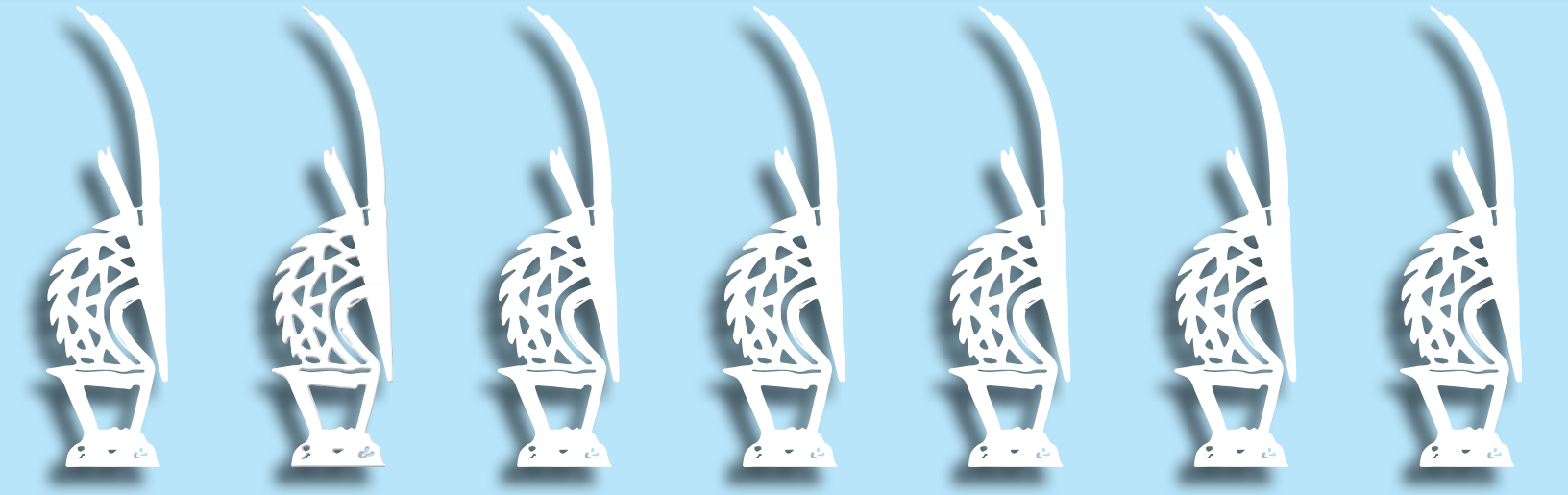
Availability, Readiness, and Utilization of Services in Mali

Analysis of the Mali Demographic and Health Survey and Service Availability and Readiness Assessment 2018



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EXECUTIVE SUMMARY

Utilisation of key reproductive, maternal and child health services has improved in Mali. However, the pace of improvement varies across services, and there is also a large disparity in service utilisation across regions. Service utilisation at the population level is determined by various factors such as demand for a service and, among those with demand for the service, ability to access quality care. To understand the determinants of service utilisation and trends in utilisation, it is crucial to study service utilisation in the context of access to quality care by using data from both the population and health facilities.

In 2018, Mali conducted a Demographic Health Survey (DHS) and a Service Availability and Readiness Assessment (SARA). This provided a relatively rare opportunity to study both the service environment and service utilisation in the country. The 2018 Mali SARA collected data from a representative sample of facilities in the country, which provided information on the availability of facilities, availability of services among the sampled facilities, and service readiness among the facilities that provide specific services. The two elements of access to care that can be studied with data from SARA include geographic accessibility (by using a crude proxy indicator) and service quality.

This study aims to increase our understanding of the service environment and its association with service utilisation at the regional level for eight services, using data from the 2018 SARA and the 2018 DHS. The services include family planning, antenatal care (ANC), delivery care, childhood vaccination, child health services, malaria diagnosis and treatment, intermittent preventive treatment in pregnancy for malaria (IPTp), and counselling and testing for human immunodeficiency virus (HIV). For each of the select services, the specific aims are to (1) assess service readiness, by domain and average across domains; (2) examine service availability, both unadjusted and adjusted; and (3) explore associations between service utilisation and various measures of service availability. In addition, we provide a region-specific summary of the service environment and utilisation that will facilitate use of the study findings at the regional and national levels.

For each of the eight services, we constructed a service readiness score for the four domains of service readiness (staff and guidelines, equipment, diagnostics, and medicine and commodities). In addition, for each service, we created a summary service readiness score that averaged the four domain scores. Operational capacity among facilities that offer specific services varies greatly across services, although this generally ranges between 60 and 90 of the maximum score of 100. Across the eight service areas, readiness is lower in the staffing and guidelines and the diagnostics domains than in the equipment and medicines and commodities domains. Overall, childhood vaccination readiness is relatively high and consistent across the four domains. Among the regions, Bamako has relatively low service readiness across all service areas. In Kayes, Sikasso, and Mopti, the readiness score is higher than or close to the national average across the eight service areas.

We also calculated service availability (percent of facilities that offer specific services), which is relatively high for all services except HIV counselling and testing. We then calculated the service availability adjusted for service readiness (percent of facilities that offer a specific service with operational capacity to provide the service). The average adjusted availability is lower than the unadjusted availability by 22 percentage points across all regions and services areas. To address the large variation in facility density across regions,

we further adjusted the availability by using the relative facility density score against the World Health Organization (WHO) benchmark (ranging from 0.45 in Mopti and Segou and 0.8 in Bamako). After the final adjustment, the ranking of regions changed substantially because regions with low availability and/or readiness scores have relatively higher facility density (such as Bamako) and vice versa. For each region, we produced detailed information on utilisation, service readiness, and service availability, along with relative comparisons against the national average and regional ranges. Finally, we assessed the relationships between service utilisation and the three service availability measures.

Although it is difficult to draw statistical inferences based on a small number of regions, we found no statistically significant linear correlation between utilisation and service availability in any service area. When we examine associations between utilisation and service availability adjusted for readiness and facility density, statistically significant linear correlation was observed in two areas: a negative association with malaria IPTp (correlation coefficient: -0.74, p-value: 0.03) and a positive association with HIV counselling and testing (correlation coefficient: 0.72, p-value: 0.04).

It is important to note that any significant correlation based on observational data does not indicate causality. A negative association can reflect targeted interventions that can improve the service environment in regions with low utilisation. The overall lack of associations with most services suggests the importance of other elements of access in service utilisation, which are not addressed in our study. These include information, sociocultural acceptability, and affordability. We attempted to control for geographic accessibility, another important element for access, by adjusting service readiness with the relative density score across regions. However, since the geographic distribution of facilities differs from the geographic distribution of population in many regions, the aggregate regional-level facility density may not have been an effective measure for adjusting geographic access.

In summary, we assessed the service environment at the regional level with various quality and availability measures for eight select services in Mali. Although most services are commonly offered at facilities, readiness to provide specific services varies greatly across regions and services. Further, relatively low facility density indicates lower accessibility at the population level. When assessing the relationship between utilisation and various service availability measures, we found significant associations in only a few services. We speculate that other elements of access to care contribute to differences in service utilisation at the regional level. However, it is important to note that lack of association between the service environment and utilisation at the population level does not imply that service quality is unimportant. Receiving high-quality service is a patient right, regardless of its impact at the population level.

ACRONYMS AND ABBREVIATIONS

ACT	artemisinin-based combination therapy
ANC	antenatal care
API	application program interface
CHU	Centre Hospitalo-Universitaire
CMIE	Centre Medical Inter-Enterprise
CSCOM	Centre de Santé Communautaires
CSREF	Centre de Santé de Référence
DHS	Demographic and Health Survey
EPH	Établissement Public Hospitalier
HIV	human immunodeficiency virus
IPTp	intermittent preventive treatment in pregnancy (for malaria)
RDT	rapid diagnostic test
SARA	Service Availability and Readiness Assessment

1 BACKGROUND

Since the first Demographic and Health Survey (DHS) in 1986, Mali has experienced increased utilisation of key reproductive, maternal and child health services. The pace of improvement, however, has varied across services. The trend has remained steady or even accelerated for some services, while the rate of increase has declined in others. For example, use of modern contraceptive methods has improved at a slightly more rapid rate in the past several years, when compared to progress in the 1990s and 2000s. Institutional delivery and intermittent preventive treatment in pregnancy for malaria (IPTp) have increased steadily, although there have been no clear trends of improvement during the last decade in either childhood immunisation and the treatment of diarrhoea among children (INSTAT, Ministere de la Sante, and ICF 2019).

Service utilisation at the population level is determined by demand for a service and, among those with demand for the service, ability to access quality care. Access to care has been studied in different service areas and populations. This research identified key elements that ensure access: information, cultural and social acceptability, geographic accessibility, affordability, and, provision of quality services at facilities (Bertrand et al. 1995; Choi, Fabic, and Adetunji 2016; Penchansky and Thomas 1981; UNCESCR 2000). To understand the determinants of service utilisation and its trends, it is crucial to study service utilisation in the context of access to quality care by using data from the population and health facilities.

In 2018, Mali conducted both the DHS and the Service Availability and Readiness Assessment (SARA), which provided a relatively rare opportunity to study both the service environment and utilisation in the country. The 2018 Mali SARA, which collected data from a representative sample of facilities in the country, provided information on the availability of facilities, availability of services (whether or not specific services are offered) among sampled facilities, and service readiness (operational capacity to provide quality care) among facilities that provide specific services (Ministere de la Sante 2018). The data captured two elements of access: geographic accessibility and service quality. Facility density can be a crude proxy of geographic accessibility, although facilities can be concentrated in certain areas that do not necessarily follow the population distribution. Service readiness is a critical dimension of quality care, although operational capacity does not necessarily mean that providers deliver care that meets clinical as well as non-clinical standards. Nevertheless, service readiness is critical for the provision of quality care.

In this study, we aim to improve understanding of the service environment and its association with service utilisation at the regional level for eight services by using data from 2018 SARA and 2018 DHS. Specific aims for each of the select services are to: (1) assess service readiness, by domain and average across domains; (2) examine service availability, both unadjusted and adjusted; and (3) explore associations between service utilisation and various measures of service availability. In addition, we provide a region-specific summary of the service environment and utilisation that can facilitate use of the study findings at the regional and national levels.

2 DATA AND METHODS

2.1 Data

2.1.1 Mali SARA 2018

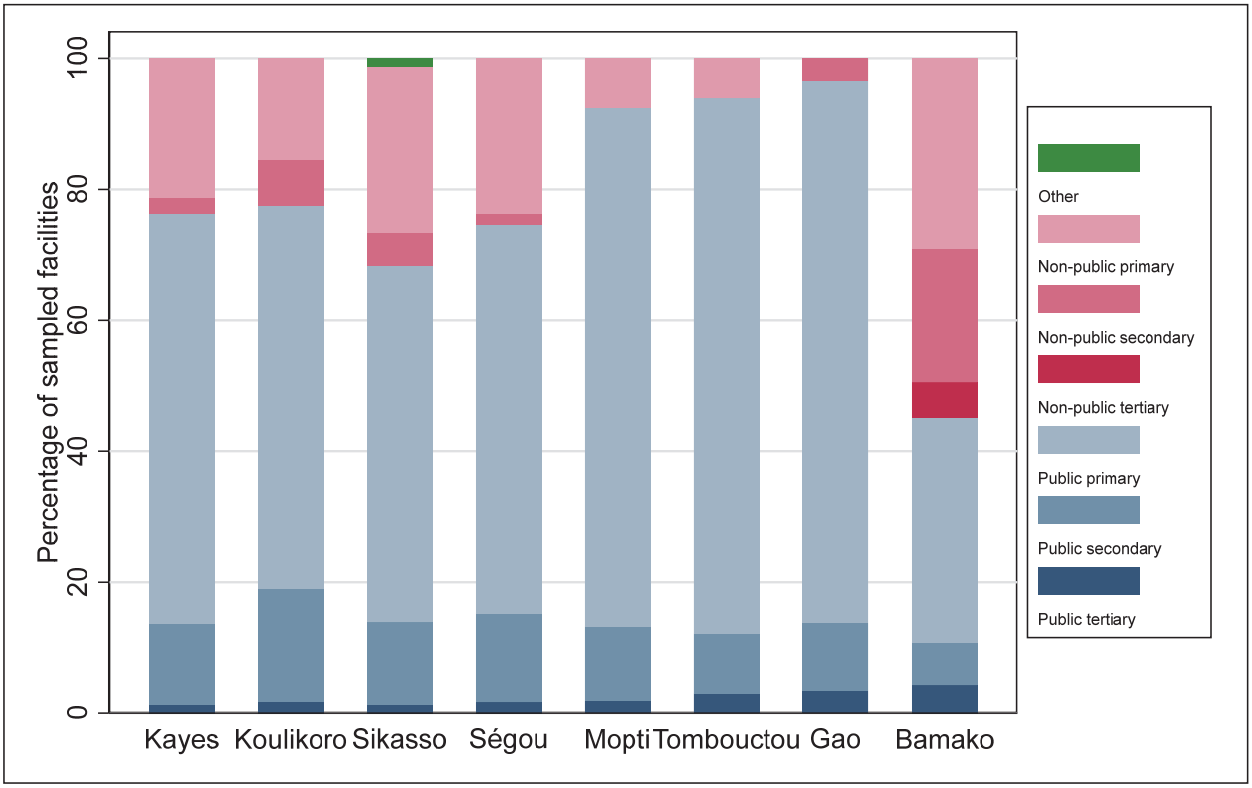
Mali SARA 2018 was the first nationally representative health facility survey conducted in the country.[1] The survey, conducted in June 2018, assessed the availability of services, operational capacity to provide specific services, and the quality of data generated from health facilities. Mali SARA 2018 was a sample facility survey, with strata by region, residential areas, managing authority, and level of facility. The target sample size estimated a hypothesised level of 50%, with a margin of error of 5%. The sample frame was the database of facilities included in the District Health Information Systems 2. For each stratum, a simple random sample was selected from the sampling frame. Two questionnaires and tablets were used to collect data: the standard SARA questionnaire and the data quality assessment questionnaire (WHO 2015). A total of 484 facilities were included. Further information on the survey methods is available elsewhere (Ministere de la Sante 2018).

Mali SARA 2018 found that sample characteristics vary substantially across regions because specific types of facilities are located more commonly in certain regions. For example, the percentage of polyclinic and clinics (private tertiary and secondary-level facilities, respectively) is substantially higher in Bamako (26%) than in other regions. In Gao, Koulikoro, and Tombouctou, roughly 80% of sampled facilities are Centre de Santé Communautaire (CSCOM), which are public primary-level facilities (Figure 1, Appendix 1). This variation in sample characteristics across regions is important for interpreting regional differences in service availability and readiness results from the survey because more advanced-level facilities may have higher operational capacity than the lower-level facilities.

The final report presents estimates of SARA indicators and indices for the country, as well as by sampling stratum, including region. Thus, regional estimates for all SARA indicators were extracted from the report and used for the analyses in this report.

[1] For security reasons, the survey did not include the Kidal, Ménaka, and Taoudénit regions and the Youwarou and Tenenkou health districts.

Figure 1 Distribution of sampled facilities by facility type: Mali SARA 2018



Note: Public tertiary facilities include Centre Hospitalo-Universitaire and Établissement Public Hospitalier; public secondary facilities are Centre de Santé de Référence; public primary facilities are Centre de Santé Communautaire, and infirmerie; non-public tertiary facilities are polyclinics, non-public secondary facilities are clinics, and non-public primary facilities are cabinet medical and Centre Medical Inter-Enterprise. See Appendix 1 for detailed distributions of facilities by region.

2.1.2 Mali DHS 2018

Mali DHS 2018, the sixth DHS in the country, provides vast information on population, health, and nutrition. Households were selected with the standard DHS sampling methods (stratified two-stage sampling). The survey provides representative data for the nation, each of the nine regions, and residential area.[2] All women age 15-49 in the selected households were eligible for individual interviews. Women provided basic demographic information, and information about use of contraceptive methods, care for pregnancies and births in the previous 5 years, and health and care seeking for their children under age 5. The survey was conducted between August and November of 2018, with tablets used for data collection. A total of 9,510 households and 10,519 women between age 15-49 were interviewed. Detailed information on the survey design and implementation is included in the final report (INSTAT, Ministere de la Sante, and ICF 2019).

[2] In the Kidal region, only the urban population was included in Mali DHS 2018 due to security concerns in and difficulties reaching rural areas.

2.2 Measures

2.2.1 Domain-weighted service readiness score

Service readiness is a summary measure comprised of individual tracer indicators. An individual readiness indicator refers to a percentage of facilities with a specific tracer item. This is measured in each specific service area (service-specific service readiness), as well as general components that are applicable for all services (general service readiness). In this report, we focus on service-specific readiness measures, since our interest is utilisation of specific services. Service-specific service readiness, however, is not necessarily comparable across different services, because its main purpose is to track tracer indicators within each service. However, for the purpose of this study that involves various services, it is important to understand how the readiness indices are calculated in each service and what differences exist across services.

First, each measure of service-specific readiness includes multiple individual indicators across four domains: staff and guidelines, equipment, diagnostics, and medicines and commodities. All service areas have two domains: staff and guidelines, and medicines and commodities. However, depending on the nature of services, the diagnostics or equipment domain may not be measured in some service areas (Table 1). In addition, the number of indicators per domain varies greatly within as well as across service areas. For example, for delivery care, the number of items ranges from 0 in diagnostics to 14 in equipment, and the number of items in the equipment domain ranges from 0 in malaria to 14 in delivery. Finally, the summary index is not standardised across service areas. For ANC and obstetric care, the index is a weighted average across the four domains. For most other services, an unweighted average of all indicators is typically reported.

Table 1 presents the number of individual indicators in each domain by service area, and Appendix 2 presents a detailed list of individual indicators.

These differences present challenges for comparative analyses across services. First, when the unweighted average is used, a summary index can be weighted toward a domain with a larger number of indicators. In addition, the relative distribution of indicators across domains differs substantially across services. For example, childhood vaccination, in which staffing and guidelines includes only 11% of the indicators (2/18), versus HIV counselling and testing, in which 40% of indicators (2/5) relate to staffing and guidelines. In such cases, the unweighted indices may be inappropriate for direct comparison between the services.

Thus, for the purpose of this study, we calculated readiness scores in each service area by using a consistent methodology with a domain-weighted average of individual indicators. We first calculated a domain-specific score (average of individual indicators in a domain) and then obtained an average across domain-specific scores. The score ranges from 0 to 100.

Table 1 Number of indicators in each domain of service readiness by service area: Mali SARA 2018

Service area	Total	By domain			
		Staff and guidelines	Equipment	Diagnostics	Medicines and commodities
Family planning	8	3	1	0	4
Antenatal care	11	3	1	2	5
Delivery	25	5	14	0	6
Childhood vaccination	18	2	8	0	8
Child health services*	19	4	5	3	7
Malaria	9	4	0	1	4
Malaria diagnosis and testing	5	2	0	1	2
Malaria IPTp	5	2	0	1	2
HIV counselling and testing	5	2	1	1	1

Source: WHO SARA manual; Mali SARA 2018 final report.
Note: For the equipment domain, the SARA manual includes five items, including a growth chart. Mali SARA 2018, however, included the Shakir band to measure circumference instead of a growth chart. The total number of equipment items remains at five.

