ANALYSIS GUIDANCE
2020

Suggested minimum set of analysis for informing:

Joint Appraisals

Review of Health System Strengthening support during country missions

Strategic **in-country discussions** relating to a new proposal and/or reprogramming of existing grants

Gavi
The Vaccine Alliance

Reach Every Child
www.gavi.org

Analysis Guidance

Contents

Acronyms

AEFI	Adverse Event Following Immunisation
AHS	Annual Health Survey
CRS	Congenital Rubella Syndrome
DTP	Diphtheria Pertussis Tetanus Containing Vaccine
ECS	EPI cluster survey
EPI	Expanded Programme on Immunisation
GAVI	The Global Alliance for Vaccination and Immunisation
GDP	Gross Domestic Product
GGE	General Government Expenditure
GGHE	General Government Health Expenditure
HBR	Home Based Record
HF	Health Facility
HFA	Health Facility Assessment
HSS	Health System Strengthening
IMF	International Monetary Fund
JA	Joint Appraisal
JRF	Joint Report Form
KAP	Knowledge Attitudes and Practices
MCV	Measles Containing Vaccine
MICS	Multiple Indicator Cluster Survey
MR	Measles Rubella Vaccine
NRVA	National Risk and Vulnerability Assessment
OPV	Oral Polio Vaccine
PCV	Pneumococcus Vaccine
Penta	Pentavalent Vaccine
SARA	Service Availability and Readiness Assessment
UNICEF	United Nations International Children's Fund
USD	United States Dollars
VPD	Vaccine Preventable Disease
WB	World Bank
WHO	World Health Organisation
WUENIC	WHO/UNICEF Estimates of National Immunization Coverage
YF	Yellow Fever

Introduction

A key aspect of preparing for the Joint Appraisal and other relevant in-country discussions is reviewing available data and analyses (i) to understand progress achieved against planned targets and (ii) to inform decisions around possible bottlenecks (e.g. delayed reporting, unrealistic targets, unavailable data, key barriers to achieving expected results, etc.). A thorough data review enables appropriate design of new Gavi support as part of the country dialogue process (e.g. full portfolio planning). It also enables the redesign of existing HSS support and/or the prioritisation of targeted country assistance as part of the Joint Appraisal recommendations.

Wherever possible, data and analyses presented at the Joint Appraisal (and resulting report) should draw on already available analyses and reports routinely generated by countries. For example, EPI reviews, annual desk reviews, routine reports such as WHO / UNICEF Joint Reporting Form, routine programme monitoring metrics integrated into HMIS/DHIS2/EPI or supply chain dashboards or alternates, equity analyses, coverage evaluation or KAP surveys. Countries are encouraged to identify the data sources when presenting the data to facilitate the interpretation of the information. **Gavi does not expect data and analyses to be generated solely for the purpose of the Joint Appraisal (or other relevant in-country discussions)**, but synthesis, review, analysis and interpretation of data takes time, effort and patience and programmes are encouraged to start preparing and compiling relevant data and analyses well in advance.

How to use this document

The use of this document should be especially considered when preparing **Joint Appraisals**, requests for new **Health System Strengthening support** and other relevant **strategic discussions**.

It outlines a **suggested minimum set of analyses and indicators** to inform in-country discussions on Gavi support across the different technical areas presented in this document as 7 different sections.

In each of these sections, a set of **key analyses** is suggested, followed by a detailed recommendation of useful presentations, relevant timeframes and levels of disaggregation.

The key analyses included in this document were selected based on data that are generally available from information systems or regular assessments in most Gavi-supported countries. There is also extensive guidance from partner organisations on how these analyses are best performed. The **additional analyses** component of this module outlines complementary analyses for which data may not be available in many countries or for which it may not be relevant in some specific cases. In those sections, further details are provided on recommended subnational disaggregation (text in blue) and triangulation analysis (text in red). Those are indicated by the symbols below:

S Subnational analysis

T Triangulation analysis

The key analysis, in each session, is followed by a description of the most typical **interpretation and use** for the described set, as well as the potential **data sources** that are generally available at the country level. This is finally followed by links to relevant **guidance and resources** made available from partner organisations. Some of these links provide

technical guidance on how to perform the analyses. Others provide access to automated analytical tools or databases for raw data extraction that may simplify the work the country may wish to perform.

For each section, some illustrative **examples** are included. These have proven particularly effective in terms of presentation and level of disaggregation. Most examples are taken from previous Joint Appraisal reports. While these showcased analyses do not cover all suggested areas of analysis, the intention here is to provide some inspiration to countries and partners in order to trigger relevant in-country discussions. Of note, the content and the presentation of some included examples could still be further improved to facilitate the interpretation and use of key findings. Good guidance and tips on data communication, presentation and visualisation have been developed by WHO, Data to Viz and Gramener.

Identifying relevant analysis to bring to the discussion

Although many different routine key analyses are performed in every country for each technical area, not all of them present important findings with relevant programmatic implications. Countries are not expected to prepare and present all suggested analyses in this guidance but are encouraged to compile and bring forward the most compelling ones in each section with potential programmatic impact.

This minimum set of analyses can be supplemented with additional information where deemed relevant by the country. The programmatic bottlenecks and problems identified with these analyses should guide decision-making on priorities for Gavi support and targeted country assistance based on the country's needs. Subnational analysis and triangulation are considered particularly useful for this purpose.

Subnational analysis

Gavi strongly recommends the use of subnational data analysis to inform decision-making and to prioritise resource allocation in specific geographic and thematic areas.

Subnational data analysis is important for many reasons. It helps to target resource allocation to those geographic areas with a large number of unimmunised children and/or low immunisation coverage, better target resources to vulnerable populations, address equity concerns, identify susceptible areas for outbreaks of vaccine-preventable diseases, prioritise improvement in infrastructure and human resource development, target data quality efforts, and reward geographic areas with recent improvement in performance, among others. **There is value in performing subnational analysis in all sections of this guidance.**

When interpreting results of subnational data analysis, some caution should be exercised. In many countries, subnational data is incomplete and possibly inaccurate due to errors or estimate distortions. This could affect administrative, logistics, financial, human resources and many other information systems. Regarding administrative systems, where more evidence is available, there are usually mismatches among numerators and denominators of different administrative units. Newly created districts, rapid growing urban areas, areas with increased participation of the private sector, areas afflicted by large refugee influx, and nomadic and migrant populations may also contribute to an increased uncertainty and compromise trend analysis. This may suggest coverage rates that are lower or higher than the reality. In certain districts it may even suggest coverage rates higher than 100%, which would seem implausible.

More information on use and [limitations](#) of subnational data analysis, with a special focus on vaccine coverage, can be found on the [WHO Subnational immunization coverage data website](#).

Triangulation of data

To mitigate data quality problems and achieve deeper insight into the phenomena of interest, data triangulation may be particularly helpful. Data triangulation is an approach for critical synthesis of two or more existing data sources to address relevant questions for programme planning and decision-making. Data triangulation identifies and aims to address limitations of any one data source and/or data collection methodology, and can be used to compare coverage, surveillance, stock, sociodemographic and other qualitative or quantitative data.

Limitations include the quantity and quality of the original data. Also, the potential exists for interpretations of data to converge at a single conclusion that is not accurate. Due to its limitations, it is recommended that triangulation analyses are focused on key relevant questions and explore patterns and differences of programmatic relevance through descriptive and graphical methods for better understanding.

Countries are encouraged to perform triangulation analyses under and across each section of this guidance with different purposes. For example, triangulation can help perform data quality checks by analysing the consistency of different data sources for coverage and for denominator estimates. The consistency between doses administered and vaccine doses delivered may also help to identify potential data quality issues and guide investments in administrative or logistics systems. Comparisons of coverage with surveillance data may help to demonstrate program impact (e.g. increases in coverage leading to decreased burden of disease) or may help to highlight where coverage data may be unreliable (e.g. outbreaks of disease among young children occurring in areas reporting high coverage). By comparing vaccine coverage and under immunised children with operational data such as human resources and vaccine availability (and stock out), distribution of health facilities and number of immunisation sessions, health managers should be more informed when considering programmatic decisions.

You can find some triangulation guidance in a recent report from the [SAGE Working group on quality and use of immunisation and surveillance data](#). You can also find it across different documents suggested as reference in this guide. Note that WHO, UNICEF, and CDC are preparing further guidance on data triangulation and this will be made available as soon as possible.

Programming guidance

Gavi also provides programming guidance, which is intended to provide evidence-based information for supporting countries in targeting investments to address identified bottlenecks in specific strategic focus areas. These programming guidance materials can be useful for the in-country planning process. For more information on this, refer to [Gavi applications guidelines](#).

Area	Suggested Analysis / Indicators
Coverage & equity	Coverage DTP1, DTP3 and MCV 1 Zero dose and under immunised infants: DTP1, DTP3 and MCV1 Inequality difference and/or ratio Additional analysis
Surveillance of VPDs and AEFI	Number of cases (suspected and confirmed) Outbreaks AEFI Additional analysis
Supply and immunisation services	Health facilities providing EPI services Vaccination sessions Cold chain equipment Health workers Stock utilisation Additional analysis
Demand	Drop-out rates (DPT1-DPT3/DPT1-MCV1/MCV1-MCV2) KAP Surveys Additional analysis
Data quality	Completeness and timeliness of reporting Internal data consistency External data consistency Denominators Additional analysis
Financing	Immunisation programme financing EPI budget execution Additional analysis
Other health programmes	Vit A and deworming Additional analysis

(Sidebar label: **Triangulation and Subnational analysis**)

S Subnational analysis

T Triangulation analysis

Suggested Analysis / Indicators

Key Analyses

Coverage: DTP1, DTP3 and MCV1

Trend analysis for the past 3-5 years (or more). Special attention to districts supported by GAVI HSS funds. Consider presenting numerator (doses administered) separated from denominators (target population) when evaluating trends. Consider MCV campaign coverage analysis if relevant.

Consider disaggregating coverage data on province (especially from survey) and district (especially from admin) levels and presenting results through heatmaps.

Coverage data must be compared with other data at subnational level for root cause analysis, prioritisation and decision making (e.g. stock, surveillance, operational data) Consider comparing different data sources for coverage (e.g. survey vs admin).

Zero dose and under immunised children: DTP1, DTP3 and MCV1

Trend analysis for the past 3-5 years (or more). Special attention to districts supported by GAVI HSS funds. Consider MCV campaign coverage analysis if relevant. Zero dose and under immunised children data are particularly useful for targeting of investments.

Consider disaggregating under immunised data by regional and district level. Analysis of under immunised based on coverage results from surveys at regional level applied to regional population estimates have been proved particularly useful in many countries. Consider presenting a ranking across provinces and districts, with cumulative number of under immunised. Consider use of heat maps to present data.

Zero dose and under immunised data must also be compared with other data at subnational level for root cause analysis, prioritisation and decision making (e.g. stock, surveillance, operational data). Consider comparing different data sources for under immunised (admin vs survey compared to different population projections)

Inequality difference and/or ratio

Disaggregated per household economic status (quintile 5- quintile 1), mother's education (secondary school or higher- no education), place of residence (urban-rural), sex (male-female). Trend analysis may be relevant when multiple surveys using same methods are available. This data usually comes from coverage surveys, but Electronic Immunisation Registries (EIR) could also be used.

Consider disaggregating this data across regional or state levels to identify areas where inequality may be more critical.

Additional analysis

- **Gender-related barriers**: qualitative analysis of gender related barriers to immunisation faced by women (e.g. lack of decision-making power, autonomy, education, money, transportation, etc) from available gender related studies and KAP surveys. Trend analysis of sex disaggregated data on coverage from surveys or Electronic Immunisation Registers (EIR) when available. Sub-national disaggregation highly recommended
- **Vulnerable groups**: Coverage trends among identified / suspected vulnerable groups (ethnic, religious, slums, refugees, migrants, internally displaced etc.). **Consider analysis of reasons for non-vaccination.**
- **Coverage across other antigens** (whether routine or campaign).
- **Full immunisation coverage** (as defined by country) should be considered if data is available.
- **Missed opportunities for vaccination**. Consider estimation of missed opportunities by comparison of antigens given at the same time (e.g. MCV1 and YF or Penta3, OPV3 and PCV3), especially for new vaccines. Consider using administrative and survey data.
- **Districts with MCV1/MCV2 coverage at or above 95%**: percentage and mapping
- Other analyses available from a recent equity assessment.

Interpretation and use

- **Understanding where the zero dose / under-immunised children are in order to prioritise support;** *further analysis of bottlenecks may be warranted in order to understand what interventions might be required.*
- Understanding EPI performance over the last year vis-à-vis delivering routine immunisation services and campaigns may help identify potential problems with the overall programme or with specific antigens and may be used to inform performance-based schemes.
- Understanding if there are missed opportunities for immunisation (and for which antigens) may help target demand interventions in some areas or address distribution issues.
- Understanding the equity profile of the country may lead to more effective intervention designs that address its specific components and the most important barriers to immunisation.
- Identifying vulnerable groups, its distribution and size and reasons for non-vaccination may help with targeting and tailoring specific interventions to reach them. This will need participatory planning.

