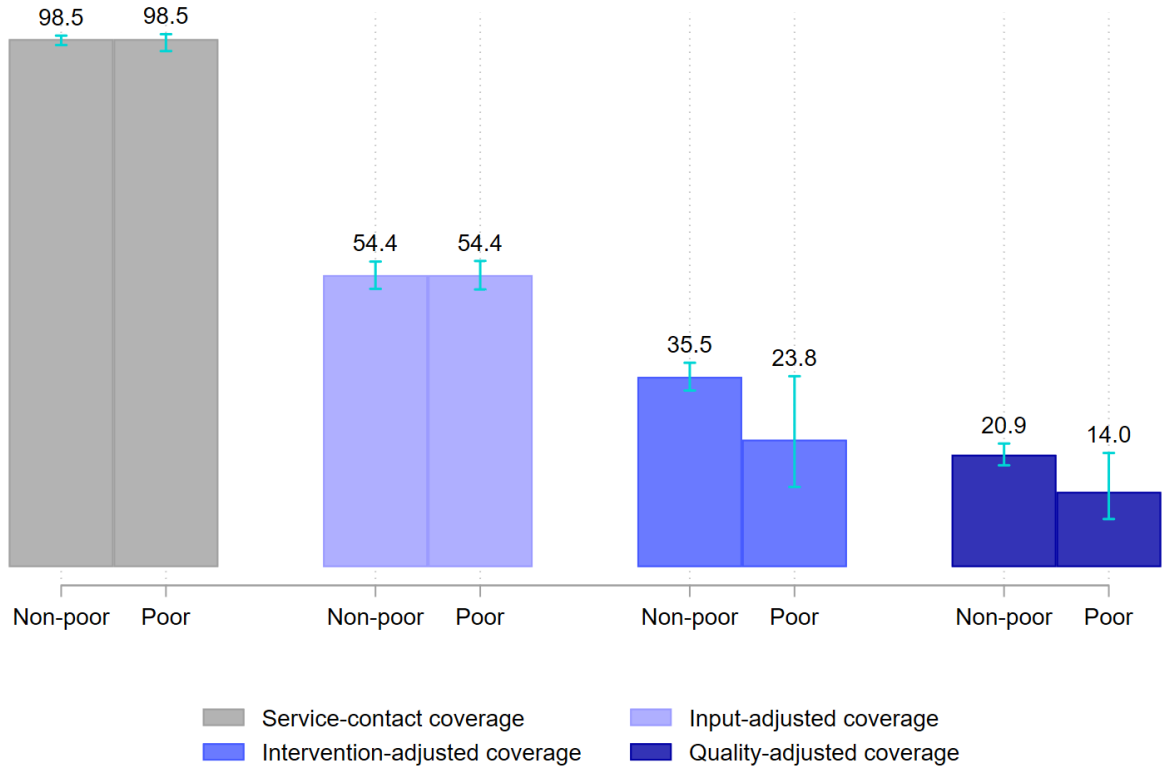


Table 9 provides the values for individual components of the ANC effective coverage cascades. Despite very high levels of service contact, levels of both readiness (55.3% overall) and receipt of complete intervention (65.2% for urban non-poor women and 43.6% for urban poor women) were low, which contributed to steep declines in the effective coverage cascade. ANC process quality, while the highest of all six countries in this analysis, was still low overall (59.0%). None of the differences between groups were statistically significant.

Table 9 Components of antenatal care and sick child care effective coverage overall and for urban poor versus non-poor, Tanzania