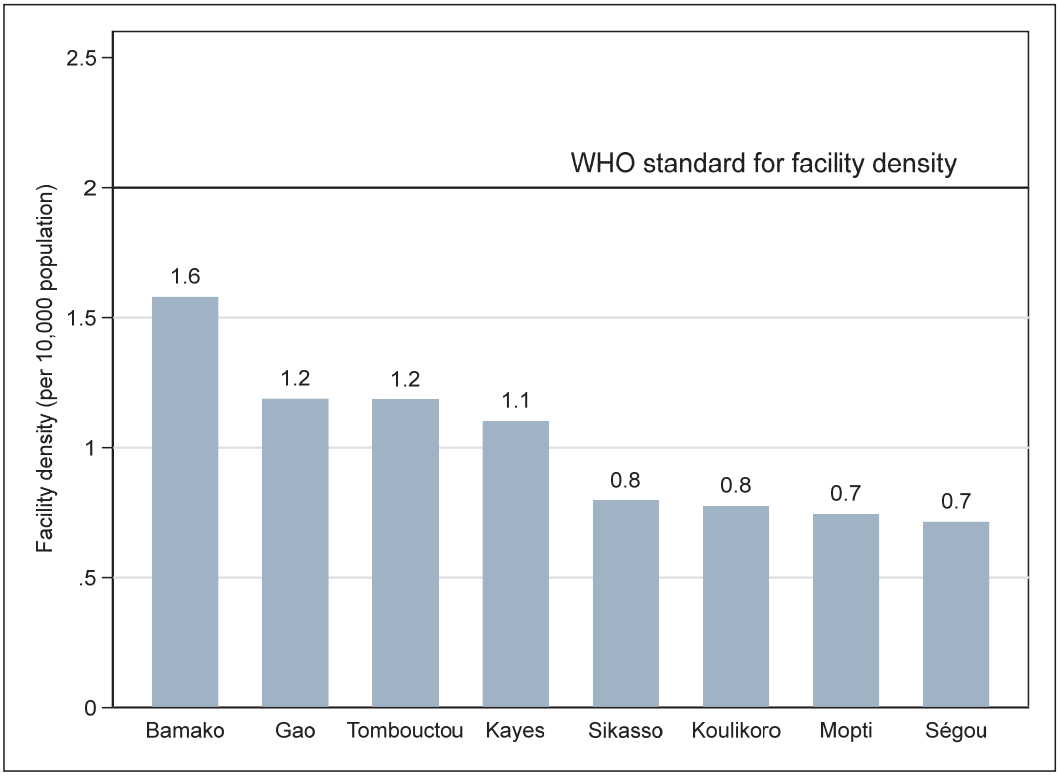
The malaria service readiness includes two different services that target categorically different populations: diagnosis and treatment, and IPTp. Thus, for this report, readiness was constructed separately for curative and preventive services.

2.2.2 Service availability adjusted for service readiness and facility density

Service readiness is measured among the facilities that offer specific services in order to monitor the facilities' structural and operational capacity. However, when considering associations between service environment and utilisation of the services at the population level, the readiness score alone is insufficient. Excellent service readiness in a limited number of facilities with low availability of the service among all facilities may not contribute to high service utilisation at the population level.

Further, geographic access to facilities is an important domain of access to services at the population level. Facility density can be a crude proxy for geographic access, although size of an area and the infrastructure for transportation are also important factors. If facility density is suboptimal, high service availability and readiness may not benefit the population. In Mali, there is considerable variation in facility density across regions, from 0.7 in Segou to 1.6 in Bamako (see Figure 2).

Figure 2 Facility density by region in Mali



Source: Mali SARA 2018 Final Report, Table III: Density of health care facilities by region in 2016.

We calculated two adjusted service availability scores:

- Service-readiness adjusted availability = service availability * readiness score for the service / 100, and
- Service-readiness and facility-density adjusted availability = service-readiness adjusted availability * facility availability score,

where service availability is the percentage of facilities that offer the service, and the facility availability score (a relative ratio) refers to the relative facility density against the WHO guideline of two facilities per 10,000 population (WHO 2015).

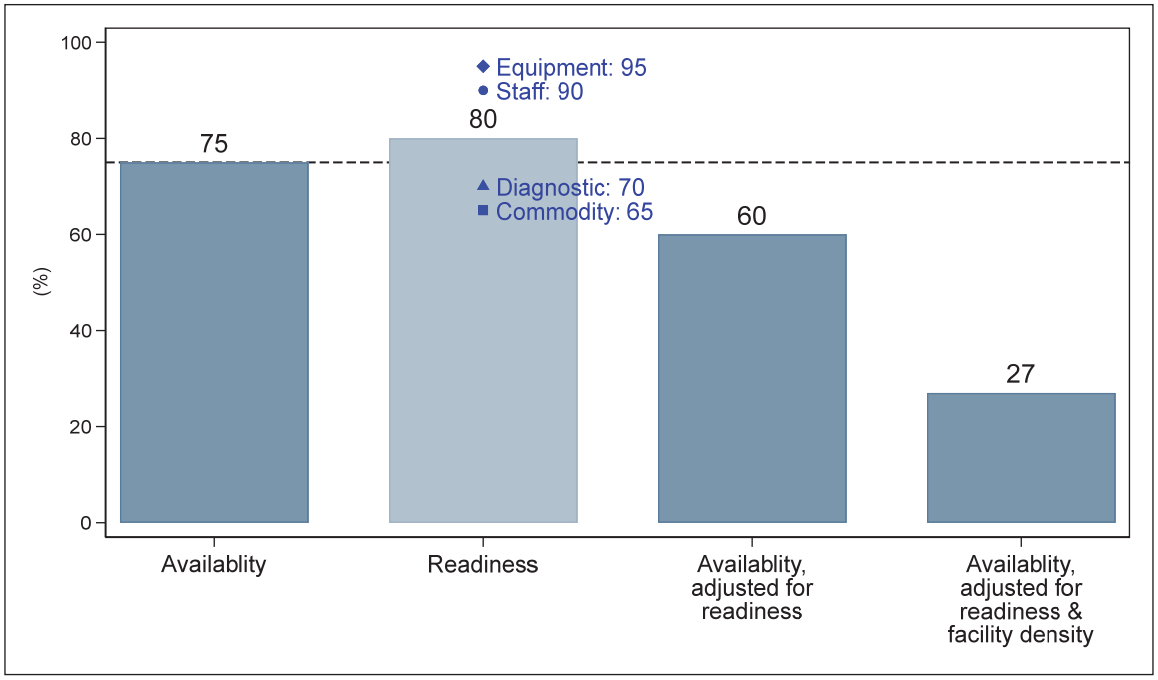
Service-readiness adjusted availability refers to percentage of facilities that offer a specific service and have the operational capacity to provide that service. Service-readiness and facility-density adjusted availability is an attempt to control for geographic accessibility, which varies greatly across regions in Mali. However, it is important to acknowledge that there are other important domains of access such as affordability that are not addressed in this study. The measure is not an absolute percentage measure, since it incorporates facility density relative to a benchmark.

With each adjustment, the availability score will decrease, although it is technically possible that the facility-density adjusted score might increase if the facility density is higher than the benchmark recommended by WHO, although it is not in Mali. The facility availability score is at the regional level,

and is not specific to each service. Therefore, the adjustment has the same relative impact across services within each region.

Figure 3 illustrates several service environment measures. Hypothetically in a region, 75% of facilities offer a specific service such as ANC. Among the facilities that offer ANC, service readiness scores are 95, 90, 70, and 65 for the equipment, staff and guidelines, diagnostics, and medicines and commodity domains, respectively. A simple average of the four domain scores is 80 for ANC-specific service readiness. Service availability adjusted for readiness would be 60% (60% of facilities [75 x 0.8] offer ANC and also have operational capacity to provide ANC). Availability is then adjusted for facility density relative to the WHO standard. If the region's density is 0.9 per 10000 population,[3] the relative density score would be 0.45 (0.9/2), and availability adjusted for both readiness and facility density would be 27 (60 x 0.45). All measures range between 0 and 100,[4] although a unit of the metric is percentage only for availability and availability adjusted for readiness.

Figure 3 Illustrative example of service environment measures



2.2.3 Utilisation of services among eligible population

For each service area, we identified an indicator of utilisation at the population level that is most relevant with the service readiness and availability measures (Table 2). The reference time period for the indicator is underlined.

[3] This is the national level facility density in Mali (Ministere de la Sante 2018).
[4] It is technically possible that the availability adjusted for readiness and facility density could be higher than 100, if facility density far exceeds the WHO benchmark. This is not the case in Mali.

Table 2 List of utilisation indicators included in the report by service area

Service area	Indicator
Family planning	Among all women age 15-49, percentage who currently use modern contraceptive methods
Antenatal care	Among women age 15-49 who had a live birth in the past 2 years before the survey, percentage who had 4 or more antenatal care visits*
Delivery	Among live births in the 2 years before the survey, percentage delivered at a health facility*
Childhood vaccination	Among children age 12-23 months, who had received all vaccinations required in Mali**
Child health	Among children age 0-59 months who had diarrhoea in the 2 weeks before the survey, percentage who sought treatment at facilities
Malaria diagnosis and treatment	Among children age 0-59 months of age who had fever in the 2 weeks before the survey, percentage who had blood taken from a finger or heel for testing
Malaria IPTp	Among women age 15-49 who had a live birth in the past 2 years before the survey, percentage who during the pregnancy took two or more doses of SP/Fansidar
HIV counselling and testing	Among all women who gave birth in the 2 years before the survey, percentage who were counselled for HIV during antenatal visit for the most recent birth.

For all estimates, the number of unweighted cases was examined in each region. The reference time for the measure is underlined.
*Estimates were calculated by authors. **Estimates were extracted from Mali DHS 2018 Key Indicators Report.

- For ANC and delivery service utilisation, DHS collects retrospective data typically in the previous 5 years, although the service environment metrics reflect the time of survey, June 2018. To reduce the time lag between reference periods for service utilisation and service environment measures, we calculated estimates based on a 2-year reference period, rather than using 5-year estimates.

- For childhood vaccinations, we measured receipt of all age-appropriate vaccinations required in the country: BCG, three doses of DPT, four doses of polio vaccine; one dose of IPV, three doses of pneumococcal vaccine, three doses of rotavirus vaccine, one dose of measles vaccine, one dose of meningitis vaccine, and one dose of yellow fever vaccine. The reference time period for this indicator spans 2 years before the survey.

- For malaria diagnosis and treatment, two indicators were initially considered: receipt of a malaria rapid diagnostic test (RDT) among children with fever, and receipt of artemisinin-based combination therapy (ACT) among children with fever. After assessing regional variation in each measure and the correlation between the two measures, we used the receipt of malaria RDT among children with fever.

- For HIV counselling and testing, we used antenatal counselling of HIV instead of HIV counselling among adults. In DHS, HIV counselling and testing data do not have a defined time reference (data reflect ever being tested in her/his life). In contrast, antenatal HIV counselling reflects services provided 2 years before the survey, which is closer to the time of the SARA survey. We also considered antenatal testing of HIV (percentage of women who received counselling for HIV and an HIV test and received the results during ANC), but this was universally low across regions with little regional variation to study. (Table 2). The reference time period for the indicator is underlined.

Table 2, the estimates for most services were obtained from the DHS application program interface (API). The DHS API provides estimates for more than 3000 indicators for the country, as well as across various background characteristics including region (ICF International 2014).

2.3 Analysis

Our analysis contains regional-level estimates of various metrics for the service environment (from Mali SARA 2018) and utilisation of services (from Mali DHS 2018), across the select eight service areas: family planning, ANC, delivery care, childhood vaccination, child health services, malaria diagnosis and treatment, malaria IPTp, and HIV counselling and testing. Since the region of Kidal has incomplete information (SARA survey was not implemented, and DHS was conducted only in urban areas of the region), only Bamako[5] and the other seven regions (Gao, Kayes, Koulikoro, Mopti, Sikasso, Ségou, and Tombouctou) were included in the study.

Given the small number of regions, our unit of analysis, we employed mostly descriptive methods, including various data visualisation and summary briefs for each region. To satisfy the first and second aims of the study, we assessed the distribution of service environment measures at the regional level.

In addition, summary information for each region (Appendix 4-Appendix 11) is presented with a regional range (lowest and highest levels among the eight regions) as well as the national-level average, in order to assist regional-level data users. For the third aim of assessing associations between the service environment and utilisation of services, we display scatter plots between utilisation and various service availability scores, which are unadjusted, adjusted for readiness, and adjusted for readiness and facility density. We did not assess associations between utilisation and readiness scores because readiness is measured only among facilities that provide particular services. Availability adjusted for service readiness—or availability adjusted for readiness and facility density—is a more appropriate measure to study the relationships between service environment and use.

We used Stata 15.1 for all analyses. We caution readers that all statistics presented in the report reflect a small number of analysis units.

Box 1 Linking and analysing household and facility survey data

Numerous studies have been conducted to develop methods to link facility and household surveys that are designed independently. Our study is limited to the regional-level analysis, not at a lower level, for three reasons. First, we were not able to link household clusters from DHS with individual facilities in SARA. When linking observations from two independent surveys, accuracy of linkage is crucial. Such linkage can be made theoretically based on geospatial data of observations, although the accuracy suffers greatly when both sources are sample surveys. A simulation study reported a significant level of mismatching of facilities from a sample facility survey and population clusters from a household survey (Burgert and Prosnitz n.d.; Skiles et al. 2013). The study recommended that observations from population-based sample surveys should be linked to facilities, only when the facility information comes from a source with a complete list of facilities in the catchment area—such as facility assessment censuses.

Second, we were not able to conduct multi-level analysis, with individual-level service utilisation as outcomes and regional-level SARA information as key covariates. Adjusted for individual and household level characteristics that are known to be determinants of care seeking, the number of regions is too small in this study, and multi-level analyses could violate the assumption of normal distribution of random effects at the regional level (Wang et al. 2012). Finally, we were not able to conduct sub-regional level analyses (district), since neither DHS nor SARA was designed to provide estimates lower than the regional-level.

[5] Bamako is a district with regional status. In this report, Bamako is referred to as a region for analytic purposes.

3 RESULTS

3.1 Service Utilisation

Table 3 presents national and regional levels in utilisation of the eight select services. The percentage of births at facilities is 70%, although utilisation is generally low in other services. Regional-level utilisation varies greatly across the services. The difference between the highest and lowest regional levels ranges from 17% points in modern contraceptive use among all women (20% in Bamako versus 3% in Gao) to 65% points for facility births (97% in Bamako versus 32% in Tombouctou).

Table 3 Service utilisation by region and service area

	Family planning	Antenatal care	Delivery	Childhood vaccination	Child health services	Malaria diagnosis and testing	Malaria IPTp	HIV counsellin g and testing
National	15	43	70	18	49	16	55	12
By region								
Kayes	11	41	59	13	39	14	50	8
Koulikoro	19	49	81	16	51	20	60	11
Sikasso	18	34	74	15	41	25	51	5
Ségou	18	35	59	30	61	9	59	12
Mopti	8	28	59	12	51	29	55	10
Tombouctou	6	28	32	20	37	7	42	3
Gao	3	40	59	9	60	39	41	17
Bamako	20	76	97	23	59	11	64	29
Range of regional estimates (percentage points)	17	48	65	21	24	32	23	26

3.2 Service Readiness by Domain

Figure 4 shows service readiness by domain: staff and guidelines, equipment, diagnostics, and medicines and commodities. Each box plot presents the distribution of regional-level values for a specific service area, with the horizontal line in the box representing the median value among the eight regions. Across service areas, the median readiness for staff and guidelines varies from 47 in child health to 82 in vaccination. Regional variation—measured with a range between highest and lowest regional estimates—is relatively large, with a range from 30 in ANC to 50 in child health.

Service readiness for the equipment domain, assessed in six service areas, tends to be higher than readiness in other domains, where the median ranges from 71 in delivery care to 98 in ANC and family planning services. The range across regions is relatively small compared to other domains, although we note an outlier for HIV counselling and testing.

Service readiness for the diagnostics domain, assessed in five service areas, is low in ANC (median: 31; range from 13 in Mopti to 55 in Bamako) and child health (median: 41; range from 34 in Tombouctou to 67 in Bamako). Diagnostics readiness is substantially higher for the three other service areas: malaria diagnosis and treatment, IPTp, and HIV counselling and testing.

Finally, service readiness for the medicines and commodities domain ranges roughly between 70 and 90 for most services. However, the range is relatively large for HIV counselling and testing (from 39 in Bamako

to 100 in Gao), although there is only one item (condom) in the domain. Median readiness specific to this domain ranges from 72 in child health to 88 in vaccination.

Figure 4 Distribution of regional scores for service readiness by domain and service area

