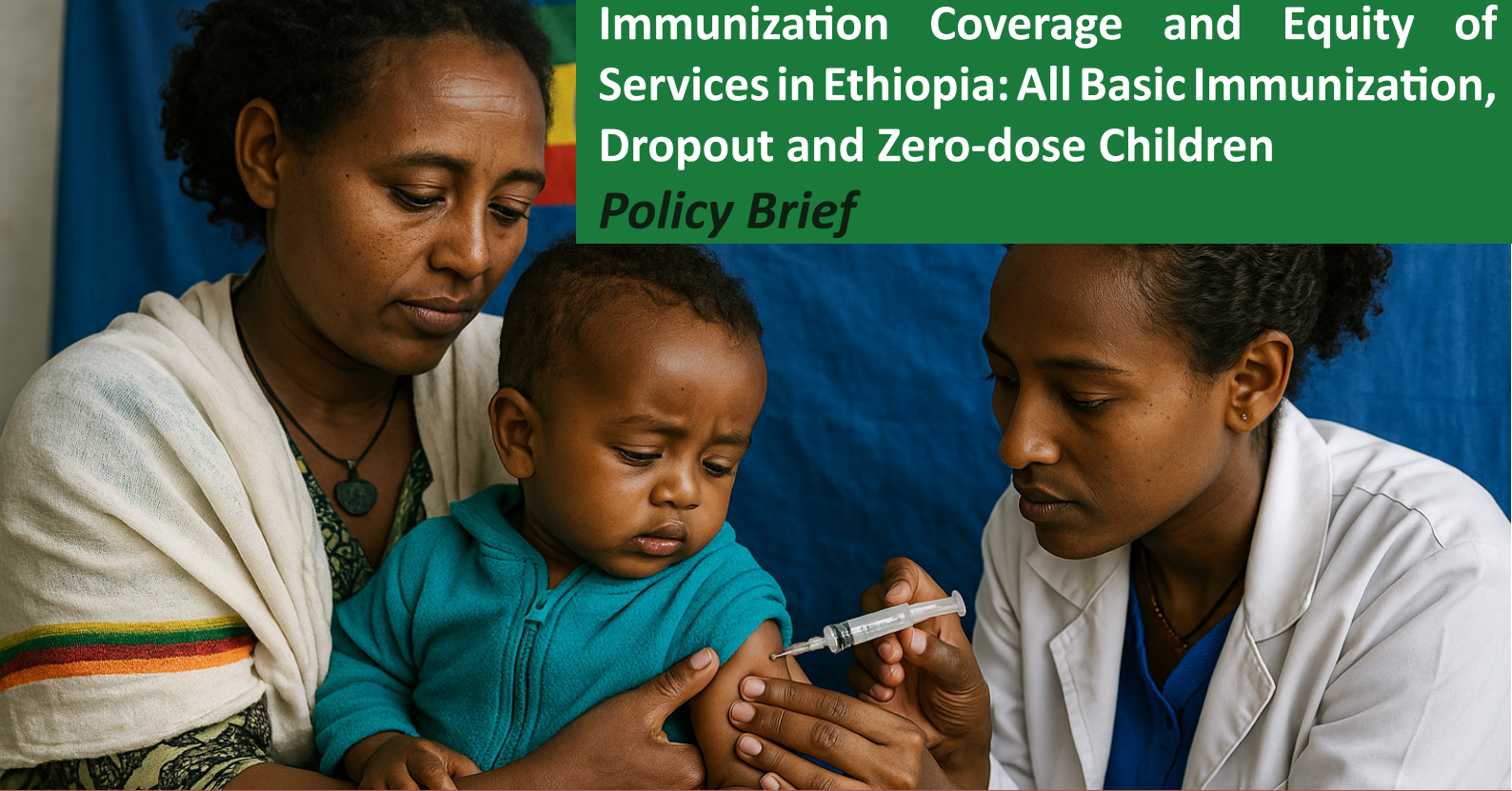


# Immunization Coverage and Equity of Services in Ethiopia: All Basic Immunization, Dropout and Zero-dose Children

## Policy Brief



University  
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LONDON  
SCHOOL OF  
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& TROPICAL  
MEDICINE



