

Routine Facility Data as a Reliable Tool for Monitoring Maternal and Child Health: *Evidence Brief*



Summary

We looked at routine data collected from health facilities (using DHIS2) to see how maternal and child health services are improving over time. We compared this data with results from national surveys and UN estimates to check how reliable the routine data is.

Maternal Health

- The number of women who had at least four antenatal care (ANC) visits went up slightly, from 50% in 2019 to 53% in 2023.
- More women are giving birth in health facilities: 48% in 2019 to 53% in 2023.
- Cesarean deliveries increased a little, from 3% to 4% over the same period.
- These routine data results are very close to what national surveys show, meaning they are reliable and consistent with other sources.

Child Immunization

- The percentage of children who received:
 - BCG vaccine increased from 69% to 74%.
 - Third dose of the pentavalent vaccine (Penta3) rose from 70% to 72%.
 - First dose of the measles vaccine increased from 66% to 68% (between 2019 and 2022).
- These figures match national survey data, showing that routine health facility data is a good source for tracking immunization coverage.

Health System Performance Assessment

- Facility density: Ethiopia meets the WHO target of 2 health facilities per 10,000 population nationally, but urban areas like Addis Ababa, Dire Dawa, and Harari fall below this benchmark, while regions such as Benishangul Gumuz and Gambela exceed it, revealing stark regional disparities in health infrastructure.
- Bed Density: Ethiopia's hospital bed density is 3.8 per 10,000 population in 2023, with wide regional disparities—Dire Dawa nears WHO standards, while many areas remain under-resourced.
- Health Workforce: In 2023, Ethiopia's core health worker density is 13.2 per 10,000—below the WHO threshold—with stark regional disparities, highlighting the urgent need for targeted workforce investments.
- Health Service Utilization: Ethiopia's 2023 national rate is 1.7 visits per person—well below the target of 5—with stark urban-rural gaps, underscoring the need to boost access in underserved pastoralist regions.
- Health System Performance: Ethiopia's overall health system performance score is 39.1%, with infrastructure and workforce scores at 58.3% and 57.4% respectively, but low service utilization (1.7 visits per capita) highlights gaps in healthcare access and use.

Introduction

The Ethiopian Ministry of Health has used the DHIS2 system to collect and report health data across the country. All districts, regional hospitals, and health facilities now use this system to submit monthly data using standardized forms. This brief shares findings from a detailed review of routine health facility data, highlighting key indicators related to the health of mothers, newborns, and children. The goal is to support national and international efforts to monitor Ethiopia's progress in improving reproductive, maternal, newborn, and child health (RMNCH).

Methods

To prepare this brief, we reviewed national health performance and DHS (Demographic and Health Survey) reports and analyzed data from DHIS2. The routine health data cover the period from January 2019 to December 2023 and include information from health facilities across Ethiopia. We used the EDHS 2019 and National health equity survey 2022 for comparison of the DHIS2 Outputs. Our focus was on key maternal, newborn, and child health indicators. (Details are available on the report).

Findings

1. Maternal and Newborn Care Indicators

Antenatal Care (ANC4+ Coverage): The proportion of pregnant women who received at least four ANC visits increased from 50% in 2019 to 53% in 2023 based on DHIS2 data, while the EDHS 2019 reported ANC4+ coverage at 43%, making the DHIS2 estimate 7 percentage points (pp) higher, indicating somewhat over reporting in DHIS2. In 2022, the DHIS2 estimate was 49%, while the survey reported 54%, a 5 pp lower figure from the DHIS2 data-indicating underreporting. Despite minor variations, the overall trend shows that ANC service utilization is improving and DHIS2 estimates are within an acceptable range of survey results.

Institutional Deliveries and Skilled Birth Attendance: The percentage of institutional live births (births occurring in a health facility) increased from 48% in 2019 to 53% in 2023 based on DHIS2. In 2019, both DHIS2 and EDHS provided almost identical estimates for institutional deliveries, indicating strong alignment. In 2022, the National Health Equity Survey reported a rate of 58%, showing a 5 pp higher estimate compared to DHIS2 (53%)-indicating low reporting rate. The rate of skilled birth attendance, although not disaggregated in detail here, is closely linked to institutional delivery rates and is assumed to follow a similar trend.

Caesarean Section Rate: Caesarean section (C-section) deliveries accounted for 3% of all births in 2019 and increased slightly to 4% in 2023, according to DHIS2 data. This indicates a slow but consistent increase in access to emergency obstetric care services over the reporting period.

