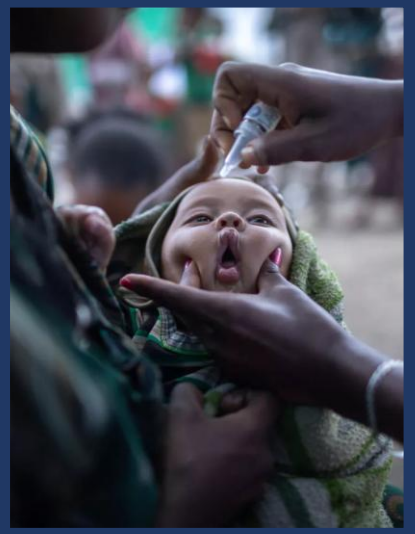





Paraguay

Administrative Data Quality Review Report, 2025







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Administrative Data Quality Review

This report presents a systematic review of immunization administrative data quality. It is designed to support country-level data review discussions. Administrative ("admin") data can be affected by reporting errors, denominator inconsistencies, and supply disruptions. This report helps identify where data quality issues may exist and why admin coverage may diverge from the WHO/UNICEF Estimates of National Immunization Coverage (WUENIC), survey, and official government estimates.

This report covers the following data quality components:

Schedule & Supply Context

Vaccine schedule, introduction years, and recorded stockouts

Coverage Overview

WUENIC, admin, official government, and survey coverage across all vaccines and years.

Admin Coverage Flags

Years where admin coverage exceeds 100% or changes by more than ± 10 percentage points.

Admin vs. Estimates

Gaps between admin and WUENIC estimates; gaps between admin and official government estimates.

Numerator Checks

Percent change from the previous year in the number of children vaccinated; co-administration consistency checks.

Denominator Checks

Percent change from the previous year in target population size; live births vs. surviving infants over time.

Admin Data Availability Heatmap

Heatmap showing which vaccines have missing or present administrative data by year.

Admin Data Comments

Country-reported explanations for numerator accuracy, denominator source, and denominator accuracy.

Flags in this report indicate areas that warrant further review — they do not necessarily indicate errors. Country context, schedule changes, and reporting system updates should be considered alongside these findings.

The electronic Joint Reporting Form (eJRF)

Since 1998, in an effort to strengthen collaboration and minimize the reporting burden of countries, WHO and UNICEF have jointly collected immunization system and related information through a standard questionnaire (the Joint Reporting Form) sent to all Member States. In 2021, the form was updated to a cloud-based solution known as the electronic Joint Reporting Form (eJRF).

The eJRF serves three core functions:

Mission-Critical Data	Strategic Utility	Comprehensive Scope
Serves as the primary data source for tracking the **Immunization Agenda 2030 (IA2030)** and the Sustainable Development Goals (SDGs).	Informs WUENIC estimates, guides global funding decisions, and populates the UNICEF *State of the World's Children* reports.	Captures national and subnational coverage, vaccination schedules, vaccine stockouts, and disease trends.

All data in this presentation is sourced from the eJRF.

Definitions of immunization terms

Vaccine coverage
Percentage of infants (children under one year of age) who received certain vaccine-doses. For example, coverage of DTP3 is the percentage of infants who received all three doses of diphtheria, tetanus, and pertussis (DTP) vaccine.

Unvaccinated
An infant that did not receive the first dose of a vaccine series. The term zero-dose is used to describe children unvaccinated with DTP1.

Under-vaccinated
An infant who received some but not all the recommended vaccine-doses in the national schedule.

Vaccine-Doses
- Bacillus Calmette-Guerin (BCG): vaccine against tuberculosis
- Hepatitis B birth dose, given within 24 hours after birth (HepBB)
- Diphtheria, tetanus, and pertussis vaccine, first dose (DTP1) and third dose (DTP3)
- Hepatitis B vaccine, third dose (HepB3)
- Haemophilus influenzae type b vaccine, third dose (Hib3)
- Inactivated polio vaccine, first dose (IPV1) and last dose (IPVC)
- Measles containing vaccine, first dose (MCV1) and second dose (MCV2)
- Rotavirus vaccine, last dose (RotaC)
- Pneumococcal vaccine, last dose (PCVC)
- Yellow Fever vaccine (YFV)
- Meningococcal A vaccine (MengA)
- Human papillomavirus vaccine, first dose (HPV1) and last dose (HPVc): vaccine to protect against certain types of human papillomavirus that can lead to cancer or genital warts

The Immunization Agenda 2030 (IA2030)
The IA2030 is a global strategy endorsed by the World Health Assembly aiming to ensure everyone, everywhere, at every age benefits from vaccines for improved health and well-being by 2030. It focuses on increasing vaccine coverage, equity, sustainability and pandemic preparedness while promoting life-course immunization and integrating immunization with other health services.

Data Sources Presented

This report presents data from the following sources:

WUENIC	Administrative ("Admin")	Official	Survey
WHO/UNICEF Estimates of National Immunization Coverage (WUENIC) provides annual country-level immunization coverage estimates produced jointly by WHO and UNICEF. These estimates are derived from a systematic review of all available data sources and are adjusted to account for data quality issues.	Reported by national authorities and based on aggregated administrative reports from health service providers on the number of vaccinations administered during a given period (numerator) and reported target population data (denominator).	Estimated coverage reported by national authorities that reflects their assessment of the most likely coverage based on any combination of administrative coverage, survey-based estimates, or other data sources or adjustments.	Based on estimated coverage from population-based household surveys among children aged 12–23 months or 24–35 months. Survey results are considered for the appropriate birth cohort based on the period of data collection. Coverage information is based on the combination of vaccination history from documented evidence or caregiver recall.

Vaccine Schedule

		Dose number and age administered				
Level	**Vaccine**	**1**	**2**	**3**	**4**	**5**
National	BCG	Birth				
National	DTP	2 months	4 months	6 months		
National	DTAPHIBHEPBIPV (booster)				18 months	
National	HEPB (pediatric)	Birth				
National	HPV (females and males)	9 to 14 years				
National	IPV					4 years
National	MCV	12 months	18 months			
National	PCV	2 months	4 months	12 months		
National	RotaC	2 months	4 months			
National	YF	12 months				

This table shows the 2025 national immunization schedule for routine services in Paraguay, reported through the WUENIC Joint Reporting Form on Immunization (JRF).

Each row corresponds to a vaccine or combination vaccine, indicating whether it is delivered at the national or subnational level. The schedule outlines the number of doses and the recommended ages for administration. Only childhood and adolescent vaccines relevant to WUENIC are included.

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Vaccine Stockouts

Vaccines / supplies	2022	2024	2025
BCG		National (1m)	
DTP-Hib-HepB-IPV			National (2m)
Measles-Mumps-Rubella (MMR)		National (1m) and subnational	
Measles-Rubella (MR)			National (1m) and subnational
PCV	National (3m) and subnational		
Rotavirus		National (1m)	
YFV	National (1m)		

Years in which a national or subnational vaccine stockout was recorded.

This table provides context for interpreting the numerator and denominator trends and flags in the following slides, as stockouts may contribute to reduced service delivery and legitimate drops in coverage that may be misinterpreted as data quality issues.

Vaccine Introductions

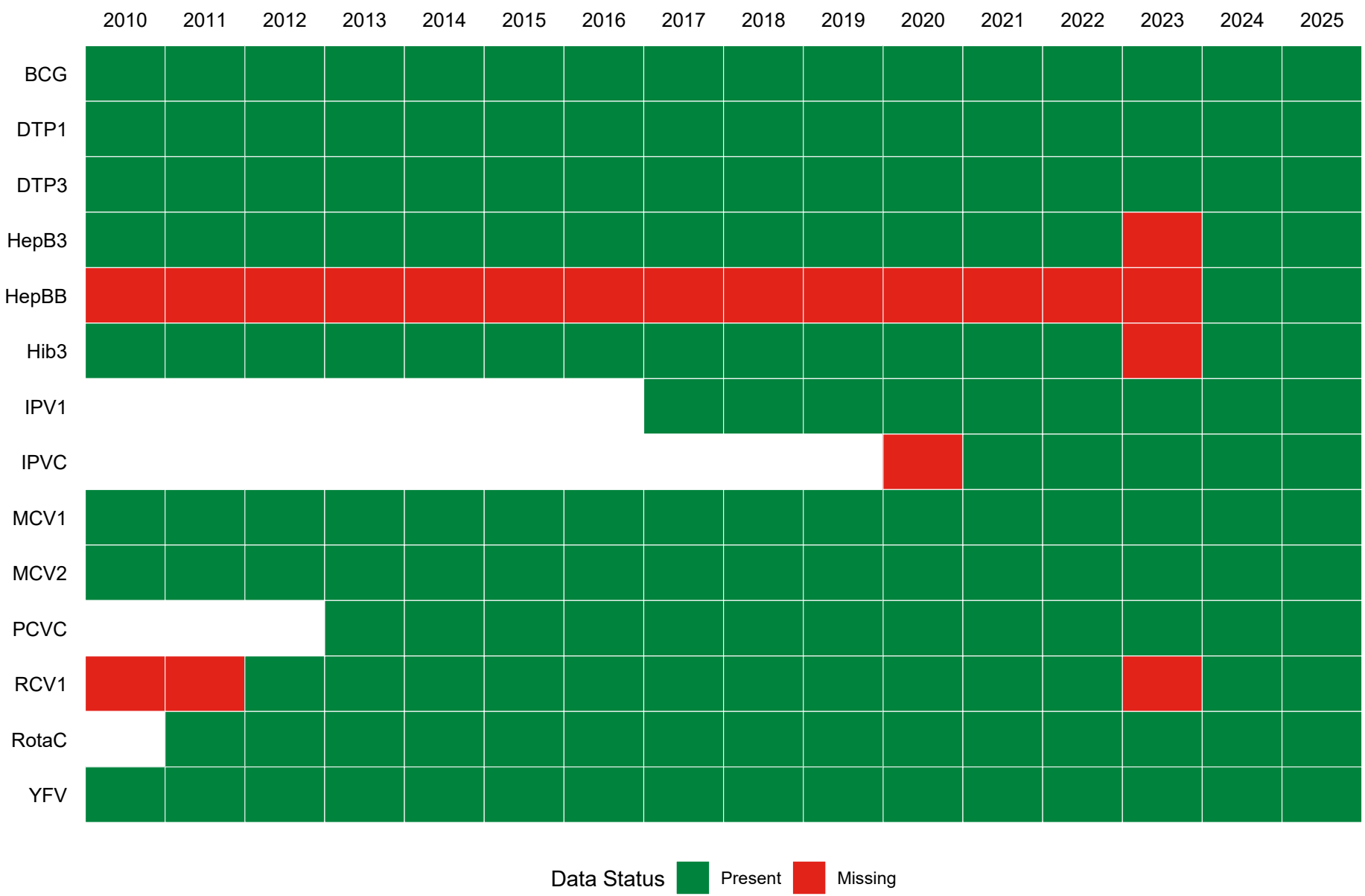
Vaccine	National introduction	Partial introduction	Risk groups
HPV (Human papillomavirus) vaccine	2013		
HepB birth dose	2017		2012
Hepatitis B vaccine	2002		
Hib (Haemophilus influenzae type B) vaccine	2002		
IPV (Inactivated polio vaccine)	2016		
IPV (Inactivated polio vaccine) 2nd dose	2019		
Malaria vaccine	Not introduced		
Measles-containing vaccine 2nd dose	2004		
Meningococcal meningitis vaccines (any strain)	Not introduced		2004
Mumps vaccine	2002		
PCV (Pneumococcal conjugate vaccine)	2012		
RSV (Respiratory syncytial virus) immunization strategy	2025		
Rotavirus vaccine	2010		
Rubella vaccine	2002		
Typhoid conjugate vaccine	Not introduced		
YF (Yellow fever) vaccine	2007	2000	