African Population and  
Health Research Center



Countdown to 2030  
Women's Children's & Adolescent's Health

### Key Messages

- Vaccination coverage with 'all basic vaccine' in Ethiopia has improved from 2011 to 2022, and large gaps are observed among regions, household income levels and education status of mothers, and place of residence—indicating the urgent need for renewed commitment and targeted action.
- Ethiopia has made significant progress in reducing vaccination dropout rates from 2011 to 2022, significant decrement in Penta1-Penta3 dropout from 42% to 6%. However, regional disparities remain, with Afar consistently experiencing the highest dropout rates and Tigray seeing a sharp increase by 2022, while children from the poorest households, urban areas, and uneducated mothers still face the greatest challenges to complete the vaccination. Although the gap among the sociogroups has narrowed, targeted efforts are urgently needed to address persistent regional and socioeconomic inequalities to achieve equitable immunization coverage.
- Despite a steady decline in the percentage of zero-dose children in Ethiopia from 36.6% in 2011 to 25.1% in 2022, significant regional, socioeconomic, and urban-rural disparities persist, with Afar consistently bearing the highest burden. The COVID-19 pandemic and armed conflicts caused temporary setbacks around 2020, and regions like Tigray, Harari, and Addis Ababa experienced increases in zero-dose prevalence. To achieve equitable vaccination coverage, sustained focus on vulnerable populations—especially in high-burden regions, poorest households, and rural areas—is essential, alongside strengthening maternal awareness on the immunization services.

### Background

Vaccination has significantly contributed to public health, including the eradication of diseases such as smallpox. It has also led to a significant reduction in morbidity and mortality from vaccine-preventable diseases (1). Expanding access to immunization is crucial. Ethiopia's Expanded Program on Immunization (EPI) has grown to include twelve antigens by 2019 where it was only six antigens in 1980.

The Ethiopian Federal Ministry of Health (MOH-Ethiopia) has been working to meet the national target plan (2023/24-2025/26) (2), HSTP-II (3) and the Sustainable Development Goals (SDG) 2030 regarding all basic immunization coverage and equity, dropout and Zero dose and its burden.

The Ethiopia Countdown to 2030 country collaboration (Health System Research Directorate –EPI) has conducted a study utilizing data from the Ethiopian Demographic and Health Surveys (EDHS 2011-2019) (4–6), and the 2022 National Health Equity Survey (7) to assess the trend and equity of vaccination services (8).

The major findings of the study are summarized and communicated in this policy brief which highlights the immunization programs' key achievements in reaching eligible children, increasing coverage, and reducing zero-dose children and dropout rates which is also underscoring unfinished agendas that demand policymakers' and program leaders' attention.

## Problem Statement

An immunization coverage service during the last five years has remained suboptimal because of the impact of COVID-19 and internal conflict. The immunization program has impacted by health system infrastructure destruction, massive internal displacement, and vaccine supply disruption, including a ban on movement. This may have hampered regular immunization campaigns, resulting in decreased coverage, increased dropouts and increased zero dose children (9)(10). A further decrease in routine immunization coverage would cause many children to be unvaccinated or under-vaccinated, putting their lives at risk of vaccine-preventable diseases(11).