Postnatal Care within 48 Hours: The percentage of women who received postnatal care (PNC) within 48 hours after delivery rose from 44% in 2019 to 50% in 2023, based on DHIS2. In 2022, survey data estimated PNC coverage at around 52%, with a 2 percentage point difference compared to DHIS2 (50%).

The analysis of routine health facility data from DHIS2 shows positive trends in the utilization of maternal and newborn health services across Ethiopia between 2019 and 2023. While small differences exist between DHIS2 and national survey estimates, all DHIS2 figures fall within the 95% confidence intervals of recent surveys. This suggests that DHIS2 is a reliable and timely source of data for monitoring key maternal and newborn health indicators and can effectively support evidence-based planning, program implementation, and decision-making at both national and subnational levels.



Table 1: Maternal and Newborn Care Indicators – National

	2015	2016	2017	2018	2019	2020	2021	2022	2023
ANC 4 or more visits									
Survey		33			43[39,46]			54[50,58]	
Facility data					50	49	49	50	53
Institutional live birth coverage									
Survey		26			48[42,53]			56[51,61]	
Facility data					48	48	51	51	53
Skilled birth attendance									
Survey		34			53			59	
Facility data					47	47	50	51	53
Caesarean section rate among all live births									
Survey		3			6			6	
Facility data					3	3	4	4	4
Postnatal care within 48 hours									
Survey		17			34			46	
Facility data					44	46	49	48	50

Note: Facility data - The estimations are based on Penta1 as a denominator

Regional Trends in Institutional Deliveries: Table 2 presents the regional trends in institutional deliveries based on routine DHIS2 data. Overall, the data show no significant changes in most regions over the period reviewed. However, when triangulated with survey-based estimates, particularly using Penta1 coverage as a proxy for live births, several patterns emerged:

- In five out of thirteen regions—Harari, Oromia, Somali, South Ethiopia, and Southwest Ethiopia—the institutional delivery rates derived from Penta1 data fell within the 95% confidence interval of the National Health Equity Survey, indicating reasonable alignment between DHIS2 and survey data in these areas.
- In contrast, substantial discrepancies were observed in Gambella (38 pp), Benishangul-Gumuz (34 pp), and Addis Ababa (22 pp), where institutional delivery coverage based on DHIS2 was significantly lower than survey estimates. This suggests potential underreporting of deliveries in these regions within routine health facility data.

Marked disparities in institutional delivery coverage persist across regions. In 2023, DHIS2 data showed that institutional delivery rates ranged from just 29% in Afar to 79% in Harari, reflecting a 50 percentage point gap. This wide variation indicates persistent regional inequalities, with pastoralist and remote regions continuing to lag far behind.

These findings underscore the importance of Improving data quality and completeness in regions where DHIS2 reporting may be weaker. Targeting interventions to improve institutional delivery access in low-performing regions like Afar, Somali, and Benishangul-Gumuz. Strengthening local data systems, especially the accuracy of denominators (e.g., live birth estimates), to ensure more reliable routine monitoring.



	2015	2016	2017	2018	2019	2020	2021	2022	2023
ANC 4 or more visits									
Survey		33			43[39,46]			54[50,58]	
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2. Immunization

Immunization coverage has shown modest improvements in recent years, with no significant differences between the DHIS2 and recent national survey estimates. In 2022, the DHIS2-based estimate for Penta-3 vaccination was 71%, closely aligning with the survey estimate of 72%; BCG coverage was 72%, and measles first-dose coverage reached 68%. All these figures fell within the 95% confidence intervals of the national health equity survey, indicating consistency between DHIS2 and survey data. These findings suggest that DHIS2 provides reliable estimates for monitoring immunization performance and can effectively support evidence-based decision-making and program planning.

Table 3: Child Health Indicators – Immunization

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Penta-3									
Survey		36[33,4]			62[56,6]			72[67,7]	
Facility data					70	71	71	71	72
WUENIC					68	71	65	65	72
BCG									
Survey		69[62,7]			73[67,7]			73[69,7]	
Facility data					70	70	72	72	73
WUENIC					69	70	68	68	74
Measles vaccination (MCV1) coverage									
Surveys		54[50,5]			59[52,6]			63[57,68]	
Facility data					66	67	67	68	68
WUENIC					57	59	53	55	61

Note: Facility data - The estimations are based on Penta1 as a denominator

The analysis reveals regional variations in the coverage of BCG and DTP3 (Penta-3) vaccinations among infants between 2019 and 2023. In 2022, facility estimates showed that regions like Afar, Gambella, and Somali had lower coverage for both BCG and Penta-3 vaccines compared to national averages. While some regions experienced improvements, others saw declines, highlighting the need for continued monitoring and targeted interventions to address these disparities. The results emphasize the importance of focusing efforts on regions with lower vaccination rates to ensure all infants receive the necessary immunizations.