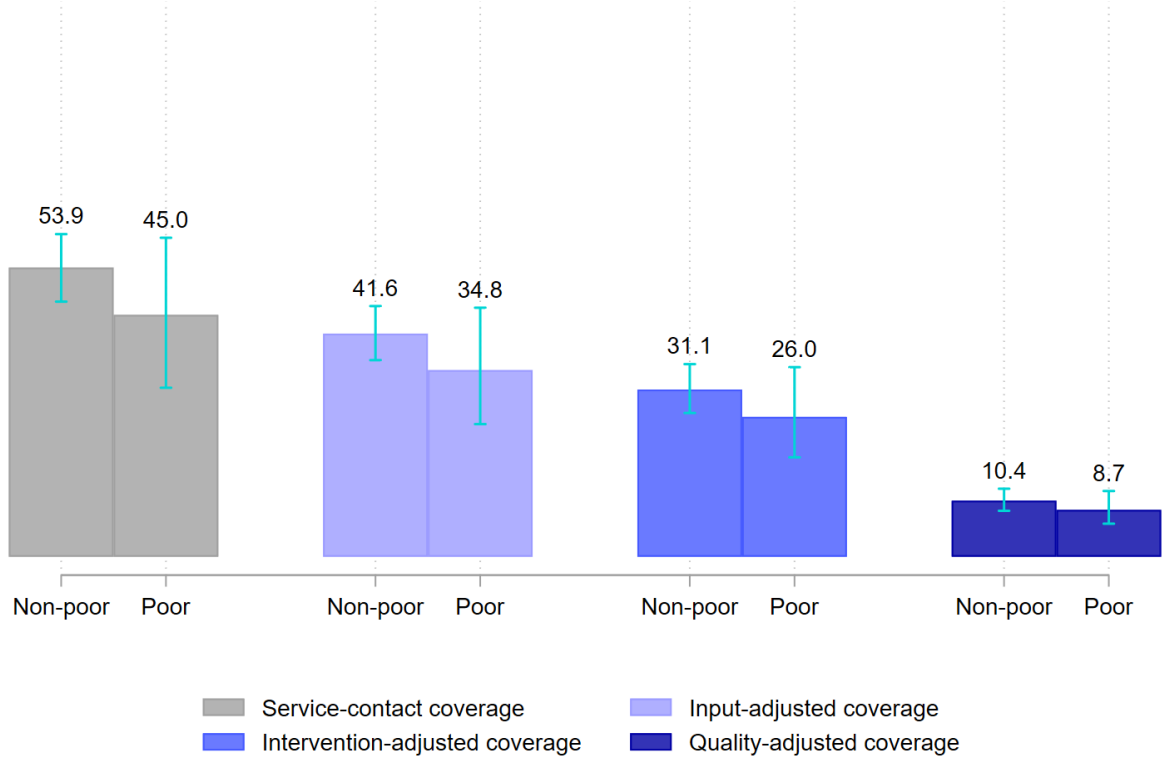
	Service contact		Service readiness		Receipt of complete intervention		Process quality	
	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI	Estimate	95% CI
Antenatal care								
All	0.985	[0.974, 0.991]	0.553	[0.527, 0.578]	0.628	[0.591, 0.663]	0.590	[0.553, 0.626]
Urban non-poor	0.985	[0.973, 0.991]		NA	0.652	[0.615, 0.686]		NA
Urban poor	0.985	[0.962, 0.994]		NA	0.436	[0.261, 0.629]		NA
Sick child care								
All	0.530	[0.472, 0.588]	0.772	[0.745, 0.796]	0.749	[0.685, 0.805]	0.335	[0.298, 0.374]
Urban non-poor	0.539	[0.475, 0.601]		NA		NA		NA
Urban poor	0.450	[0.315, 0.594]		NA		NA		NA

Note: Estimates are for each individual component of effective coverage, which were then combined to determine effective coverage cascades.
CI = confidence interval
NA = not available

3.6.2 Sick child care

Figure 24 shows Tanzania's sick child care effective coverage cascades (values also provided in Appendix Table 4). Coverage was similar for urban poor and urban non-poor children at each step in the cascade, with no statistically significant differences between groups (Figure 24). Although service-contact coverage differed by nearly nine percentage points (53.9% for urban non-poor and 45.0% for urban poor), the gap narrowed to less than two percentage points by the final step in the cascade, quality-adjusted coverage (10.4% for urban non-poor and 8.7% for urban poor). As in some other countries in the analysis, the small proportion of urban poor in Tanzania combined with the small proportion of children under 5 who experienced symptoms in the past 2 weeks contributed to large confidence intervals for the estimates for urban poor children.

Figure 24 Sick child effective coverage cascades for urban poor and urban non-poor children, Tanzania



Regarding the individual components of the sick child care cascade, we found both high values—53.0% for service contact overall (the highest among the countries in this analysis)—and low values—33.0% for process quality (the lowest among the countries in this analysis) (Table 9). Values for readiness and receipt of complete intervention were also high (77.2% and 74.9%, respectively), which contributed to the high relative coverage seen in Figure 24 at each step in the sick child effective coverage cascade.