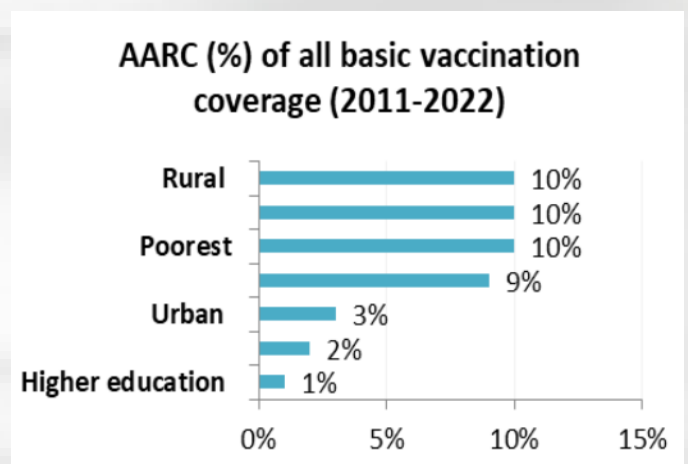
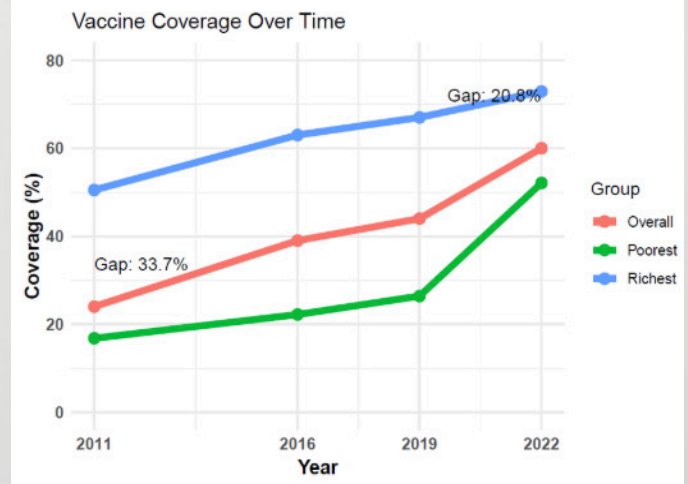
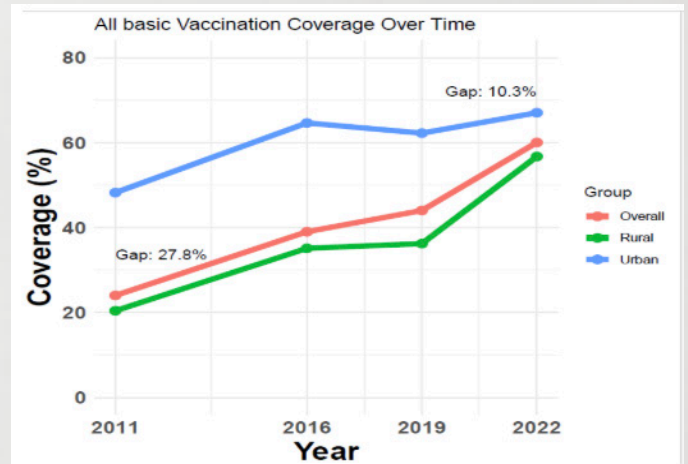
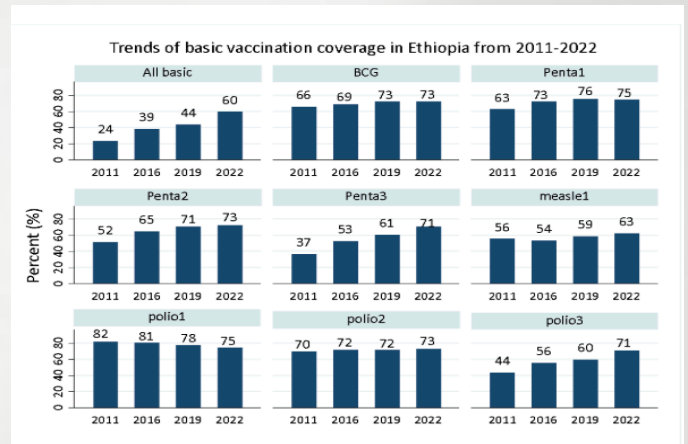
### Key message 1: All basic vaccination coverage

Vaccination coverage with 'all basic vaccine' in Ethiopia has improved from 2011 to 2022, and large gaps are observed among regions, household income levels and education status of mothers, and place of residence—indicating the urgent need for renewed commitment and targeted action.

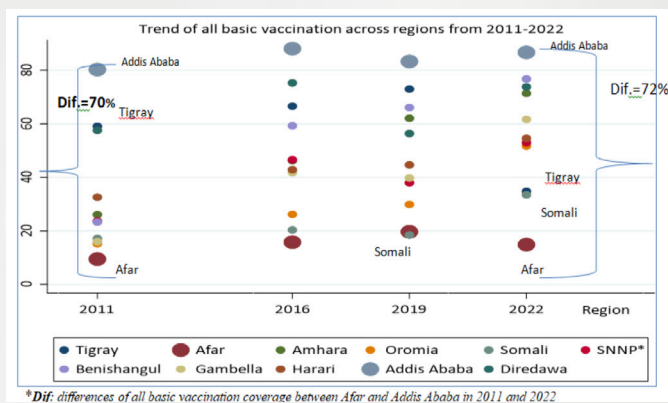
The coverage of almost all antigens provided by the national EPI program has increased, specifically, the coverage of penta3 and polio3 vaccines have steadily increased. However, onwards 2019 the coverage of many vaccine antigens including BCG, Penta1, penta2, polio2 and measles1 has stalled, while polio1 coverage is backsliding; showcasing the need for consolidating efforts to strengthening vaccination services across the country.