Despite these regional variations, there was strong alignment between the facility estimates and the 2022 national health equity survey for both BCG and Penta-3 vaccinations. Five regions—Harari, Oromia, Sidama, Somali, and

Southwest Ethiopia—showed BCG estimates within the 95% confidence interval of the national survey, while four regions—Gambella, Harari, Sidama, and South Ethiopia—demonstrated Penta-3 estimates that aligned with national survey data. This consistency suggests that DHIS2-based facility data is a reliable source for monitoring vaccination coverage, reinforcing its potential as a valuable tool for public health decision-making.

Table 4: Coverage of BCG and Penta3 vaccination by regions

Year	BCG (%) as Penta1 as denominator		Survey		Penta3 (%) as Penta1 as denominator		Survey	
	2019	2022	EDHS 2019	NHES 2022	2019	2022	EDHS 2019	NHES 2022
Addis Ababa	82	82	96[87,99]	94[90,97]	75	75	93[84,97]	96[92,99]
Afar	68	67	46[33,59]	28[19,36]	65	65	27[17,39]	21[13,2]
Amhara	72	71	79[68,87]	83[78,88]	73	72	78[71,90]	83[78,8]
Benishangul Gumuz	69	70	86[76,92]	85[77,92]	70	69	77[71,88]	86[79,9]
Central Ethiopia****	75	76	ND	ND	74	74	ND	ND
Dire Dawa	72	74	96[88,98]	93[89,97]	68	68	74[63,84]	85[79,9]
Gambella	57	58	82[69,90]	76[66,86]	68	65	60[55,80]	75[65,8]
Harari	73	74	70[54,82]	80[72,88]	63	69	54[41,68]	70[60,7]
Oromiya	70	73	70[58,79]	67[60,74]	70	72	53[41,66]	63[56,7]
Sidama***	76	80	ND	71[63,80]	72	75	ND	79[71,8]
Somali	58	66	40[26,54]	61[50,72]	65	68	26[15,41]	46[35,5]
South Ethiopia*	70	76	71[62,79]	72[64,79]	72	72	56[42,70]	71[64,7]
Southwest Ethiopia	67	71	ND	46[37,54]	71	71	ND	42[34,5]
Tigray**	72	ND	92[81,97]	50[43,57]	71	ND	84[72,92]	52[46,5]
national	70	72	73[67,78]	73[69,76]	70	72	61[55,69]	71[67,7]

Note: Facility data - The estimations are based on Penta1 as a denominator

3. Curative Health Service Utilization for Children

From 2019 to 2023, there was a significant increase in health service utilization for children, as evidenced by the steady rise in outpatient department (OPD) visits for children under five, from 105,727,216 to 178,422,352. The mean OPD visits per 100 children per year also grew from 162 in 2019 to 294 in 2023, showing greater access to healthcare. Similarly, inpatient admissions for under-five children increased from 1,451,925 in 2019 to 1,690,564 in 2023, with the mean admissions per 100 persons per year rising from 105 to 163, reflecting an overall increase in the use of inpatient services across all age groups. These trends indicate improved healthcare access and utilization among children over the four-year period.



Total population (DHIS2 proj.)	10067582	10287328	10511996	10717840	10923379
	4	8	0	8	2
Population under-5 (DHIS2)	14773820	15098219	15427785	15731152	16036136
Data inputs OPD					
Completeness reporting OPD	76	87	94	72	
Number of OPD visits per year					
Among children under-5	23998536	27396612	30230690	38560836	47180788
Among all ages	10572721	11084310	12156865	14780121	17842235
	6	4	6	6	2
Indicators OPD					
Mean OPD visits per 100 children per year, under-5	162	181	196	245	294
Mean OPD visits per 100 inhabitants per year, all ages	1	1	1	1	2
Percent of OPD visits that are under-5	23	25	25	26	26
Data inputs IPD					
Completeness reporting IPD	85	78	95	89	
Number of IPD visits per year					
Among children under-5	259635	242790	282723	301206	307132
Among all ages	1451925	1367317	1484950	1566408	1690564
Indicators IPD					
Mean IPD admissions per 100 children per year, under-5	2	2	2	2	2
Percent of IPD admissions under-5	18	18	19	19	18
Mean IPD admissions per 100 person per year, all ages	105	108	116	138	163
Under five deaths					
N of deaths in children under-5	8899	9527	10338	11035	9987
CFR: deaths per 100 admissions per year, under-5	3	4	4	4	3
N of deaths per year, all ages	61587	56897	58557	63597	48238
CFR: deaths per 100 admissions per year, all ages	4	4	4	4	3
Proportional death (%): under-5 death to total death	14	17	18	17	21