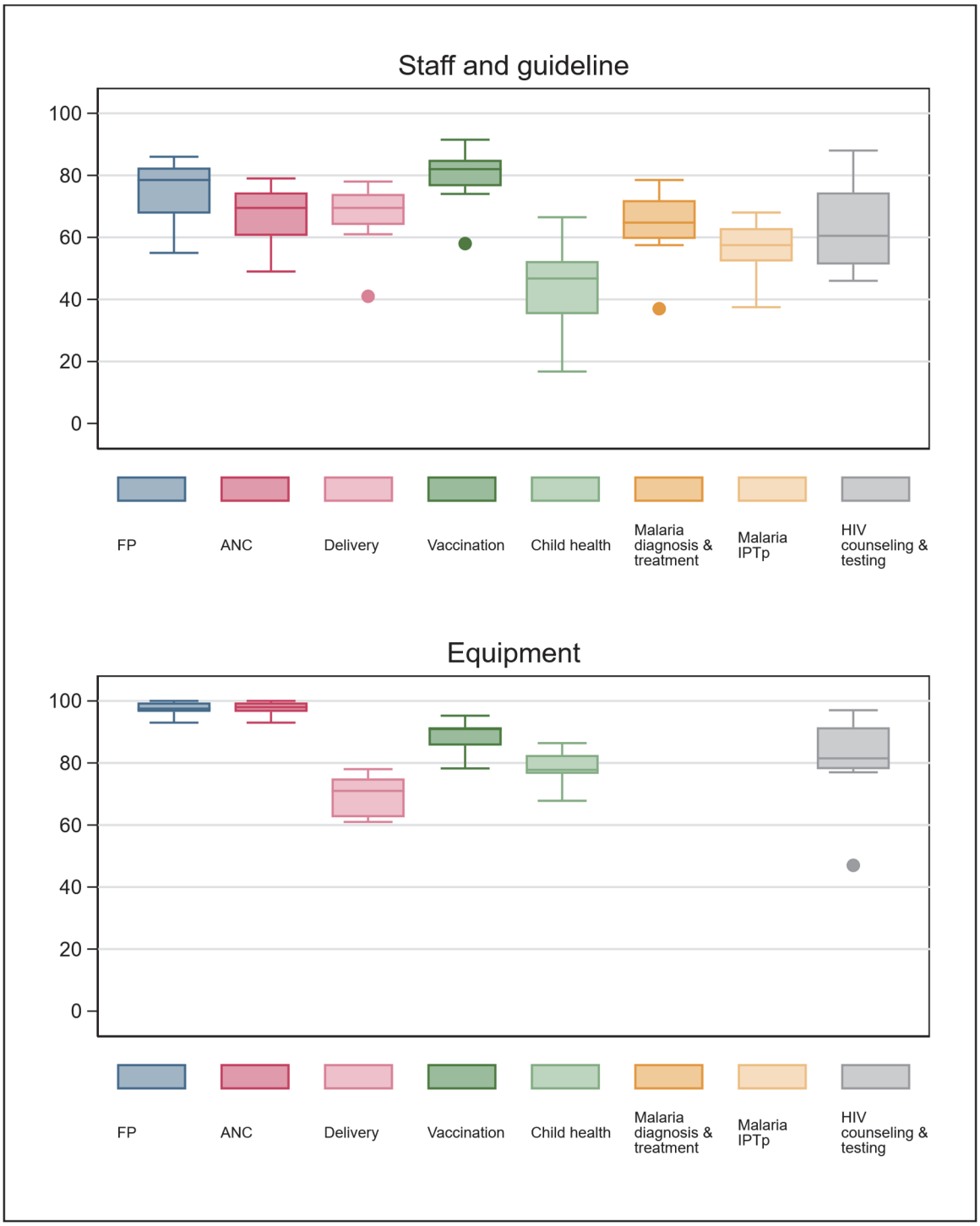


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Figure 4—*continued*

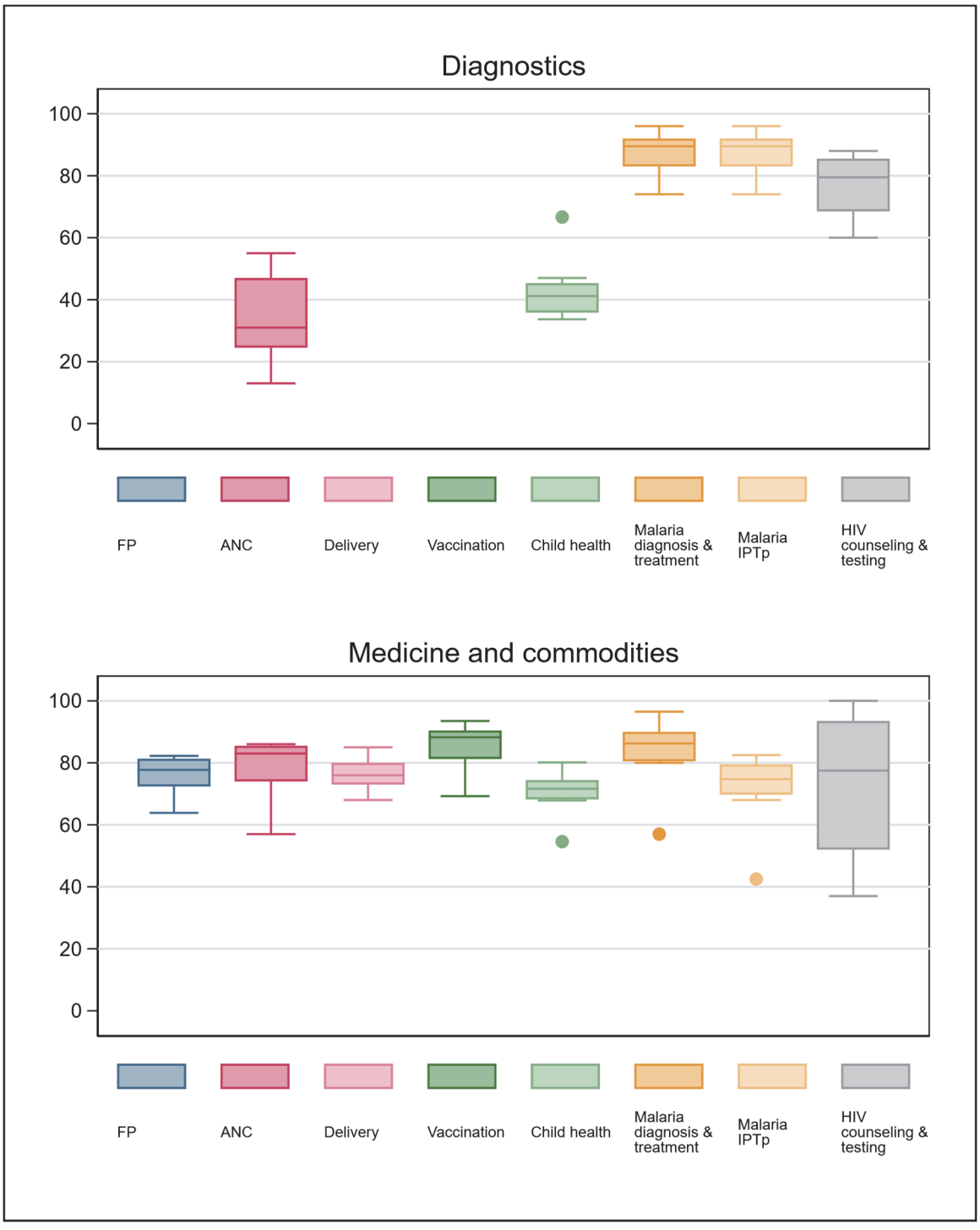
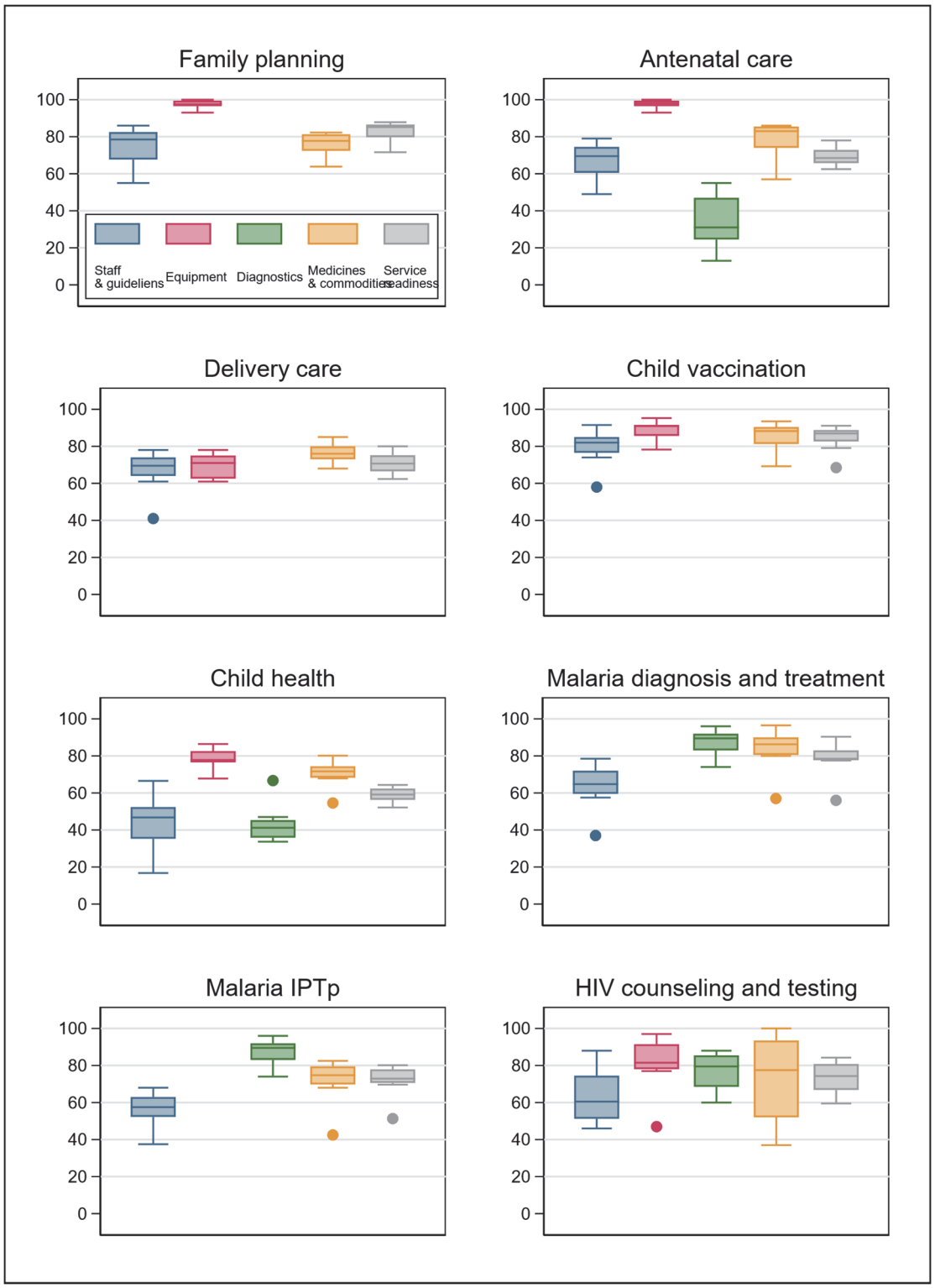


Figure 5 presents the same values grouped by service area. Childhood vaccination readiness is relatively high and similar across the four domains (above 70 in all domains and regions). The HIV counselling and testing has substantial regional variation in all domains.

Figure 5 Distribution of regional scores for domain-specific and overall readiness: by service area



Across regions, Bamako consistently shows relatively low service readiness across all service areas (Appendix 11), despite the fact that a larger share of the sample is located in higher-level facilities (Figure 1). In four service areas (delivery care, vaccination, malaria diagnosis and treatment, and malaria IPTp), Bamako has the lowest readiness scores. For the remaining four service areas, the readiness scores in Bamako are substantially lower than the national average. In Kayes, Sikasso, and Mopti, the readiness score across the eight service areas is higher than or close to the national average. Detailed region-specific results are described in Appendix 4-Appendix 11.

3.3 Service Availability Adjusted for Service Readiness and Facility Density

Service availability is relatively high in all services among sampled facilities (Figure 6). One exception is HIV counselling and testing. This service is offered at a lower level with a wider range, from 29% of facilities in Kayes to 72% in Koulikoro. Bamako again has the lowest service availability in all service areas, except HIV counselling and testing. This low service availability may be attributed to the facility sample in Bamako, which has more private and lower-level facilities than the samples in other regions.

Readiness-adjusted availability (third box plot in Figure 6, in each service area) is substantially lower than unadjusted availability. On average, the adjusted availability is lower than unadjusted availability by 22 percentage points across all regions and services areas (n=64). Availability adjusted for both service readiness and relative facility density (last box plot in Figure 6, in each service area) is also lower by the relative facility density score (ranging from 0.45 in Mopti and Segou and 0.8 in Bamako). After the final adjustment, the ranking of regions changes substantially because the regions with low availability and/or readiness scores have relatively higher facility density (such as Bamako), and vice versa. Regional ranking is not included, but is implied in the later figures and appendices.

Figure 6 **Distribution of regional scores for service availability, readiness, and adjusted availability by service area**

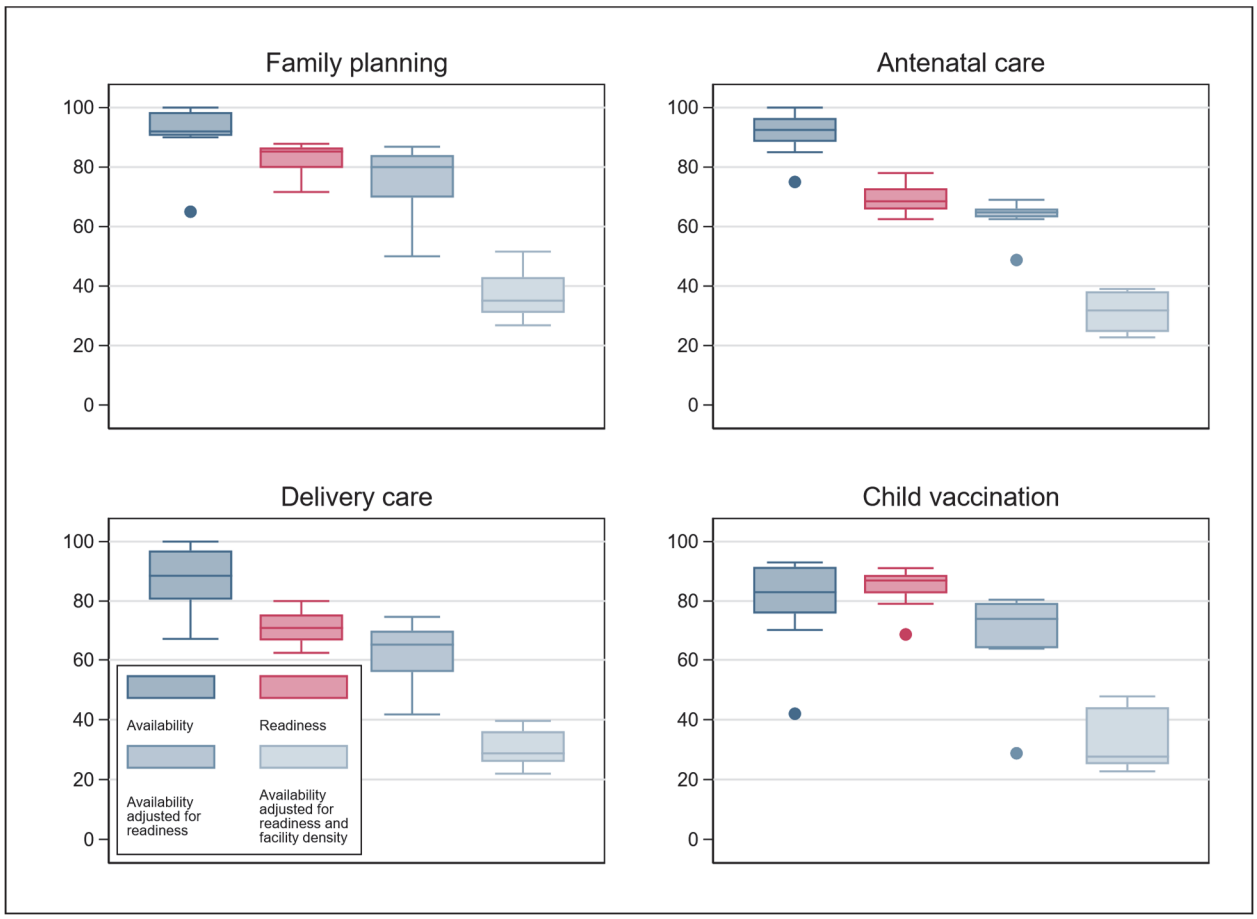


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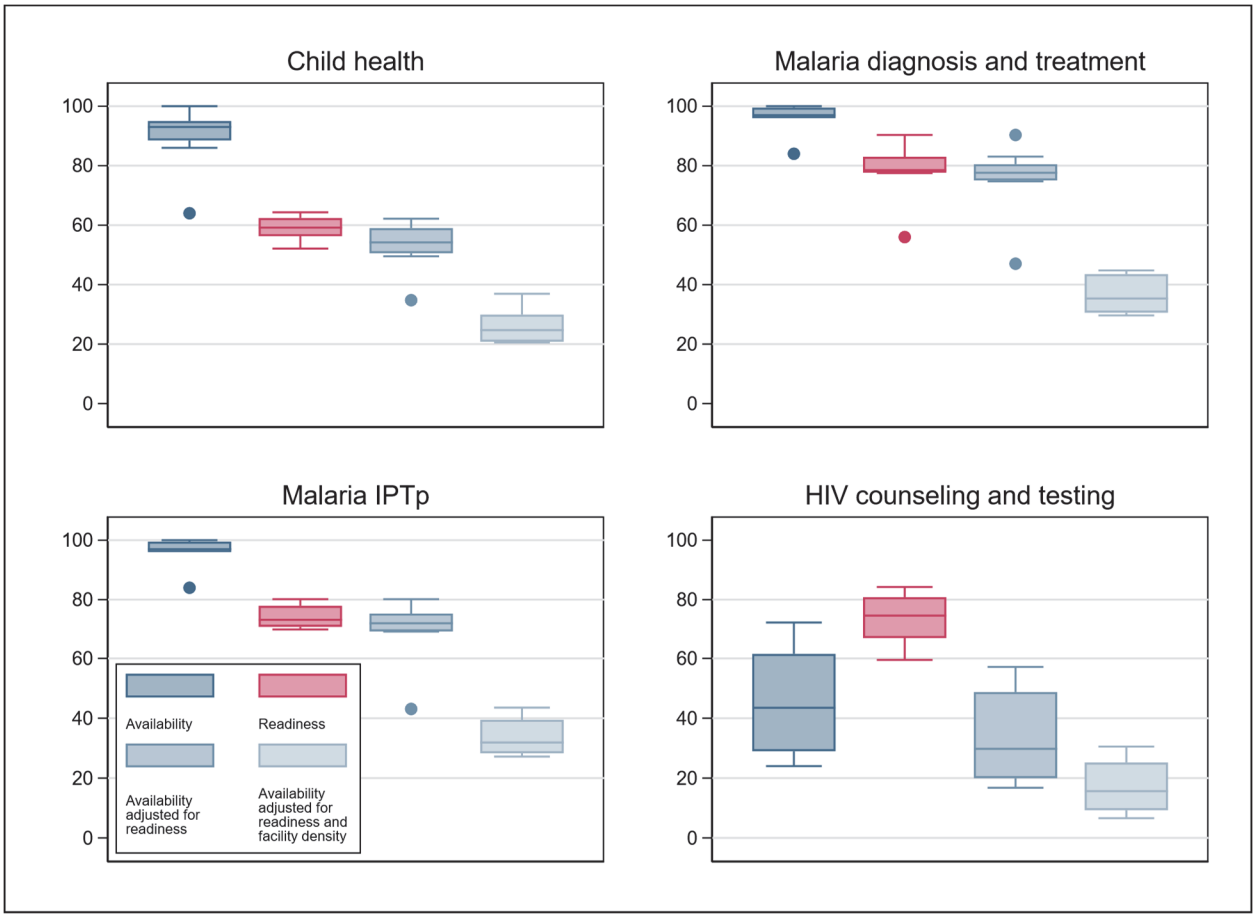
Figure 6—*continued*



3.4 Association between Service Environment and Utilisation of Services

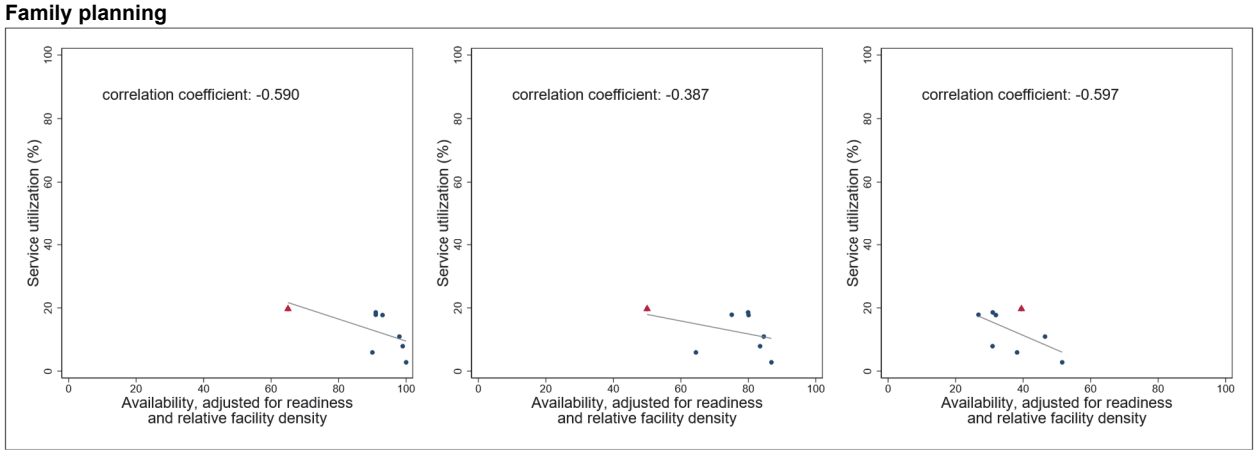
The final study aim was to explore associations between service utilisation and various service availability measures. Figure 7 presents scatter plots of service utilisation (on the Y axis) and three availability scores: availability, availability adjusted for readiness, and availability adjusted for readiness and facility density, by each service area (each row in the figure). Bamako is marked with a red triangle, because the sample composition is substantially different from other regions. In terms of service utilisation, Bamako has the highest or close to the highest level in all service areas, except malaria diagnosis and treatment. However, in all services areas (except HIV counselling and testing), Bamako has the lowest service availability as well as readiness-adjusted availability (first and second graph in each service). When further adjusted for facility density (third graph in each service), however, Bamako's ranking moves up substantially. Where its score is the lowest, as in childhood vaccination, the gap between Bamako and the second lowest region is minimal.