Data Sources

Administrative, Official Estimates, WHO-UNICEF estimates, Coverage surveys, Other surveys, Electronic Immunisation Registries, Secondary analysis and models, Census, Other population projections

Coverage & Equity

Case Study: Mozambique FPP 2019

During in-country dialogue in the Full Portfolio planning process, Mozambique realised that their Administrative coverage data was potentially unreliable to be used in isolation to target Gavi investments as there was in 2019 a 36% difference for DTP3 between WUENIC (80%) and Admin (116%). Based on this information, the country decided to triangulate last survey (IMASIDA 2015) and census (2017) data to estimate the number of under immunised children in each province. The provincial level was selected because it has a relatively small confidence interval as compared with lower levels still with a representative sample of the population. This analysis allowed to country to identify the 5 regions with the highest number of under immunised children (Nampula, Zambezia, Tete, Sofala and Manica) with 84% of the total under immunised and 64% of the total population. Based on this and other analysis, those regions have been selected for prioritisation in the new strategic cycle. Further triangulation with surveillance and operational data was used to refine further the prioritisation on district level and a targeted survey in this area is planned to better understand challenges with more timely data.
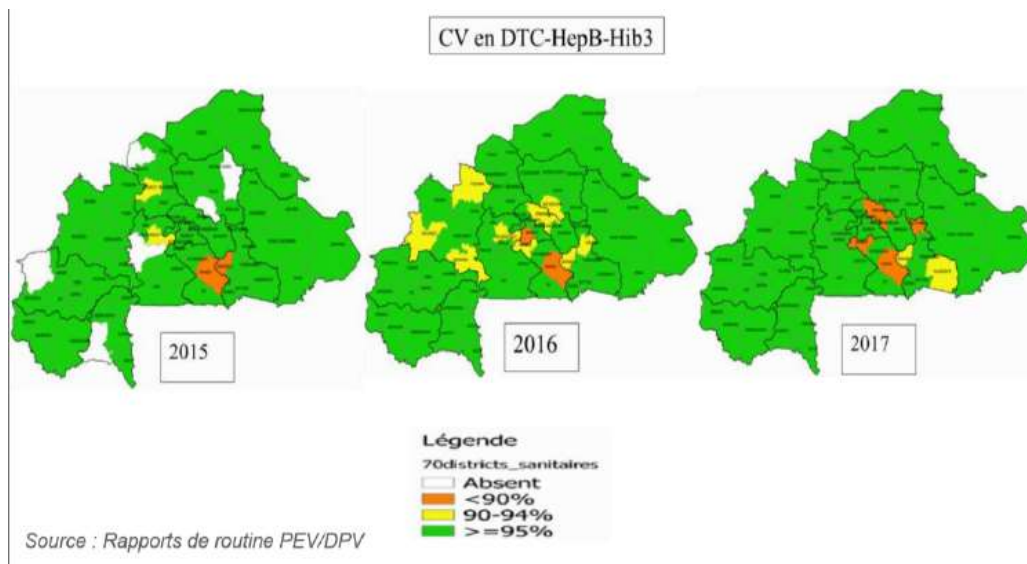

Figure 3: Number of unvaccinated children in Mozambique; Source IMASIDA 2015
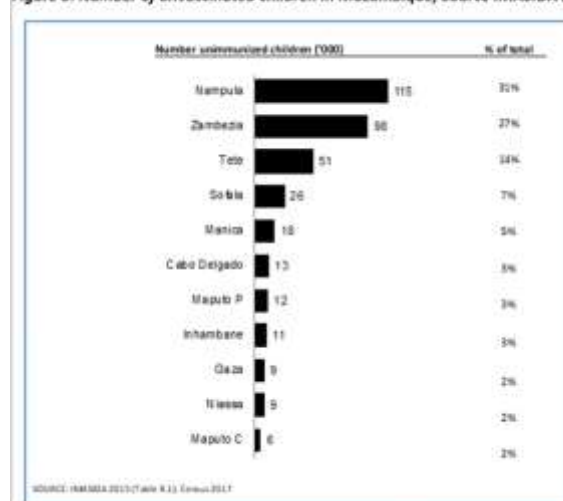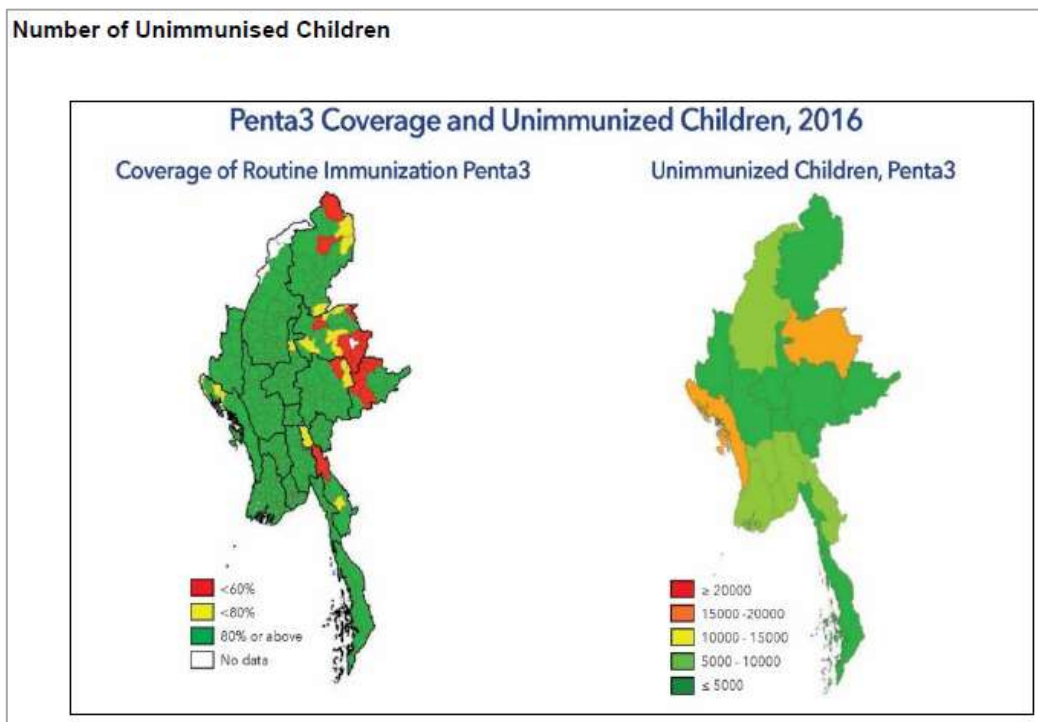
Other examples

Coverage: DTP1, DTP3 and MCV1
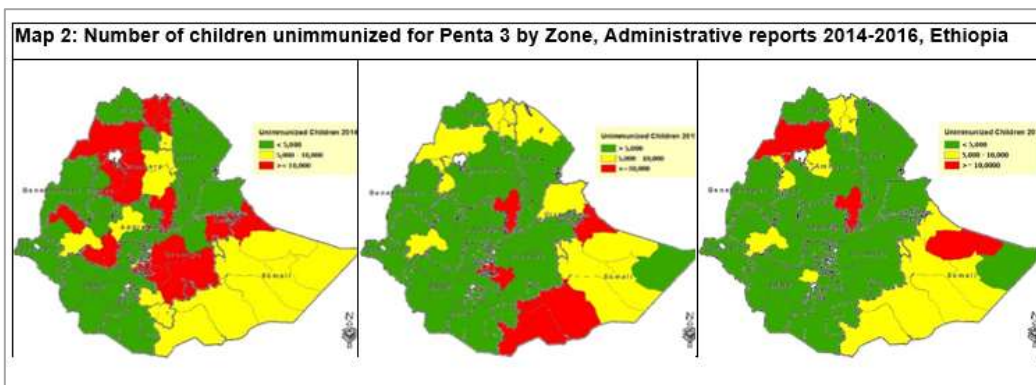
Changes in Immunisation coverage 2014-2017

Burkina Faso JA, 2018

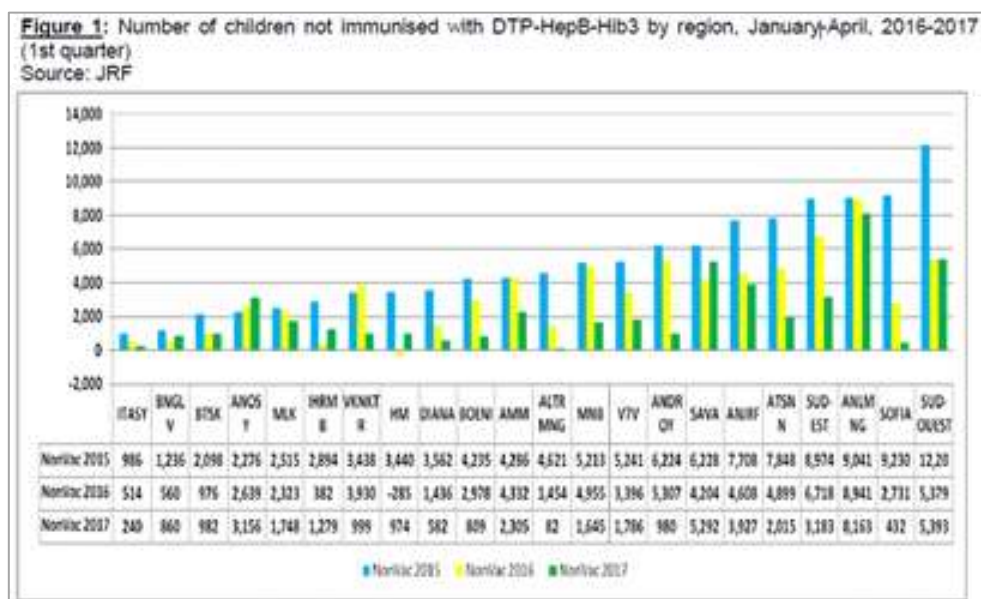**Zero dose and under immunised children: DTP1, DTP3 and MCV1**

Myanmar JA, 2017

Map 2: Number of children unimmunized for Penta 3 by Zone, Administrative reports 2014-2016, Ethiopia

Ethiopia JA, 2017

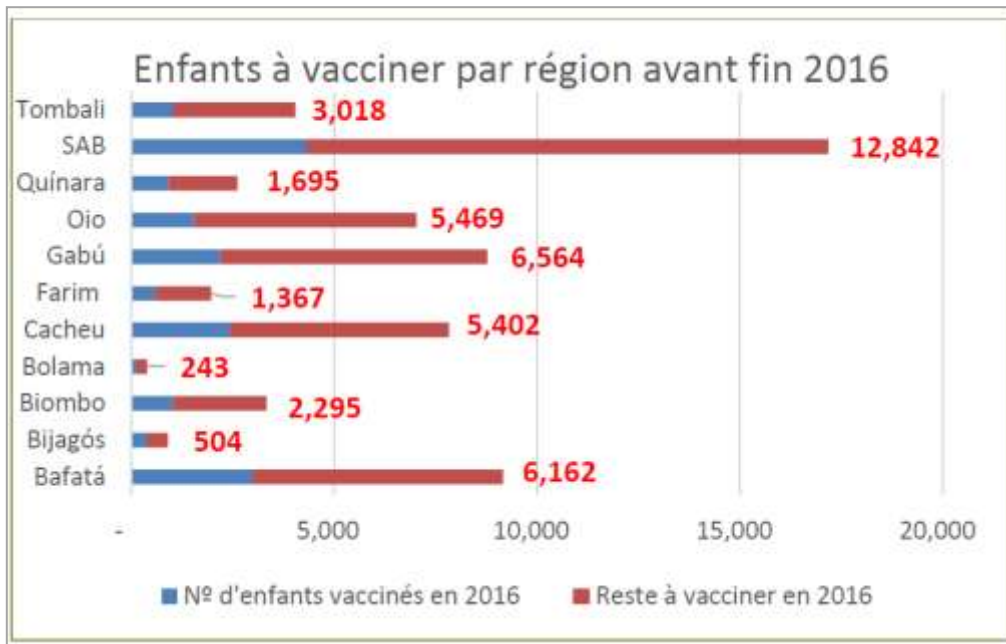Top 10 HDs with the greatest number of infants not immunised

REGION	RANKING	DISTRICT	Children missed	% (of total number of children missed)	% cumul. increase	Completeness of health facilities' reports (%)
Far North	1	Kousseri	6,898	5	5	100
Far North	2	Mora	4,904	3.6	8.6	100
Far North	3	Makary	4,106	3	11.6	97.2
Littoral	4	Boko	4,022	2.9	14.5	96.3
Centre	5	Nkolndongo	3,384	2.5	17	93.2
Northwest	6	Bamenda	2,992	2.2	19.2	100
North	7	Touboro	2,977	2.2	21.4	100
Northwest	8	Ndop	2,968	2.2	23.6	100
Adamawa	9	Ngaoundéré Urban	2,931	2.1	25.7	100
Far North	10	Maroua 1	2,871	2.1	27.8	100
COUNTRY TOTAL			137,456	100	100	97.5

Cameroon JA, 2018

Madagascar JA, 2017

Guinea-Bissau JA, 2016

Inequality difference and/or ratio

Nigeria JA, 2017

DTP3 immunization coverage among one-year-olds in Afghanistan, disaggregated by background characteristics (DHS 2015)

Select country
Afghanistan

Characteristic	Subgroup	Coverage (%)
Child's sex	Female	58.2
	Male	58.4
Birth order	1st born	63.1
	2nd-3rd born	54.4
	4th-5th born	58.9
	6th born or higher	59.3
Mother's age at birth	15-19 years	49.7
	20-34 years	59.0
	35-49 years	64.0
Mother's education	No education	54.1
	Primary school	70.4
	Secondary school or more	79.8
Mother's ethnicity	Baloch	44.4
	Hazara	60.4
	Nuristani	0.7
	Pashai	43.5
	Pashtun	51.7
	Tajik	64.6
	Turkmen	57.2
	Uzbek	70.8
	Other	48.6
Sex of household head	Female	68.7
	Male	58.2
Household economic status	Quintile 1 (poorest)	46.9
	Quintile 2	52.1
	Quintile 3	54.4
	Quintile 4	64.7
	Quintile 5 (richest)	70.4
Place of residence	Rural	55.2
	Urban	68.2

| Characteristic	Subgroup	Coverage (%)
Subnational region	Nooristan	0.7
	Urozgan	2.1
	Kandahar	24.8
	Zabul	26.8
	Ghor	33.0
	Farah	33.3
	Samangan	38.5
	Ghazni	39.1
	Logar	41.5
	Kunarha	42.7
	Daykundi	44.5
	Sar-e-pul	45.0
	Paktya	45.2
	Khost	49.3
	Helmand	49.9
	Baghlan	52.7
	Balkh	53.0
	Kunduz	57.9
	Panjsher	59.0
	Jawzjan	61.3
	Badghis	61.4
	Herat	62.2
	Laghman	65.5
	Takhar	66.5
	Nimroz	69.2
	Kapisa	71.6
	Kabul	73.1
	Parwan	76.1
	Paktika	77.1
	Bamyan	78.3
	Nangarhar	78.6
	Wardak	80.0
	Faryab	81.9
	Badakhshan	82.4