4. Health System Performance Assessment

Facility density: The health system performance assessment in Ethiopia, based on DHIS2 2023 data, reveals that while the national health facility density meets the World Health Organization (WHO) recommendation of 2 health facilities per 10,000 population, significant regional disparities exist. Urban areas like Addis Ababa, Dire Dawa, and Harari have lower health facility densities (0.6, 1.1, and 1.6 per 10,000 population, respectively), highlighting challenges in accessibility, while regions like Benishangul Gumuz, Gambela, and Southwest Ethiopia report higher densities (4, 3.4, and 2.4 per 10,000 population), indicating better infrastructure availability. This calls for targeted interventions to address urban health inequalities and ensure comprehensive healthcare access across all regions.

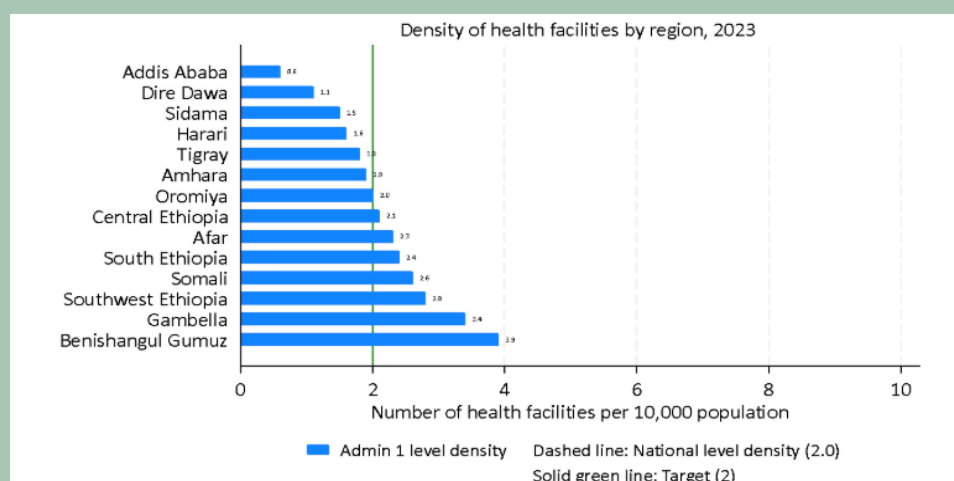


Figure 7:1 Health facility density per 10,000 populations by region, 2023

Bed density: As of 2023, Ethiopia's national hospital bed density is 3.8 beds per 10,000 population, indicating room for

improvement in healthcare capacity. Regional disparities are significant, with urban areas like Dire Dawa (23 beds per 10,000) nearing the WHO standard of 25 beds per 10,000, while Addis Ababa and Harari have 15 beds per 10,000, and Gambella has 9.4 beds per 10,000. While some urban regions are approaching international standards, there is a need to increase hospital bed capacity more evenly across all regions, with a focus on under-resourced areas to improve access to quality healthcare nationwide.