Given the small number of regions, it is difficult to draw statistical inferences. Nevertheless, there is no statistically significant linear correlation between utilisation and service availability in any service area (first graph in each service). When we examine associations between utilisation and service availability adjusted for readiness (second graph in each service), statistically significant linear correlation is observed in only one service: ANC (correlation coefficient: --.84, p-value<0.01). However, this relationship is driven

primarily by Bamako. When we further adjust the availability by facility density, the relationship becomes positive, although not statistically significant. When we examine associations between utilisation and service availability adjusted for both readiness and facility density (third graph in each service), there is statistically significant linear correlation in two areas: negative association with malaria IPTp (correlation coefficient: -0.74, p-value: 0.03) and positive association with HIV counselling and testing (correlation coefficient: 0.72, p-value: 0.04).

Figure 7 Scatter plots of service utilisation and service environment—availability, availability adjusted for readiness, and availability adjusted for readiness and facility density by service area

Family planning



Antenatal care

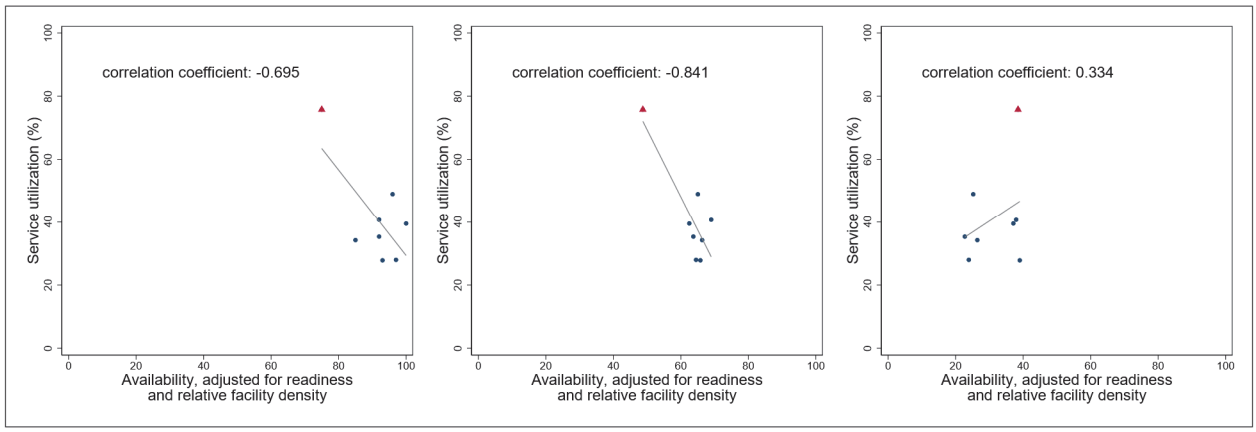


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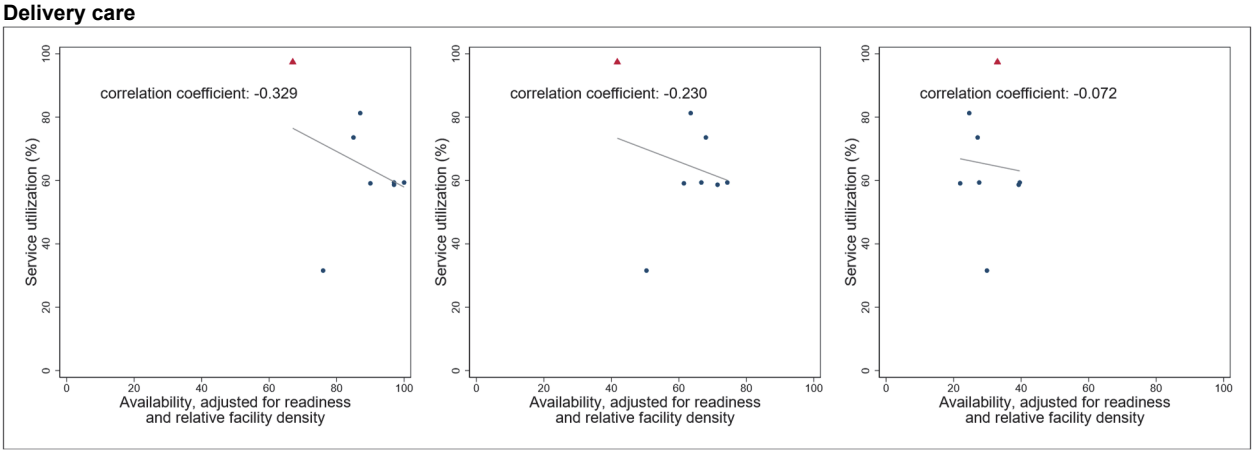
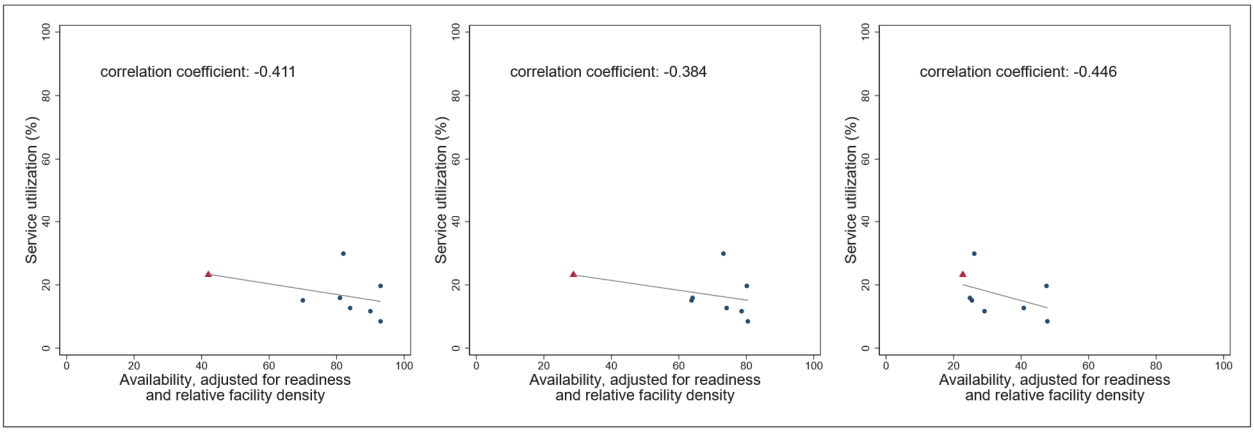
Figure 7—*continued*

Delivery care



Childhood vaccination



Child health

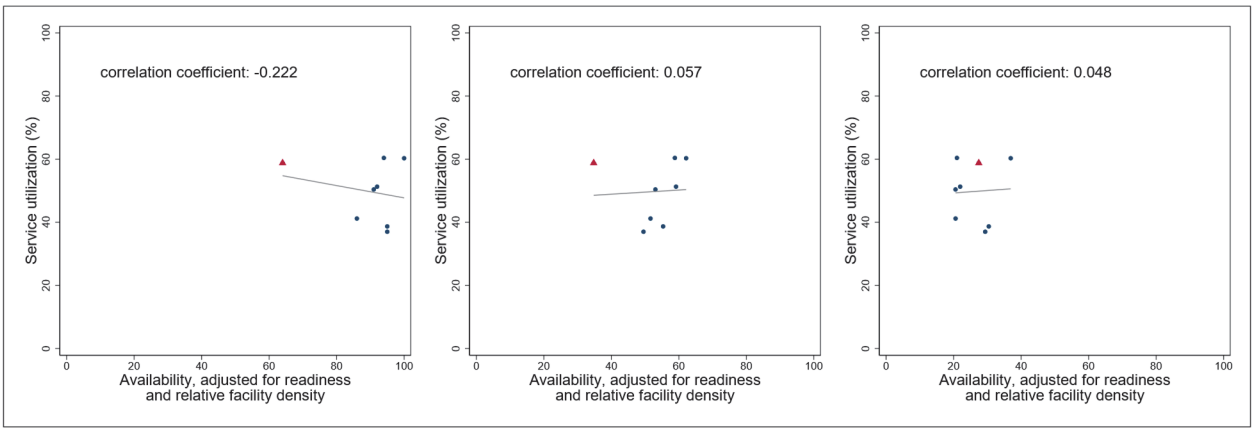


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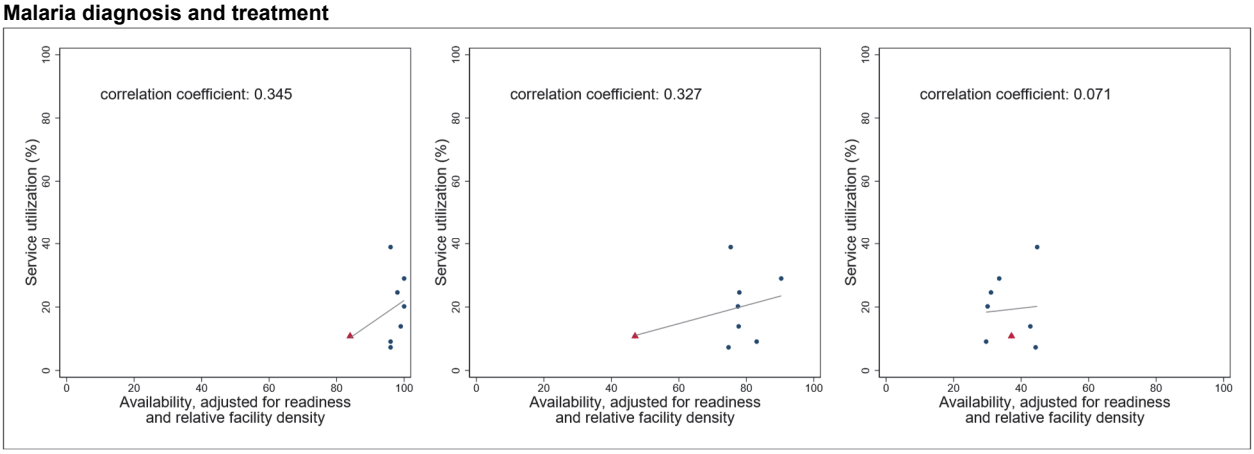
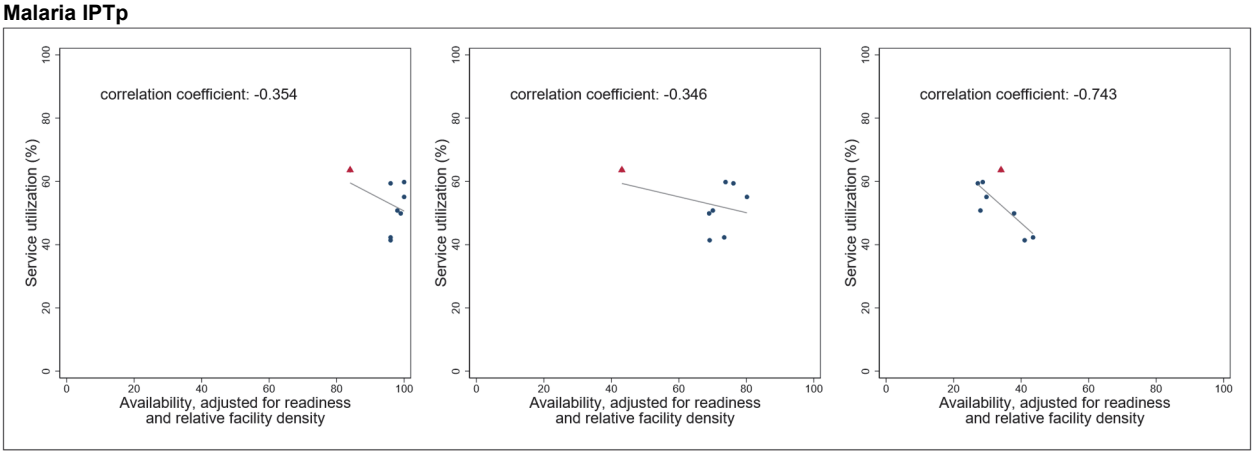
Figure 7—*continued*

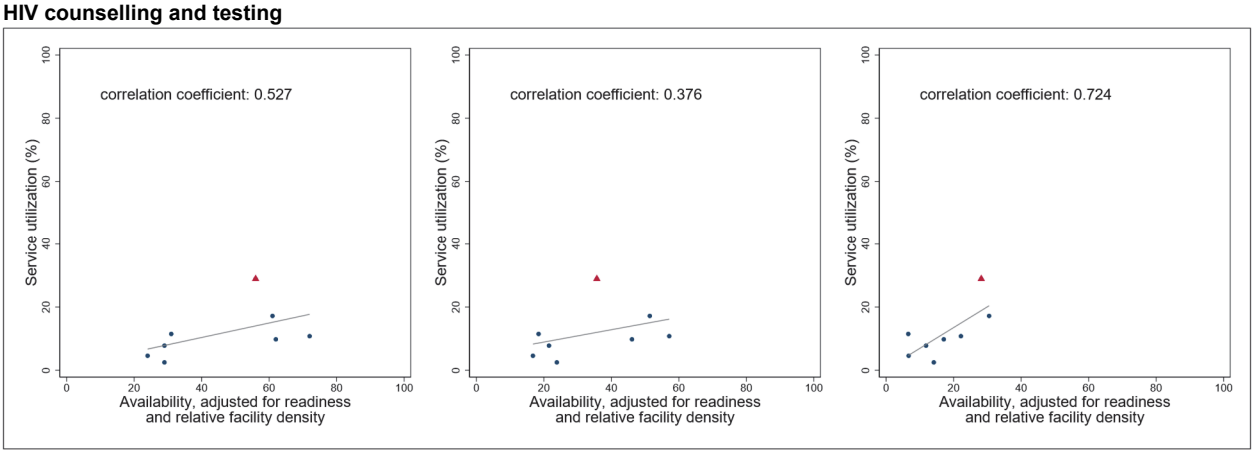
Malaria diagnosis and treatment



Malaria IPTp



HIV counselling and testing



Note: Solid line is the predicted line based on a linear regression.

4 DISCUSSION AND CONCLUSION

The Government of Mali is committed to improving reproductive, maternal, newborn and child health in the country. The Health and Social Development Plan (PDDSS) 2014-2023 and Health Sector Development Programme (PRODESS IIII) reflect this commitment and outline strategies to expand service provision and increase use of services by the population. Utilisation of key reproductive, maternal and child health services has increased over the last few decades, although the pace of improvement in the most recent decade has varied across services. Understanding the factors that contribute to greater utilisation of essential health services is essential.

We examined levels of and patterns in the service environment at facilities and the association with service utilisation at the population level, by using data from two recently conducted surveys, the 2018 SARA and the 2018 DHS. The availability of data from both facilities and the population provides a rare opportunity to understand health service utilisation with information on the supply side, and in a broader context of access to care which is influenced by various elements (Bertrand et al. 1995; Choi, Fabic, and Adetunji 2016; Penchansky and Thomas 1981; UNCESCR 2000). Specifically, the 2018 SARA data provide information on two elements of access to care: availability of services—which is a proxy for geographic accessibility—and detailed data on service readiness—which is a structural dimension of service quality. Our study is conducted at the regional level with a focus on eight service areas.

Utilisation at the population level is generally low in most services included in this report. However, there is generally high availability of services at facilities (service availability) for most services and regions (above 80%), except for the availability of HIV counselling and testing. Operational capacity among facilities that offer specific services (service readiness) varies greatly across services, but generally ranges between 60 and 90 from a maximum score of 100. For most services, readiness is relatively lower in the staffing and guidelines domain and the diagnostics domain than in the other two domains of equipment, and medicines and commodities. When adjusted for service readiness, the availability decreases by about 22% points across all regions and service areas. Facility density is generally low in Mali, and, when availability is adjusted for relative facility density against the WHO benchmark, is further reduced by 20% in Bamako and up to 55% in Mopti and Segou.

When we examined the relationships between service utilisation and various availability measures, there are few statistically significant associations at the regional level. Having four or more ANC visits is negatively correlated with availability adjusted for service readiness, but not when further adjusted for facility density. This is driven primarily by one region, Bamako, which has low service readiness and relatively high facility density. Receiving two or more IPTp for malaria is also negatively associated with service availability when adjusted for both readiness and facility density. The only positive association is observed between receiving HIV counselling during pregnancy and service availability adjusted for both readiness and facility density.

It is important to note that any significant correlation based on observational data does not necessarily indicate causality. A negative association can reflect targeted interventions to improve service environment in regions with low utilisation. A negative association can also indicate high utilisation, if the service environment—specifically readiness in the medicines and commodities domain—is not able to satisfy the

demand. This may partially explain the negative association observed in IPTp for malaria, despite efforts made through the National Malaria Control Programme.[6]

Given the small number of regions, it is difficult to draw statistical inferences in our study. However, the overall lack of associations in many scatterplots suggests the importance of other elements of access in service utilisation, which are not addressed in our study. These include information, sociocultural acceptability, and affordability. Table 4 presents a wide range of socioeconomic characteristics across the eight regions, which shows substantial variation in other elements of access. Compared to traditional services, modern health services may be less acceptable and popular in some rural regions. The higher education of women in Bamako suggests a lower barrier to access in the region in terms of both information and sociocultural acceptability of services. Bamako also has higher economic status, which suggests lower barriers in terms of affordability. Although some key services are free in the country (IPTp for malaria among pregnant women, and treatment of malaria among children under age 5), there is additional cost related to seeking care at facilities.

We attempted to control for geographic accessibility by adjusting service readiness with the relative density score across regions. Geographic proximity was reported to be positively associated with service utilisation for contraceptive use and continuation (Magnani et al. 1999; Pullum 1991; Steele, Curtis, and Choe 1999) and ANC and delivery care services (Rose et al. 1999). However, aggregate regional-level facility density does not necessarily measure geographic access accurately, especially if the geographic distribution of facilities is different from the geographic distribution of population in the region. Except for Bamako, the regions in Mali are predominantly rural (Table 4), although the percentage of facilities located in urban areas far exceeds their share of population (Figure 8). In particular, Koulikoro, Mopti and Segou have the lowest overall facility density (0.7-0.8 per 10000 population), and there is a large gap in the distributions of population and facility by residential area. Strategies to overcome poor geographic accessibility—such as community-based service delivery—would be particularly important in these regions.