Year in which each vaccine was introduced nationally, partially, for risk groups, or risk areas.

We present the vaccination introductions table here to contextualize the data availability heatmap on the following slide.

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Admin Data Availability Heatmap by Vaccine, Paraguay, 2010–2025



Heatmap showing whether admin data are present (green), missing (red), or not applicable because the vaccine had not yet been introduced or reporting had not started (white), by vaccine and year.

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WUENIC 2025 revision

Admin Data Comments Summary: 2025

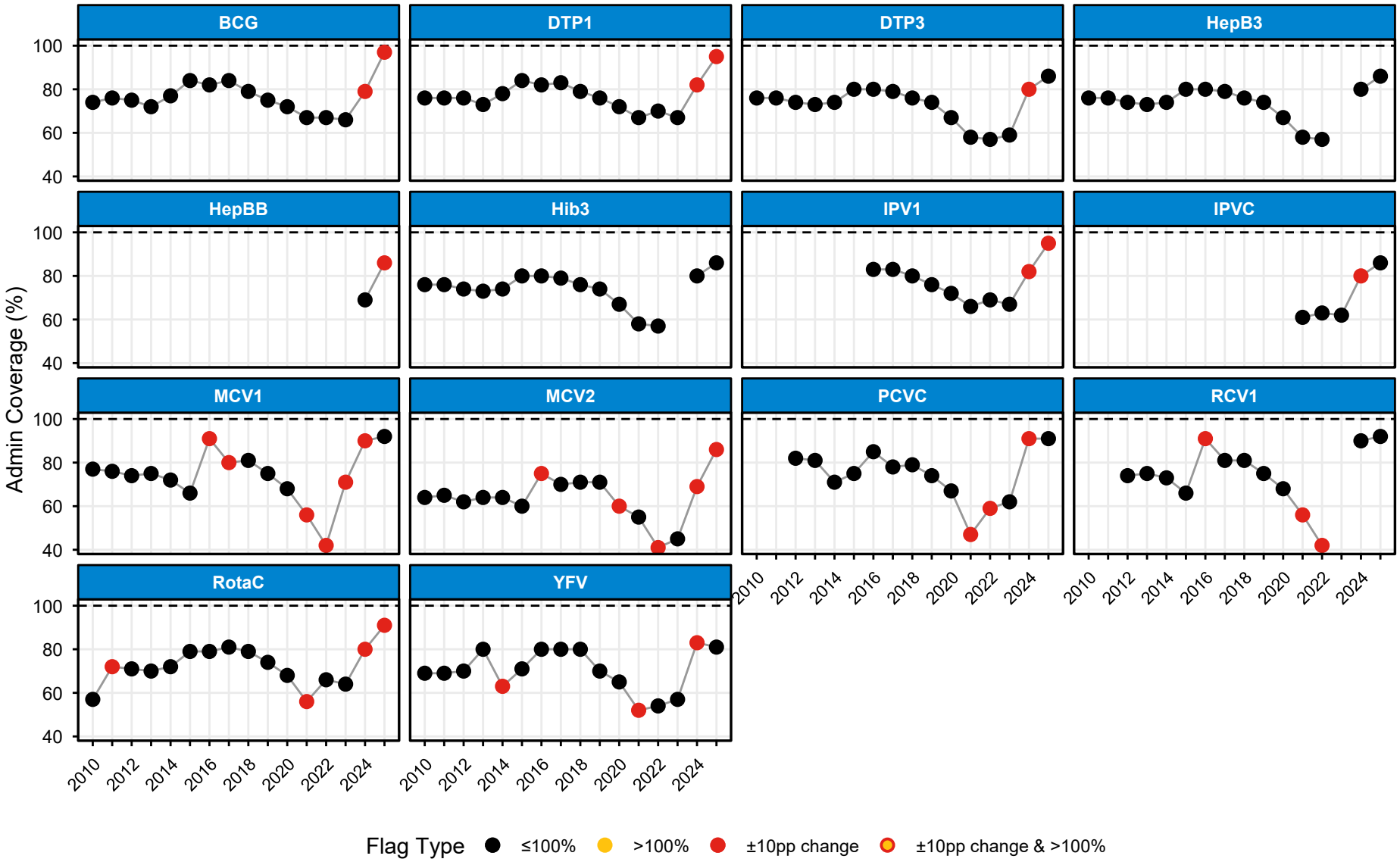
Comment Type	Comment
Denominator Accuracy	Although there are limitations associated with underreporting, delayed reporting, and population mobility, their impact is estimated to be low to moderate and does not substantially alter the observed trends in coverage.
Denominator Source	The denominator is derived from administrative records of live births captured by the health system during the fiscal year. Once these actual birth records have been consolidated, the official figure is provided by the General Directorate of Strategic Health Information (DIGIES) for the calculation of coverage rates for the year 2025.
Numerator Accuracy	Although the Electronic Vaccination Registry (RVe) is a web-based system with real-time updates at all management levels, the accuracy of the numerator may be affected by delays in data entry in hard-to-reach areas. In these areas, the lack of stable connectivity necessitates a delayed upload of records, resulting in temporary underreporting until the information is processed by the system.

Summary of all admin data comment fields for the most recent year with available data (2025).

Admin Coverage Flags

Admin Coverage Flags by Vaccine and Year, Paraguay, 2010–2025

Orange = coverage > 100% | Red = ± 10pp



Flag Type ● ≤100% ● >100% ● ±10pp change ● ±10pp change & >100%

Gaps in line indicate missing admin data for that year.

Admin coverage flagged where values exceed 100% (orange) or change by more than ±10 percentage points from the previous year (red), 2010–2025.

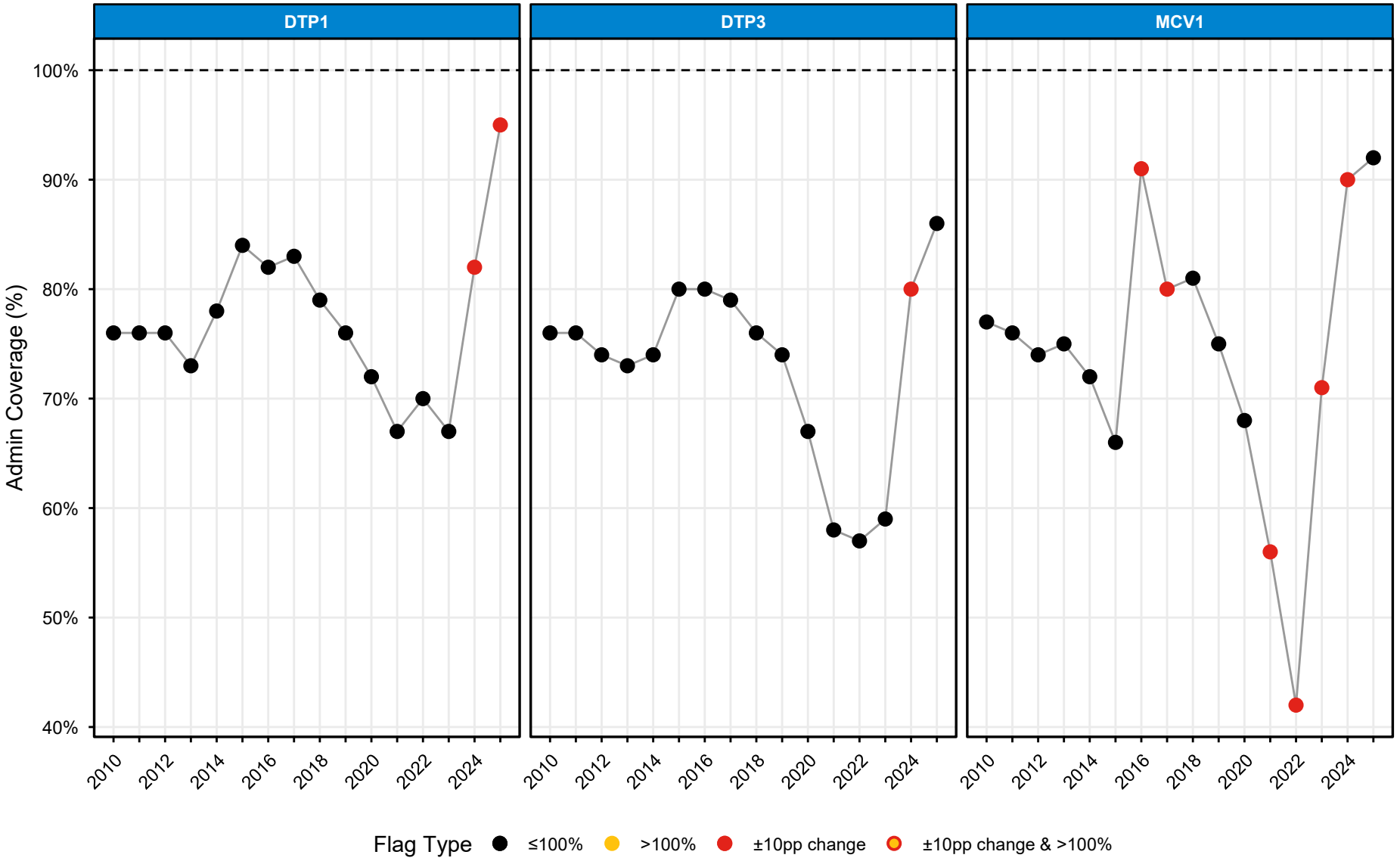
Two types of data quality issues are highlighted: coverage values above 100%, which suggest errors in the reported number of vaccinations or the denominator used, and year-on-year changes greater than 10 percentage points, which may reflect inconsistent reporting rather than true changes in vaccination coverage.