3.7 Overall Findings

Figure 25 displays the differences found between urban poor and urban non-poor at each step in the ANC effective coverage cascade for all six countries included in this analysis. Statistically significant differences between the two groups (indicated with diamonds) were seen in only three countries—DRC, Ethiopia, and Haiti. In Haiti, these disparities were observed at all four steps in the cascade. In DRC and Ethiopia, they were observed for only a subset of the steps, generally later in the cascade. This may be because in all three countries, measures of receipt of complete intervention differed significantly between urban poor and non-poor women; thus, intervention-adjusted coverage, which took this measure into account, was more likely to have disparities.

The range of absolute differences between the two groups at each step in the cascade was smallest for Afghanistan and largest for Ethiopia.

Figure 25 Summary of country differences in antenatal care effective coverage cascade by urban poverty status

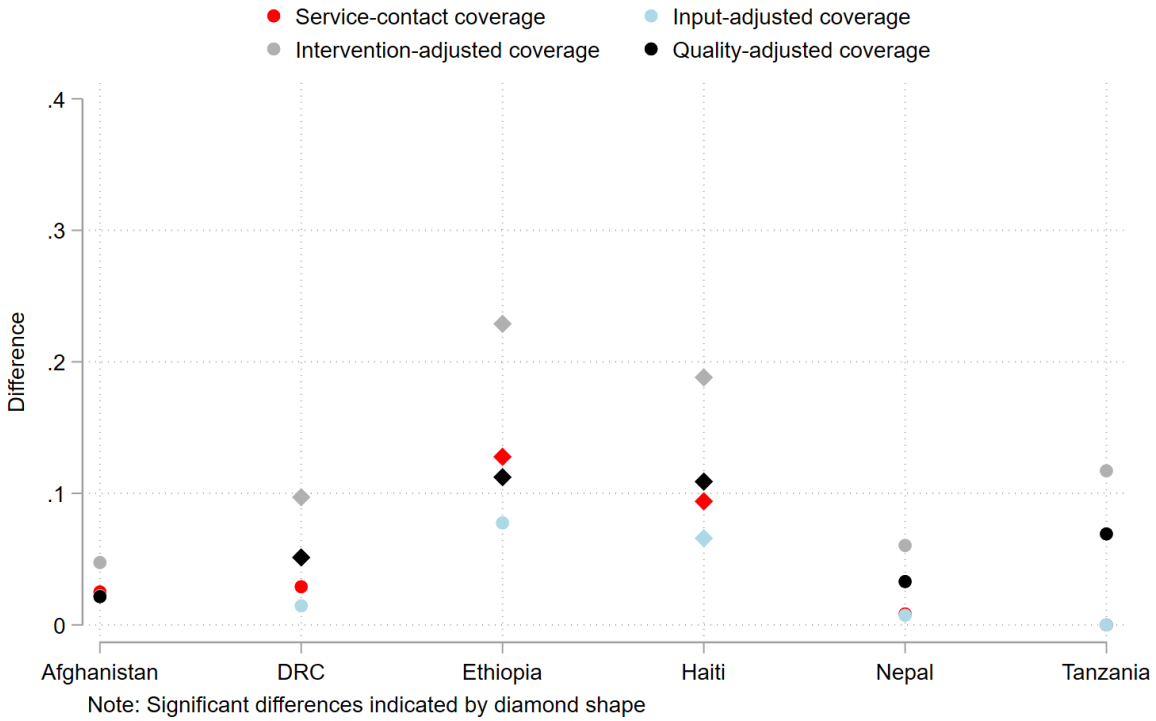
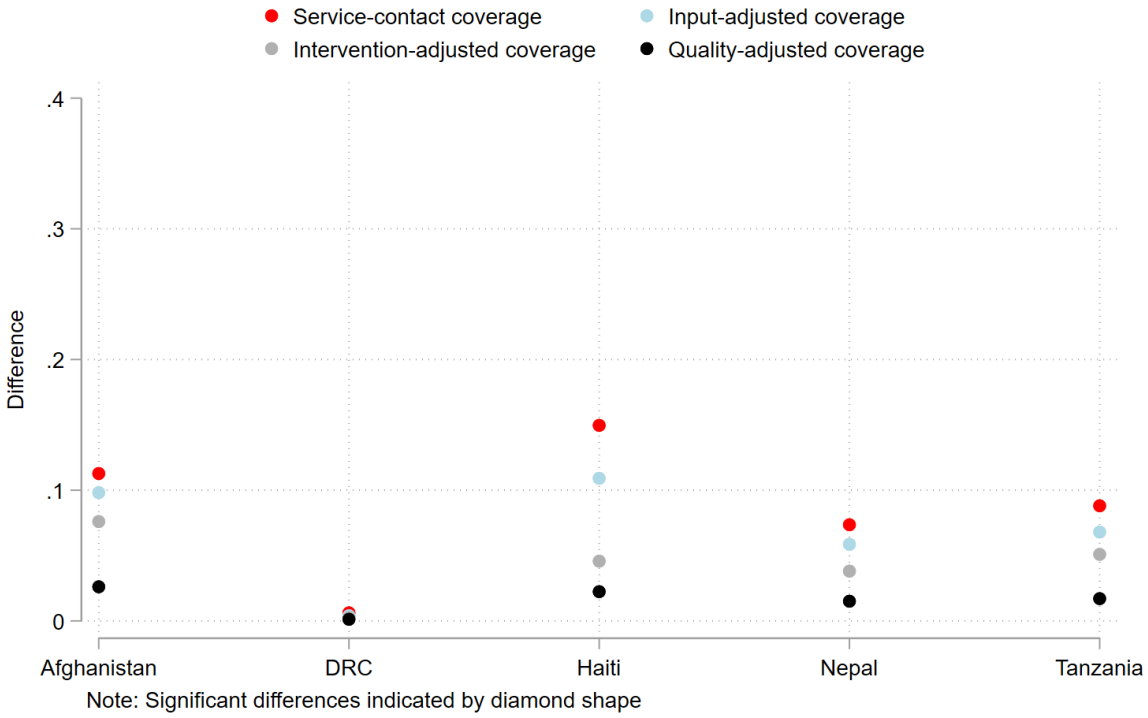