58.3

Afghanistan JA, 2018

Figure 7: Trend in immunization inequities in Ethiopia, EDHA 2000-2016
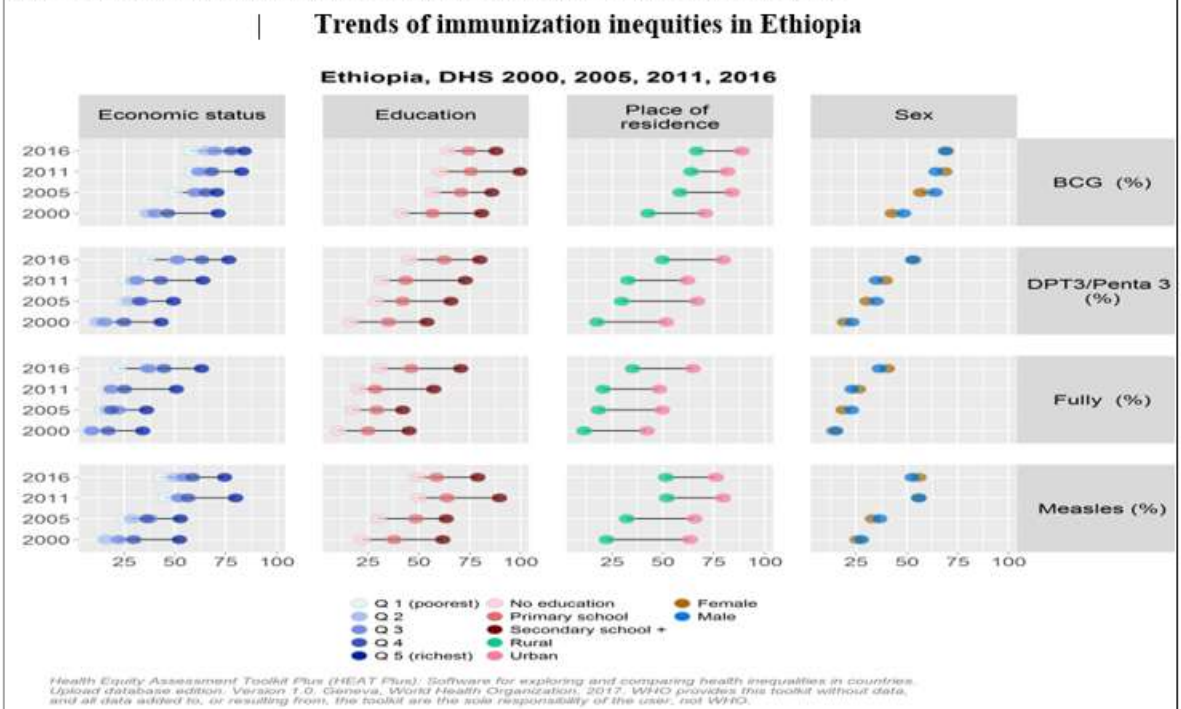
Ethiopia JA, 2017

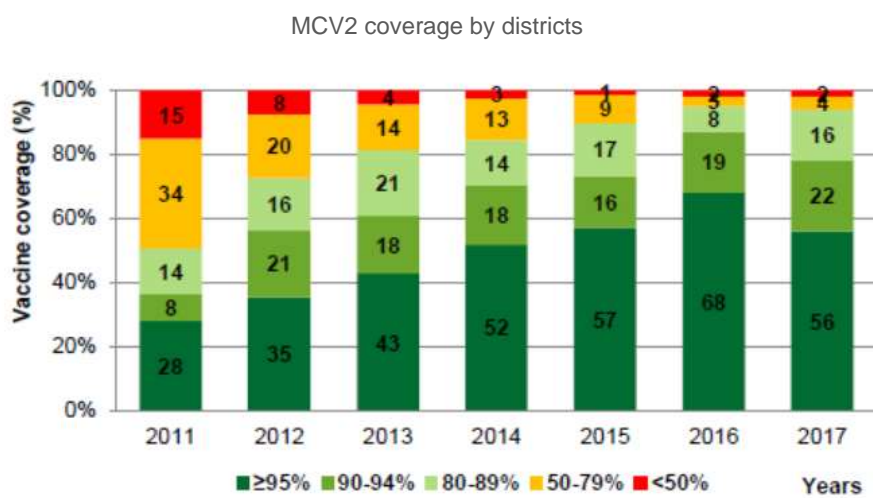**Additional analysis**

Proportion of full immunisation status, WHO concurrent RI monitoring, 2013-2018
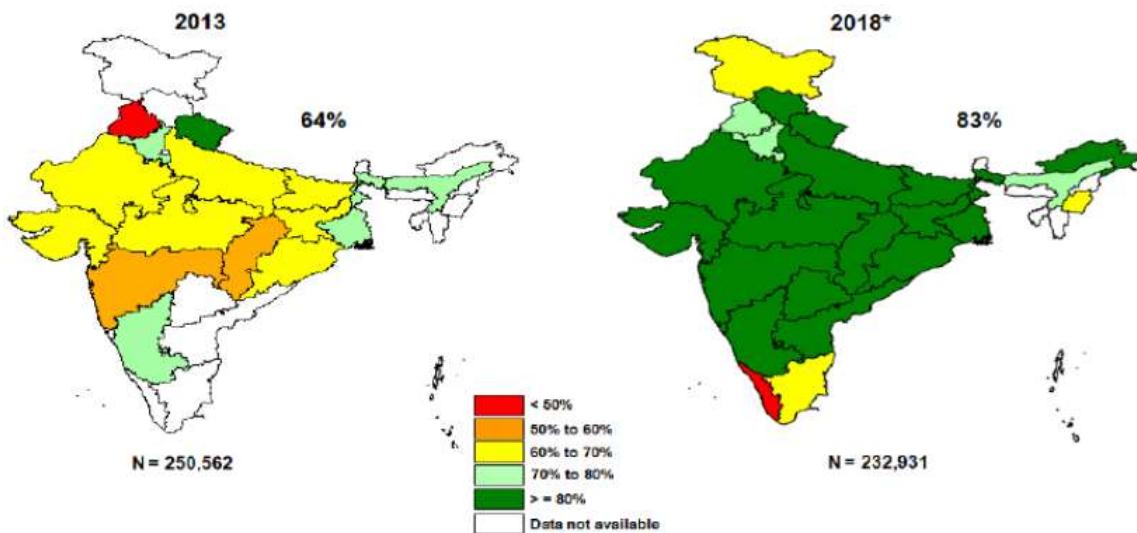
India JA, 2018

MCV2 coverage by districts

Vietnam JA, 2018

Suggested Analysis / Indicators

Key Analyses	

	Cases of VPD (suspected and confirmed)
	Number of Measles, Rubella, Congenital Rubella Syndrome (CRS), Polio/Vaccine-derived Polio (VDPV), Diphtheria, Tetanus (neonatal and non-neonatal), and Pertussis. Consider presenting incidence rates. Consider disaggregating by age, vaccination status, migrant status, ethnicity.
	Consider disaggregation by province or especially at district level. Consider using maps / heat maps to present the data. Consider comparing with coverage and/or under immunised data. The following analysis may be more relevant to present:
	    • Comparison of cases of Measles and Rubella with MCV (M or MR) coverage.
	    • Comparison of cases of Diphtheria or Tetanus (neonatal and non-neonatal) with DTP3 coverage.
	    • Comparison of cases of Acute Flaccid Paralysis (polio and non-polio) with Polio coverage if relevant.
	Consider comparison of vaccine coverage for a specific cohort year with surveillance data from the corresponding age group when relevant. If only aggregate surveillance data is available, use the number of cases for under five years of age in comparisons with coverage (this is especially useful for Diphtheria and Tetanus, as those vaccines have waning immunity without provision of vaccine booster doses). Consider comparing with routine or campaign coverage if relevant. Compare this analysis with data quality analysis of underlying vaccine coverage and relevant VPD surveillance system performance indicators and interpret results with caution.
	Also consider comparing different reporting mechanisms (aggregate vs case-based reporting of cases, monthly vs. weekly reporting mechanisms) if available and relevant.

Outbreaks

Epidemiologic curve of any VPD outbreak in the country, depending on local epidemiology (e.g. Measles, Polio/VDPV, Meningitis, Yellow Fever, Japanese Encephalitis, Cholera). Distribution of cases by characteristics and final case classification.

Consider presenting the distribution of cases across subnational geographic areas (e.g. districts) Consider using heatmaps to present the data.

AEFI

Number of AEFI reported per 100,000 surviving infants and comparison with international standard. Proportion of serious AEFI cases that were investigated or assessed by AEFI causality committee.

Consider disaggregation on regional level if possible and analysis on AEFI after routine or campaign.

Additional analysis

- **Number of other VPDs cases** reported and confirmed per year, including Rotavirus, Pneumococcus, Typhoid and others, when available. Consider disaggregation by district level when relevant and presenting with heatmaps. Consider comparison with vaccine coverage.
- **Surveillance performance indicators** (completeness, timeliness, lab confirmation rate) and distribution of silent districts for reporting. Consider disaggregation on subnational level and use of heatmaps.
- Reports from seroprevalence surveys, if available. Consider comparison with coverage surveys or administrative coverage in relevant areas. Consider comparing with VPD cases from surveillance systems. Interpret results with caution.
- Burden of disease from global models.
- Outbreaks of non VPD

Interpretation and use

- Understanding the distribution of cases by geographical area, age groups or other key characteristics may help identify low immunity populations and target service delivery activities and intensification strategies.
- Assessing cases by vaccination status may also help identify areas with low quality vaccine supply and/or injection practices and help prioritise investments in improving cold chain and/or vaccine administration.
- Understanding where outbreaks occur may improve understanding of population immunity status and guide the needs for intensification of routine services and/or campaigns.
- Understanding the performance and results of the AEFI system may provide information for strengthening AEFI monitoring and provide input into communications and risk mitigation plans.
- Understanding where cases are both being reported and confirmed informs the functionality of surveillance systems and helps prioritise activities for improvements in human resources, sample transportation and laboratory capacity.

Data Sources

Administrative, Coverage surveys, Seroprevalence surveys, Surveillance systems, Others

Surveillance of Vaccine Preventable Diseases and AEFI

**Case study: Uzbekistan JA 2019**

During Uzbekistan JA discussions, the country realised through analysis of measles reported and confirmed cases in the country that measles cases were on the rise, with no confirmed cases in 2017, 22 confirmed cases in 2018 and 267 confirmed cases in 2019 only until May 2019. Further analysis demonstrated that the surveillance system was presenting poor performance in many regions of the country, which could compromise case detection and country response to outbreaks. Analysis of confirmed cases in 2019 demonstrated that many cases were affecting mostly children under 1 year (41% of cases). Based on this information, the country then decided to concentrate efforts to update the surveillance database, strengthen epidemiologic surveillance across regions including appointment of focal point for measles response in regional and district levels. The country also decided with support of WHO EURO office to immunise children from 6 to 9 months of age, keeping a mandatory vaccination at the age of 12 months. In addition, the country also started questioning its administrative coverage and WUENIC estimates, that used to indicate a high performance for the measles programme. They decided to enhance data quality control initiatives. As a first step, the country will carry out an in-depth data quality assessment combined with a coverage survey, that has not been performed for many years in the country.
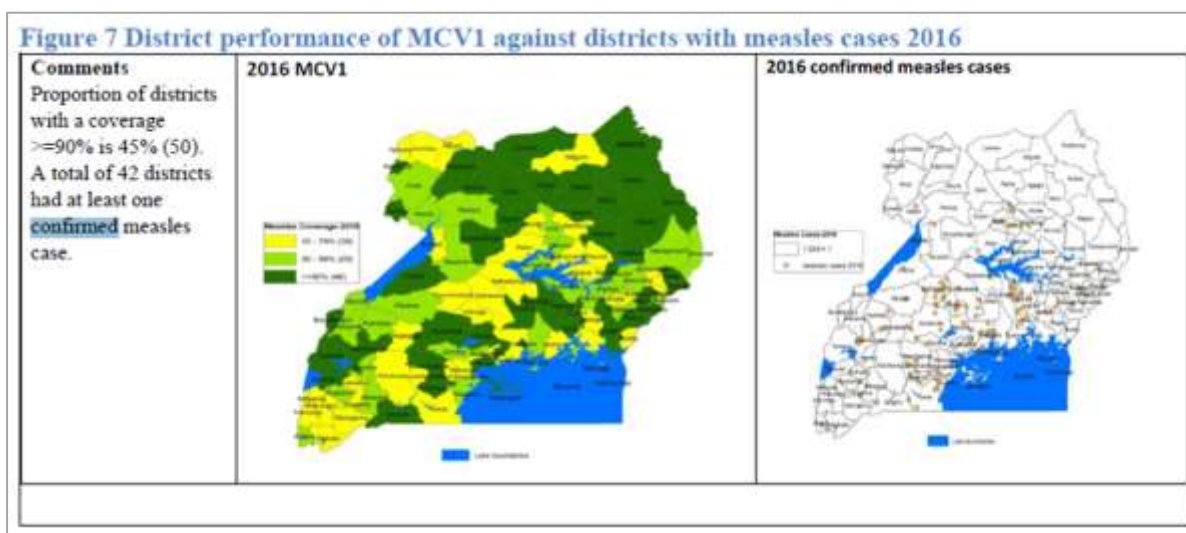

PERCENT OF LABORATORY CONFIRMED MEASLES CASES, 2019
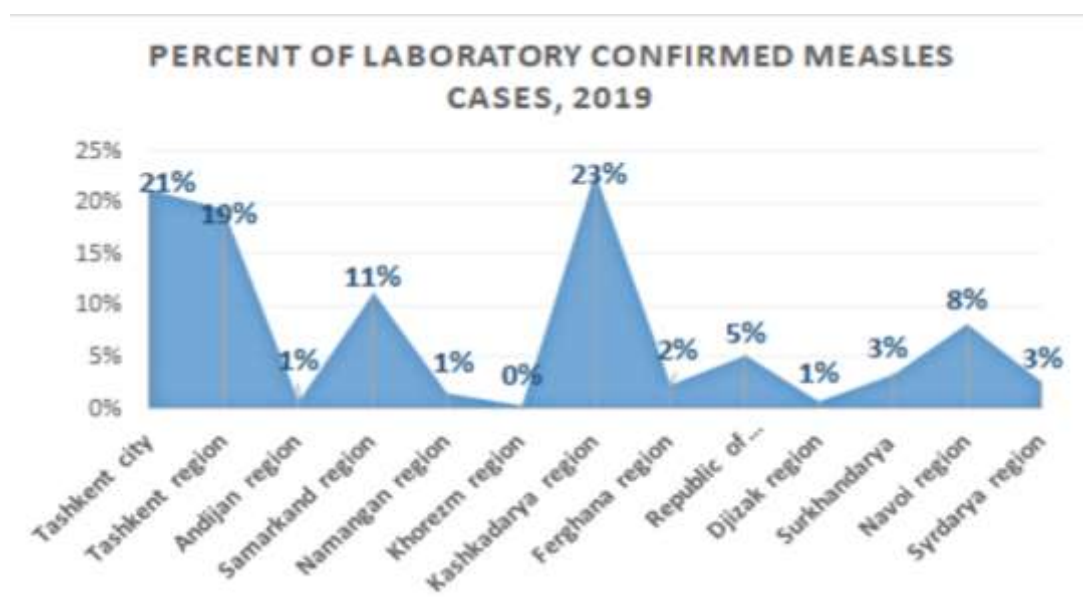
Other examples