Significant national-level progress has been achieved on all basic vaccination coverage during the past decade, with the average annual rate of change (AARC) rising by 9%. This improvement is driven largely by a notable increase in rural areas, where coverage grew from 20% to 57%, resulting in an ARRC of 10%, and reaching more of the poorest mothers, whose coverage increased from 16% to 45%, also with an ARRC of 10%. However, despite these gains, only half of the rural and the poorest populations are receiving all basic immunization.

While the gap in vaccine coverage between children from the poorest and richest households, educated and uneducated mothers, and urban and rural areas has decreased over time, children from the poorest households, with uneducated mothers, and in rural areas still face challenges in accessing vaccines. These persistent inequities remain an on-going challenge and highlight the need for increased efforts to achieve universal health coverage.



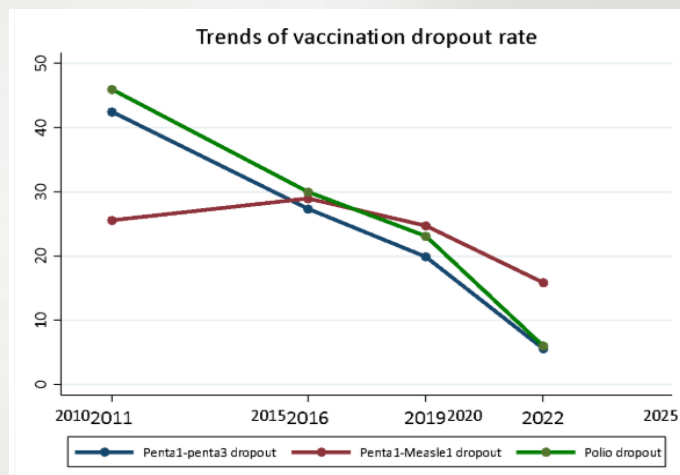
The coverage of all basic vaccination has improved in almost all regions of Ethiopia from 2011 to 2022, but Tigray, a region with relatively better vaccination coverage until 2019 has experienced a significant decline in 2022, from 73% in 2019 to 35% in 2022, which might be attributable to armed conflicts. Afar and Somali regions consistently showed the lowest coverage of all antigens, while Addis Ababa has the highest coverage from 2011-2022. In 2022 only 15% of children in Afar region received all basic vaccines, while 87% of children received all basic vaccines in Addis Ababa during the same year. The gap in all basic vaccination coverage between Afar (lowest coverage) and Addis Ababa city (highest coverage) was 70 percentage points in 2011 and modestly rose to 72 percentage points in 2022. The figure showcases the gap in vaccination coverage among regions still remains wide.



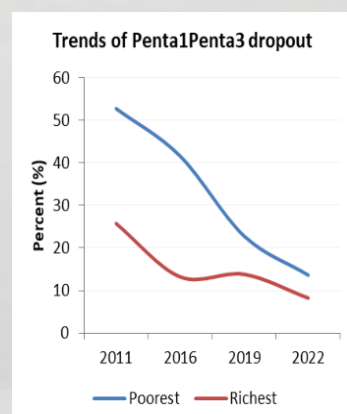
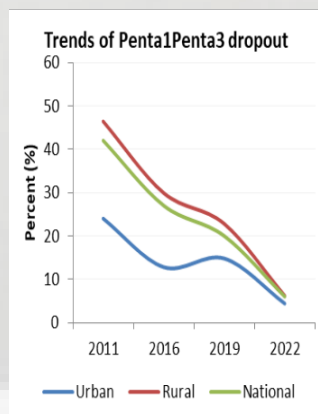
**Key message 2: Vaccination dropout rates**

Ethiopia has made significant progress in reducing vaccination dropout rates from 2011 to 2022, significant decrement in Penta1-Penta3 dropout from 42% to 6%. However, regional disparities remain, with Afar consistently experiencing the highest dropout rates and Tigray seeing a sharp increase by 2022, while children from the poorest households, urban areas, and uneducated mothers still face the greatest challenges to complete the vaccination. Although the gap among the sociogroups has narrowed, targeted efforts are urgently needed to address persistent regional and socioeconomic inequalities to achieve equitable immunization coverage.