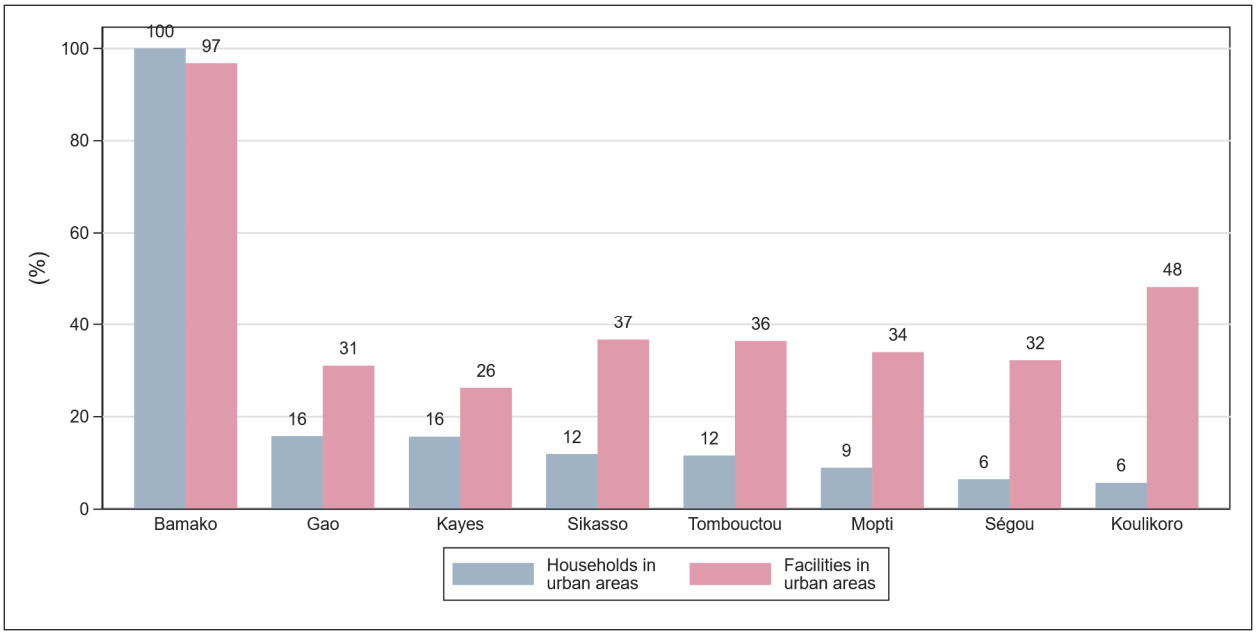
Table 4 Socioeconomic background characteristics of the female population and households by region

Region	Women age 15-49 who attended primary school (%)	Women age 15-49 who attended secondary school (%)	Households in urban areas (%)	Households in top two wealth quintiles of the country (%)	Households with electricity (%)
National	35	21	22	40	49
By region					
Kayes	30	11	16	41	39
Koulikoro	37	23	6	44	49
Sikasso	28	15	12	26	53
Ségou	25	15	6	25	48
Mopti	23	12	9	14	24
Tombouctou	23	12	12	20	20
Gao	24	13	16	23	15
Bamako	61	49	100	100	91
Range of regional estimates (percentage points)	38	38	94	86	76

[6] With malaria, it is also notable that the level of RDT among children with fever is relatively low in Bamako, unlike the typical regional pattern of service utilisation, in which Bamako has the highest or close to highest level. Further studies can assess if there are fewer socioeconomic differences in malaria service utilisation in the country because of programmes that specifically reduced socioeconomic barriers to access care.

Source: Mali DHS 2018.

Figure 8 Distributions of households and health facilities by residential area in each region



Source: Household data from Mali DHS 2018;facility data from Mali SARA 2018.

There are additional methodological limitations in this study. The 2018 SARA provides data on the service environment at the time of survey, which was June, 2018. However, most measures of service utilisation from DHS have a two-year retrospective reference period. Only treatment of childhood diarrhoea and RDT among children with fever have a relatively current time period, which is 2 weeks before the survey. Even for current use of modern contraceptive methods, women who currently use a long-acting reversible method (although relatively rare in Mali with 20% of total modern method users) might have received the method in the relatively distant past. Thus, our analysis assumes that service readiness was constant during the reference periods. We also acknowledge the limited geographic coverage of our study, in which we excluded Kidal due to lack of data from the region.

In summary, we assessed service environment at the regional level with various quality and availability measures for eight select services in Mali. While most services are commonly offered at facilities, readiness to provide specific services ranges greatly across regions and services. Further, relatively low facility density indicates lower accessibility at the population level. When assessing the relationship between utilisation and various service availability measures, we found significant associations in only a few services. We speculate that other elements of access to care contribute to differences in service utilisation at the regional level. It is, however, important to note that lack of association between service environment and utilisation at the population level does not imply that service quality is unimportant. Receiving high-quality service is a patient right, regardless of its impact at the population level.

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APPENDICES

Appendix 1 Number of Sampled Facilities by Background Characteristics by Region and Overall: Mali SARA 2018

	Kayes	Koulikoro	Sikasso	Ségou	Mopti	Tombouctou	Gao	Bamako	Total
Total	80	58	79	59	53	33	29	93	484
By facility type									
CHU	0	1	0	0	0	0	0	3	4
EPH	1	0	1	1	1	1	1	1	7
CSREF	10	10	10	8	6	3	3	6	56
CSCOM	50	33	40	35	41	25	24	31	279
CMIE	0	1	0	1	0	0	0	3	5
INFIRMERIE	0	1	3	0	1	2	0	1	8
polyclinic	0	0	0	0	0	0	0	5	5
clinic	2	4	4	1	0	0	1	19	31
CABINETMEDICAL	17	8	20	13	4	2	0	24	88
other	0	0	1	0	0	0	0	0	1
By managing authority									
Public	61	46	54	42	48	31	28	45	355
Non-public	19	12	25	17	5	2	1	48	129
By location									
Urban	21	28	29	19	18	12	9	90	226
Rural	59	30	50	40	35	21	20	3	258

Note: The number of facilities tabulated using SARA 2018 facility-level datafile.
CHU: Centre Hospitalo-Universitaire, EPH: Établissement Public Hospitalier, CSREF: Centre de Santé de Référence, CSCOM: Centre de Santé Communautaire, and CMIE: Centre Medical Inter-Enterprise

Appendix 2 List of Service Readiness Indicators by Service Area and Domain

Family planning: % of facilities that provide family planning services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines on family planning
	Family planning check-lists and/or job-aids
	Staff trained in family planning
Equipment	Blood pressure apparatus
Medicines and commodities	Combined estrogen progesterone oral contraceptive pills
	Progestin-only contraceptive pills
	Injectable contraceptives
	Male condoms

Antenatal care: % of facilities that provide ANC services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines on ANC
	ANC check-lists and/or job- aids
	Staff trained in ANC
Equipment	Blood pressure apparatus
Diagnostics	Haemoglobin
	Urine dipstick- protein
Medicines and commodities	Iron tablets
	Folic acid tablets
	Tetanus toxoid vaccine
	IPT drug
	ITNs

Delivery care: % of facilities that provide facility-based delivery services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines for essential childbirth care
	Check-lists and/or job-aids for essential childbirth care
	Guidelines for essential newborn care
	Staff trained in essential childbirth care
	Staff trained in newborn resuscitation
Equipment	Emergency transport
	Sterilisation equipment
	Examination light
	Delivery pack
	Suction apparatus (mucus extractor)
	Manual vacuum extractor
	Vacuum aspirator or D&C kit (with speculum)
	Neonatal bag and mask
	Delivery bed
	Partograph
	Gloves
	Infant weighting scale
	Blood pressure apparatus
	Soap and running water or alcohol-based hand rub
Medicines and commodities	Antibiotic eye ointment for newborn
	Injectable uterotonic
	Injectable antibiotic
	Magnesium sulphate (injectable)
	Skin disinfectant
	Intravenous solution with infusion set

Childhood vaccination: % of facilities that provide routine immunisation services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines for child immunisation
	Staff trained in child immunisation
Equipment	Cold box/vaccine carrier with ice packs
	Refrigerator
	Sharps container/safety box
	Auto-disposable syringes
	Temperature monitoring device in refrigerator
	Adequate refrigerator temperature
	Immunisation cards
	Immunisation tally sheets
Medicines and commodities	Measles vaccine
	DPT-Hib+HepB vaccine
	Oral polio vaccine
	BCG vaccine
	Pneumococcal vaccine
	Rotavirus vaccine
	IPV (Inactivated Poliovirus Vaccine)
	HPV (Human Papillomavirus)

Child health care: % of facilities that provide child curative care services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines for IMCI
	Guidelines for growth monitoring
	Staff trained in IMCI
	Staff trained in growth monitoring
Equipment	Child and infant scale
	Length/height measuring equipment
	Thermometer
	Stethoscope
	Shakir band*
Diagnostics	Haemoglobin (Hb)
	Test parasite in stool (general microscopy)
	Malaria diagnostic capacity
Medicines and commodities	Oral rehydration solution packet
	Amoxicillin (dispersible tablet 250 or 500 mg or syrup/suspension)
	Co-trimoxazole syrup/suspension
	Paracetamol syrup/suspension
	Vitamin A capsules
	Me-/albendazole cap/tab
	Zinc sulphate tablets, dispersible tablets or syrup

Malaria diagnosis and treatment: % of facilities that provide malaria services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines for diagnosis and treatment of malaria
	Staff trained in malaria diagnosis and treatment
Diagnostics	Malaria diagnostic capacity
Medicines and commodities	First-line antimalarial in stock
	Paracetamol cap/tab

Malaria IPTp: % of facilities that provide malaria services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines for IPT
	Staff trained in IPT
Diagnostics	Malaria diagnostic capacity
Medicines and commodities	IPT drug
	ITN

HIV counselling and testing: % of facilities that provide HIV counselling and testing services with tracer items on the day of the assessment

Domain	Indicator
Staff and guidelines	Guidelines on HIV counselling and testing
	Staff trained in HIV counselling and testing
Equipment	Visual and auditory privacy
Diagnostics	HIV diagnostic capacity
Medicines and commodities	Condoms

Source: Mali SARA 2018 final report.
*In the SARA manual, Shakir band is not listed, but growth chart is included.

Appendix 3 Regional-level Service Readiness Scores by Domain in Each Service

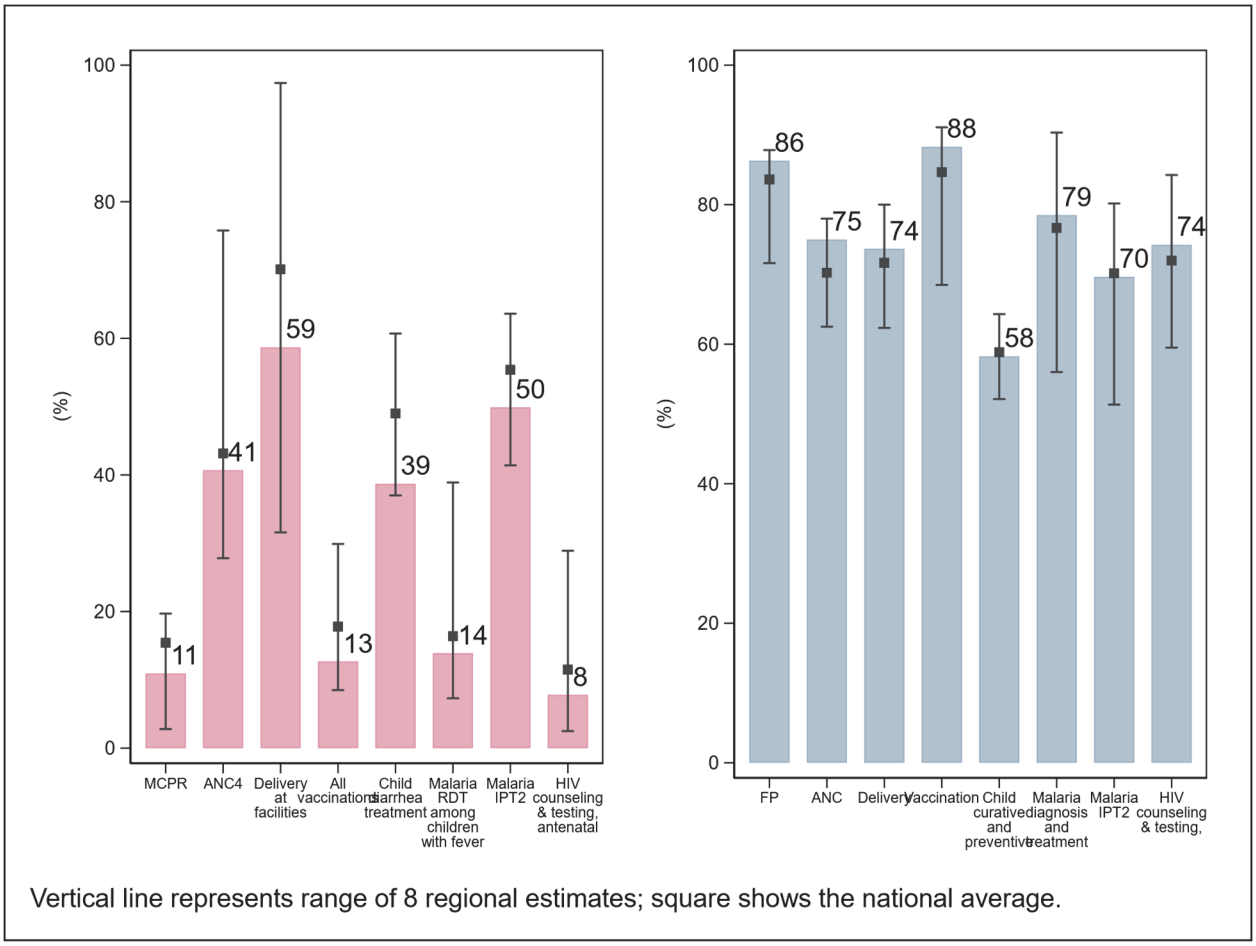
Service are and domain	Kayes	Koulikoro	Sikasso	Ségou	Mopti	Tombouctou	Gao	Bamako
Family planning								
Staff and guidelines	79	86	81	72	84	55	78	63
Equipment	98	97	100	97	93	96	100	99
Diagnostics	-	-	-	-	-	-	-	-
Medicines and commodities	82	80	77	78	76	64	82	68
Antenatal care								
Staff and guidelines	75	70	79	64	74	69	57	49
Equipment	98	97	100	98	93	96	100	99
Diagnostics	46	26	48	30	13	32	23	55
Medicines and commodities	81	78	85	85	86	86	70	57
Delivery								
Staff and guidelines	72	70	78	69	76	61	67	41
Equipment	70	72	77	61	73	64	61	78
Diagnostics	-	-	-	-	-	-	-	-
Medicines and commodities	79	77	85	75	81	74	72	68
Childhood vaccination								
Staff and guidelines	86	74	85	85	92	79	80	58
Equipment	91	83	95	91	89	92	92	78
Diagnostics	-	-	-	-	-	-	-	-
Medicines and commodities	89	81	94	92	82	88	89	69
Child health services								
Staff and guidelines	42	46	48	51	67	17	54	28
Equipment	79	77	77	76	79	86	86	68
Diagnostics	40	42	47	44	37	34	35	67
Medicines and commodities	72	68	69	80	75	72	74	55
Malaria diagnosis and testing								
Staff and guidelines	66	62	64	79	79	66	58	37
Equipment								
Diagnostics	79	91	88	92	96	87	92	74
Medicines and commodities	91	80	87	89	97	81	86	57
Malaria IPTp								
Staff and guidelines	53	63	55	68	64	60	52	38
Equipment	-	-	-	-	-	-	-	-
Diagnostics	79	91	88	92	96	87	92	74
Medicines and commodities	78	68	72	78	81	83	72	43
HIV counselling and testing								
Staff and guidelines	57	68	56	47	82	64	88	46
Equipment	79	97	95	77	47	82	81	88
Diagnostics	69	88	60	77	83	88	68	82
Medicines and commodities	92	65	69	37	86	95	100	39

Appendix 4 Regional Summary of Service Environment and Utilisation: Kayes

Service utilisation is relatively low in the region (left panel of Figure A4.1). In all service areas examined in this report, the region has a level lower than the national average (circle in the figure). On the other hand, service readiness—essential operational capacity to provide services (right panel of Figure A4.1)—is relatively high. In most services, the readiness score is close to the highest regional score (top of the vertical lines) or above the national level (circles in the figure). The levels range roughly between 70 and 90 out of 100 in most services, except in child health service where the readiness score is 58.

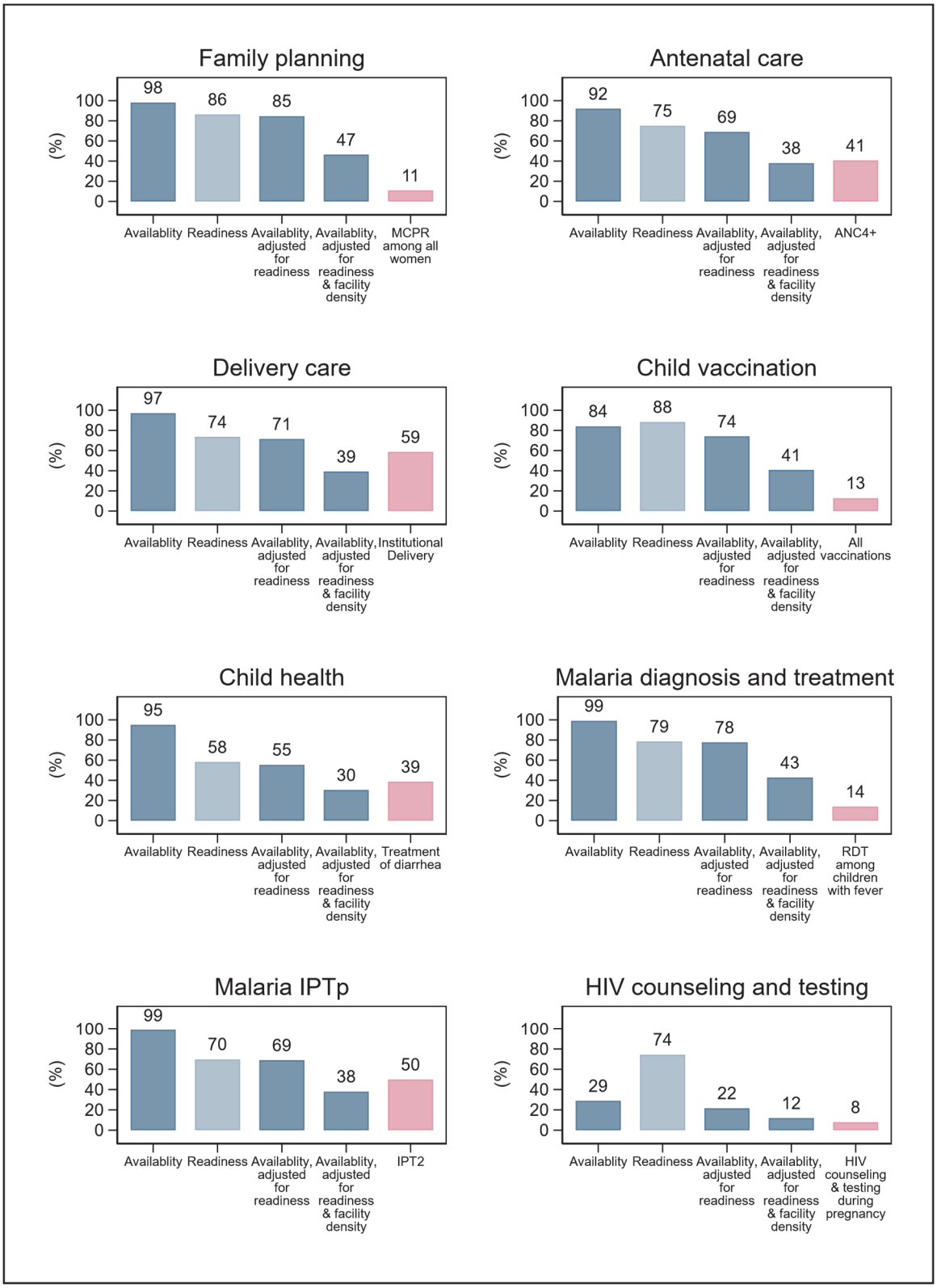
In terms of service availability, most facilities offer the services in the region (ranging from 84% for vaccination to 99% for malaria services), although only 29% of facilities offer HIV counselling and testing (Figure A4.2). Adjusted for service readiness, availability ranges from 22% for HIV counselling and testing (22% of facilities offer and have operational capacity to provide the service), 55% for child health, and 85% for family planning. Facility density is low in the region (1.1 per 10,000 population) compared to the WHO standard, although slightly higher than the national average, while the availability score is reduced by about 45% when adjusted for facility density additionally.