Figure 26 shows differences in the sick child care effective coverage cascades for urban poor and urban non-poor children for the five countries included in this analysis. The largest absolute differences between these two groups were in service-contact coverage. This was to be expected since service-contact coverage was the only DHS measure and, therefore, the only measure that could be disaggregated by urban poverty status.

The range of absolute differences between the two groups at each step in the cascade was smallest in DRC and largest in Haiti.

Figure 26 Summary of country differences in sick child care effective coverage cascade by urban poverty status



Note: Significant differences indicated by diamond shape

4 DISCUSSION

Previous research has demonstrated disparities in health indicators by urban poverty status,[15-17,19] but no studies had compared estimates of effective coverage. When assessing effective coverage in health service delivery, it is important to disaggregate the measures to identify inequities within the aggregate metric. The goal of this study was to determine disparities in antenatal care (ANC) and sick child care effective coverage between poor and non-poor populations living in urban areas in six countries: Afghanistan, Democratic Republic of the Congo (DRC), Ethiopia, Haiti, Nepal, and Tanzania. The following is a summary of our three main findings, implications of these findings, and strengths and limitations of our research.

Main Findings

- Disparities between urban poor and non-poor were evident in the ANC effective coverage cascade.
- Disparities were seen in countries with both high and low proportions of urban poor.
- No disparities were seen in the sick child care effective coverage cascade

4.1 Significant Differences in Antenatal Care Effective Coverage Cascade

We found statistically significant differences (that is, disparities) in ANC quality-adjusted coverage in three of the six countries included in the ANC analysis: DRC, Ethiopia, and Haiti. Poor coverage[31] as well as quality[7] of maternal health care among the urban poor has been established in previous research, so finding disparities in ANC effective coverage, which combines coverage and quality, is in line with this earlier research.

The ANC effective coverage cascade was assessed using DHS data for two of the four component measures: service contact, corresponding to the first step of the cascade, and receipt of complete intervention, which was used to calculate the intervention-adjusted coverage step of the cascade. Since DHS data were available by urban poverty status, this allowed for an additional opportunity for the urban poverty disparity to be incorporated into the cascade, increasing the likelihood of statistically significant differences.

4.2 Significant Differences in Antenatal Care Effective Coverage in Countries with High and Low Proportions of Urban Poor

Statistically significant differences in ANC effective coverage were observed in countries with large proportions of urban poor such as DRC, where 43% of urban women live in urban poor clusters, and Ethiopia, where 84% of urban women live in urban poor clusters. Disparities were also seen in countries with small proportions of urban poor such as Haiti, where only 6% of urban women live in urban poor clusters. Even in countries where quality-adjusted coverage did not differ significantly by urban poverty status, the proportion of urban women living in urban poor clusters ranged widely, from 60% in Afghanistan to 4% in Nepal.