The magnitude of dropout rates for penta 1 to penta3, polio1 to polio3 and penta1 to measles I are dropped sharply at national level. Penta1 to penta3 dropout has declined from 42% in 2011 to 6% in 2011, and polio1 to polio3 dropout has declined from 46% in 2011 to 6% in 2022. Penta1 to measles1 dropout decreased from 26% in 2011 to 16% in 2022. Both penta1 to penta3 and polio1 to polio3 dropout has declined on average by 17% annually while the penta1-measles1 dropout declined slightly, by only 4% annually from 2011-2022.



Even though the Penta 1 to penta3 vaccination dropout rates declined sharply over the last decade, there are still gaps remained especially among the poorest communities and rural residents indicating the need for strengthening the follow-up and completion of vaccine schedules. Penta1 to penta3 dropout has declined sharply among the poorest (from 53% to 8%) & and richest (from 27% to 3%). Similar trend is observed between rural (46% to 6%-with AARC -17%) and urban (from 24% to 4%-with AARC-15%) residents. In 2011, children of uneducated mothers had 20 percentage points more Penta1to penta3 dropout compared to those of highly educated mothers. By 2022, this difference had dropped to less than 3 percentage points, showing major progress in reaching underserved families.



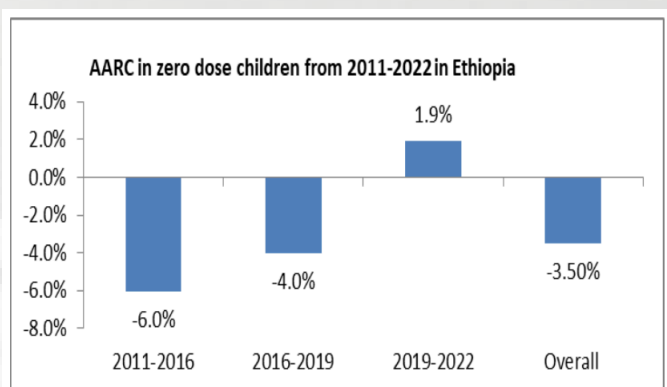
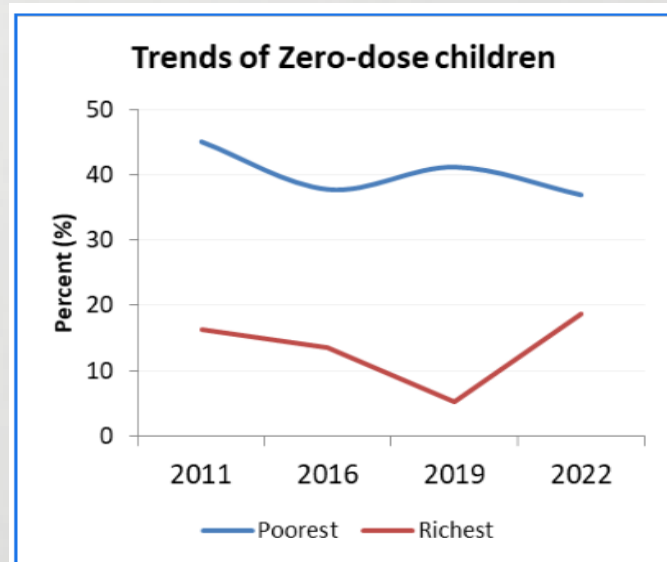
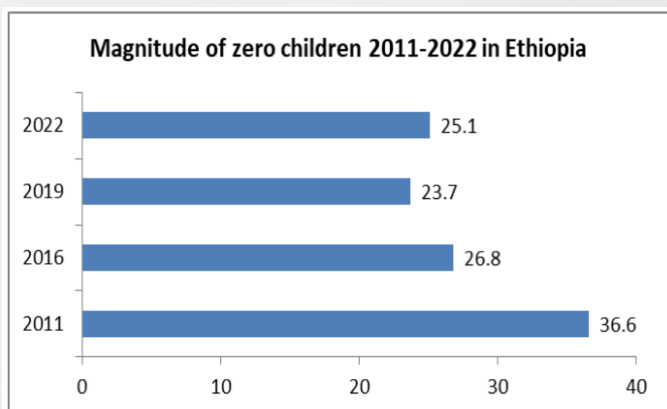
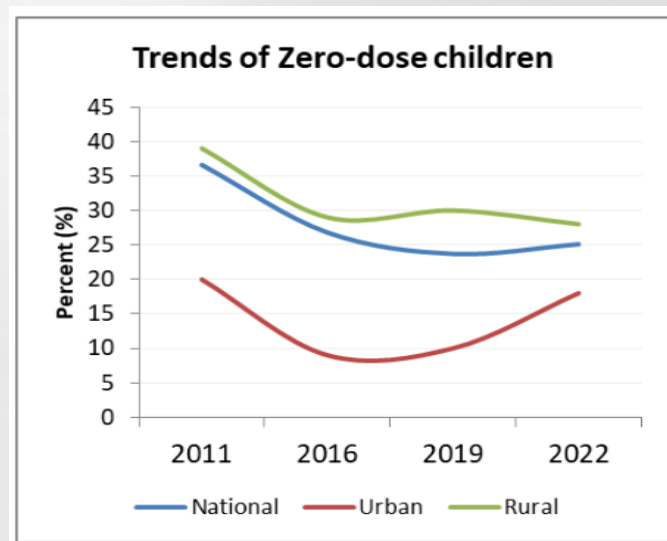
Penta1-penta3 dropout (%)	2011	2022	AARC (%)
Rural	46	6	-17%
Urban	24	4	-15%
No Education	45	6	-17%
Higher Education	21	3	-19%
Poorest	53	8	-16%
Richest	27	3	-18%