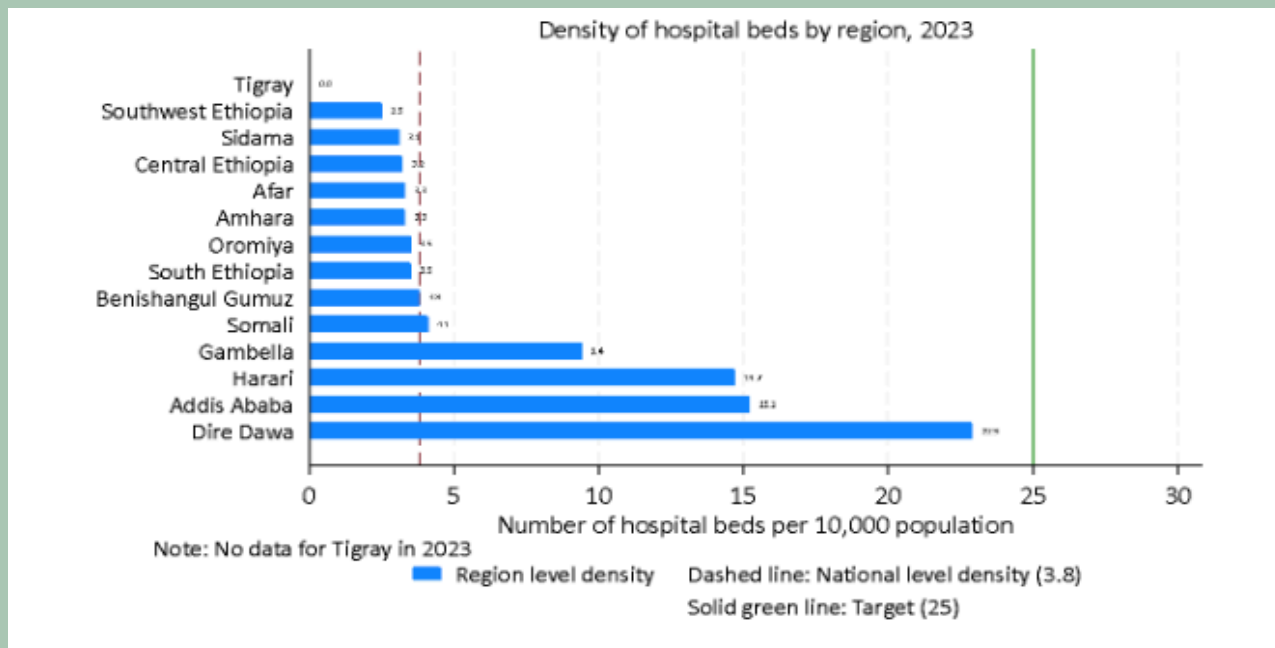


Figure 7:2 Number of hospital beds per 10,000 populations by region, 2023

Health workforce: As of 2023, Ethiopia’s national core health professional density stands at 13.2 per 10,000 population, falling short of the WHO recommended threshold of 23 per 10,000. There are significant regional disparities, with Addis Ababa having the highest density at 120 per 10,000, followed by Harari (50 per 10,000) and Gambella (36 per 10,000). In contrast, Southwest Ethiopia has the lowest density at 2.7 per 10,000, with Oromia and Amhara showing 7 and 10 per 10,000, respectively. These disparities underscore the need for targeted policies to train, recruit, and retain healthcare professionals, especially in rural and populous areas, to meet WHO standards and ensure equitable healthcare access across the country.