It could be hypothesized that quality of care would be lower among the urban poor than non-urban poor in countries where larger shares of the urban population live in urban poverty clusters, due to overstretched health care workers and other drivers of poor quality of care.[32] However, in our analysis, we observed some significantly significant differences even in Haiti, where the urban poor population is very small, which

resulted in large confidence intervals for estimates. We can compare our results from regions with a higher proportion of households living in urban poverty clusters to previous results of regional effective coverage calculations for some countries to explore this hypothesis. In Haiti, for example, the two regions with the highest share of households living in urban poverty clusters, Grand'Anse and Nord-Est, both had below average service readiness but either average (Grand'Anse) or above average (Nord-Est) process quality for ANC. A similar pattern was seen in the two regions with the highest proportions of households living in urban poor clusters in Tanzania—Lake Region and Central Region.[21] Therefore, there does not appear to be a consistent association between the share of a population living in urban poverty and disparities in ANC effective coverage.

4.3 Lack of Disparities in Sick Child Care Effective Coverage Cascade

Previous research has found that sick child care service-contact coverage, the first step in the cascade, increases as household wealth increases.[19,21,33,34] However, we found no statistically significant differences in sick child care at any of the steps in the effective coverage cascade in our analysis.

There are likely two main contributors to our null result. First, in any given DHS survey, only a small number of children under 5 have experienced diarrhea or symptoms of acute respiratory infection in the past 2 weeks. With a small sample size comes large confidence intervals around estimates of the proportion of urban poor and non-poor who seek care at a health facility. This was especially true for urban poor estimates in the study countries with small proportions of children under 5 living in urban poor clusters—Haiti, Nepal, and Tanzania. Since our analysis determined statistical significance by non-overlapping confidence intervals, the likelihood of reaching statistical significance was reduced when confidence intervals were large. Compounding these small numbers is the fact that in many countries, a large proportion of caregivers will seek care from non-health facility sources, such as community health workers or retail outlets like pharmacies and shops.[33] Since our analysis focused on care sought at health facilities, these children were not included, further reducing the sample size.

The second contributor was that measures for three of the four individual components of the effective coverage cascade came from SPA data, which could not be disaggregated by urban poor versus non-poor status. Therefore, we had to use the aggregate measure for the three components for both groups. Another study that looked at sick child effective coverage, from Rwanda, did find disparities by wealth and place of residence using maternal self-report of intervention receipt instead of direct observation from a health facility survey.[19] Although maternal self-report has been shown to produce valid measures of care seeking,[35] maternal recall of receipt of complete intervention, which in the case of sick child care is "children under age 5 who received appropriate treatment among children under age 5 who were diagnosed with diarrhea or pneumonia at a facility," does not produce valid estimates.[36] Our previous research has shown that using maternal self-report can produce very different effective coverage estimates than observation.[24]

Very limited data are available on disparities in quality of care for sick child care, and those that do exist are focused on geographic disparities.[37,38] More research is needed on socio-demographic disparities in sick child quality of care.

4.4 Implications

The findings of this analysis have both programmatic and research implications. For programs, our results showed disparities in effective coverage of ANC for the urban poor and urban non-poor in many settings, with the urban poor being worse off. Programs working in urban areas should consider focusing on urban poor areas to both increase coverage of ANC services as well as improve quality of care provided in these areas.

We see three primary research implications of this work. First, questions that would help establish an individual's urban poverty status could be incorporated into the client exit interview of SPA surveys. In this way, future research could identify facilities frequented by urban poor populations as well as disaggregate process quality by urban poverty status. The second research implication is that this analysis could be replicated using alternative strategies for measuring the different components of the effective coverage cascade. Because there are no universally agreed upon definitions of the components/steps in the effective coverage cascade, additional analyses would be useful to determine if the disparities we identified hold true when other definitions are used. The final implication is in regard to sample size, as many of the differences we found in urban poor versus non-poor effective coverage cascades were not statistically significant, likely due to small sample sizes. If the size of the urban poor population is small at the national level, then further analyses on more context-specific areas, such as regional or other sub-national areas of urban poor, may not be useful. However, if there is interest in this kind of analysis, the household and facility assessment would need to ensure adequate sample sizes for the urban poor population.