### Key message 3: Zero dose children

Despite a steady decline in the percentage of zero-dose children in Ethiopia from 36.6% in 2011 to 25.1% in 2022, significant regional, socioeconomic, and urban-rural disparities persist, with Afar consistently bearing the highest burden. The COVID-19 pandemic and armed conflicts caused temporary setbacks around 2020, and regions like Tigray, Harari, and Addis Ababa experienced increases in zero-dose prevalence. To achieve equitable vaccination coverage, sustained focus on vulnerable populations—especially in high-burden regions, poorest households, and rural areas—is essential, alongside strengthening maternal awareness on the immunization services.

The number of zero-dose children in Ethiopia has declined from 36.6% in 2011 to 25.1% in 2022, on average annually 3.5%. the burden showed reduction until 2019, while during 2019-2022 burden has increased on average by nearly 2% annually; which might be attributable to the COVID 19 pandemic and conflicts in the country.

Remarkable reduction of zero-dose children in rural areas makes the rural-urban gap narrowed. Despite these positive trends, addressing poverty and enhancing maternal education remain critical to achieving equitable vaccination coverage.



Children from the poorest families remain significantly more likely to be zero-dose, with the gap narrowing from 28.7 percentage points in 2011 to 18.7 percentage points in 2022. Meanwhile, improvements in maternal education have contributed to reducing the likelihood of zero-dose children, with the gap between children of uneducated mothers and those with at least secondary education decreasing from 35 percentage points in 2011 to just 13 percentage points in 2022.

Zero Dose Children	2011	2022	AAR C
Rural	39	28	-3%
Urban	20	18	-1%
No Education	43	29	-4%
Higher Education	8	17	7%
poorest	45	35	-2%
richest	16	17	1%

## Burden of zero-dose and dropout by region

Remarkable progress has observed across regions on reduction of vaccination dropout rates, however, some regions are still lag far behind. Afar had the highest dropout rate both in 2011 (65%) and 2022 (27%) followed by Somali 23% in 2022, while Addis Ababa had the lowest dropping from 5.6% to nearly 0%. Tigray, once among the best performers, experienced a steep increase in dropout by 2022 due to conflict.