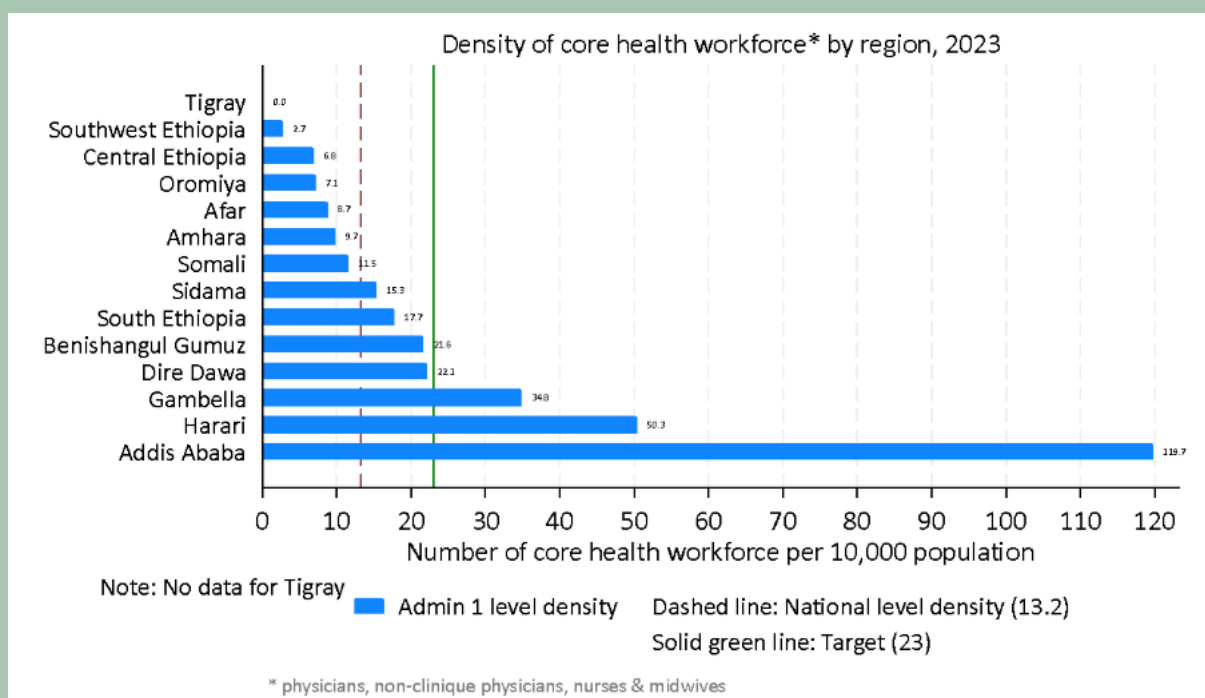


Figure 7:3 Number of core health professionals per 10,000 populations, 2023

Health Service Utilization Score: The national health service utilization rate in Ethiopia is 1.7 visits per person, which is

significantly lower than the target of 5 visits per person, reflecting gaps in accessing healthcare services. There is wide variation across regions, with Harari leading at 4.7 visits per person, followed by Addis Ababa at 4.3 and Dire Dawa at 3.3, indicating better healthcare access in urban areas.

Pastoralist regions, such as Somali (0.6 visits), Afar (0.8 visits), and Benishangul Gumuz (1.3 visits), show much lower health service utilization rates, highlighting challenges in accessing healthcare. The disparities between urban and rural/pastoralist regions emphasize the need for targeted interventions to improve healthcare access and utilization, particularly in underserved areas.

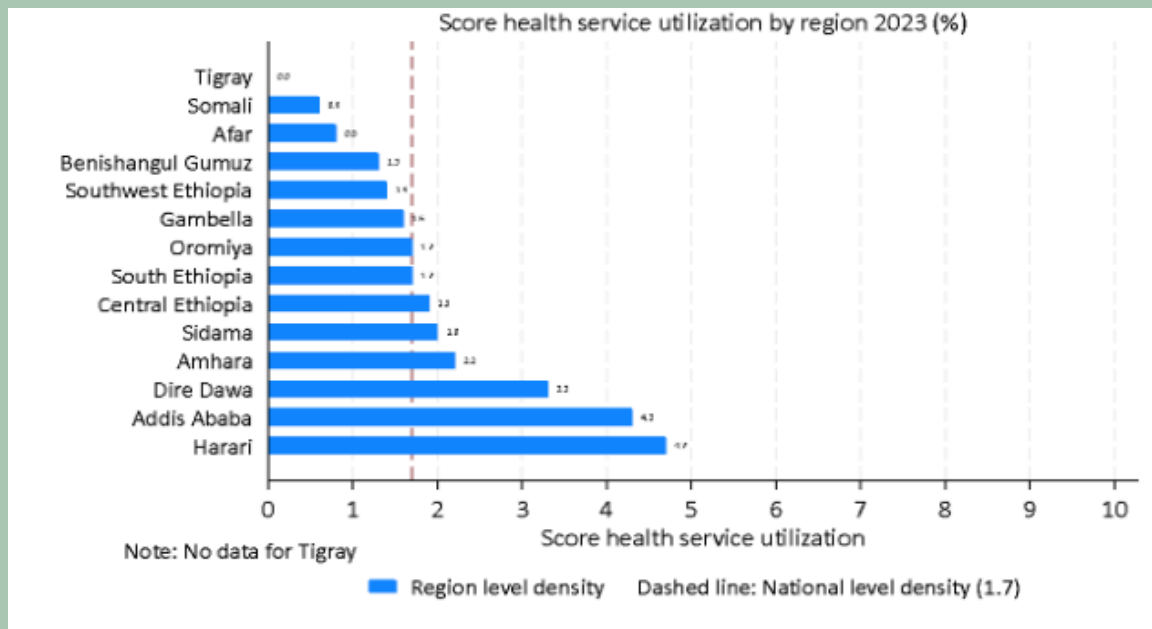


Figure 7:8 Health service utilization score by region, 2023

Health System Performance by Region

Health system performance across Ethiopia varies significantly by region, with Gambella achieving the highest performance at 67%, followed by Benishangul-Gumuz at 65%. Urban areas like Harari, Dire Dawa, and Addis Ababa report moderate performance (58%, 57%, and 50%, respectively), while regions such as Tigray, Southwest Ethiopia, Oromiya, Central Ethiopia, Amhara, Afar, and Sidama show considerably lower performance levels. This disparity highlights the need for targeted improvements in underperforming regions.