Cases of VPD (suspected and confirmed)

Confirmed cases of measles by geographical location
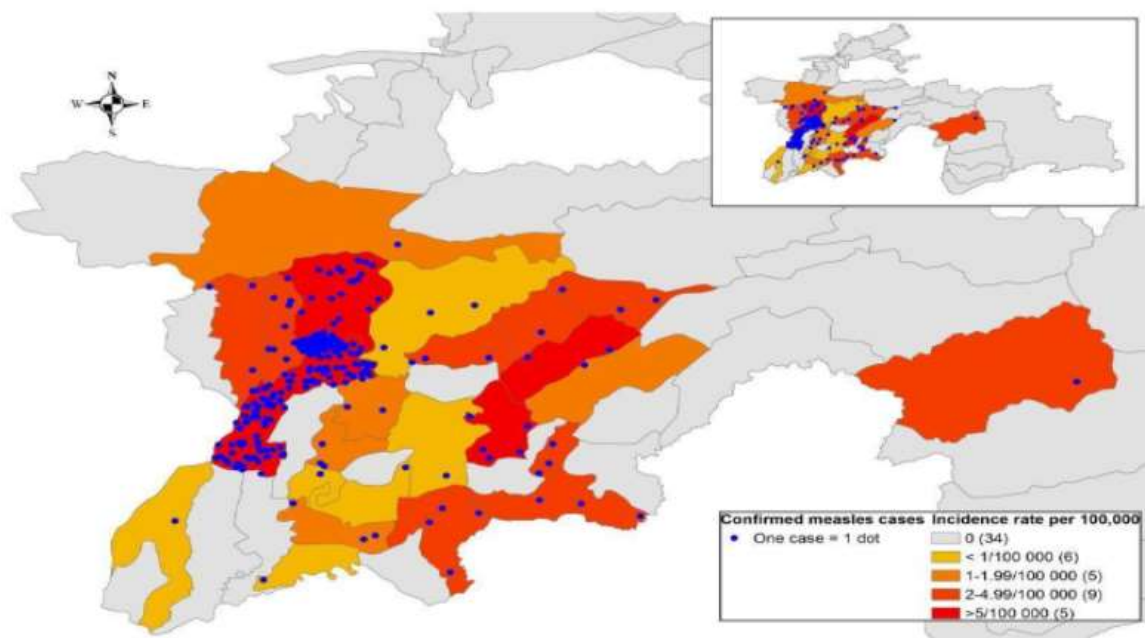
Tajikistan JA, 2018

Uganda JA, 2017

Ethiopia JA, 2017

Outbreaks

Epidemiologic curve for Measles and Rubella
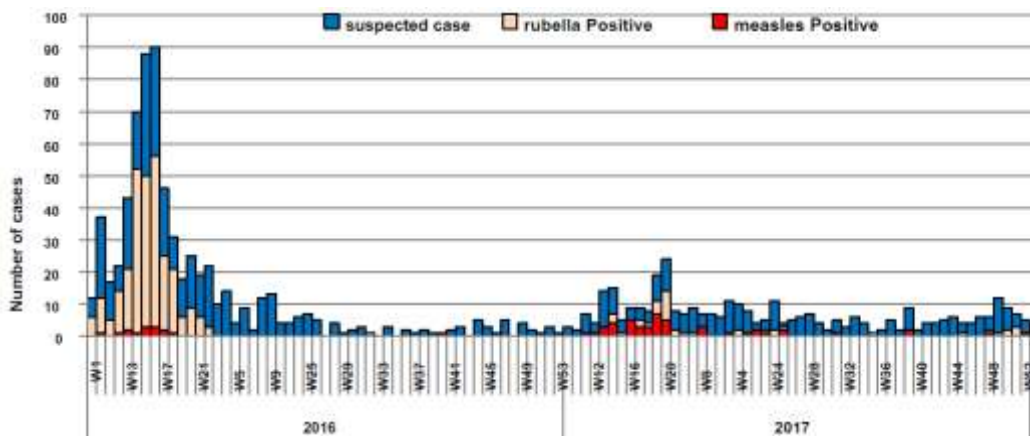
Togo JA, 2018

AEFI

AEFI cases reported by grade level

Tableau VII : Evolution des cas de MAPI notifiés par degré de gravité

Indicateurs	Période			
	2015	2016	2017	2018
Nombre total de cas de MAPI mineures notifiés	16 192	15 801	15 218	38407
Nombre de cas de MAPI graves notifiés	7	1	2	77
Nombre de cas de MAPI graves signalés et ayant fait l'objet d'une enquête	7	1	2	4
Ratio de rapportage des MAPI pour 100 000 nourrissons survivants par an	2 210	2 114	1 997	4 942

Source : Données administratives MS

Burkina Faso JA, 2019

Expected vs reported cases of AEFI

Madagascar JA, 2019

Additional analysis

Fig 3:Percentage of Districts Reporting At Least one Suspected Measles case
2012 -2015

	ASH	BAR	CEN	EAS	GAR	NOR	UPE	UPW	VOL	WES
2012	83	81	75	81	62	66	61	89	64	68
2013	83	96	81	85	69	77	100	91	72	77
2014	83	96	85	88	69	54	92	91	80	86
2015	77	100	80	81	81	46	100	74	100	100
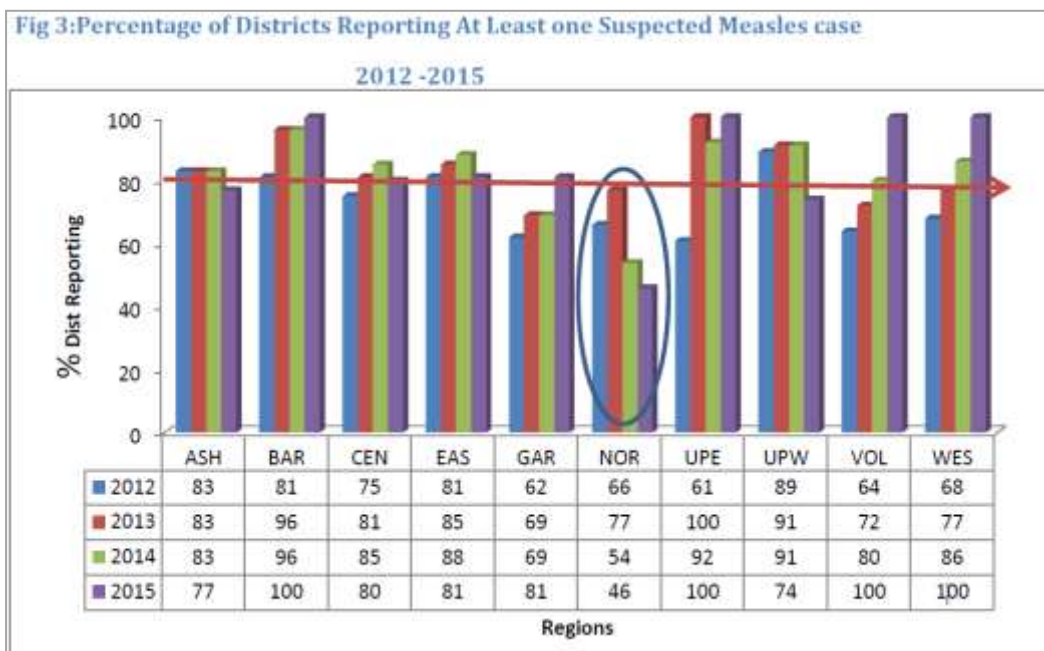
Ghana JA, 2016

Suggested Analysis / Indicators

| Key Analyses	
	Health facilities providing EPI services
	Number and proportion of health facilities providing immunisation services with trends over time. The total population covered by health facilities should be considered if estimations of population per catchment areas are available. Otherwise, average population covered by health facilities per administrative area could be used. Consider analysis of the proportion of the population living up to 5 km from a health facility if available.
S	Consider disaggregation at province and specially at district level in priority areas. Consider presenting the distribution of health facilities with maps / heatmaps.
T	Consider comparing with coverage and number of under immunised children to identify operational bottlenecks.
	Vaccination sessions
	Number, frequency and proportion of vaccination sessions provided over planned with trends over time. Consider analysis of average number of children immunised by vaccination session. Consider disaggregation by delivery model (fixed/outreach/mobile). Collection of data on number of children immunized disaggregated by type of session is currently not an Alliance recommendation. However, you can still consider calculation of averages based on number immunized and number of sessions.
S	Consider disaggregation at province and specially at district level in priority areas. Consider presenting this data with heatmaps.
T	Consider comparing with coverage and number of under immunised children to identify operational bottlenecks.
	Cold chain equipment
	Number and proportion of functional cold chain equipment and trends over time. Consider disaggregation by health facility type. In countries implementing the Cold Chain Equipment Operational Platform (CCEOP), consider analysis of proportion of health facilities in which expansion, extension and/or replacement of equipment are being conducted and compare with planned targets.
S	Consider disaggregation at province and specially at district level in priority areas. Consider presenting the distribution of cold chain equipment with maps / heatmaps.
T	Consider comparing with health facilities providing EPI services, coverage and number of under immunised children to identify operational bottlenecks.
	Health workers
	Number and distribution of vaccinators by cadres, highlighting those most commonly providing vaccination services and trends over time. The average population covered by health workers cadre should be considered.
S	Consider disaggregation at province and specially district level in priority areas. Consider presenting the distribution of cold chain equipment with maps / heatmaps.
T	Consider analysis of proportion of health facilities with adequate/trained immunisation staffing according to national policies. Consider comparing with, coverage and number of under immunised children to identify operational bottlenecks.
	Stock utilisation
	Number of vaccines doses issued by higher levels (central, regional and district level distribution centres). Number of doses used by health facilities (calculated using starting balance, closing balance, number of doses received, and number of doses discarded) with trends over time. It is better to present number of vaccine doses rather than number of vaccine vials. Consider also presenting number of vaccines doses at closing stock for each level or relevant distribution centre in the supply chain. It is better to present data for DTP, but Rota, PCV and measles should also be considered if available.
S	Consider aggregation of doses used at health facility level by province and specially by district level. Consider presenting data on doses issued by province and specially by district level stores. Consider use of heatmaps to present this data.
T	Consider comparison with number of children immunised according to admin systems considering all doses (e.g. DTP1+DTP2+DTP3 for Penta). Consider comparison of stock utilisation data across different system levels (e.g. total number of doses used by health facilities aggregated by district level vs doses issued by districts). Consider comparing with data quality analysis of Admin and stock management system. Consider comparison with denominator data. Interpret results with caution.
	Additional analysis
S **T**	• Stock outs / Full stock availability. Consider disaggregation at district level and presenting with heatmaps. Consider comparison with coverage data
	• Wastage rates (closed and open vials).
	• Frequency of cold chain maintenance.
	• Availability of temperature monitoring devices and number/proportion of alarms.
	• Availability of transportation means, and percent of orders delivered on-time and in-full (OTIF).
Interpretation and use	• Understanding the supply and profile of immunisation services may help inform and adjust investments in infrastructure, and rebalance the distribution of human resources, equipment and training.
	• It may also help redesign delivery strategies in some areas. (e.g. a district with low population density and a low number of health facilities providing immunisations, programmes may need to rely more heavily upon outreach and mobile strategies, while in densely populated urban areas with an adequate number of facilities, fixed services with community involvement may be preferred).
Data Sources	Administrative, Stock management tools, Logistic management information systems, Health facility assessments, Master facility lists, Others

Guidance and Resources	Health statistics and information systems: service availability and readiness assessment (SARA), WHO
	Health statistics and information systems: health facility & community data toolkit, WHO (2014)
	Indicators for monitoring district and national performance, WHO
	Immunization in practice: Monitoring and using your data, WHO
	Master facility list resource package: guidance for countries wanting to strengthen their master facility list, WHO
	Monitoring vaccine wastage at country level: guidelines for programme managers, WHO (2005)
	A Spatial database of health facilities managed by the public sector in sub-Saharan Africa, WHO
	Supplies and Logistics: Gavi the Vaccine Alliance, UNICEF

Country case study: Madagascar JA 2019

During the 2019 annual Joint Appraisal discussions in Madagascar, the triangulation of stock and admin data at national level prompted further discussion on stock management problems, as the number of doses used was lower than the number of children immunized for some antigens in 2018. Based on this analysis, the country decided to prioritise capacity building for the logistics system including strengthening HR and IT tools in order to improve the quality of stock data at regional and district levels.
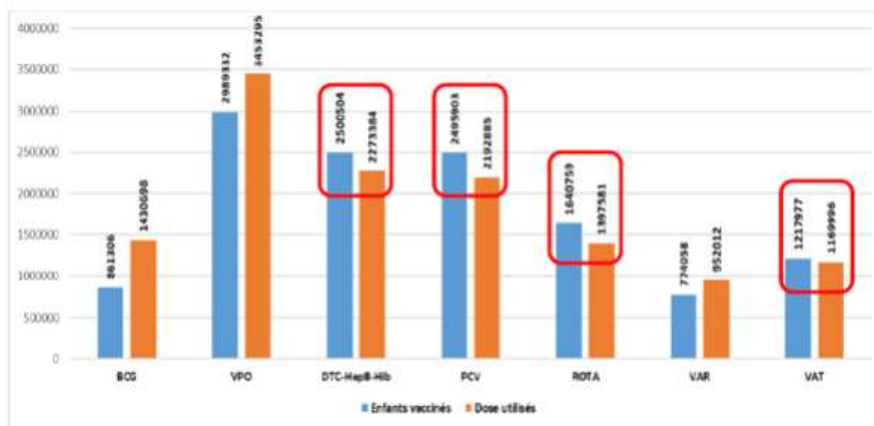
Graphique 18 : Comparaison entre les doses de vaccins utilisées et les doses administrées en 2018.