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WUENIC 2025 revision

DTP1, DTP3, and MCV1 Admin Coverage Flags by Year, Paraguay, 2010–2025

Orange = coverage > 100% | Red = ± 10pp



Gaps in line indicate missing admin data for that year.

Same flag logic applied to DTP1, DTP3, and MCV1 only, 2010–2025.

Two types of data quality issues are highlighted: coverage values above 100%, which suggest errors in the reported number of vaccinations or the denominator used, and year-on-year changes greater than 10 percentage points, which may reflect inconsistent reporting rather than true changes in vaccination coverage.

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WUENIC 2025 revision

Numerator Checks

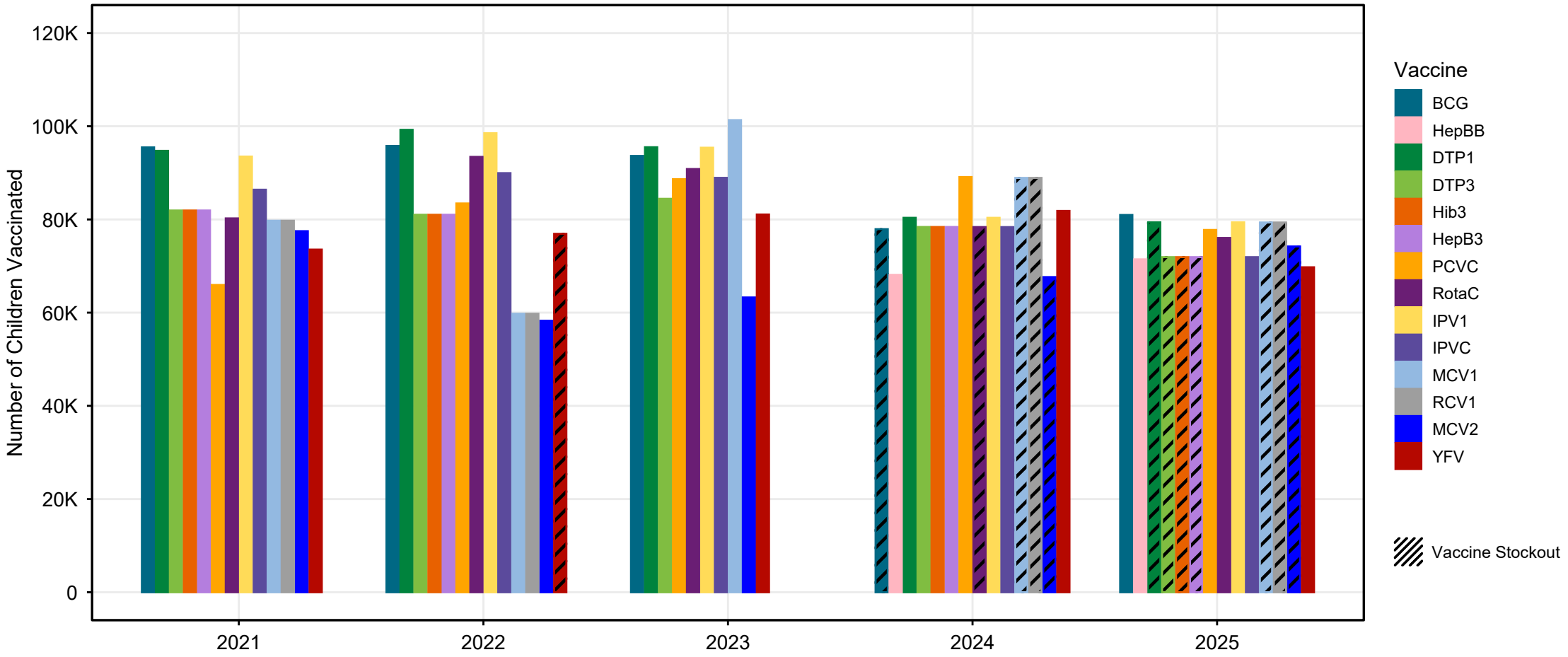
Admin Data Comments: Numerator Accuracy (2021–2025)

Year	Comment
2025	Although the Electronic Vaccination Registry (RVe) is a web-based system with real-time updates at all management levels, the accuracy of the numerator may be affected by delays in data entry in hard-to-reach areas. In these areas, the lack of stable connectivity necessitates a delayed upload of records, resulting in temporary underreporting until the information is processed by the system.
2024	The lack of continuous and comprehensive monitoring of data quality could result in excessive or incomplete recording of vaccination data by local health services. In addition, vaccination data from other subsectors—such as the private sector, which also provides vaccines to the general population—are excluded. Similarly, a lack of monitoring of the nominal vaccination system has been identified.
2023	The lack of continuous and comprehensive monitoring of data quality could result in excessive or incomplete recording of vaccination data by local health services. In addition, vaccination data from other subsectors—such as the private sector, which also provides vaccines to the general population—are excluded. Similarly, there is a lack of monitoring of the nominal vaccination system.
2022	Lack of continuous and comprehensive monitoring of data quality, given that vaccination data from local-level health services may be underreported or incompletely reported. Additionally, the exclusion of vaccination data from other subsectors that also provide vaccines to the general population—such as the private sector—and the lack of monitoring of the nominal vaccination system.
2021	Lack of continuous and comprehensive monitoring of data quality, given that underreporting or incomplete reporting of vaccination data by local-level health services could occur. Additionally, the exclusion of vaccination data from other subsectors that also provide vaccines to the general population—such as the private sector—and the lack of monitoring of the nominal vaccination system.

Factors limiting the accuracy of the numerator as reported by Paraguay.

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Number of Children Vaccinated by Vaccine and Year, Paraguay, 2021–2025

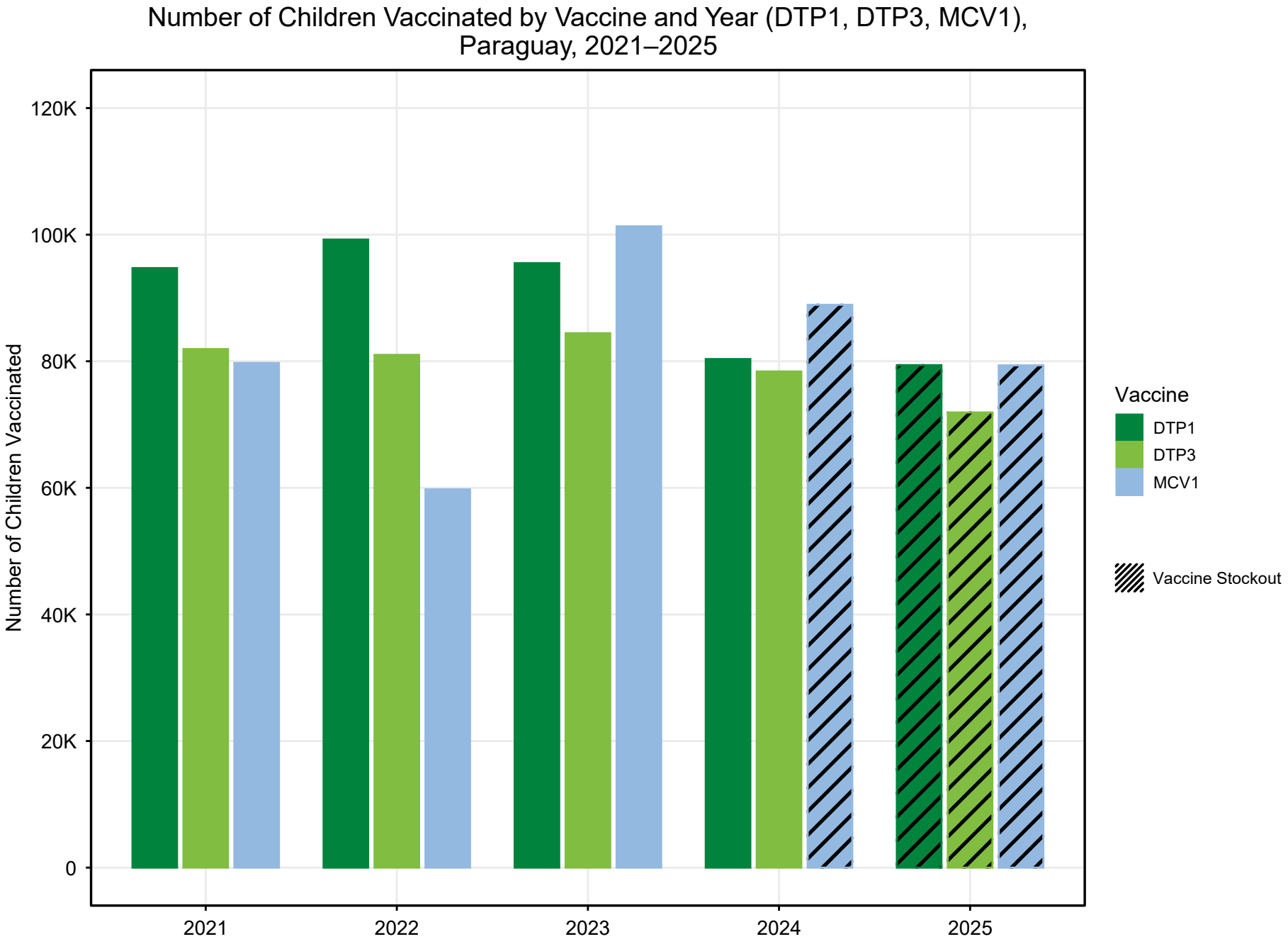


This chart shows number of children vaccinated (numerator) by vaccine and year.