Figure A4.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Kayes



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A4.2 Service environment metrics and utilisation of services at the population level by service area: Kayes

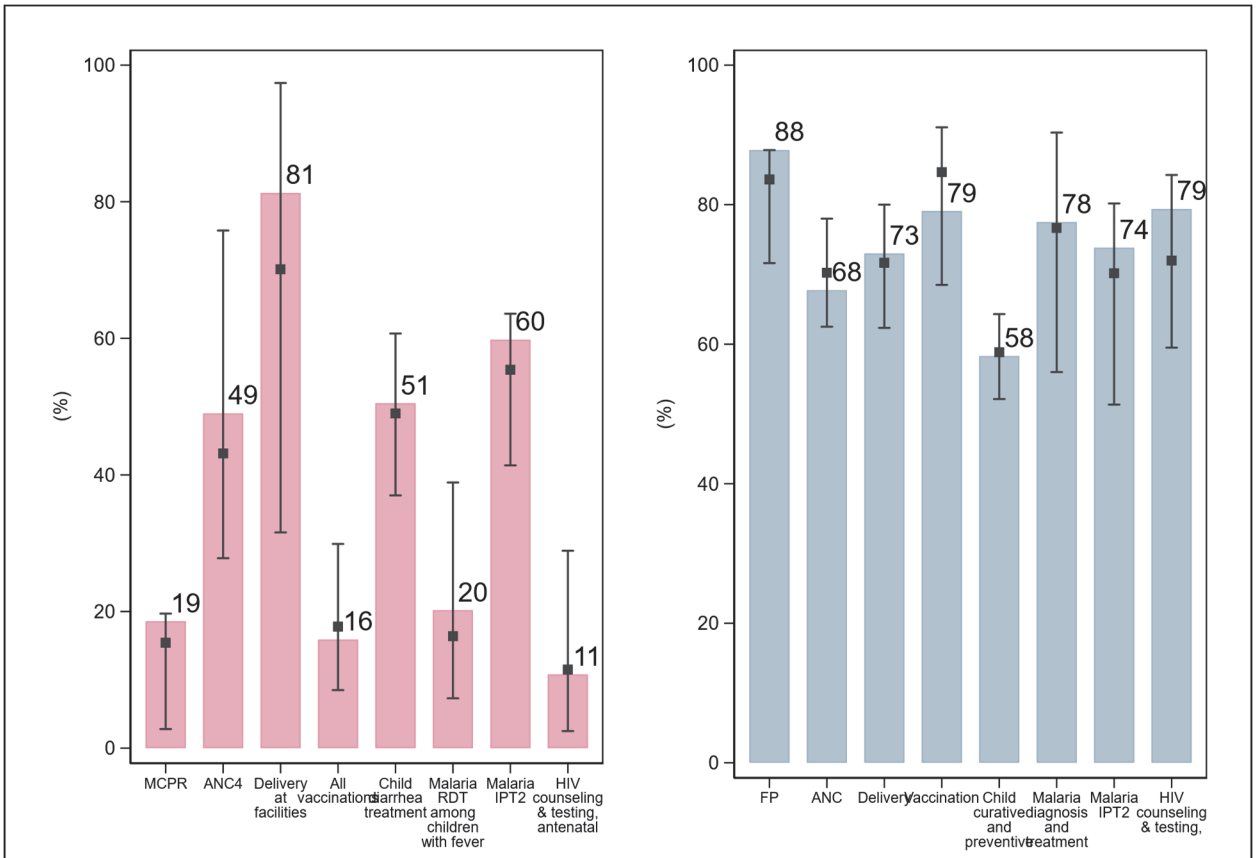


Appendix 5 Regional Summary of Service Environment and Utilisation: Koulikoro

Service utilisation ranges from 11% for HIV counselling and testing among pregnant women to 81% for delivery at health facilities (left panel of Figure A5.1). These levels are close to or slightly higher than the national average in the region. Service readiness—essential operational capacity to provide services (right panel of Figure A5.1)—ranges from 58 for child health to 88 for family planning. These levels are roughly at or above the national average in most services. Service readiness for family planning is the highest among the eight regions studied in this report. However, service readiness scores for ANC and childhood vaccination are lower than the national average.

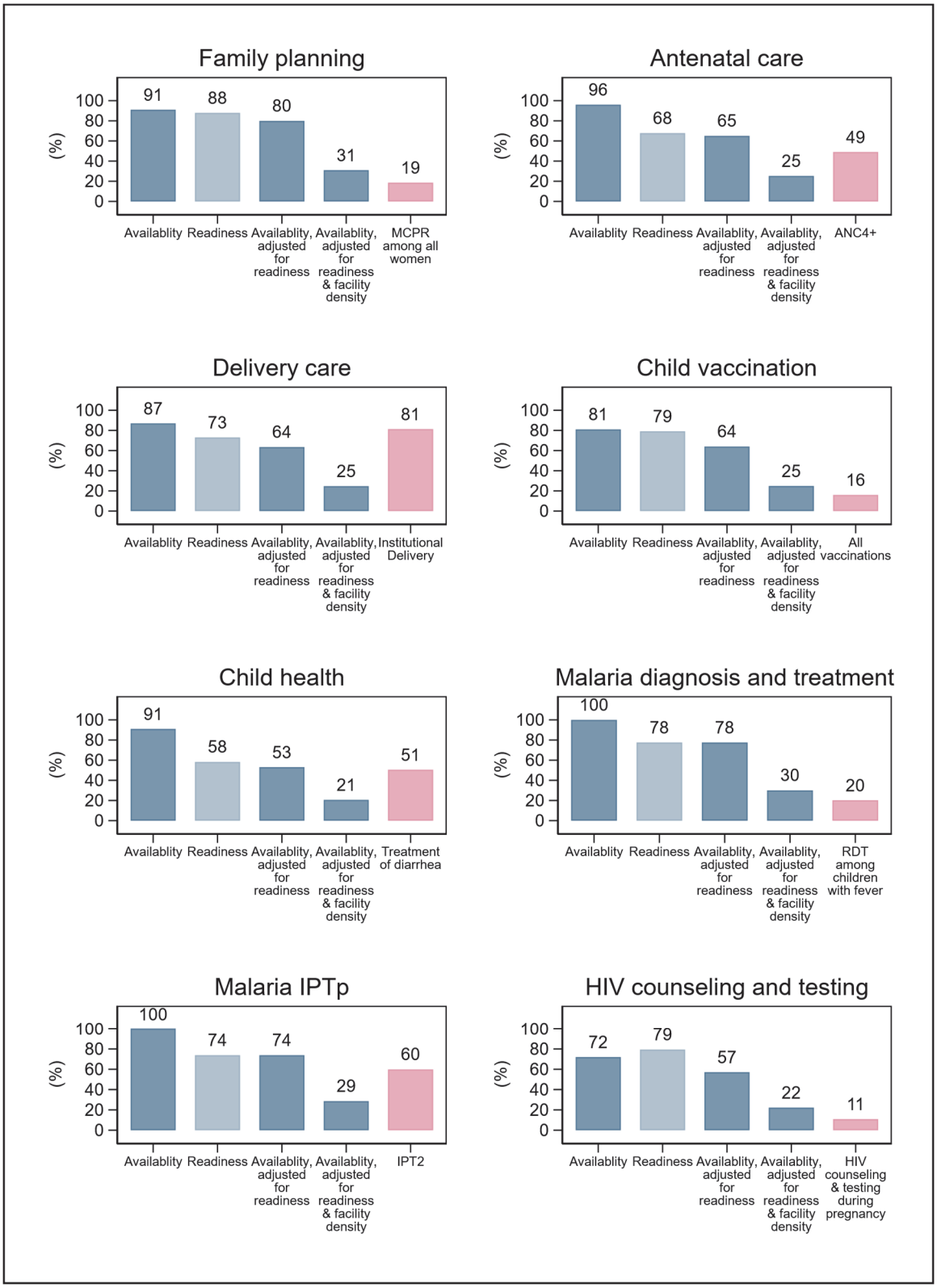
In terms of service availability, most facilities offer the services in the region, ranging from 72% for HIV counselling and testing to 100% for malaria services (Figure A5.2). Adjusted for service readiness, availability ranges from 53% for child health (53% of facilities offer and have operational capacity to provide the service), 57% for HIV counselling and testing, and 80% for family planning. Facility density is low in the region (0.8 per 10,000 population) compared to the WHO standard as well as the national average, while the availability score is reduced by about 60% when adjusted for facility density additionally.

Figure A5.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Koulikoro



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A5.2 Service environment metrics and utilisation of services at the population level by service area: Koulikoro

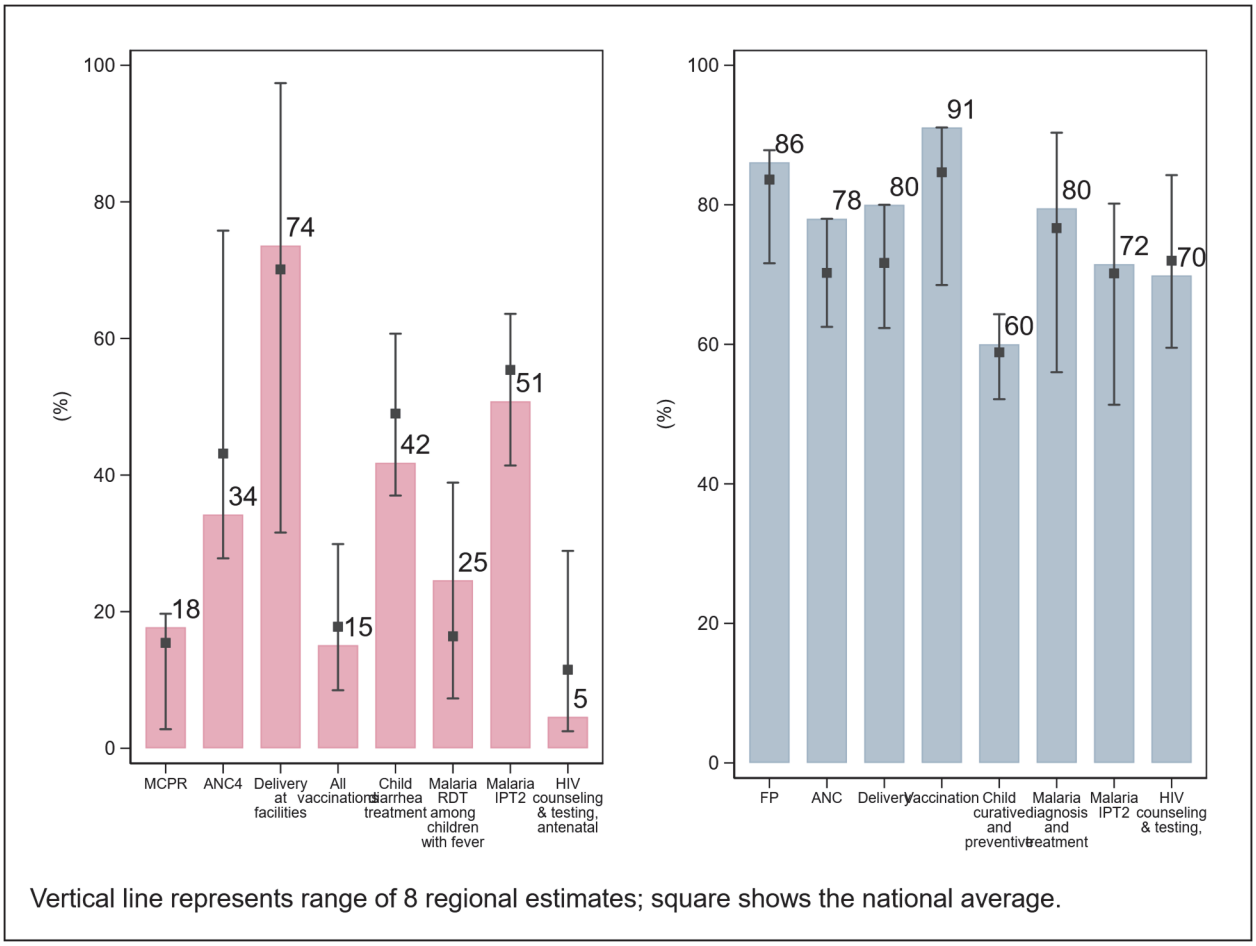


Appendix 6 Regional Summary of Service Environment and Utilisation: Sikasso

Service utilisation ranges from 5% for HIV counselling and testing among pregnant women to 74% for delivery at health facilities in the region (left panel of Figure A6.1). These levels are lower than the national average in most service areas, although modern contraceptive use, delivery at facilities, and RDT for malaria among children with fever are higher than the national average. Service readiness—essential operational capacity to provide services (right panel of Figure A6.1)—ranges from 60 for curative and preventive child health services to 91 for vaccination. These levels are above the national average in most services. In three service areas—ANC, delivery care, and vaccination—the readiness score is the highest among the eight regions studied in this report.

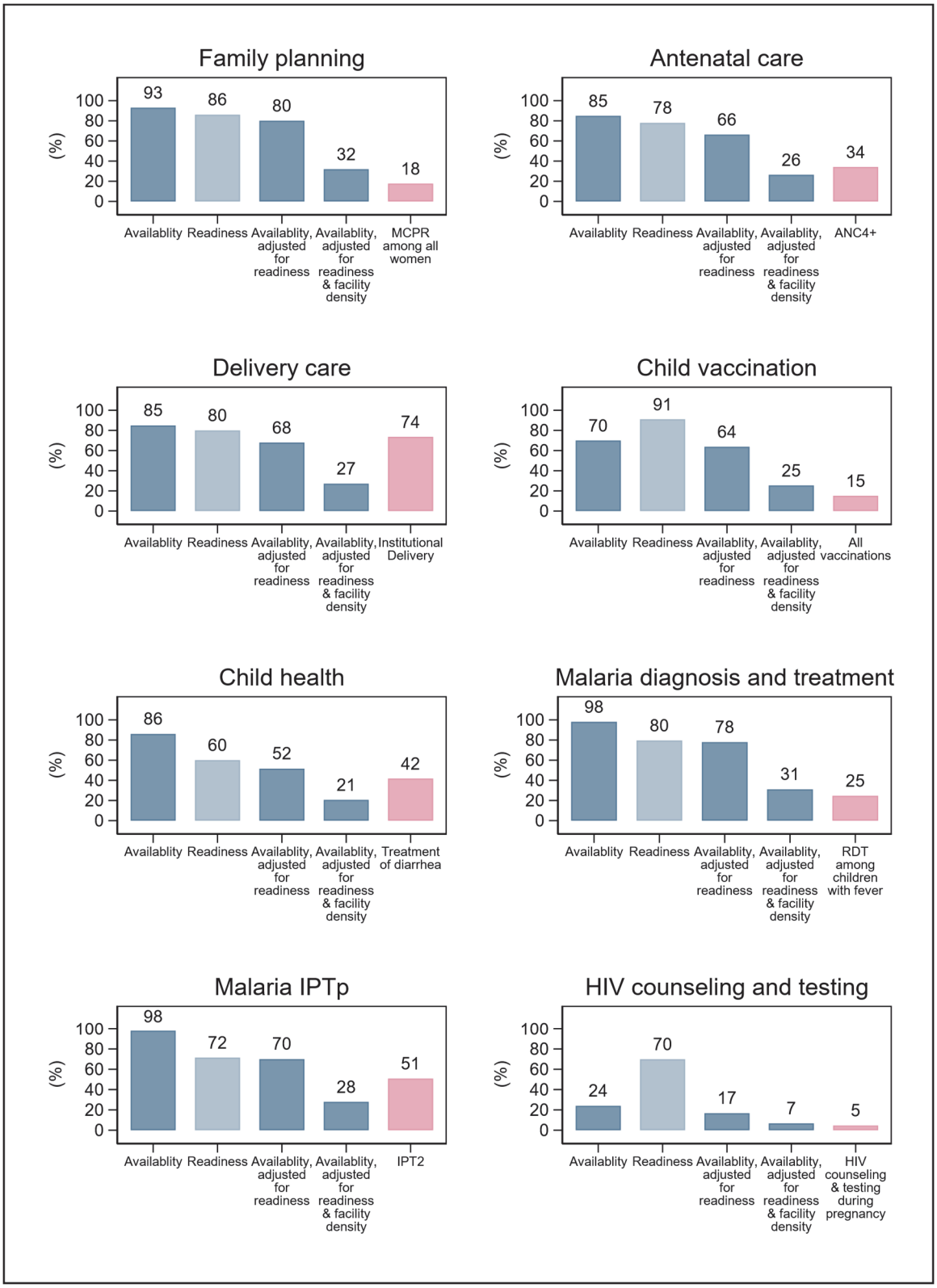
In terms of service availability, most facilities offer the services in the region, ranging from 70% for vaccination to 98% for malaria services (Figure A6.2). However, similar to most other regions, HIV counselling and testing is offered at a much lower level, 24%. Adjusted for service readiness, availability ranges from 17% for HIV counselling and testing (17% of facilities offer and have operational capacity to provide the service) to 80% for family planning. Facility density is low in the region (0.8 per 10,000 population) compared to the WHO standard as well as the national average, while the availability score is reduced by about 60% when adjusted for facility density additionally.