Other examples

Health facilities providing EPI services

Density of health facilities in Cameroon in 2016
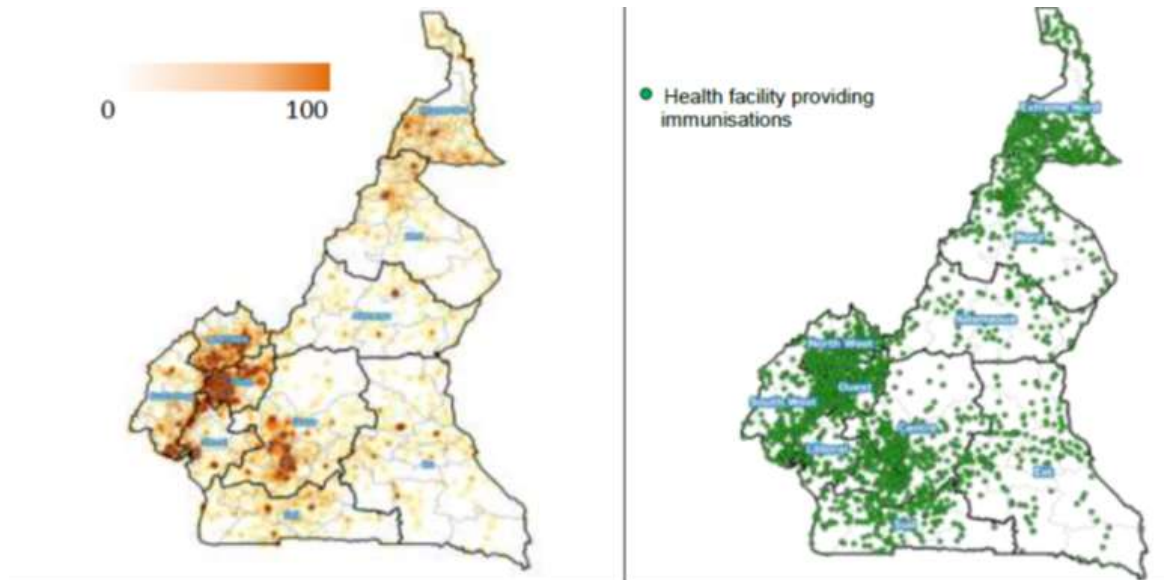
Cameroon JA, 2018

Vaccination sessions provided

Number of sessions held for each in relation to

minimum number of sessions for an adequate service level (April, 2018)
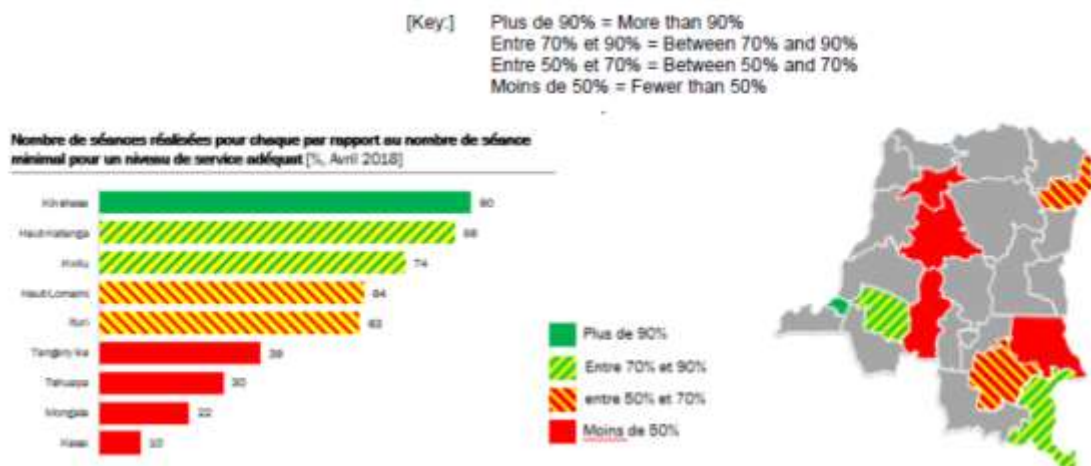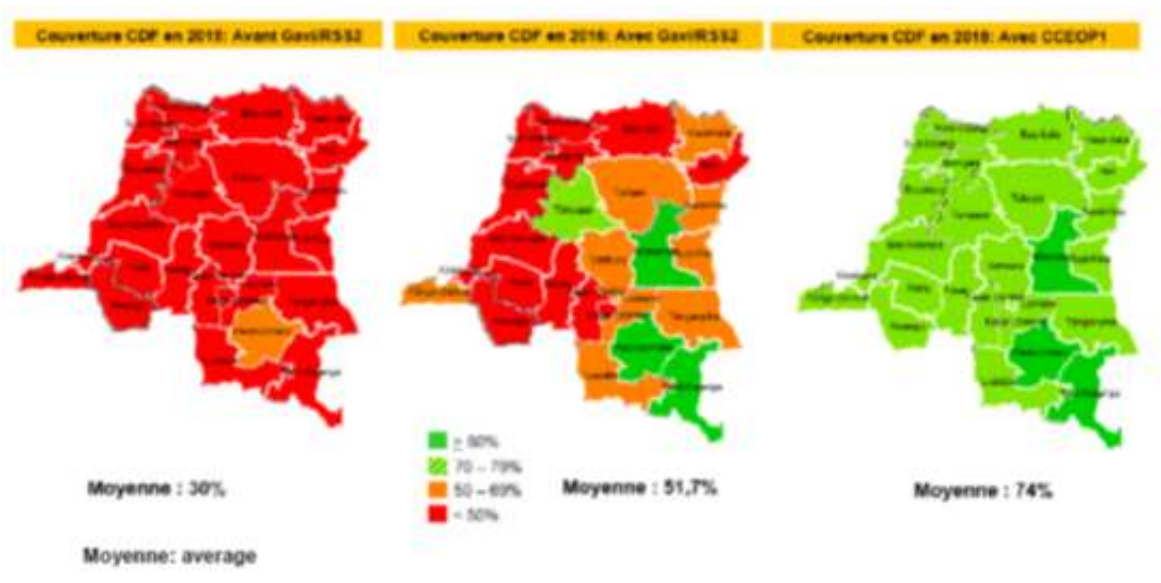

DRC JA, 2018

Figure 1: Trend of EPI service by strategy 2010-2015:
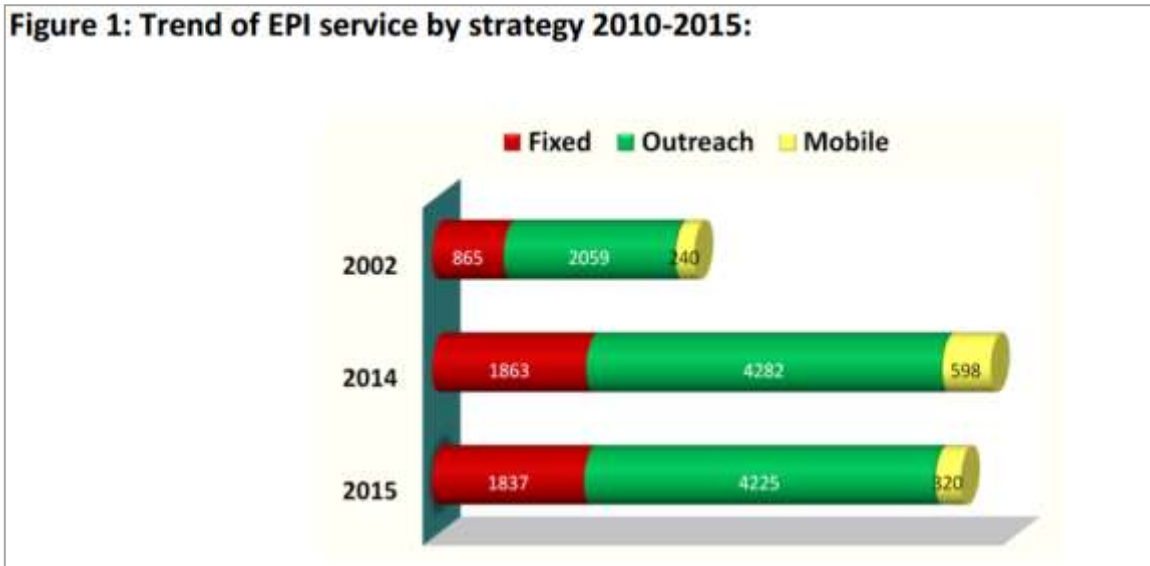
Sudan JA, 2016

Cold chain equipment

Democratic Republic of Congo JA, 2018

Health workers

Number of fixed centres and vaccinators in Afghanistan
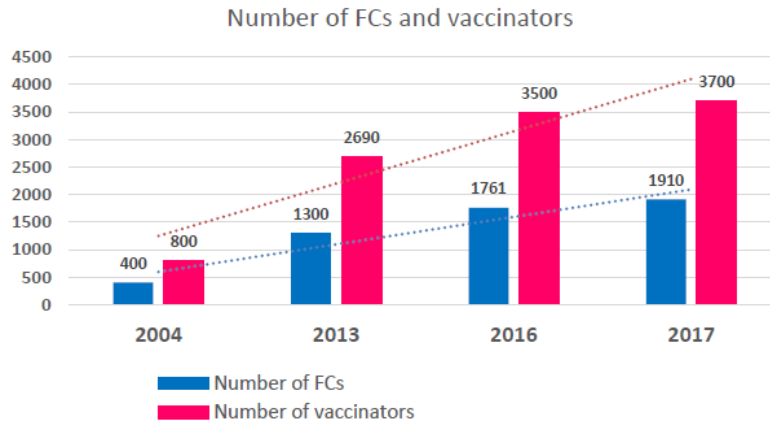
Afghanistan JA, 2018

Stock utilisation

Comparison of number of children immunised for DTP-HepB-Hib with number of vaccines available to health regions (2017)
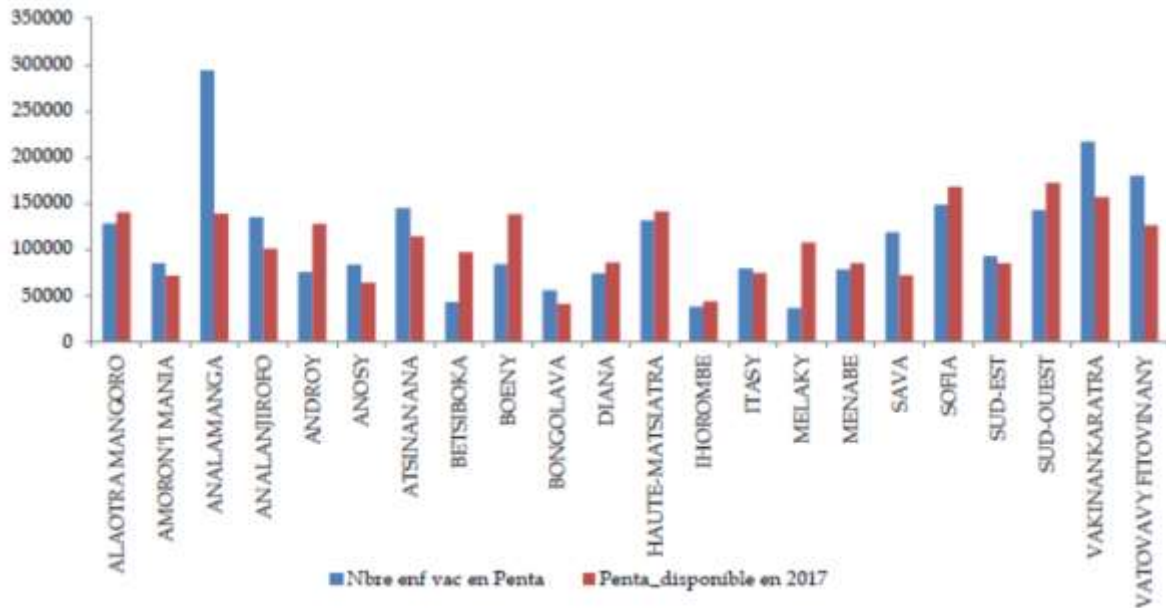
Madagascar JA, 2018

Triangulation nombres d'enfants vaccinés, doses ouvertes et doses disponibilisées
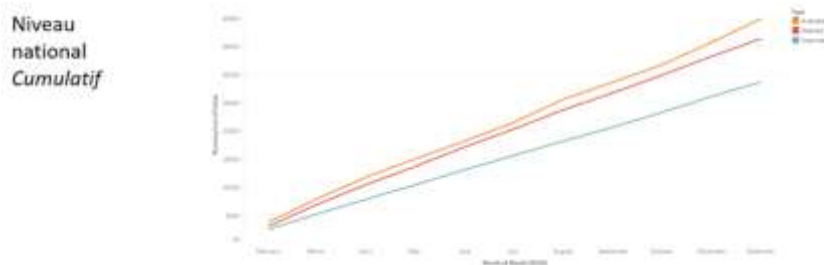
Democratic Republic of Congo, 2017

Additional analysis
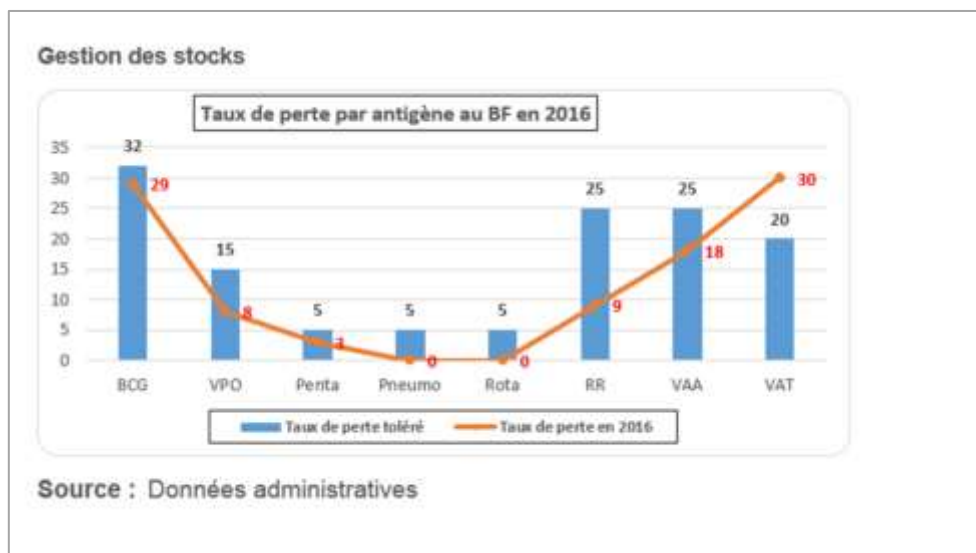
Burkina Faso JA, 2017

Comparison of doses of Pentavalent vaccine used with children immunised and calculation of wastage rate

Pentavalent vaccine	Carryover 1 January 2017	Qty received in 2017	Stock as of 31/12/17	Wastage identified	Total useful doses 2017_2	Children immunised MR	Gap CI - Dose 2	Wastage Rate 2
Adamawa	63,000	183,100	18,700	0	227,400	132,307	95,093	41.8%
Centrre	11,610	498,180	43,230		466,560	368,392	98,168	21.0%
East	31,550	95,810	4,500		122,860	108,949	13,911	11.3%
Far North	71,500	377,600	8,900		440,200	484,443	- 44,243	-10.1%
Littoral	31,170	461,100	60,470	17,290	414,510	240,923	173,587	41.9%
North	320	299,740	10,800	0	289,260	296,481	- 7,221	-2.5%
Northwest	52,800	203,200	21,460	52,500	182,040	163,900	18,140	10.0%
West	46,250	229,100	-	17,300	258,050	217,471	40,579	15.7%
South	22,820	82,970	9,450	3,990	92,350	72,614	19,736	21.4%
Southwest	46,250	151,500	23,030	27,880	146,840	145,006	1,834	1.2%
Total	377,270	2,582,300	200,540	118,960	2,640,070	598,991	80,289	3.0%
National Level	2,140,600	383,100	33,600	0	2,490,100	650,543	1,839,557	73.9%

Cameroon JA, 2018

Suggested Analysis / Indicators

Key Analyses

Drop-out rates (DPT1-DPT3/DPT1-MCV1/MCV1-MCV2)[1]

Numbers and trends over time. Consider analysis for vulnerable and high-risk groups, if information is available. Consider disaggregation at provincial and district level, with special attention to areas supported by GAVI HSS. Consider comparison with supply and immunisation services indicators. Consider comparison with main reasons for non-immunisation.