Black diagonal lines indicate years with a national- or subnational-level vaccine stockout, which may explain any drops in the number of children vaccinated.

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Number of children vaccinated (numerator) by vaccine (DTP1, DTP3, and MCV1 only) and year.

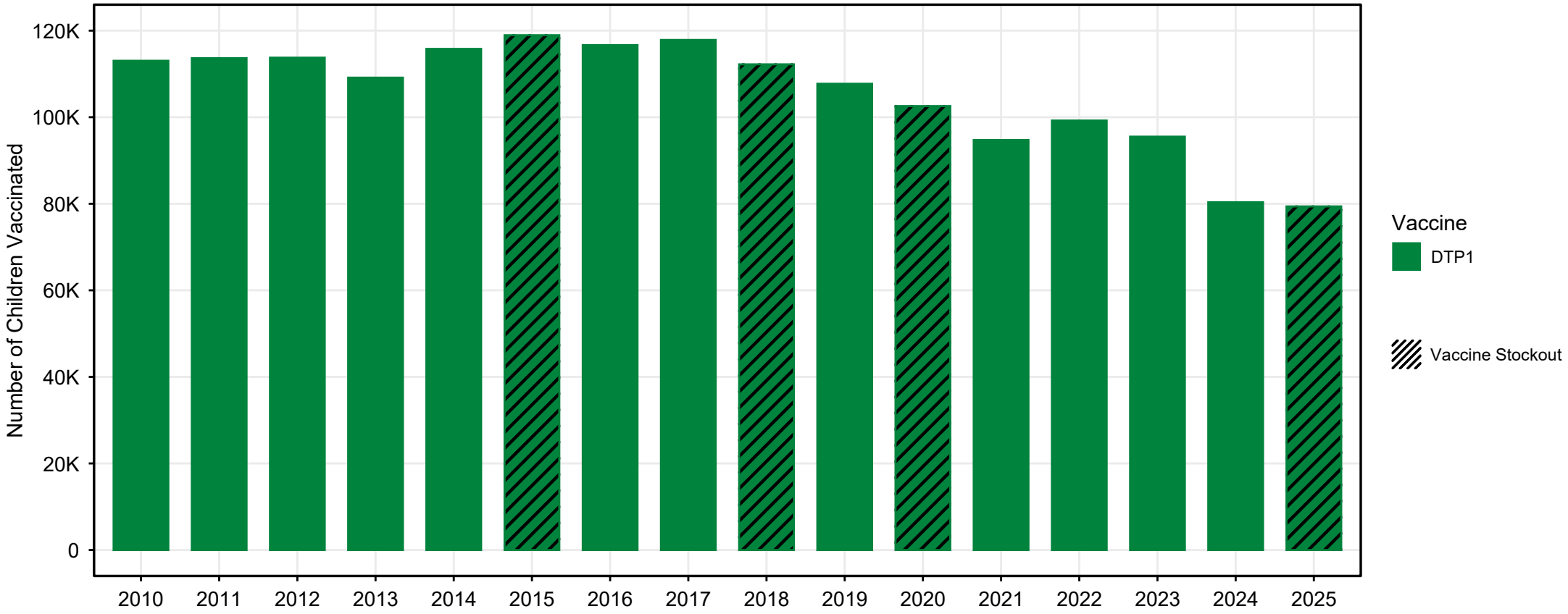
Black diagonal lines indicate years with a vaccine stockout, which may explain any drops in the number of children vaccinated.

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WUENIC 2025 revision

Number of Children Vaccinated by Vaccine and Year, Paraguay, 2010–2025

WUENIC vaccines administered at 2 months of age



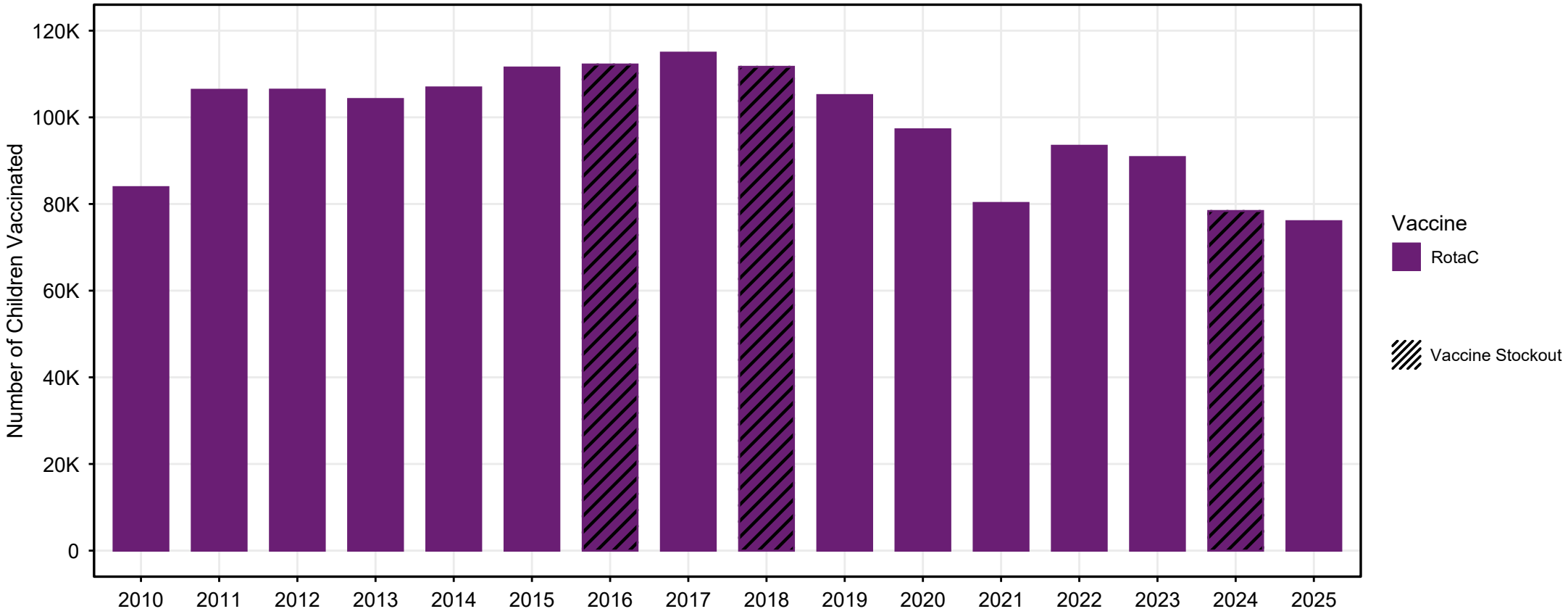
Number of children vaccinated with vaccines co-administered at the 2 months visit per the national schedule.

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Number of Children Vaccinated by Vaccine and Year, Paraguay, 2010–2025

WUENIC vaccines administered at 4 months of age



Number of children vaccinated with vaccines co-administered at the 4 months visit per the national schedule.

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Number of Children Vaccinated by Vaccine and Year, Paraguay, 2010–2025



Gaps in line indicate missing admin data for that year.

Raw counts of children vaccinated (numerator) by vaccine and year. Points are colored by the percent change from previous year in the number of children vaccinated.

Green point = stable year-to-year count of children vaccinated.

Orange/red point = high fluctuation in number of children vaccinated, which may indicate data quality issues.

Black point = first year of available numerator data for that vaccine.

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WUENIC 2025 revision

Denominator Checks

Admin Data Comments: Denominator Source (2021–2025)

Year	Comment
2025	The denominator is derived from administrative records of live births captured by the health system during the fiscal year. Once these actual birth records have been consolidated, the official figure is provided by the General Directorate of Strategic Health Information (DIGIES) for the calculation of coverage rates for the year 2025.
2024	The denominator used for the year 2024 was derived from the preliminary results of the census conducted in 2022 by the National Institute of Statistics of Paraguay.
2023	In Paraguay, the official population denominator is derived from the Population Projection by Sex and Age, by Department, for the years 2000–2025, conducted in 2015. This projection uses data from the 2002 National Population and Housing Census as its population base. This study was prepared by the National Institute of Statistics, formerly known as the General Directorate of Statistics, Surveys, and Censuses of the Technical Secretariat for Planning of the Office of the President of the Republic.
2022	In Paraguay, the official population denominator is derived from the Population Projection by Sex and Age, by Department, for the years 2000–2025. (Conducted in 2015). The base population used is that obtained from the 2002 National Population and Housing Census, compiled by the National Institute of Statistics, formerly known as the “General Directorate of Statistics, Surveys, and Censuses” of the Technical Secretariat for Planning of the Presidency of the Republic.
2021	In Paraguay, the official population denominator is derived from the Population Projection by Sex and Age, by Department, for the years 2000– 2025. (Conducted in 2015). The base population used is that obtained from the 2002 National Population and Housing Census, prepared by the National Institute of Statistics, formerly known as the “General Directorate of Statistics, Surveys, and Censuses” of the Technical Secretariat for Planning of the Office of the President of the Republic.

Explanation of how the denominators (target population) are obtained.