4.5 Strengths and Limitations

This study filled a gap in the literature by comparing effective coverage cascades for two essential primary health care services—ANC and sick child care—by urban poverty status. We were able to combine data from two nationally representative surveys (that is, DHS and SPA surveys) to estimate effective coverage cascades for urban poor and urban non-poor populations.

This analysis also had its limitations. First, the urban poverty measure utilized urban residence, which in DHS data was determined based on information from the country statistical agency and the most recent available census data. This information might have been outdated[39] and thus may have resulted in some misclassification of clusters as rural or urban.

Second, as discussed earlier, SPA data do not include individual measures of place of residence and poverty that could be used to determine the urban poverty status of each woman or child. Therefore, the effective coverage cascades reflected service readiness and process quality for all urban health facilities. This means that any disparities we found between urban poor and urban non-poor were likely smaller than in actuality, as research has shown that poor clients receive lower quality of care.[5-7] Future research could consider using external measures of poverty, such as the multidimensional poverty index, to categorize catchment areas around facilities to better capture socioeconomic differences in facility client populations.[40]

Finally, the DHS and SPA surveys were conducted 3+ years apart in both Afghanistan and DRC. Ideally, effective coverage is calculated with data that are collected close enough in time to assume that health facility services, service readiness, and process quality are comparable between the two surveys. For

Afghanistan and DRC, it is therefore plausible that quality of care at the health facilities had changed by the time data from the SPA were collected.[41,42]

4.6 Conclusion

Disparities in coverage and quality of care as separate measure by urban poverty status are evident in ANC and sick child care. This research sought to take an equity analysis one step further by examining differences in the effective coverage cascades. Even with methodological limitations, disparities in ANC emerged in half of the countries, and in countries with both high and low proportions of urban poor women. Future research should explore ways to improve on the methodological limitations identified here to better illuminate inequity for the urban poor.

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APPENDIX

Appendix Table 1 Proportion of households meeting criteria for each variable used to construct urban poverty measure

Country	Year	Improved water	Improved sanitation	Durable material home	Crowded	Urban poor household
Afghanistan	2015	71.2	34.5	8.7	56.0	15.1
DRC	2013–14	48.8	39.7	15.8	42.9	16.0
Ethiopia	2019	68.7	19.5	7.4	65.5	22.2
Haiti	2016–17	75.6	55.3	59.2	37.6	7.3
Nepal	2022	98.0	92.8	50.0	21.2	9.7
Tanzania	2015–16	64.0	74.9	40.6	32.6	4.4
Among urban only and after keeping the same provinces as Service Provision Assessment surveys in Afghanistan and Ethiopia						
Country	Year	Improved water	Improved sanitation	Durable material home	Crowded	Urban poor household
Afghanistan	2015	93.5	74.7	29.0	57.9	55.5
DRC	2013–14	84.6	56.2	46.1	44.7	50.5
Ethiopia	2019	86.3	38.4	15.7	53.8	76.1
Haiti	2016–17	97.5	79.3	85.3	40.1	18.2
Nepal	2022	98.8	93.9	61.1	20.3	14.5
Tanzania	2015–16	92.7	92.2	79.3	29.0	13.3

Appendix Table 2 Percentages of women ages 15–49 and children under 5 living in urban poor clusters among the total and urban populations