Figure A6.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Sikasso



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A6.2 Service environment metrics and utilisation of services at the population level by service area: Sikasso

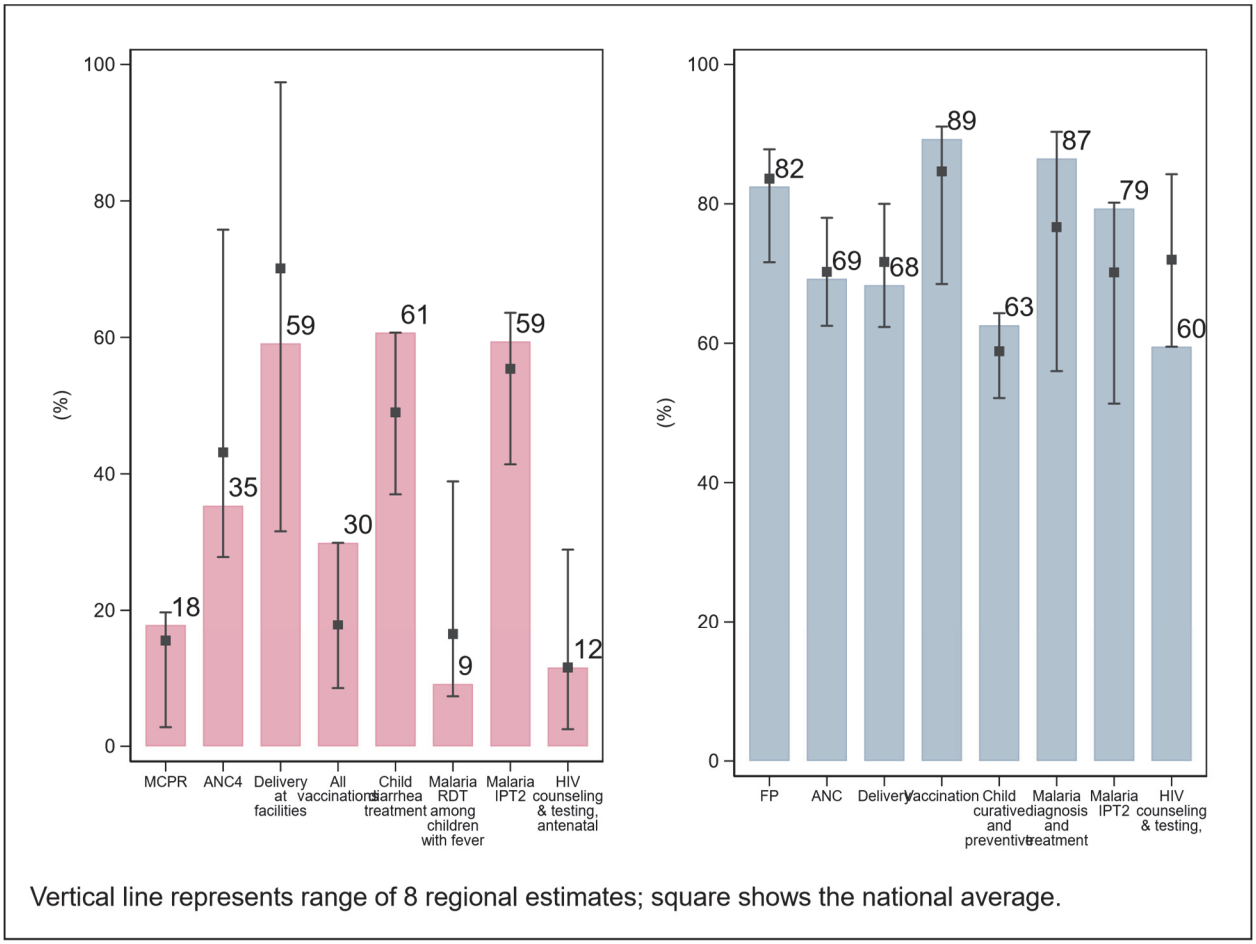


Appendix 7 Regional Summary of Service Environment and Utilisation: Ségou

Service utilisation ranges from 9% for malaria RDT among children with fever to 60% for childhood diarrhoea treatment in the region (left panel of Figure A7.1). The region has the highest utilisation levels for vaccination and seeking care at facilities for childhood diarrhoea, but levels are substantially lower than the national average for some services (ANC, delivery at facilities, and malaria RDT). Service readiness—essential operational capacity to provide services (right panel of Figure A7.1)—ranges from 60 for HIV counselling and testing to 89 for vaccination. Readiness scores are above the national average in most services, although the readiness score for HIV counselling and testing is the lowest among the eight regions studied in this report.

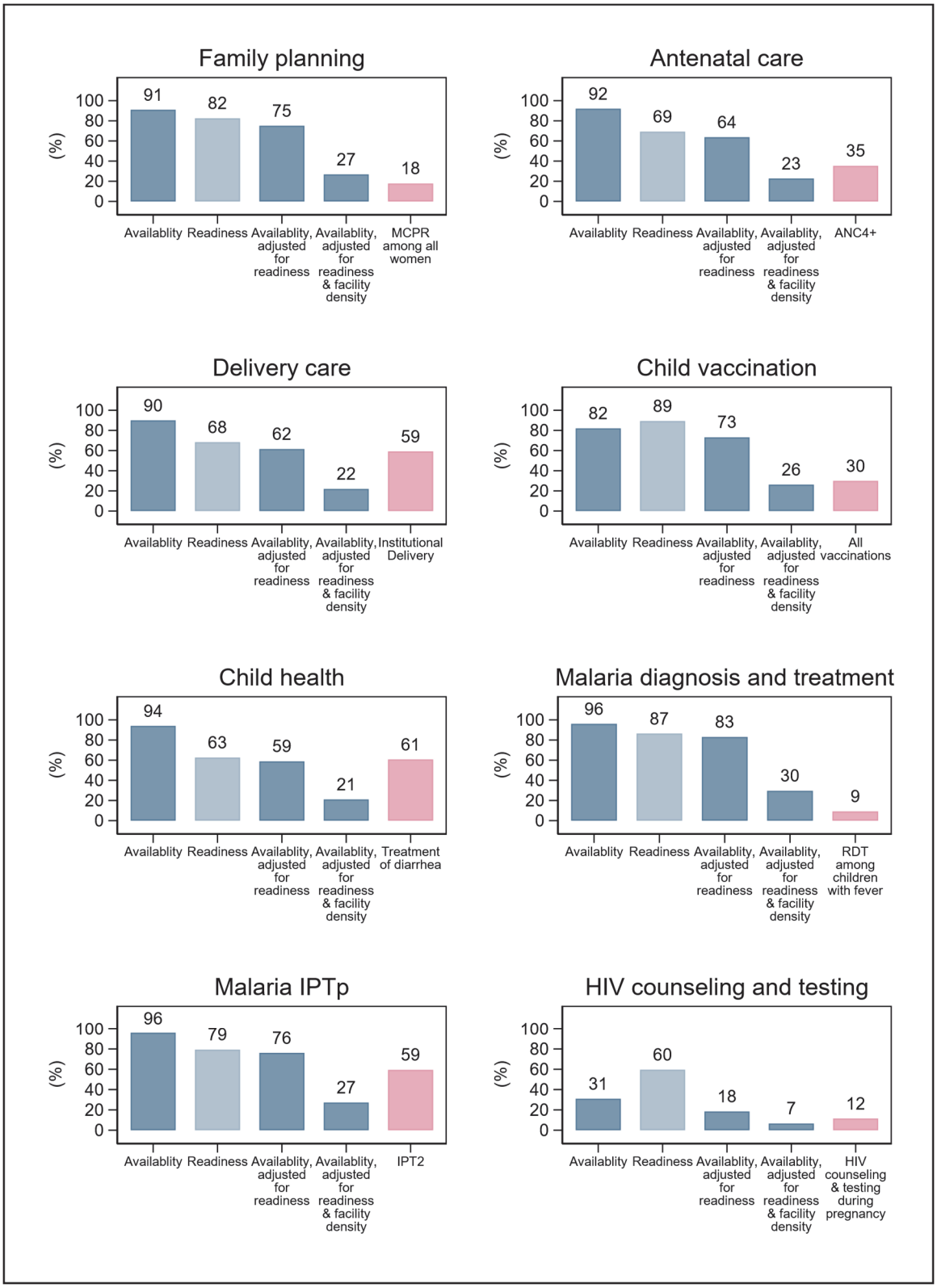
In terms of service availability, most facilities offer the services in the region, ranging from 82% for vaccination to 96% for malaria services (Figure A7.2). However, similar to most other regions, HIV counselling and testing is offered at a much lower level, 31%. Adjusted for service readiness, availability ranges from 18% for HIV counselling and testing (18% of facilities offer and have operational capacity to provide the service) to 83% for malaria IPTp. Facility density is lowest in the country (0.7 per 10,000 population). Thus, the availability score is further reduced by 65% when adjusted for density.

Figure A7.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Ségou



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A7.2 Service environment metrics and utilisation of services at the population level by service area: Ségou

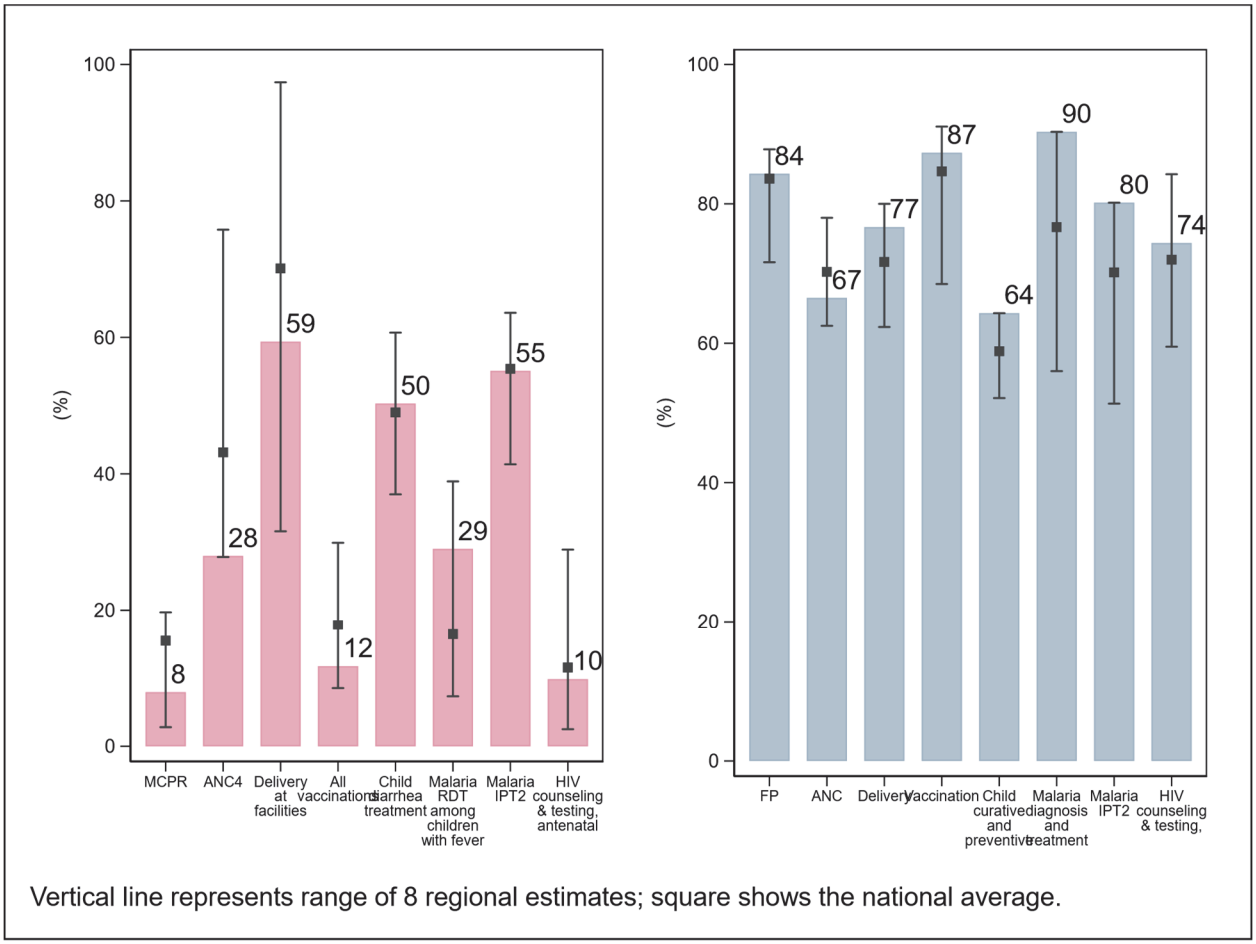


Appendix 8 Regional Summary of Service Environment and Utilisation: Mopti

Service utilisation ranges from 8% for modern contraceptive use among all women to 59% for delivery at facilities (left panel of Figure A8.1). The utilisation levels are around or below the national average in most services, except for malaria RDT for children with fever. Service readiness—essential operational capacity to provide services (right panel of Figure A8.1)—ranges from 64 for child health services to 90 for malaria diagnosis and treatment. These readiness scores are above the national average in all services, except ANC. In particular, readiness scores are highest for child health and malaria services among the eight regions studied in this report.

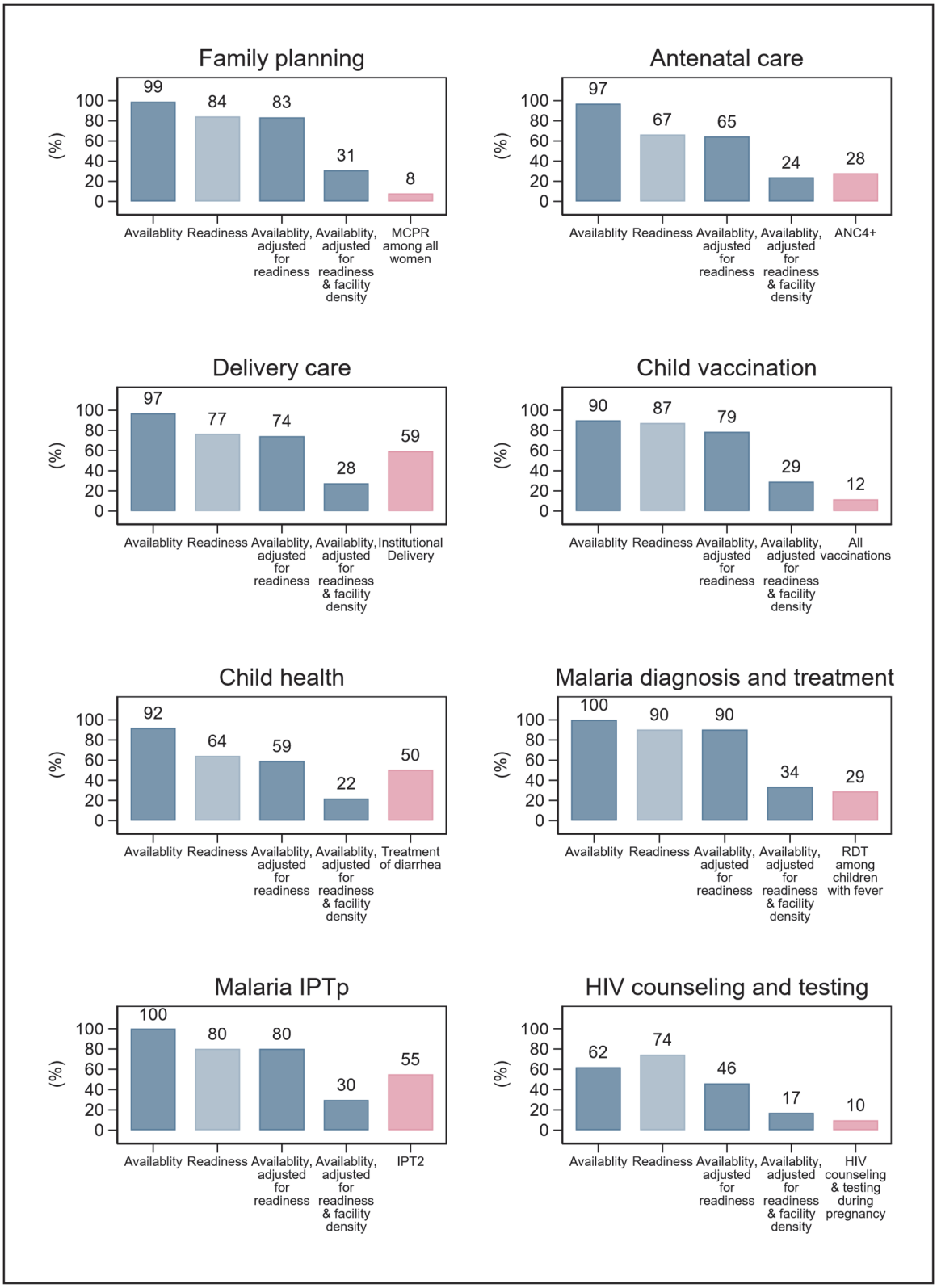
In terms of service availability, most facilities offer the services in the region, ranging from 90% for vaccination to 100% for malaria services, although HIV counselling and testing is offered at a lower level, 62% (Figure A8.2). Adjusted for service readiness, availability ranges from 46% for HIV counselling and testing (46% of facilities offer and have operational capacity to provide the service) to 90% for malaria diagnosis and treatment. Although the region has relatively high availability and readiness scores, facility density is the lowest in the country (0.7 per 10,000 population). Thus, the availability score is further reduced by 65% when adjusted for density.

Figure A8.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Mopti



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A8.2 Service environment metrics and utilisation of services at the population level by service area: Mopti

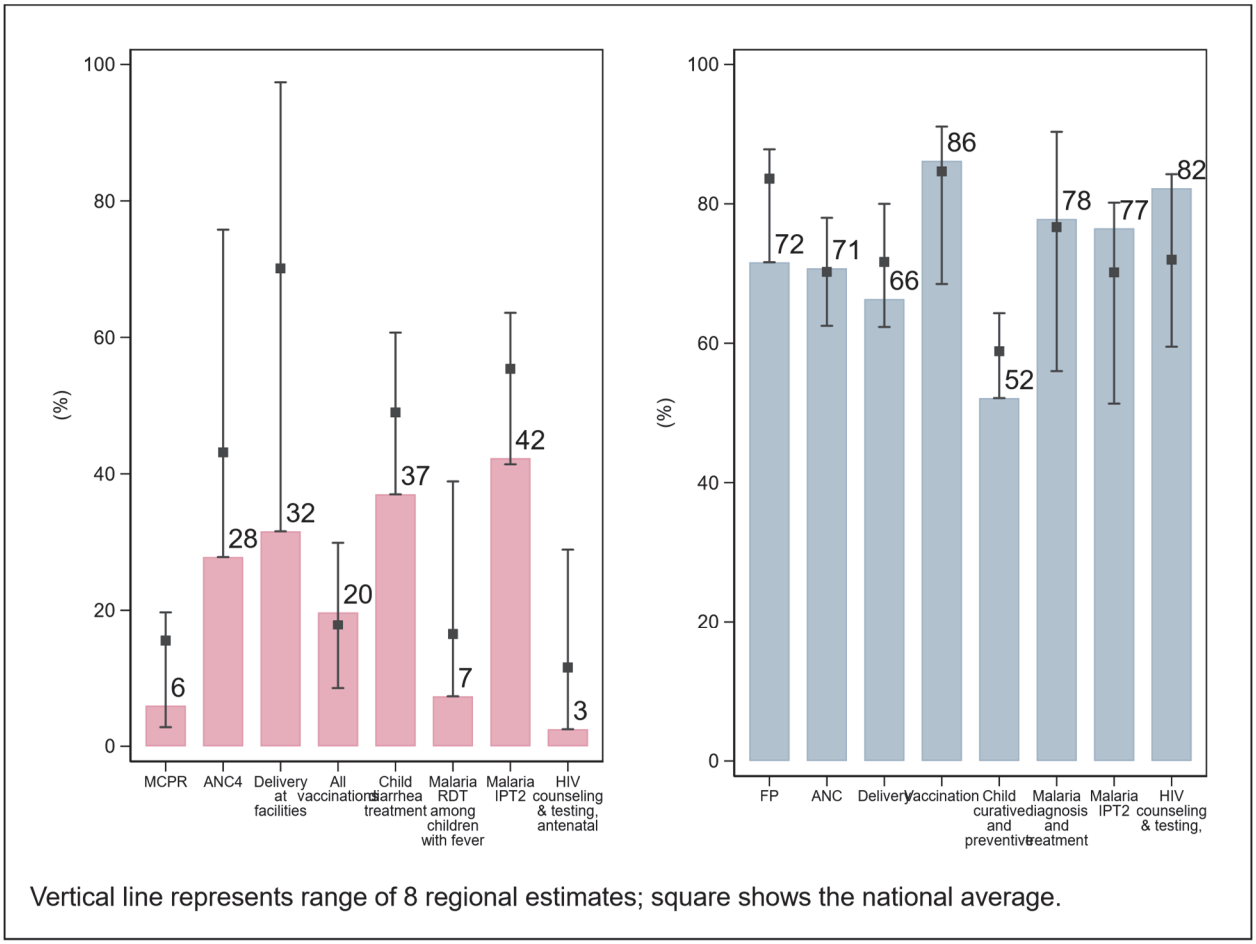


Appendix 9 Regional Summary of Service Environment and Utilisation: Tombouctou

Service utilisation ranges from 3% for HIV counselling and testing during pregnancy to 42% for malaria IPTp (left panel of Figure A9.1). In most service areas, the utilisation levels are the lowest or close to the lowest among the eight regions studied in this report. One exception is childhood vaccination, which is slightly above the national average. Service readiness—essential operational capacity to provide services (right panel of Figure A9.1)—ranges from 52 for child health services to 86 for vaccination. Compared to other regions, the region has the lowest readiness scores for family planning and curative and preventive child health services, whereas service readiness for HIV counselling and testing is close to the highest.