KAP Surveys

In the case of a recent Knowledge, Attitudes and Practice (KAP) survey (either alone or embedded in coverage or missed opportunities surveys), list the main reasons for non-vaccination and drop-out, as well as a quantitative and qualitative analysis for people not seeking immunisation. Consider analysis for vulnerable and high-risk groups, if information is available.

Consider disaggregation at provincial and district level, with special attention to areas supported by GAVI HSS.

Consider comparison with numbers of zero-dose children, under immunised and drop-out.

Additional analysis

- Quality of care scores from SARA/HFA
- Observations of reasons for non-vaccination from surveillance systems.

Interpretation and use

- Understanding where the access is granted but children are still getting lost to follow up through the immunisation schedule, may inform the targeting of demand generation strategies.
- Understanding reasons for non-immunisation may help tailor demand generation strategies to specific populations and inform communications plans.

Data Sources

Administrative, KAP surveys, Coverage surveys, Other assessments

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[1] Drop-out rates may be affected by different causes, which are not necessarily related to immunisation demand. Discussing reasons for drop-out including a service delivery perspective will be also relevant.

Demand

**Country case study: Afghanistan JA 2019**

During JA discussions in 2019 in Afghanistan, the results of a recent KAP survey have been presented. It indicated that there were important supply side barriers for immunisation such as distance to the health centre and lack of vaccinators or vaccinations sessions, which are being addressed by the current Gavi grant. It also demonstrated that other demand barriers were relevant, such as lack of caretaker empowerment to decide on vaccination, lack of knowledge, either on practical issues, such as where to get vaccines, but also on value and safety of vaccines, and some of it was based on purity beliefs. Based on this result and taking the current demand promotion strategy in the country, the country has decided to adjust its communication strategy with the current findings and reinforce religious leader's engagement, training and follow up to establish a demand generation network to address those barriers.

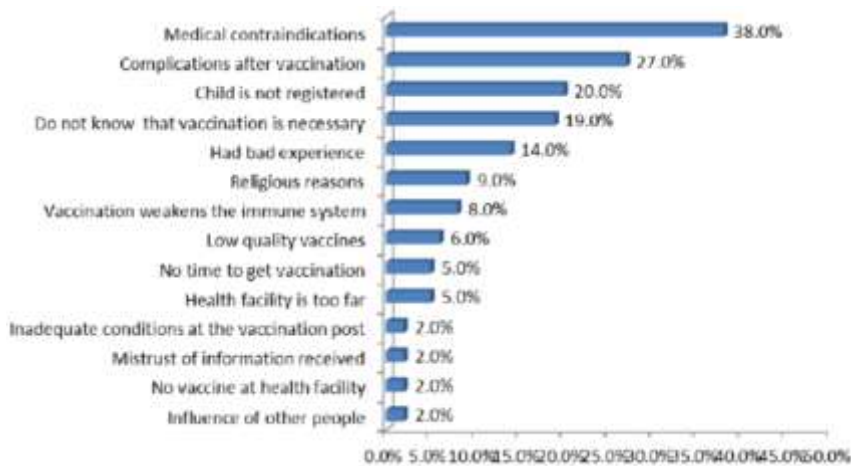- Fig.19. Reasons for not vaccinating children
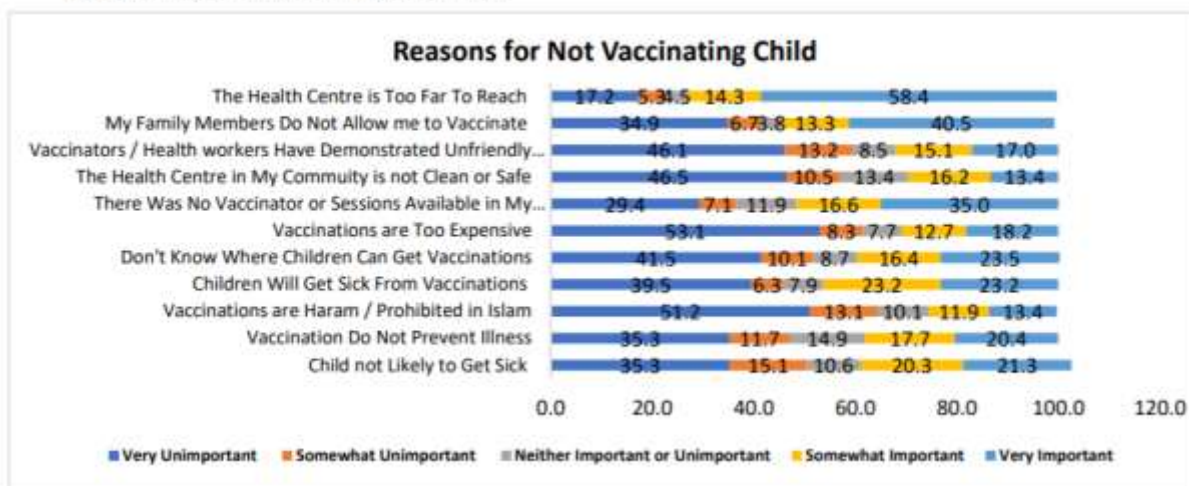
Other examples

Drop-out rates (DPT1-DPT3/DPT1-MCV1/MCV1-MCV2)[2]
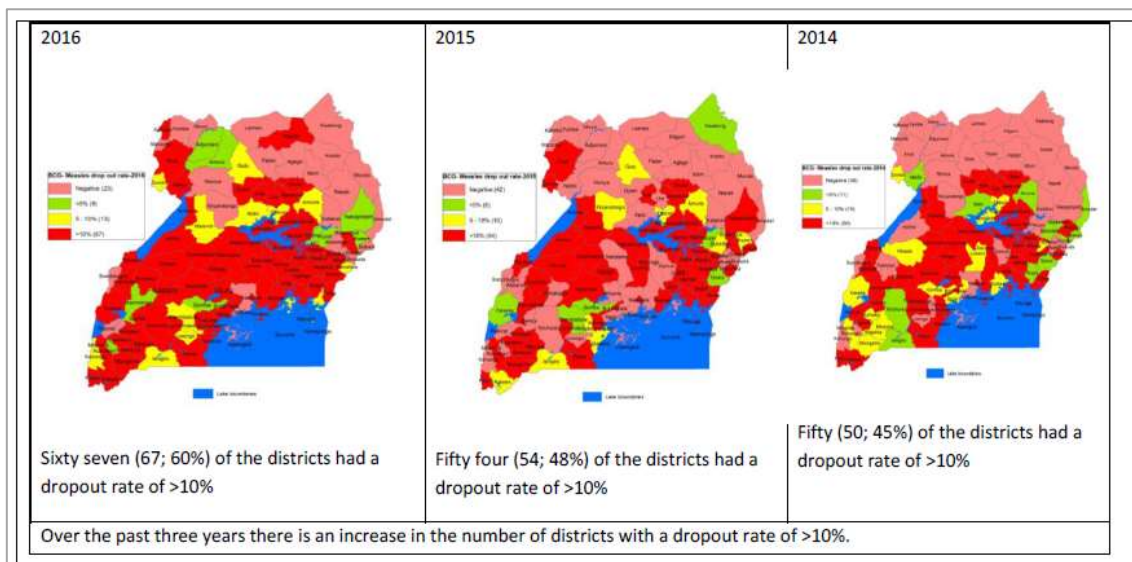
Uganda JA, 2016

KAP Surveys

Reasons for refusing immunisation of children under 5 among those who did not vaccinate their children

Tajikistan JA, 2018

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[2] Drop-out rates may be affected by different causes, which are not necessarily related to immunisation demand. Discussing reasons for drop-out including a service delivery perspective will be also relevant.

Reasons for partial/no immunisation

India JA, 2018

Suggested Analysis / Indicators

Key Analyses

Completeness and timeliness of reporting
Number and proportion of reports received (timely or not) against expected and trends over time.

Consider disaggregation at province and specially district level and in priority areas. Consider presenting health facility level data in some priority districts. Consider presenting with maps / heatmaps.

Consider comparing with coverage data to understand potential impact on coverage levels. Consider comparison with completeness of reporting for other health programmes.

Internal data consistency
Verification factors, outliers, year to year variation, negative dropouts and coverage higher than 100%. Trend analysis should be considered and they are usually more useful than snapshot analysis. When performing trend analysis, presented periods should be comparable (e.g. January 2018 should be compared with January 2019). It is better to analyse numerators separated from denominators whenever possible to identify the source of the problem. Those analysis could be based on regular desk reviews or in-depth assessments. Consider use of electronic data quality dashboards if available

Consider disaggregation at province and specially district level and in priority areas. Consider presenting health facility level data in some priority districts. Consider presenting with maps / heatmaps.

Consider comparing with coverage data to understand potential impact on coverage levels.

External data consistency
Comparison of administrative coverage with coverage surveys and WUENIC projections. Consider use of electronic data quality dashboards if available.

Consider disaggregation by province level and use of heat maps.

Denominators
Total number of surviving infants in the end of the first year of life. Consider describing the methodology and processes for developing EPI denominator estimates.

Consider disaggregation at province and specially district level and in priority areas. Consider presenting a ranking table that ranks subnational areas by target population (most to least). Consider presenting with maps / heatmaps.

Consider comparison of population estimates from different data sources such as EPI projections, UNPD estimates, CRVS systems, other programmes projections (e.g. malaria bed nets campaigns) or others as available. Consider comparing district level surviving infants estimates with aggregation of surviving infants' numbers from catchment areas of health facilities if possible. Consider comparison with stock utilisation data.

Additional analysis
- Trend analysis of Home-Based Records (HBR) for children: printing, ownership and availability
- Comparison of implied Infant Mortality Rates according to different population denominator data sources and other official sources and, if relevant.

Interpretation and use
- Understanding which districts/areas present important data quality issues may help the targeting of data quality efforts.
- Understanding the main problems and the scale of data quality issues may help inform the interpretation of country performance at national and subnational levels.

Data Sources
Administrative, KAP surveys, Coverage surveys, UNPD population estimates, EPI population projections, Other denominators sources available, Other assessments

Data Quality

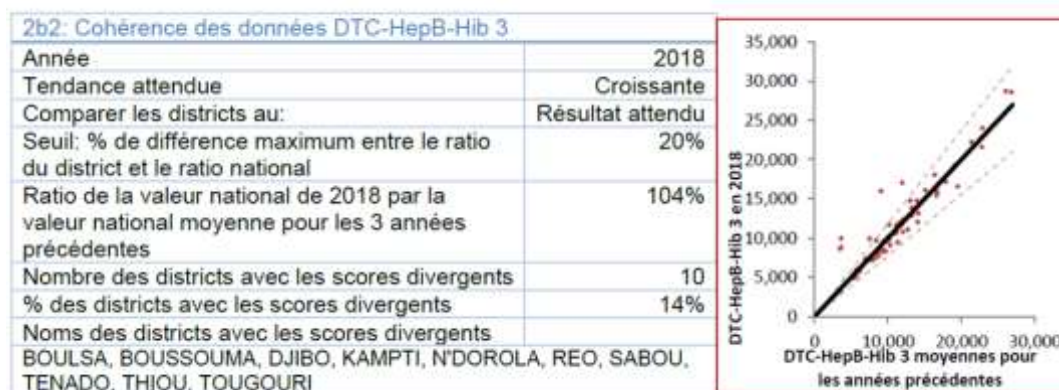**Case study: Burkina Faso JA 2019**

During the JA 2019 in Burkina Faso, data quality checks have been used to understand the quality of immunisation data. Although the district completeness of reporting was consistently 100% in the national level across last 4 years, problems were identified on the health facility level, with a completeness of 97.4% and a timeliness of 82.1% compromising the capacity of district managers and health workers to take timely decisions based on data. Further analysis demonstrated that the timeliness problem was concentrated in only 6 districts. Internal consistency check also demonstrated that those and many other districts were consistently presenting aberrant data. Based on this finding the country decided to reinforce supervision for adequate data collection at health facility level, specially in those areas. They also decided to reinforce data collection, validation, analysis and use, through training and workshops at regional and district level. A new coverage survey has also been proposed to be able to compare with administrative data and improve decision making.