	Women ages 15–49								
	N	% of total living in urban areas	95% CI	% of total living in urban poor clusters	95% CI	n urban	% in urban population living in urban poor clusters	95% CI	n living in urban poor clusters
Afghanistan	12,552	57.6	[52.4, 62.6]	25.5	[18.6, 33.9]	5,326	60.0	[45.3, 73.1]	3,198
DRC	18,827	61.6	[57.6, 65.5]	16.5	[13.3, 20.3]	7,225	43.0	[34.8, 51.5]	3,103
Ethiopia	8,256	68.3	[65.5, 71]	26.7	[23.8, 29.9]	2,618	84.3	[78.9, 88.5]	2,206
Haiti	15,393	53.9	[51.2, 56.7]	2.6	[1.4, 4.7]	7,091	5.6	[3.0, 10.2]	395
Nepal	14,845	31.4	[30.1, 32.8]	2.9	[1.5, 5.5]	10,178	4.2	[2.1, 8.0]	424
Tanzania	13,266	63.7	[61.7, 65.7]	2.1	[1.0, 4.5]	4,811	5.9	[2.7, 12.3]	282
	Children under 5								
	N	% of total living in urban areas	95% CI	% of total living in urban poor clusters	95% CI	n urban	% in urban population living in urban poor clusters	95% CI	n living in urban poor clusters
Afghanistan	13,075	58.8	[52.3, 65.0]	26.3	[18.8, 35.5]	5,389	63.7	[48.6, 76.6]	3,434
DRC	17,017	69.1	[65.3, 72.7]	15.7	[12.7, 19.4]	5,257	51.0	[42.0, 59.8]	2,679
Haiti	5,867	64.8	[61.9, 67.6]	3.6	[1.9, 6.7]	2,065	10.2	[5.3, 18.7]	211
Nepal	5,040	35.0	[32.7, 37.3]	3.6	[1.8, 7.1]	3,276	5.5	[2.7, 10.9]	180
Tanzania	9,520	73.3	[70.9, 75.6]	3.0	[1.3, 6.9]	2,541	11.2	[4.8, 23.9]	285

CI = confidence interval

Appendix Table 3 Items included in antenatal and sick child care service readiness and process quality measures

	Antenatal care	Sick child care
service readiness	(3 items)	(2 items)
	Power (electricity or generator)	Medication availability: zinc/oral rehydration salts for diarrhea
	Soap and running water or alcohol-based hand rub	Medication availability: antibiotics for pneumonia (amoxicillin suspension or dispensable pediatric-dosed tablets)
	Access to adequate sanitation facilities for clients	
Process quality	(3 items)	(6 items)
	Provider checked blood pressure	Provider counted respiration for 60 seconds
	Daily oral iron and folic acid supplementation (counseled or prescribed)	Provider checked skin turgor for dehydration (for example, pinched abdominal skin)
	Provider counseled on breastfeeding	Provider weighed client
		Provider checked palms/conjunctiva for pallor
		Provider plotted weight on growth chart
		Provider discussed weight/growth/growth chart

Appendix Table 4 **Effective coverage cascade estimates for antenatal care and sick child care, proportions with 95% confidence intervals**

		Service-contact coverage		Input-adjusted coverage		Intervention-adjusted coverage		Quality-adjusted coverage	
		Proportion	95% CI	Proportion	95% CI	Proportion	95% CI	Proportion	95% CI
					Antenatal care				
	All	0.757	[0.712, 0.797]	0.667	[0.611, 0.719]	0.250	[0.214, 0.290]	0.113	[0.091, 0.141]
Afghanistan	Urban non-poor	0.741	[0.665, 0.805]	0.654	[0.578, 0.723]	0.280	[0.216, 0.354]	0.127	[0.094, 0.169]
	Urban poor	0.766	[0.705, 0.818]	0.676	[0.609, 0.736]	0.232	[0.197, 0.272]	0.105	[0.084, 0.132]
					Sick child care				
	All	0.471	[0.419, 0.524]	0.410	[0.345, 0.478]	0.317	[0.261, 0.379]	0.109	[0.083, 0.142]
	Urban non-poor	0.548	[0.459, 0.634]	0.477	[0.382, 0.573]	0.369	[0.292, 0.454]	0.127	[0.094, 0.169]
	Urban poor	0.435	[0.376, 0.496]	0.379	[0.312, 0.450]	0.293	[0.237, 0.356]	0.101	[0.076, 0.133]
					Antenatal care				
	All	0.947	[0.935, 0.957]	0.473	[0.452, 0.495]	0.276	[0.257, 0.297]	0.146	[0.128, 0.165]
						*		*	
	Urban non-poor	0.962	[0.942, 0.975]	0.481	[0.458, 0.503]	0.327	[0.299, 0.356]	0.173	[0.151, 0.197]
DRC	Urban poor	0.933	[0.913, 0.948]	0.466	[0.444, 0.488]	0.230	[0.212, 0.250]	0.121	[0.106, 0.139]
					Sick child care				
	All	0.295	[0.261, 0.331]	0.190	[0.168, 0.215]	0.116	[0.085, 0.155]	0.060	[0.043, 0.083]
	Urban non-poor	0.291	[0.239, 0.350]	0.188	[0.154, 0.228]	0.115	[0.081, 0.159]	0.059	[0.041, 0.085]
	Urban poor	0.297	[0.253, 0.346]	0.192	[0.163, 0.225]	0.117	[0.085, 0.159]	0.060	[0.042, 0.085]
					Antenatal care				
	All	0.835	[0.759, 0.890]	0.506	[0.458, 0.555]	0.292	[0.228, 0.367]	0.143	[0.112, 0.182]
		*				*		*	
Ethiopia	Urban non-poor	0.948	[0.900, 0.974]	0.575	[0.536, 0.613]	0.499	[0.450, 0.548]	0.245	[0.218, 0.274]
	Urban poor	0.820	[0.738, 0.881]	0.498	[0.446, 0.549]	0.270	[0.204, 0.349]	0.133	[0.100, 0.173]
					Antenatal care				
	All	0.935	[0.917, 0.950]	0.656	[0.644, 0.667]	0.485	[0.450, 0.519]	0.281	[0.259, 0.304]
		*		*		*		*	
	Urban non-poor	0.945	[0.927, 0.959]	0.662	[0.651, 0.673]	0.506	[0.473, 0.538]	0.293	[0.271, 0.315]
Haiti	Urban poor	0.851	[0.807, 0.886]	0.596	[0.568, 0.624]	0.317	[0.248, 0.396]	0.184	[0.144, 0.231]
					Sick child care				
	All	0.362	[0.305, 0.423]	0.264	[0.223, 0.309]	0.111	[0.087, 0.140]	0.054	[0.042, 0.070]
	Urban non-poor	0.340	[0.288, 0.396]	0.248	[0.211, 0.289]	0.104	[0.082, 0.131]	0.051	[0.040, 0.065]
	Urban poor	0.490	[0.254, 0.730]	0.357	[0.202, 0.549]	0.150	[0.088, 0.243]	0.073	[0.044, 0.121]