The burden of zero-dose children varied among regions. Afar region consistently had the highest burden of zero dose children. In 2022, nearly two third of children (65%) in Afar region were zero doses followed by Somali (nearly half of children are zero dose children), while only 11% of children were zero doses in Addis Ababa city. While regions like Oromia, Amhara, and Somali made major gains, regions like Tigray, Harari, and Addis Ababa saw increases in zero-dose rates since 2011.

Table 1 Trends of vaccination dropout and zero-dose children by region

Regions	Penta1-penta3 dropout			Zero dose children		
	2011	2022	AARC	2011	2022	AARC
Tigray	21.8	16	-2.80%	7	40	17%
Afar	64.5	26.6	-7.70%	72	65	-1%
Amhara	44.1	3.7	-20.20%	33	15	-7%
Oromia	46.5	7.9	-14.90%	49	39	-2%
Somali	38.8	23.1	-4.60%	59	48	-2%
SNNP*	49	3.3	-21.80%	26	31	2%
Benishan gul Gumuz	42.7	0	-100.00%	28	29	0%
Gambella	61.8	6.5	-18.50%	30	22	-3%
Harari	32.2	5	-15.50%	26	33	2%
Addis Ababa	5.6	0.1	-34.60%	5	11	7%
DireDawa	16.6	10.5	-4.10%	11	25	8%
<b>National Average</b>	<b>42.5</b>	<b>5.6</b>	<b>-16.80%</b>	<b>37</b>	<b>25</b>	<b>-4%</b>

## Policy recommendations and implications:

**Addressing Stagnation (Nationwide):** Conduct a national comprehensive review of the immunization program to identify bottlenecks and challenges hindering progress. This will help identify critical gaps in the immunization program, allowing for targeted interventions to improve vaccination rates. This could lead to more efficient resource allocation and better program outcomes.

**Reducing Regional Disparities (Afar and Somali):** Develop region-specific vaccination plans based on local context, cultural norms, and barriers to access in Afar and Somali. Tailoring vaccination plans to local contexts will likely increase community engagement and acceptance.

By considering cultural norms and access barriers, these plans can effectively address specific needs, thereby improving vaccination coverage in underserved areas.

**Addressing Dropout Rates (Poorest community, Afar & Somali):** Strengthen the follow-up of those children taking the complete vaccination programs in regions with high dropout rate, rural areas and hard to reach areas. Systems such reminder or phone calls, targeted to the poorest households and communities in regions like Afar and Somali to reduce Penta1-Penta3 dropout. This can significantly reduce dropout rates, ensuring that more children complete their vaccination schedules.

**Reaching Zero-Dose Children (Afar, Somal, Rural community):** Strengthening outreach programs and deploys mobile vaccination teams to reach remote and rural areas, particularly focusing on regions like Afar and Somali, to identify and vaccinate zero-dose children. Deploying mobile vaccination teams will enhance outreach efforts, particularly in remote areas. This could lead to a decrease in the number of zero-dose children and improve overall public health outcomes in those regions.

**Reducing Socioeconomic Disparities (Poorest, Uneducated):** Provide subsidized vaccination services to low-income families and implement programs promoting education for mothers, particularly in regions with low maternal education. Subsidizing vaccination services and promoting or improving health literacy can empower low-income families to access healthcare. This can contribute to higher immunization rates and foster a more informed population about health issues.

**Strengthening Health Systems (Nationwide, Rural):** Invest in strengthening health infrastructure, including cold chain facilities, transportation, and communication systems, with a focus on reaching rural and underserved areas nationwide. Investing in health infrastructure will improve service delivery and sustainability of immunization programs, particularly in rural areas. A robust health system is essential for maintaining high vaccination coverage.

**Building Resilience to Shocks (conflict affected areas and displaced populations):** Develop contingency plans for maintaining vaccination services during emergencies, including alternative delivery mechanisms, especially in conflict-affected regions like Tigray and for displaced populations. This ensures that vaccination services can continue during emergencies. This is vital for maintaining health services in conflict areas and for displaced populations, preventing outbreaks of vaccine-preventable diseases.

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