Tableau VIII : Complétude et promptitude des rapports en 2018

| Nb.	Mesure	Taux National	Districts avec un taux en dessous du seuil	
			Nombre	%
1a	Exhaustivité des rapports de district	100,0%	0	0%
1b	Promptitude des rapports de district	97,4%	6	8,6%
1c	Exhaustivité des rapports d'établissements de santé	99,9%	6	8,6%
1d	Promptitude des rapports d'établissements de santé	82,1%	32	45,7%

Source : Données administratives MS

- **Qualité des données :** Cohérence des données d'une année à l'autre

2b2: Cohérence des données DTC-HepB-Hib 3	
Année	2018
Tendance attendue	Croissante
Comparer les districts au:	Résultat attendu
Seuil: % de différence maximum entre le ratio du district et le ratio national	20%
Ratio de la valeur national de 2018 par la valeur national moyenne pour les 3 années précédentes	104%
Nombre des districts avec les scores divergents	10
% des districts avec les scores divergents	14%
Noms des districts avec les scores divergents	
BOULSA, BOUSSOUMA, DJIBO, KAMPTI, N'DOROLA, REO, SABOU, TENADO, THIOU, TOUGOURI	

Data Quality

Other examples
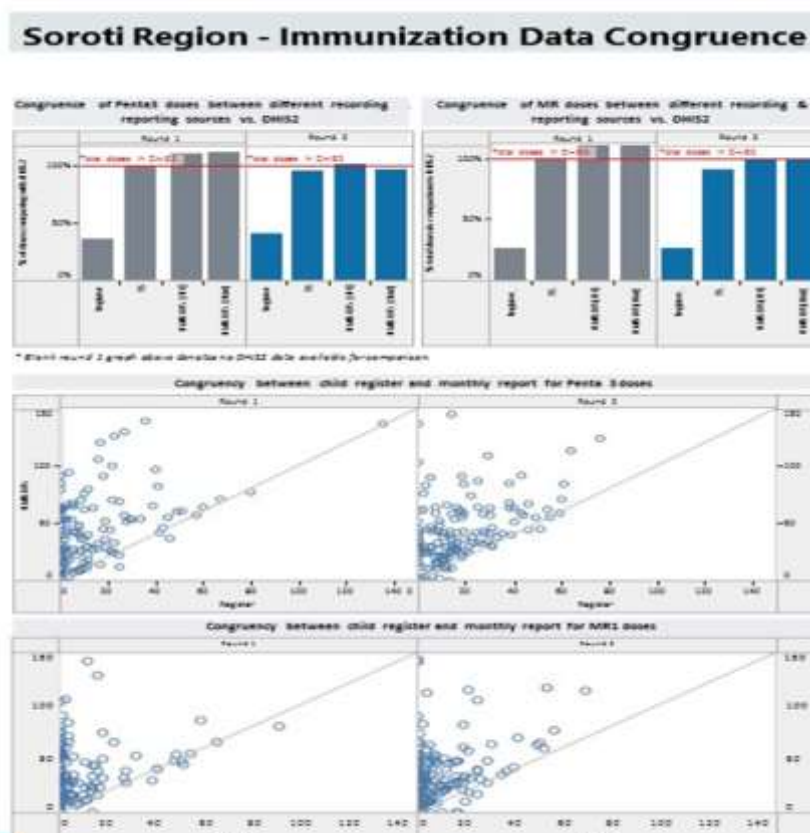
Completeness and timeliness of reporting

Timeliness of Health Facility Report submission analysis by district 2016-2017
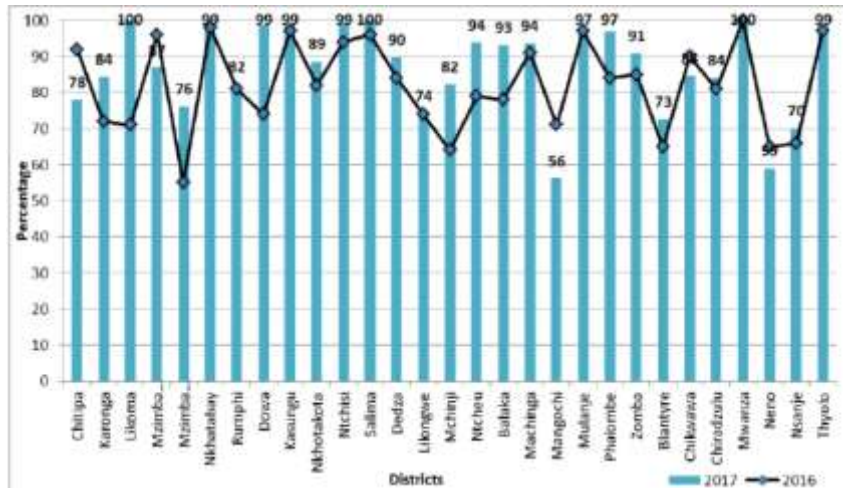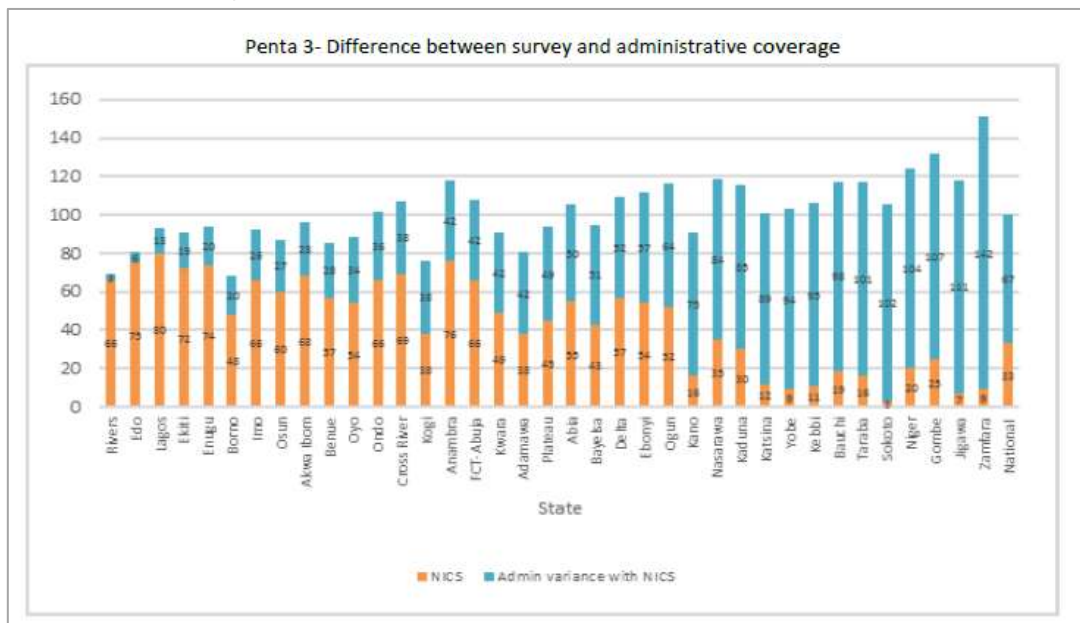

Malawi JA, 2018

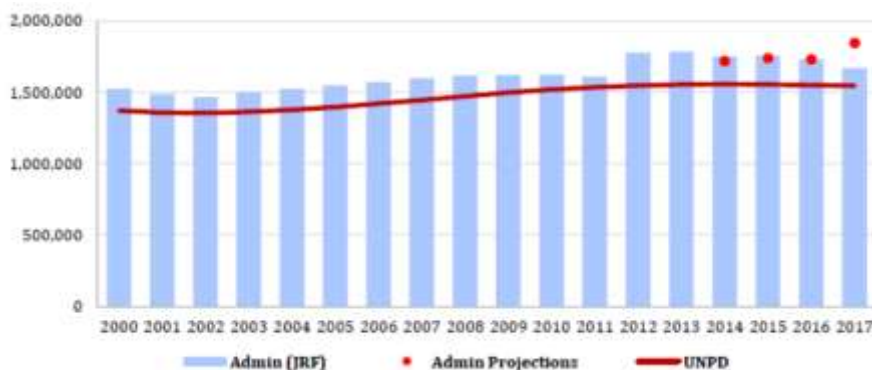**Internal data consistency**

Immunisation data congruence

Uganda JA, 2018
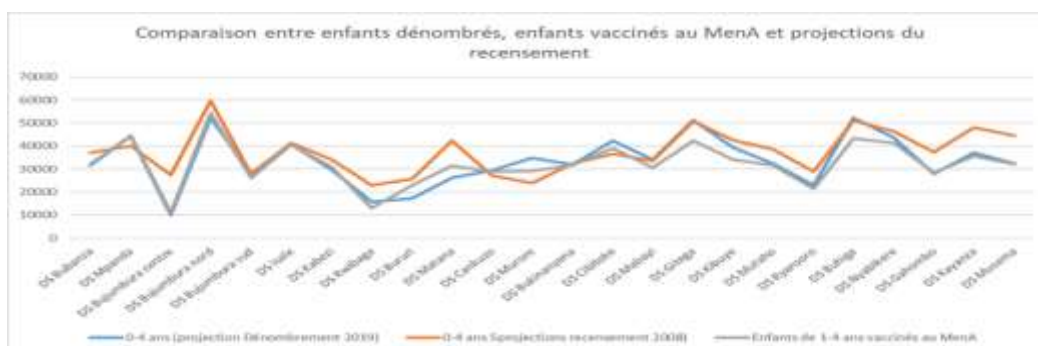
External data consistency

Nigeria JA, 2017

Denominators

Vietnam JA, 2018

Comparison between EPI projections, census projections and children immunised on Men A campaign

Burundi Rapport du dénombrement des enfants de moins de 5 ans, 2020

Suggested Analysis / Indicators

Key Analyses

Health and immunisation programme financing
Total budget allocation and proportions with trends over time. Consider analysis by funding sources (government vs others). Analysis of main donors involved in immunisation activities by theme and regions is highly desirable.

Health and EPI budget execution
Total budget execution and proportion with trends over time. Consider analysis by programmatic function (e.g. salary vs non-salary or capital vs recurrent costs)
Consider disaggregation by administrative level (e.g. central, provincial, district), specially for priority areas.
Consider comparison with coverage and or supply and immunisation services indicators, if relevant.

Additional analysis
- Trends in Gross Domestic Product (GDP) and economic growth perspectives.
- Trends in General Government Health Expenditures (GGHE) in absolute terms and as share of the General Government Expenditure (GGE). Consider disaggregation by level of care (primary, secondary and tertiary) and international comparisons.

Interpretation and use
- Understanding the financing profile of the health and immunisation programme may lead to better understanding of the sustainability of the program and help inform funding related activities and strategies.
- The health and budget execution profile help to understand the funds absorption capacity of the country and may help in the re-prioritisation of activities with low absorption and adjust financial flows.

Data Sources

Ministry of Health budget execution report, EPI budget execution report, EPI operational plan report, Other assessments

Financing

Case study: Niger FPP, 2019

During 2019 in-country dialogue in Niger, the country compared the EPI budget execution across different levels from 2017 to 2018. There was a marked improvement in the absorption of funds between those 2 years, even though the country has been through a brief period of blocked accounts for 2 months in 2018. For the central level, a heavy procurement process has been implicated as a main cause for poor absorption. Based on this analysis, the country recommended keep using the basket fund model for grant management and to prioritise strengthening of capacity among its personnel, the central and the regional level financial manager. Main activities prioritised are audit and inventory management to increase absorption of funds and reduce financial risks.

Tableau N°06 : Exécution financière par niveau en 2017, Niger

Niveau	Prévisions	Mobilisations	Dépenses	Réalisation financière
Régional	53 043 362 236	31 517 751 509	29 767 442 432	56,12%
Central	110 218 454 987	64 921 257 705	54 749 528 111	49,67%
Total	163 261 817 223	96 439 009 214	84 516 970 543	52%

Source: REP 2017 / REP 2018 (montant en F CFA)

**Tableau N°07 : Exécution financière par niveau en 2018, Niger**

Niveau	Montant prévu	Montant mobilisé	Montant dépensé	Taux de réalisation financière
Régional	43 711 659 515	30 165 569 176	28 833 129 635	66%
Central	112 977 601 659	67 728 286 910	65 299 611 050	58%
Total	156 689 261 174	97 893 856 086	94 132 740 685	60%

Source: REP 2017 / REP 2018 (montant en F CFA)
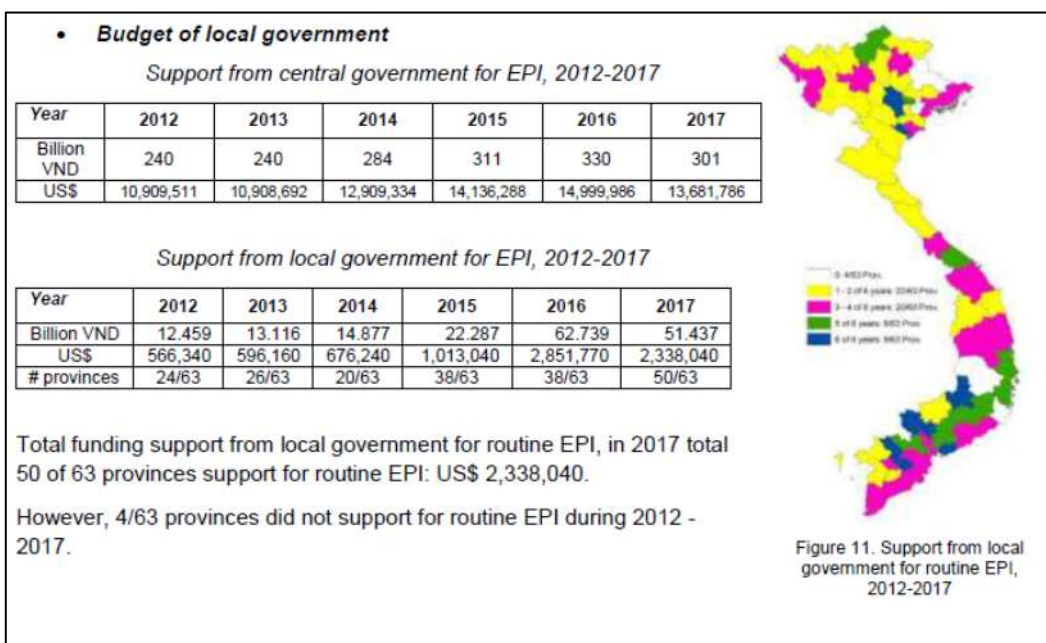
Other examples