Continued…

Appendix Table 4—*Continued*

		Service-contact coverage		Input-adjusted coverage		Intervention-adjusted coverage		Quality-adjusted coverage	
		Proportion	95% CI	Proportion	95% CI	Proportion	95% CI	Proportion	95% CI
					Antenatal care				
	All	0.975	[0.964, 0.982]	0.858	[0.842, 0.873]	0.684	[0.648, 0.718]	0.373	[0.350, 0.396]
	Urban non-poor	0.975	[0.964, 0.983]	0.858	[0.842, 0.873]	0.687	[0.650, 0.722]	0.374	[0.352, 0.398]
Nepal	Urban poor	0.967	[0.892, 0.990]	0.851	[0.783, 0.900]	0.627	[0.493, 0.743]	0.341	[0.276, 0.414]
					Sick child care				
	All	0.158	[0.118, 0.207]	0.126	[0.094, 0.165]	0.082	[0.060, 0.110]	0.032	[0.023, 0.044]
	Urban non-poor	0.161	[0.120, 0.212]	0.128	[0.096, 0.169]	0.083	[0.061, 0.113]	0.033	[0.024, 0.045]
	Urban poor	0.087	[0.021, 0.299]	0.069	[0.017, 0.239]	0.045	[0.012, 0.156]	0.018	[0.005, 0.062]
					Antenatal care				
	All	0.985	[0.974, 0.991]	0.544	[0.519, 0.570]	0.342	[0.317, 0.368]	0.202	[0.183, 0.222]
	Urban non-poor	0.985	[0.973, 0.991]	0.544	[0.519, 0.570]	0.355	[0.329, 0.381]	0.209	[0.190, 0.230]
Tanzania	Urban poor	0.985	[0.962, 0.994]	0.544	[0.518, 0.571]	0.238	[0.149, 0.356]	0.140	[0.090, 0.213]
					Sick child care				
	All	0.530	[0.472, 0.588]	0.409	[0.363, 0.457]	0.307	[0.265, 0.351]	0.103	[0.085, 0.124]
	Urban non-poor	0.539	[0.475, 0.601]	0.416	[0.366, 0.467]	0.311	[0.268, 0.359]	0.104	[0.086, 0.127]
	Urban poor	0.450	[0.315, 0.594]	0.348	[0.247, 0.464]	0.260	[0.185, 0.353]	0.087	[0.062, 0.122]

* Statistically significant difference between urban poor and non-poor
CI = confidence interval