Admin Data Comments: Denominator Accuracy (2021–2025)

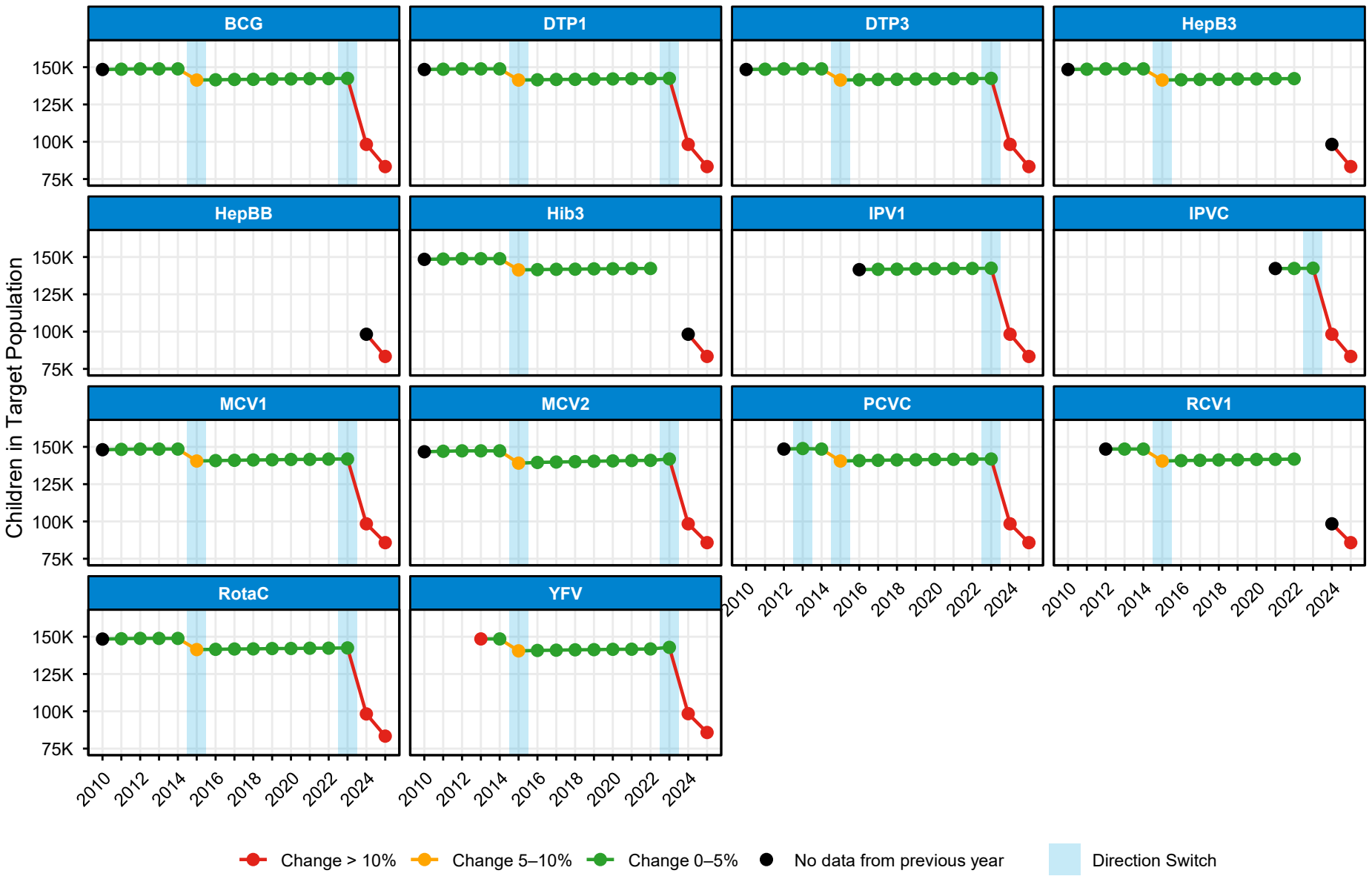
Year	Comment
2025	Although there are limitations associated with underreporting, delayed reporting, and population mobility, their impact is estimated to be low to moderate and does not substantially alter the observed trends in coverage.
2024	Based on the preliminary results obtained following the 2022 census conducted by the National Institute of Statistics, the accuracy of the denominator is not currently subject to any limiting factors.
2023	The accuracy of the denominator is limited by several factors, including internal migration within the country and outdated population estimates dating back more than a decade. These estimates are based on a projection that uses the population from the 2002 National Population and Housing Census as a reference. It is important to note that the 2012 National Census achieved only 74.4% coverage of the population surveyed. Although this population projection is broken down to the district level, the distribution of the population across health services varies arbitrarily in each of the country's health regions.
2022	The accuracy of the denominator is limited by the country's internal migration flow as well as by population estimates that are more than a decade out of date, based on projections that use the population figures from the 2002 National Population and Housing Census as the base population. This is because the 2012 National Population and Housing Census had a coverage rate of only 74.4% of the population. This population projection is presented down to the district level; however, the allocation of the population to health services is carried out on a discretionary basis in each of the country's health regions.
2021	The accuracy of the denominator is limited by the country's internal migration flow as well as by population estimates that are more than a decade out of date, based on projections that use the population data from the 2002 National Population and Housing Census as the base population. Given that the 2012 National Population and Housing Census had a coverage rate of only 74.4% of the population. This population projection is presented down to the district level; however, the allocation of the population to health services is carried out on a discretionary basis in each of the country's health regions.

Factors limiting the accuracy of the denominator as reported by Paraguay.

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WUENIC 2025 revision

Number of Children in Target Population by Vaccine and Year, Paraguay, 2010–2025



Gaps in line indicate missing admin data for that year.

Target population (denominator) by vaccine and year. Points are colored by the magnitude of year-on-year change: green for less than 5%, orange for 5–10%, and red for greater than 10%. Black points indicate there was no denominator data in the previous year (unable to calculate percent change). Light blue shading highlights years where the direction of change switches unexpectedly.

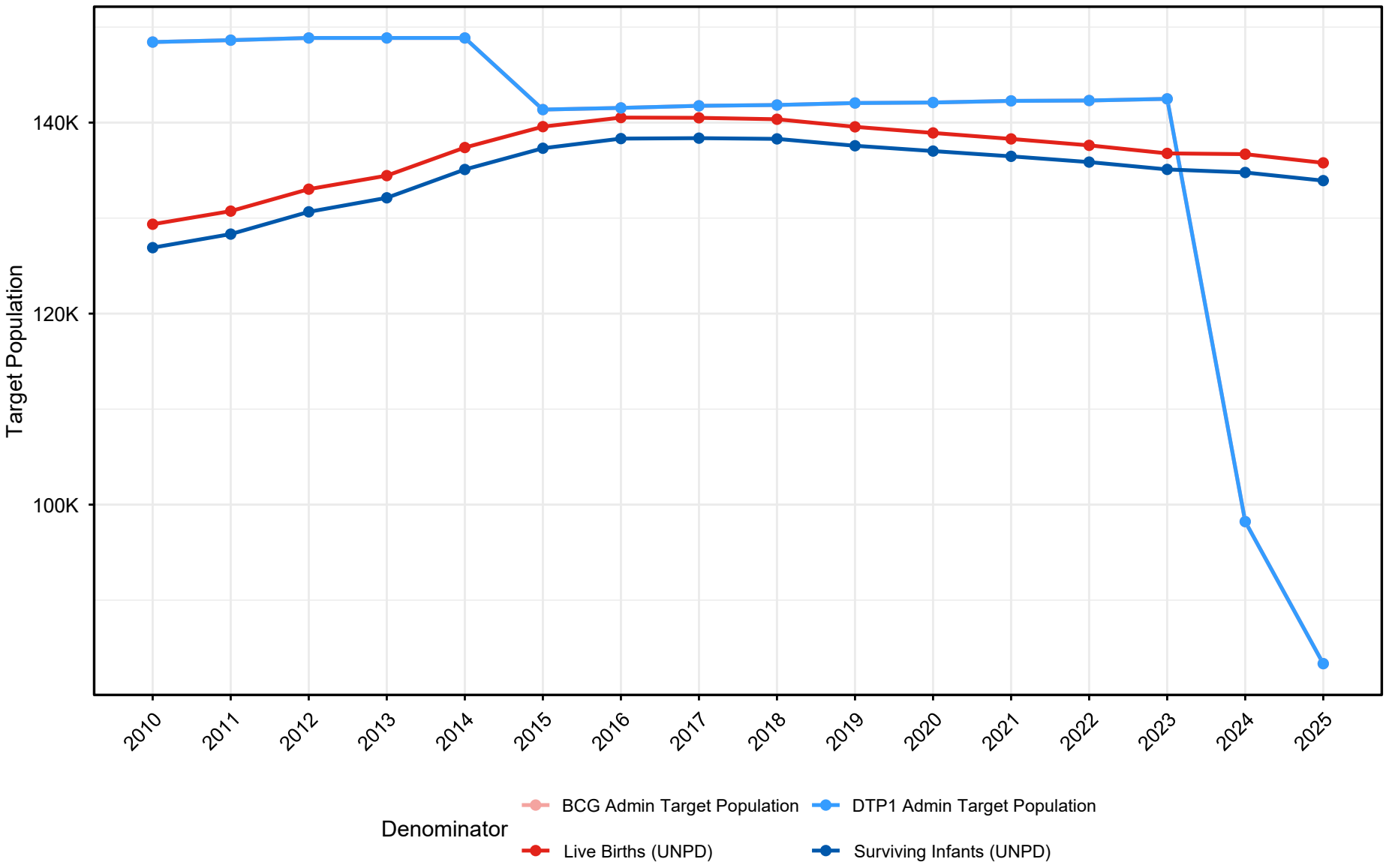
Target populations should follow a smooth, steady trajectory. Sudden directional switches are demographically unnatural and typically indicate administrative errors, shifting census boundaries, or changes in reporting sources.

Genuine switches are rare and generally limited to extreme disruptions such as humanitarian crises, cross-border migrations, or very small island populations.

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WUENIC 2025 revision

Live Births & Surviving Infants (UNPD) vs. Admin Denominators, Paraguay, 2010–2025



Data from 2024 World Population Prospects (WPP) revision.

Comparison of trends in live births and surviving infants, 2010–2025.

Live births is used is the denominator for BCG and HepBB.