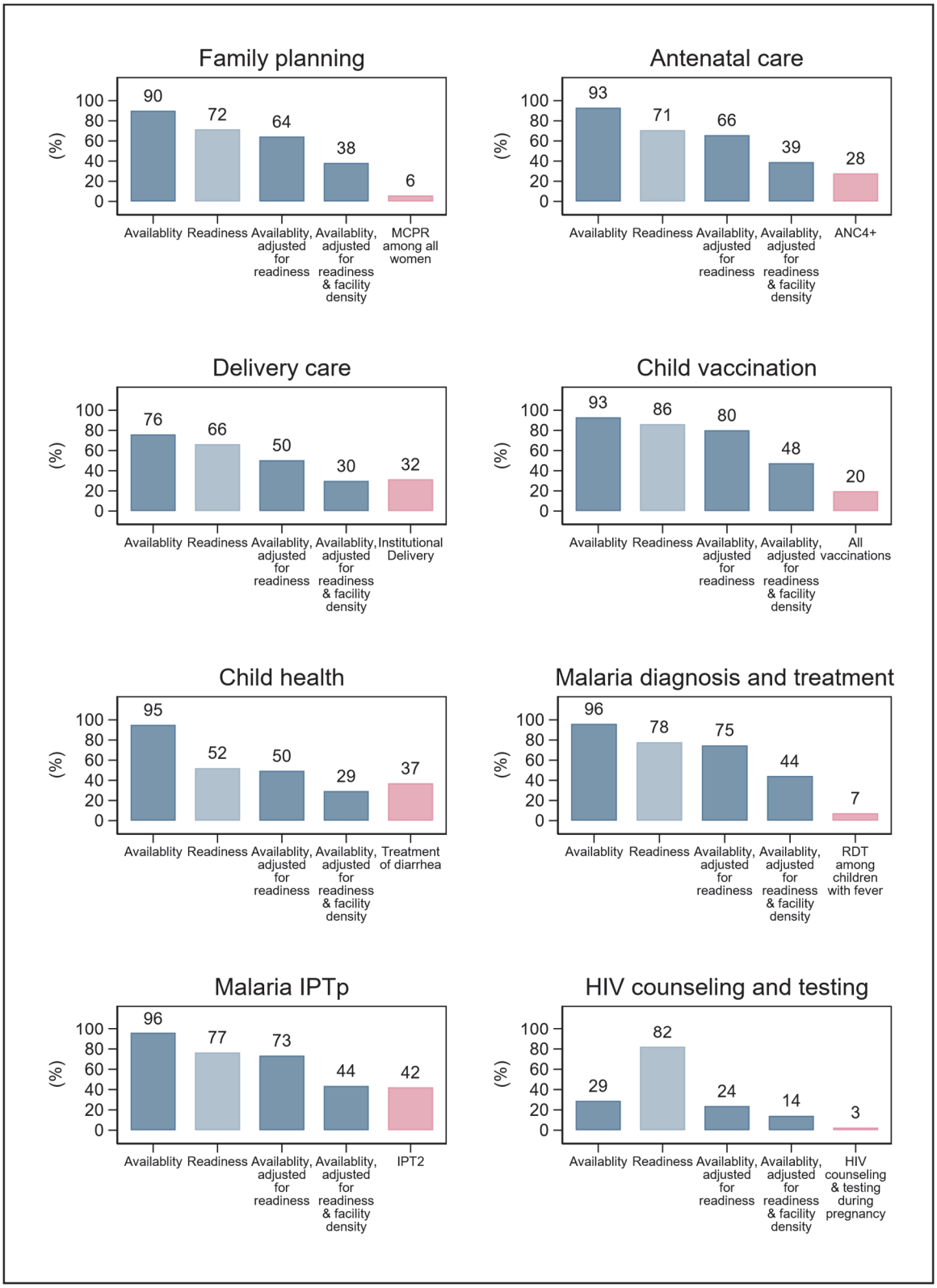
In terms of service availability, most facilities offer the services in the region, ranging from 76% for delivery care to 96% for malaria services (Figure A.9.2). However, HIV counselling and testing is offered at a much lower level at 29%. Adjusted for service readiness, availability ranges from 24% for HIV counselling and testing (24% of facilities offer and have operational capacity to provide the service) to 80% for vaccination. Facility density is 1.2 per 10,000 population. This is higher than the national level average, although lower than the WHO standard by 40%. Thus, the availability score is further reduced by 40% when adjusted for density.

Figure A9.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Tombouctou



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A9.2 Service environment metrics and utilisation of services at the population level by service area: Tombouctou

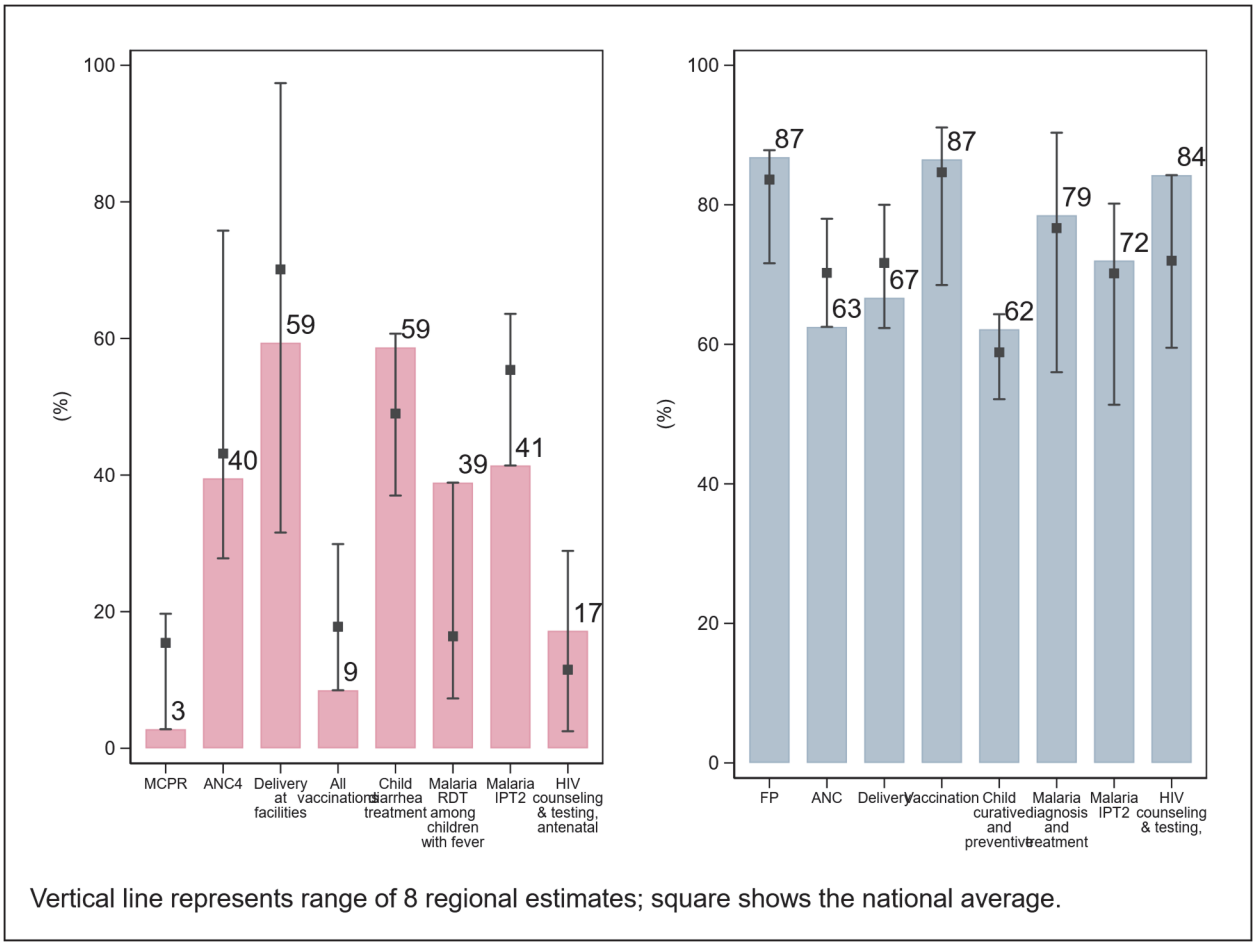


Appendix 10 Regional Summary of Service Environment and Utilisation: Gao

Service utilisation ranges from 3% for modern contraceptive use among all women to 60% for treatment of diarrhoea among children (left panel of Figure A10.1). The utilisation levels are the lowest among the eight regions studied in this report in the three service areas: family planning, vaccination, and malaria IPTp. On the other hand, the region has the highest utilisation levels for treatment for diarrhoea among children and malaria RDT among children with fever. Service readiness—essential operational capacity to provide services (right panel of Figure A10.2)—ranges from 62 for child health services to 87 for family planning as well as vaccination. Compared to other regions, the region has relatively high readiness in most service areas, although readiness was lower than the national average for ANC and delivery.

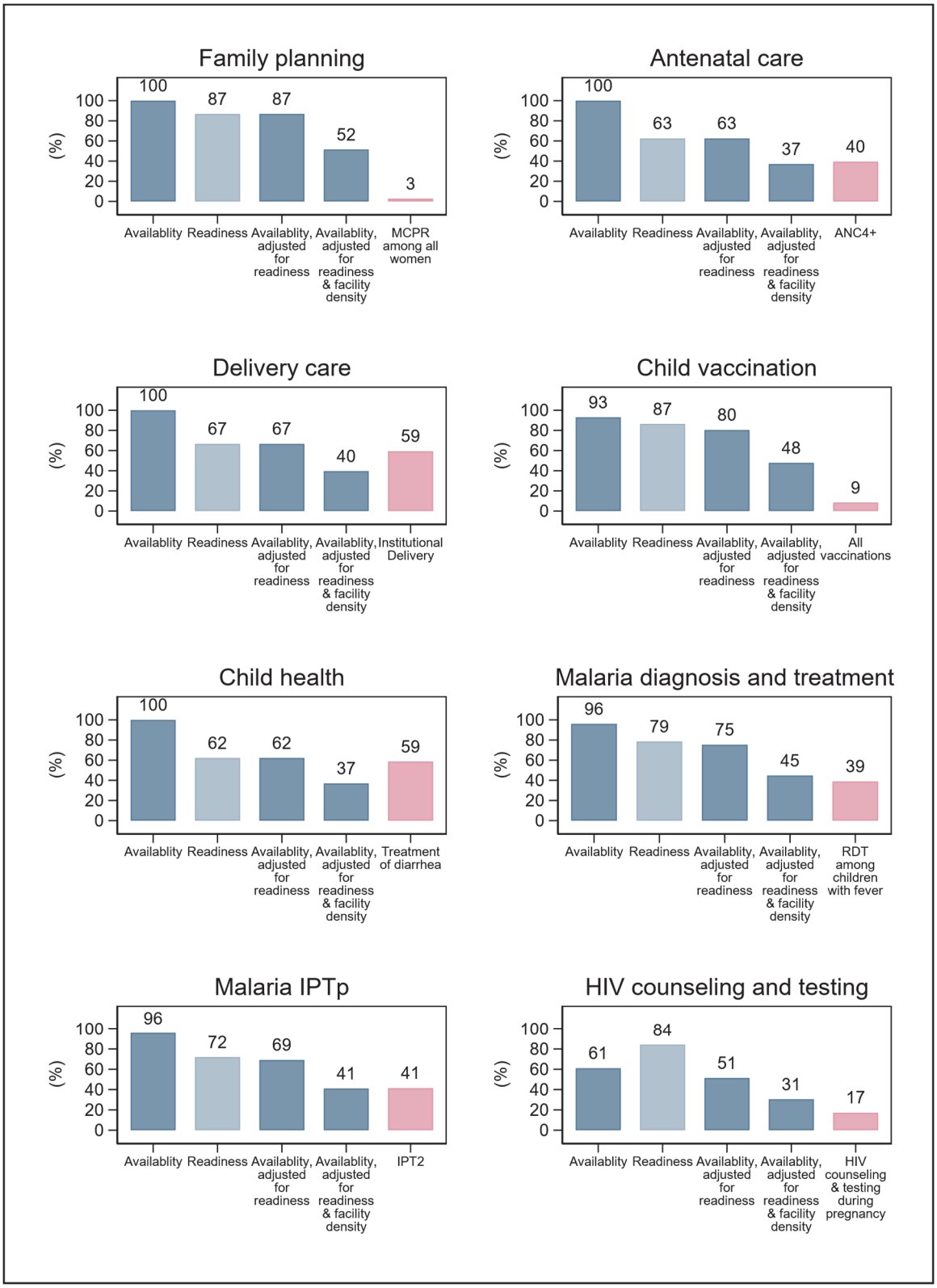
In terms of service availability, most facilities offer the services in the region, with 61% for HIV counselling and testing, which is substantially higher compared to other regions, to 100% for family planning, ANC, delivery care, and child health services (Figure A10.2). Adjusted for service readiness, availability ranges from 51% for HIV counselling and testing (51% of facilities offer and have operational capacity to provide the service) to 87% for family planning. Facility density is 1.2 per 10,000 population—higher than the national level average, although 40% lower than the WHO standard. Thus, the availability score is further reduced by 40% when adjusted for density.

Figure 10A.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Gao



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A10.2 Service environment metrics and utilisation of services at the population level by service area: Gao

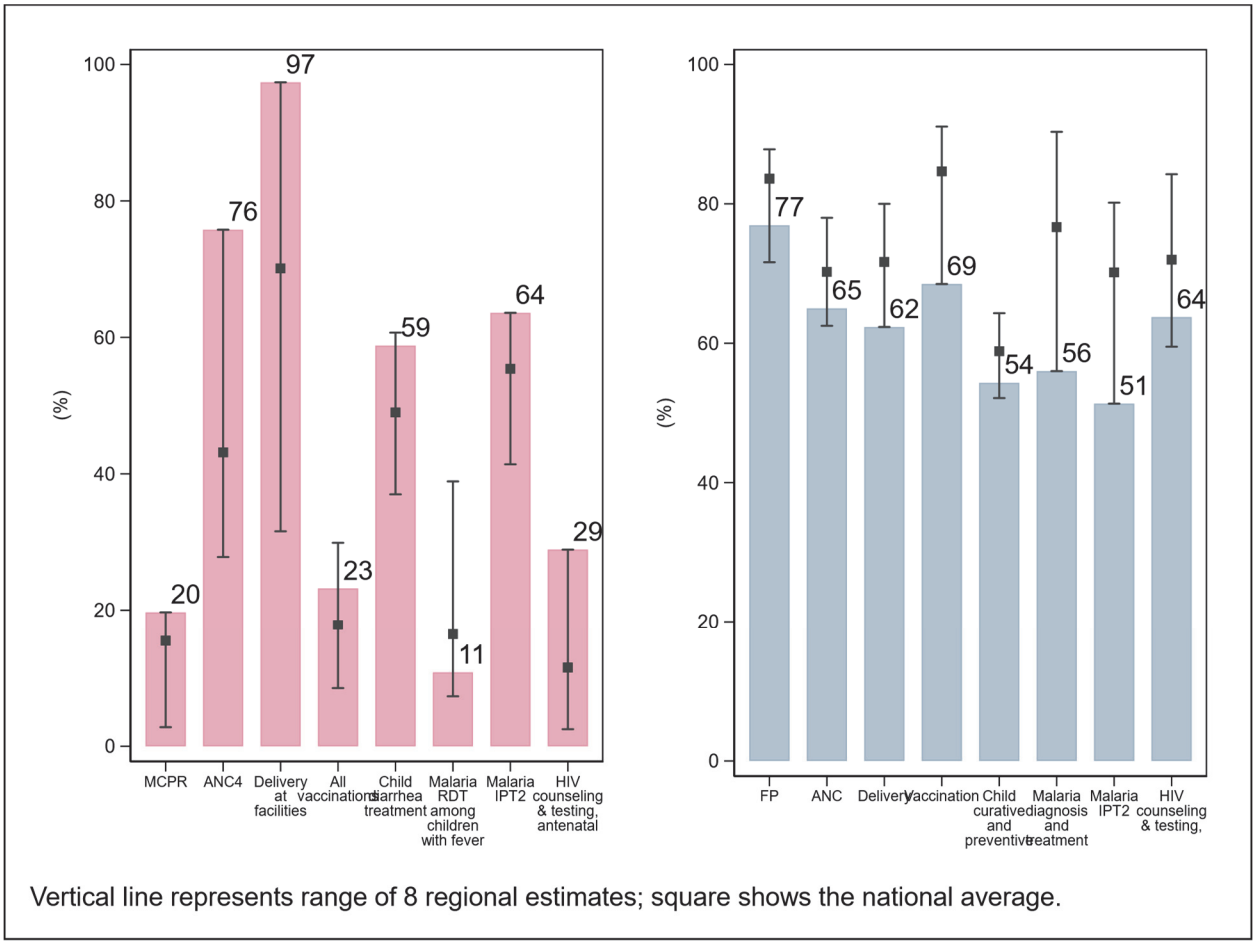


Appendix 11 Regional Summary of Service Environment and Utilisation: Bamako

Service utilisation ranges from 11% for malaria RDT among children with fever to 97% for delivery at facilities (left panel of Figure 11.1A). In most services, the utilisation levels are substantially above the national level or often the highest when compared to other regions. One exception is malaria RDT among children with fever, where service utilisation is substantially lower than the national average. Service readiness—essential operational capacity to provide services (right panel of Figure A11.1)—ranges from 51 for malaria IPTp to 77 for family planning. Compared to other regions, the region has relatively low readiness in all service areas.

Service availability ranges from 42% for vaccination to 84% for malaria services (Figure A11.2). This availability is relatively low, compared to other regions, except for HIV counselling and testing. Adjusted for service readiness, availability ranges from 29% for vaccination (29% of facilities offer and have operational capacity to provide the service) to 50% for family planning. Facility density is 1.6 per 10,000 population—highest in the country, although 20% lower than the WHO standard. When further adjusted for density, availability is reduced by 20%, which is the smallest amount of adjustment across the eight regions studied in this report.

Figure A11.1 Utilisation of services at the population level and service readiness among facilities that offer the service: Bamako



Vertical line represents range of 8 regional estimates; square shows the national average.

Figure A11.2 Service environment metrics and utilisation of services at the population level by service area: Bamako