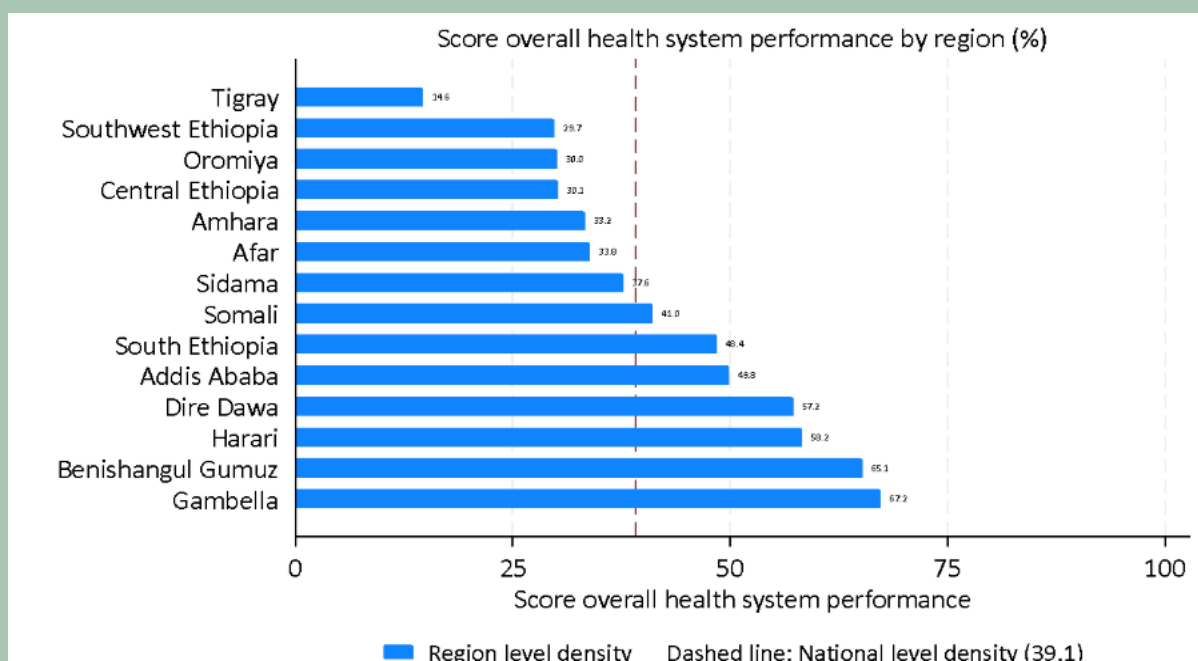


Figure 7:9 Health system performance score by region, 2023

The national total health system performance score was calculated using various health system inputs, including workforce, hospital beds, and health infrastructure (health facilities), as well as health system outputs such as service utilization rates (inpatient admissions and outpatient department visits). The overall health system performance score stands at 39.1%. Among the health system inputs, the infrastructure score is 58.3%, while the health workforce score is 57.4%. Additionally, the national service utilization score is low, averaging only 1.7 visits per capita (Figure 7:10).