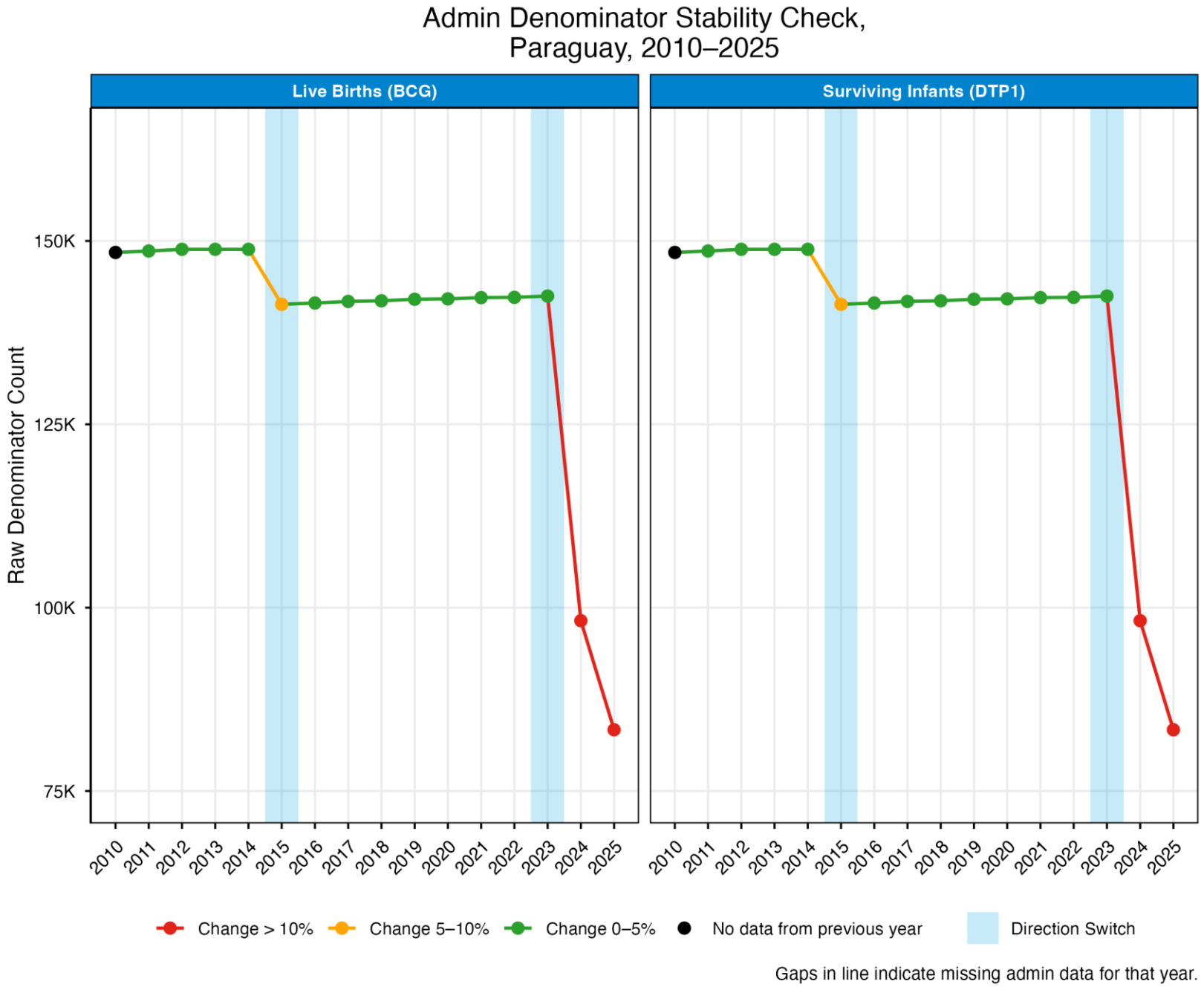
Surviving infants is used as the denominator for other vaccines given in the first year of life.

Admin target populations are reported by the country, while the United Nations Population Division (UNPD) produces the World Population Prospects (WPP) data.

UNPD is the United Nations Population Division.

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WUENIC 2025 revision



Number of children in the live births (BCG) and surviving infants (DTP1) administrative populations by year. Points are colored by the magnitude of year-on-year change: green for less than 5%, orange for 5–10%, and red for greater than 10%. Black points indicate there was no denominator data in the previous year (unable to calculate percent change). Light blue shading highlights years where the direction of change switches unexpectedly.

Under normal circumstances, target populations should follow a smooth, steady trajectory rather than fluctuating. Sudden switches in direction, such as an increasing population abruptly decreasing the following year, are demographically unnatural and typically indicate administrative errors, shifting census boundaries, or changes in reporting data sources without historic time series adjustment.

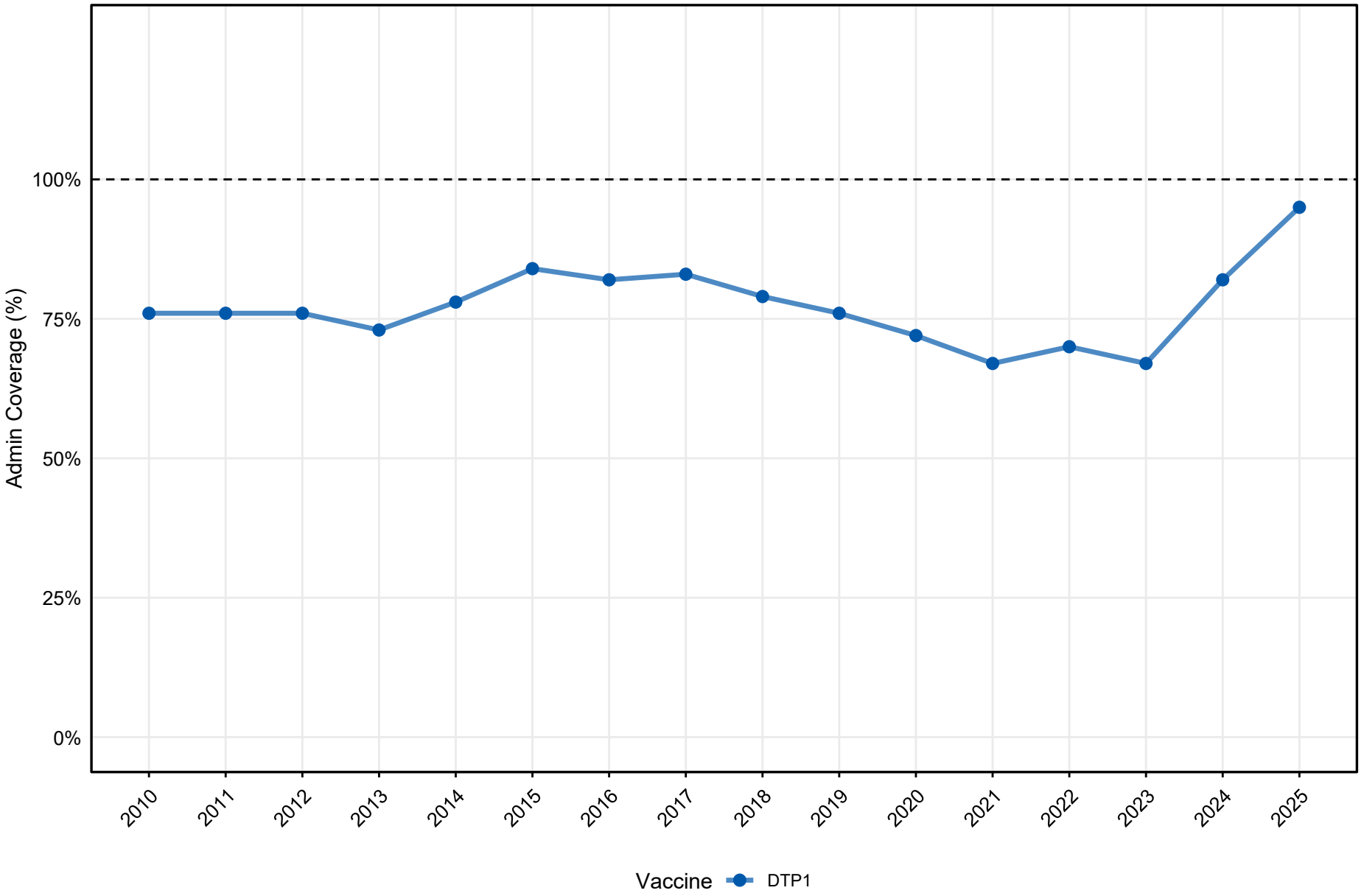
Genuine switches in growth direction are rare and generally limited to extreme disruptions like humanitarian refugee crises, cross-border migrations, or very small island populations.

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WUENIC 2025 revision

Coverage of Vaccines Recommended at the Same Age

Admin Coverage of Vaccines Administered at 2 months, Paraguay, 2010–2025



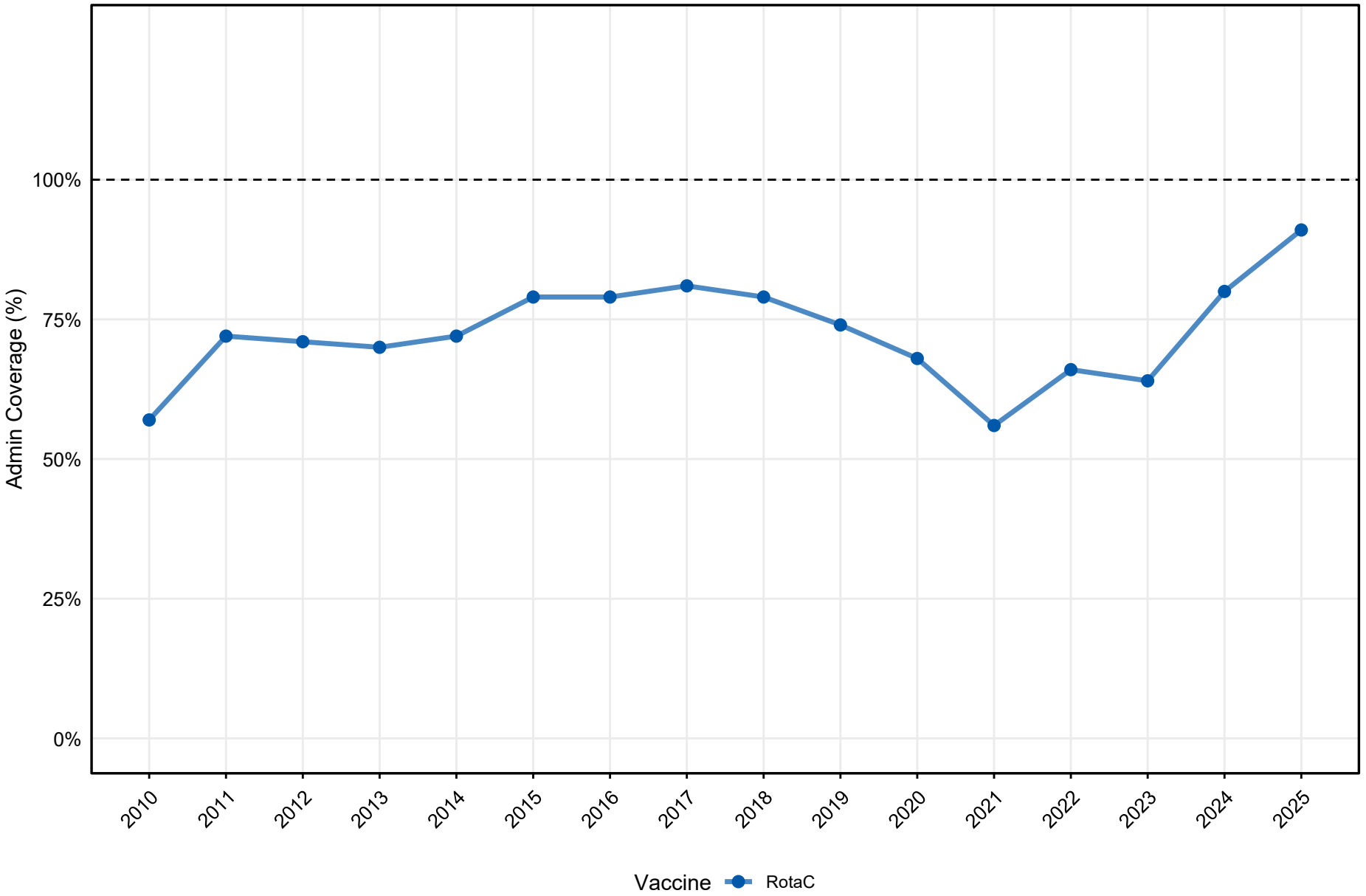
Admin coverage of WUENIC vaccines co-administered at the 2 months visit per the national schedule.

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WUENIC 2025 revision

Admin Coverage of Vaccines Administered at 4 months, Paraguay, 2010–2025



Admin coverage of WUENIC vaccines co-administered at the 4 months visit per the national schedule.

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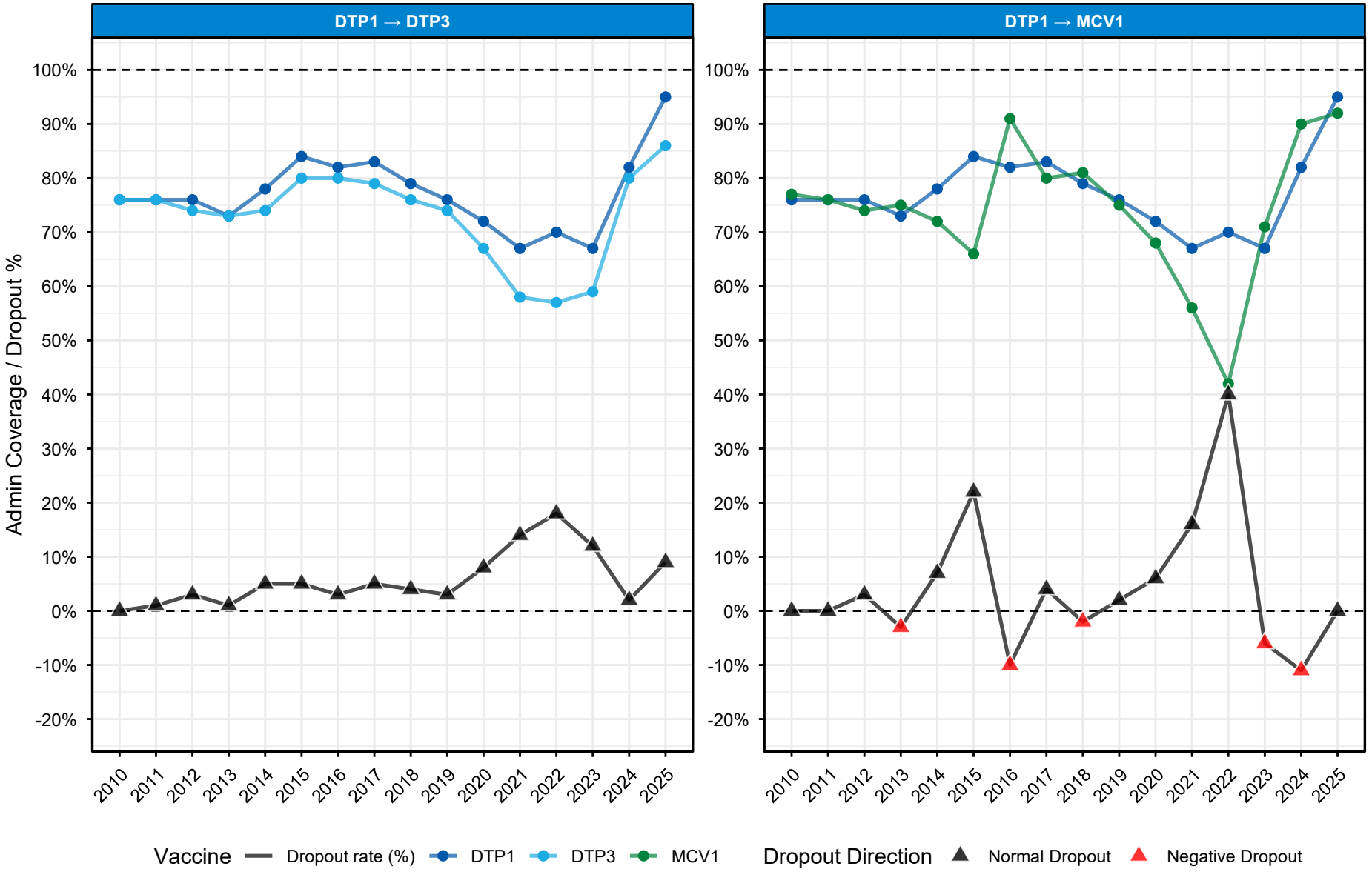
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WUENIC 2025 revision

Vaccine Dropout

Key Vaccine Dropout, Paraguay, 2010–2025

Circles = Admin Coverage | Triangles = Dropout %



Dropout % = (Dose 1 - Dose 2) / Dose 1 * 100

Admin coverage for key vaccine pairs (DTP1→DTP3, DTP1→MCV1) with dropout rate shown as triangles. High dropout may indicate supply, access, or demand barriers.

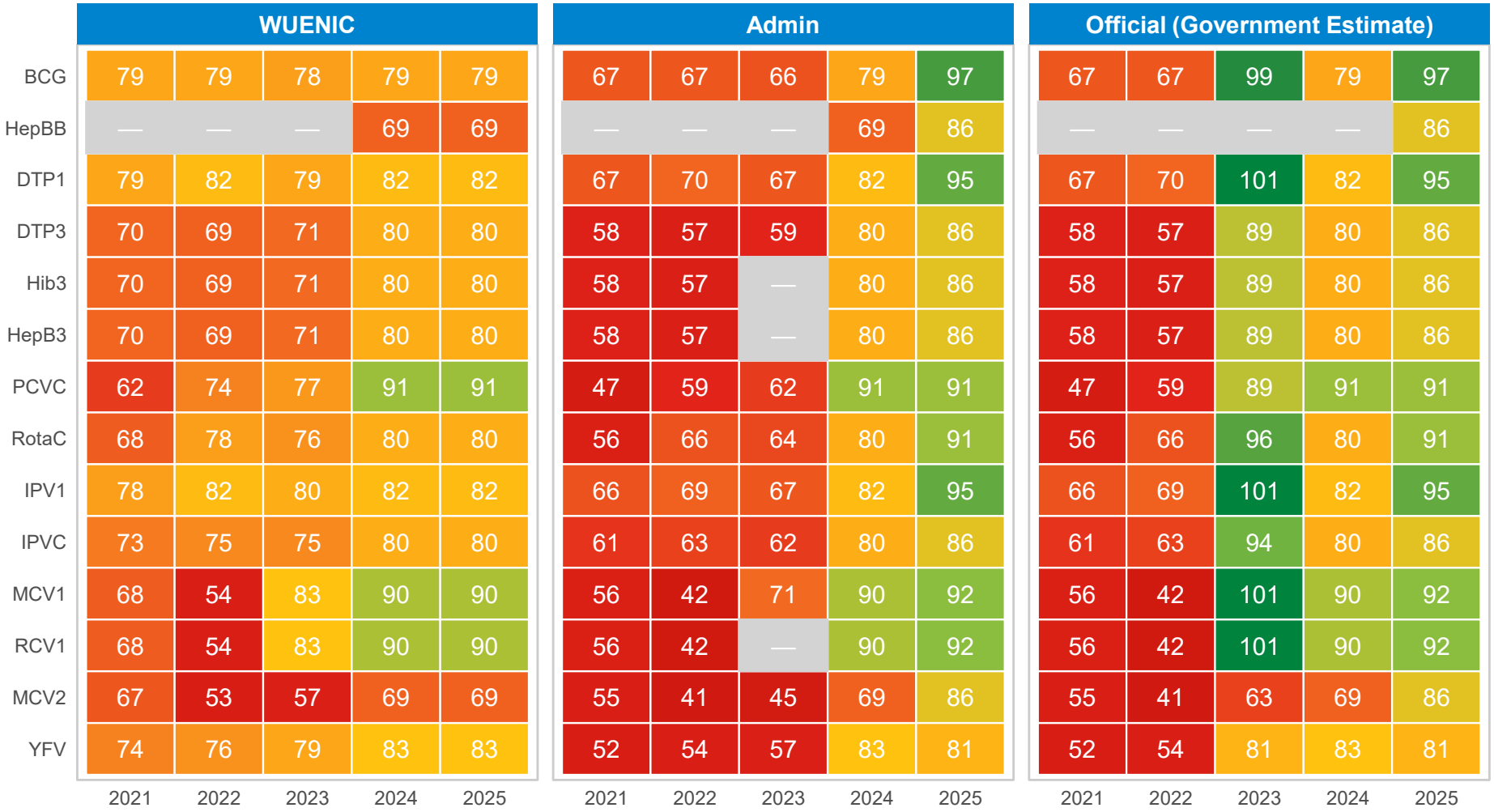
A normal dropout rate means more children received DTP1 than DTP3 or MCV1, which is expected. A negative dropout rate means more children received DTP3/MCV1 than DTP1.