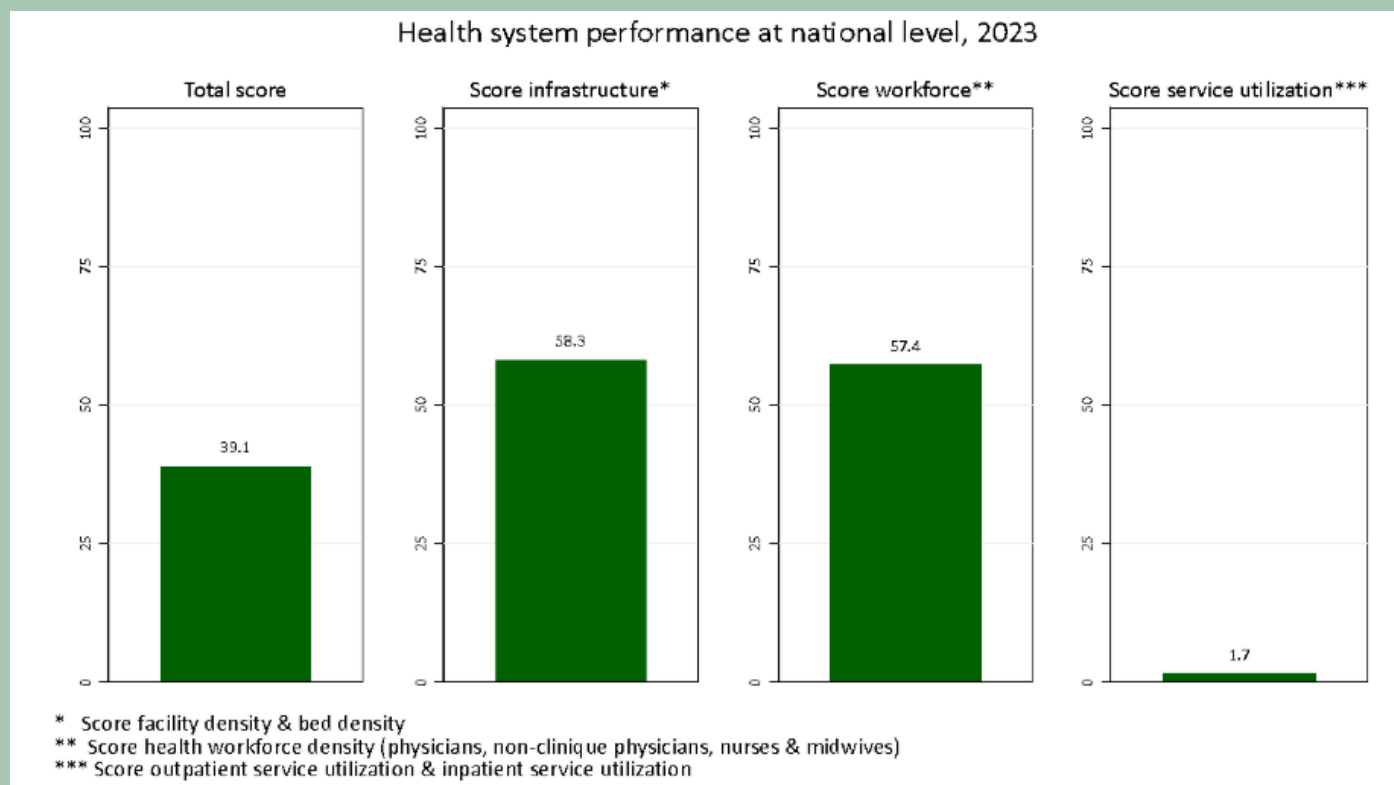


Figure 7:10 National Health system performance by health system inputs, 2023

Call to Action: Strengthening Ethiopia’s Health System through Better Use of DHIS2 Data

The Opportunity

Our analysis of routine health facility data within the DHIS2 platform reveals its potential as a powerful tool for monitoring key maternal and child health indicators. The data provides valuable insights into trends in antenatal care, institutional delivery, postnatal care, vaccination coverage, and healthcare utilization. By comparing DHIS2 data with recent survey results, we have confirmed its reliability as a source for evidence-based decision making.

The analysis of Ethiopia’s health system performance from 2019 to 2023 reveals encouraging progress in maternal and newborn care, immunization, and child health service utilization. However, persistent disparities in service access, workforce distribution, infrastructure availability, and data quality continue to hinder equitable health outcomes across regions—especially in pastoralist and underserved areas.

1. Improve Data Quality in Underreporting Regions

Prioritize investments to enhance the accuracy and completeness of DHIS2 data, especially in regions like Gambella, Benishangul Gumuz, and Addis Ababa where gaps between facility and survey data suggest underreporting. Focus on improving denominator accuracy and regional reporting to support timely, evidence-based decisions.

2. Target Resources to Address Regional Disparities

Use DHIS2 data to identify low-performing regions—such as Afar—and direct resources to overcome local barriers to maternal and child health services. Learn from high-performing regions like Harari and replicate effective practices to promote national equity.

3. Boost Vaccination Coverage Through Data-Led Interventions

Develop targeted immunization strategies for Afar, Gambella, and Somali, tackling vaccine hesitancy, logistical constraints, and access gaps using insights from DHIS2 data to tailor local solutions.

4. Strengthen Monitoring and Evaluation Systems

Establish a consistent system for tracking intervention outcomes using routine DHIS2 data. Regular performance reviews can ensure adaptive management and help close coverage gaps over time.

5. Build Capacity for Data-Driven Decision-Making

Train healthcare workers and decision-makers at all levels to use DHIS2 effectively—improving their ability to interpret data, recognize trends, and implement timely actions that improve health outcomes.

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Additional information about the Ethiopian Health care financing can be obtained from the Ethiopian Public Health Institute (EPHI), Gulele Arbegnoch Street, Gulele Sub-City, Addis Ababa, Ethiopia. Telephone: +251.11.275.4647; Fax: +251.11.275.4744; Website: <http://www.ephi.gov.et>.

Information about the Countdown to 2030 can be obtained from website: <https://www.countdown2030.org/>