For DTP1–DTP3, negative dropout almost certainly reflects data quality issues, as a child cannot receive the third dose without first receiving the first dose.

While a child can receive MCV1 without DTP1, negative dropout is generally unusual as MCV1 is recommended later in infancy. Negative dropout may occur in instance of outbreak response, but campaigns often include older children, which may contaminate the numerator and lead to misinterpretation.

Coverage Comparison Between WUENIC, Admin, and Official Estimates

Coverage Trends by Vaccine and Source, Paraguay, 2021–2025



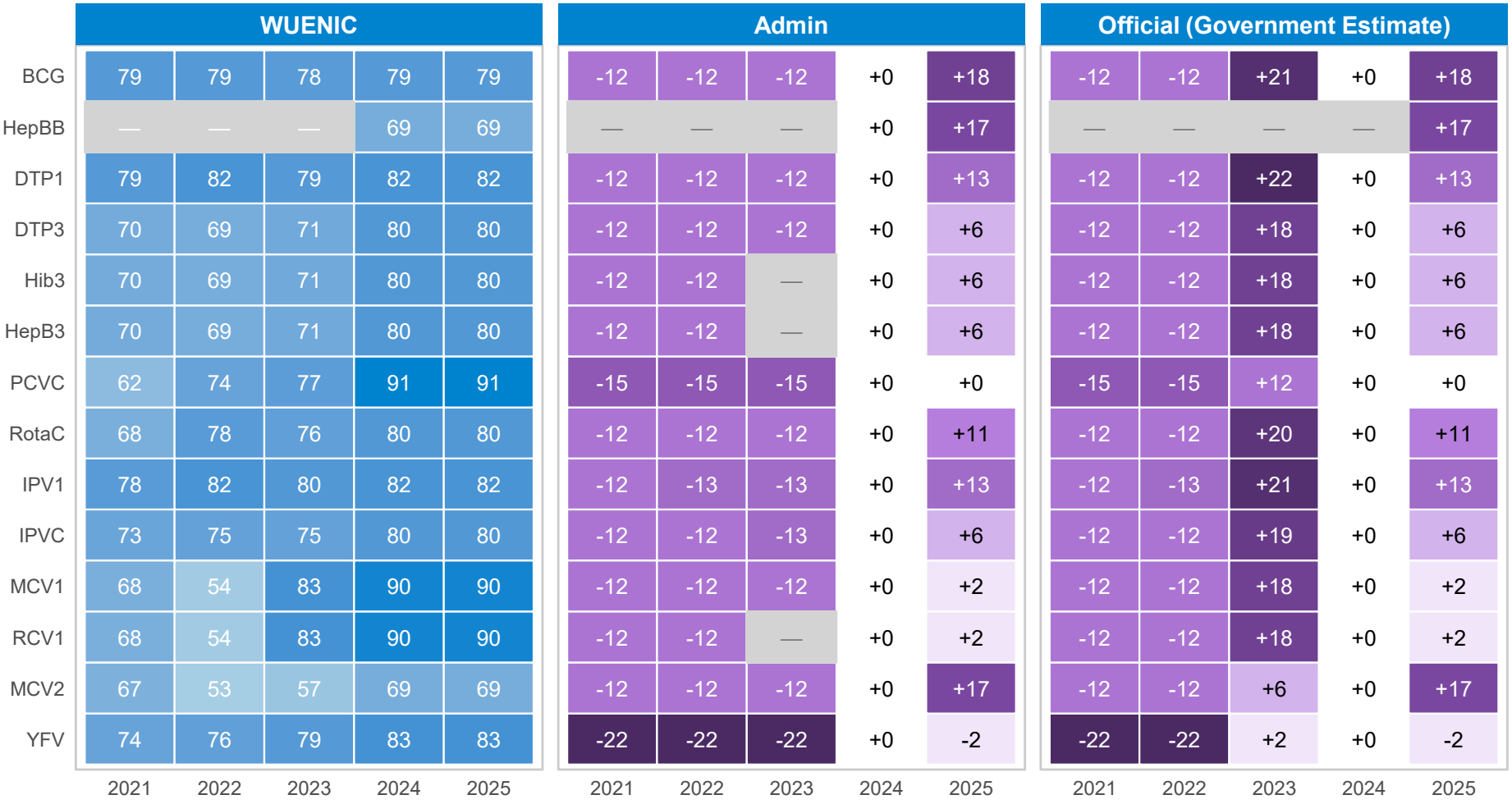
WUENIC HPV coverage estimates not included.
White = not yet introduced or not reported. Grey = missing data.
Survey panel not presented as Paraguay reported no survey data.

Coverage by vaccine and data source (WUENIC, Admin, Official, Survey) for the most recent 5 years.

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Coverage vs. WUENIC Estimates by Source, Paraguay, 2021–2025



WUENIC panel shows absolute coverage. All other panels show percentage point difference vs. WUENIC estimate.

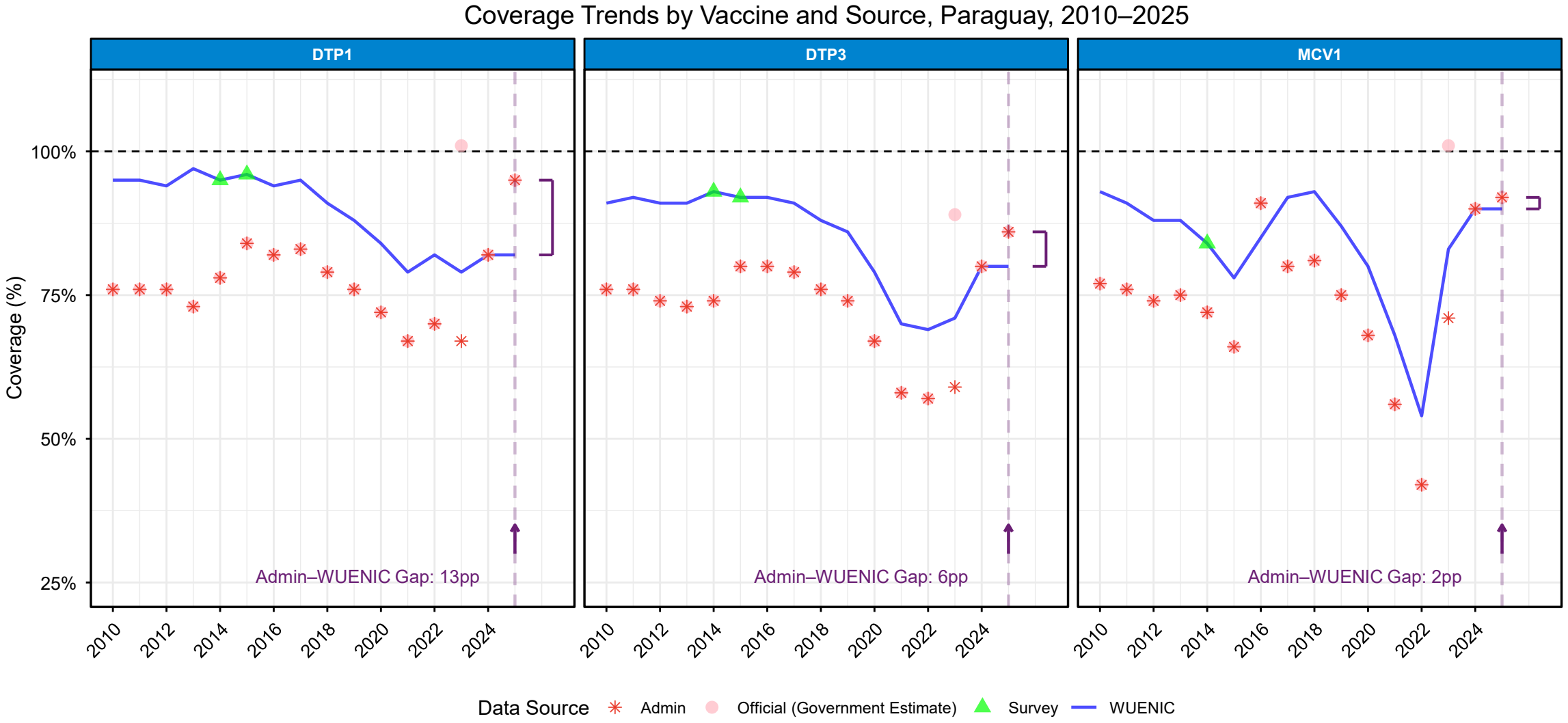
White = not yet introduced or not reported. Grey = missing data.
Survey panel not presented as Paraguay reported no survey data.

Difference in percentage points between administrative, official, and survey coverage and WUENIC estimates (e.g., Admin - WUENIC) for the most recent 5 years.

A difference of zero indicates that the coverage source and WUENIC estimate are identical, usually indicating that source informed the WUENIC estimate.

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WUENIC 2025 revision



Coverage trends for DTP1, DTP3, and MCV1 by data source, 2010–2025.

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Actionable Health Analytics for Decision-making (AHEAD)

AHEAD is a UNICEF initiative that strengthens the quality and use of routine immunization data by working closely with Ministries of Health and national Expanded Programme on Immunization (EPI) teams.

AHEAD begins with a systematic review of routine immunization data to identify and address data quality issues, including missing or inconsistent reporting, internal inconsistencies, implausible year-to-year fluctuations, and inaccuracies in target population denominators. Through a collaborative process with national teams, reported data are reviewed, cleaned, and validated, while alternative denominator sources are assessed to improve the accuracy and interpretation of vaccination coverage estimates.

Building on these strengthened data, AHEAD produces timely subnational immunization analytics at regional, district, and health facility levels to identify priority areas, monitor trends, and support evidence-based planning and targeted interventions.

Please contact UNICEF for more information at: data@unicef.org

AHEAD