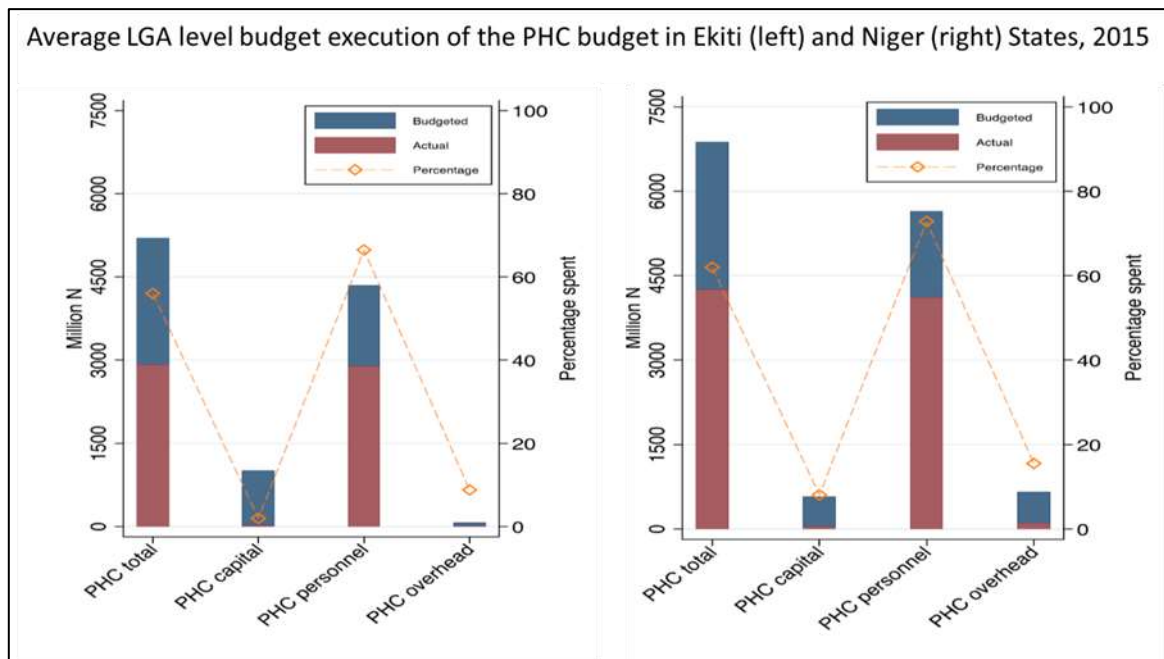**Health and immunisation programme financing**

Immunisation financing 2017
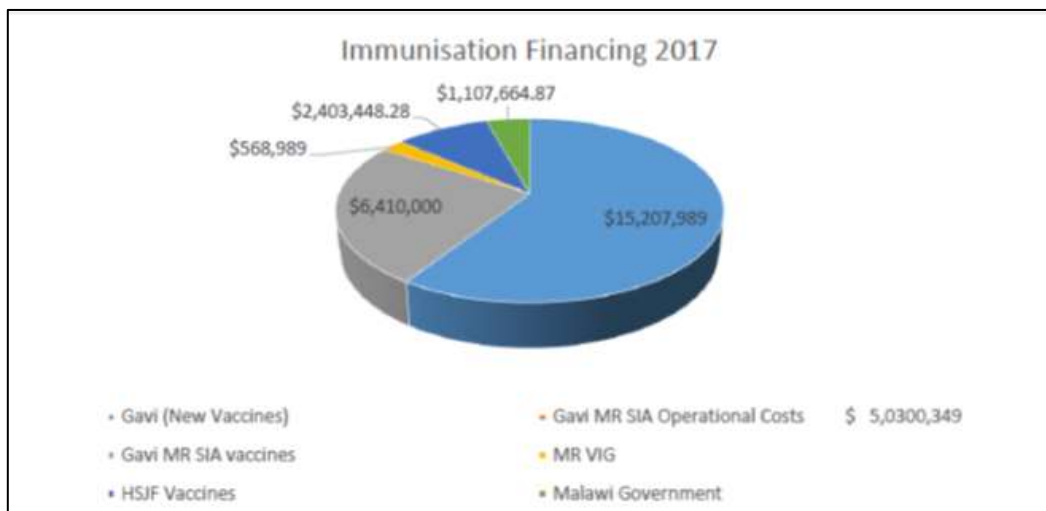
Malawi JA, 2017

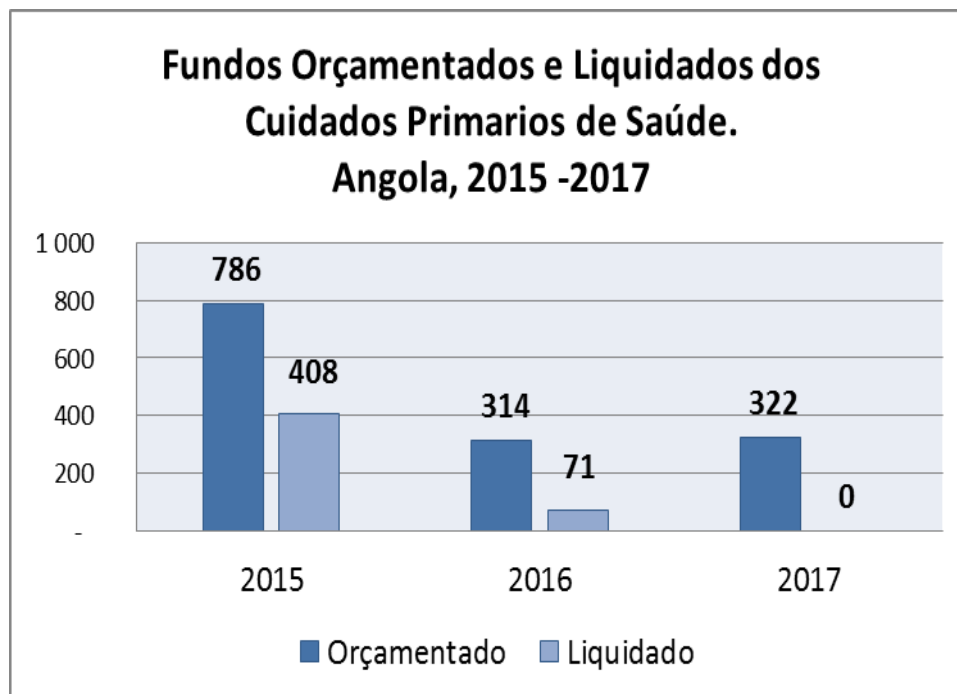Immunisation financing 2012-2017

Vietnam JA, 2018

Health and EPI budget execution

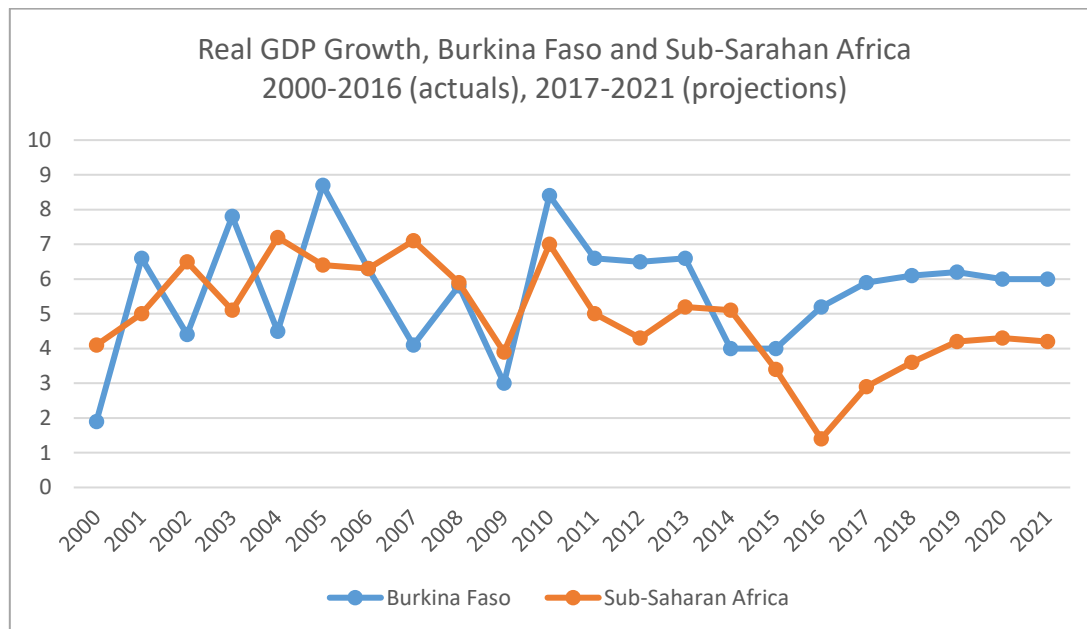*World Bank, 2017. Public expenditure tracking survey*

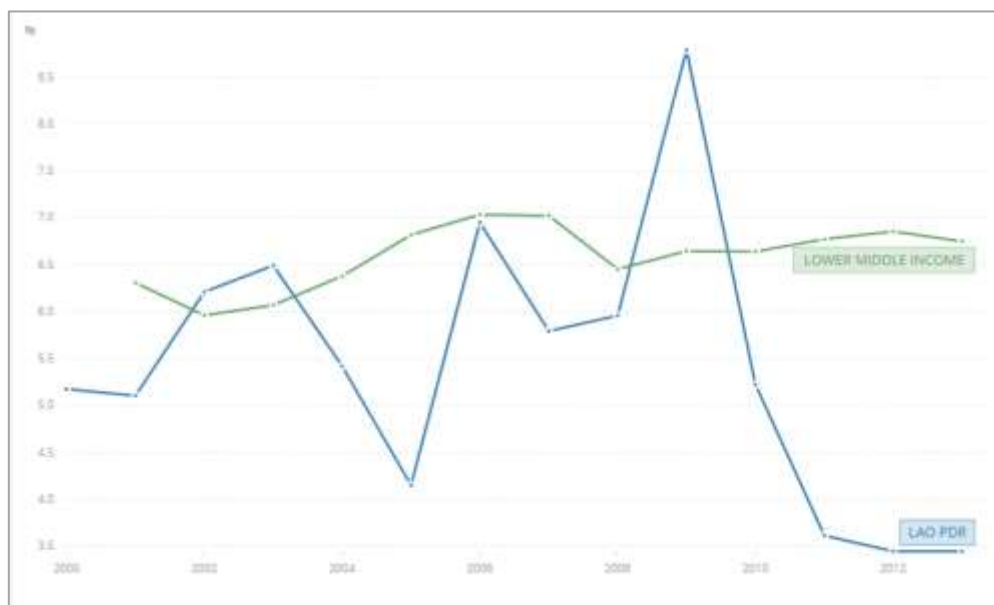Funds allocated and executed for primary health care in Angola, 2015-2017

Post-transition discussions, 2018

Additional analysis

GDP growth, Burkina Faso and Sub-Saharan Africa, 1980-2016 (actuals), 2017-2021 (trends)

Government Health Expenditures as a share of General Government Expenditures, Lao PDR and lower-middle-income countries (2001-2014)

Suggested Analysis / Indicators

Key Analyses

Vitamin A and deworming

Total numbers treated and estimated coverage for integrated public health interventions. This analysis is especially useful when those interventions are combined with vaccination campaigns.

Consider disaggregation at provincial or district level. Consider use of heatmaps to present this data.

Consider comparison with vaccine coverage. Consider comparison across different post-campaign results data sources (e.g. post campaign admistrative reports and post-campaign coverage surveys) and interpret results with care.

Additional Analysis

- Total number of mothers registered for antenatal care (1+ visit) and antenatal care coverage (4+ visits). Consider analysis of TT1 and TT2 coverage. Consider disaggregation at provincial and district level and presenting data with heatmaps. Consider comparison with immunisation coverage and interpret results with care.
- Total number and incidence of malaria cases and deaths. Consider disaggregation at provincial and district level and presenting data with heatmaps. Consider comparison with immunisation coverage and interpret results with care.

Interpretation and use

- Vitamin A and deworming analysis may help to identify locations where there are problems with the vaccine distribution and cold chain and / or with immunisation practices (e.g. not immunising children with MCV1) affecting vaccine coverage. It may also help to understand the data quality of the campaign reporting and help to better identify problems with unrealistic denominators estimates in some areas.
- The number of mothers registered for antenatal care may help to understand potential denominators problems and better contextualise vaccine coverage. It may also help to identify potential quality of care and accessibility issues providing suggestions on areas with high gender related barriers that will also impact immunisation coverage
- Regions with high malaria burden are also likely to have low immunisation coverage, so understanding Malaria distribution may help the programme to better target its efforts.

Data Sources

Post campaign administrative reports, post-campaign coverage surveys, Admin system, Others surveys, other assessments

Other health programmes

Case study: Togo JA 2019

During JA discussions in 2019 in Togo, the country presented the results of a 2018 MR catch up campaign (9m – 14y) under the measles elimination strategy. This campaign was combined with Vitamin A administration (5-59m) and deworming (12-59m). A post campaign coverage survey showed that 4 regions have reached the target of 95% coverage for the 3 interventions. Despite of the different age groups, results across interventions were similar indicating that the vaccines, Vitamin A and Albendazole has adequately reached children in most areas, except for Lomé and Maritime. Further analysis comparing the post-campaign survey data with the Admin data demonstrated a clear gap for Maritime region - Admin data was 103% there while the post campaign survey suggested 89% - indicating that the quality of data there was a problem and that the campaign management team was not aware of its low performance. After the campaign MR1 and MR2 doses have been introduced in January 2019 and the country plans to use the vaccination on the second year of life to catch up the children in those regions that missed their measles doses. The country also proposed to prioritise technical assistance for next year for the development of a Strategic Plan for Measles Rubella elimination.

Post campaign measles coverage vs deworming and Vitamin A by region

	Lomé	Maritime	Plateaux	Centrale	Kara	Savanes	Togo
RR (9 mois-14 ans)	88	89	98	98	97	95	94
Vitamine A (6 à 59 mois)	82	85	97	98	96	96	92
Albendazole (12 à 59 mois)	84	86	97	99	95	96	92
Obj CV	95	95	95	95	95	95	95
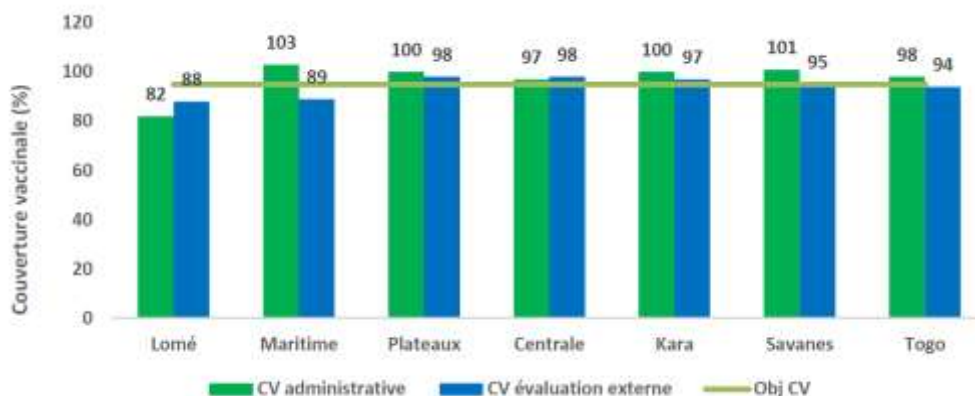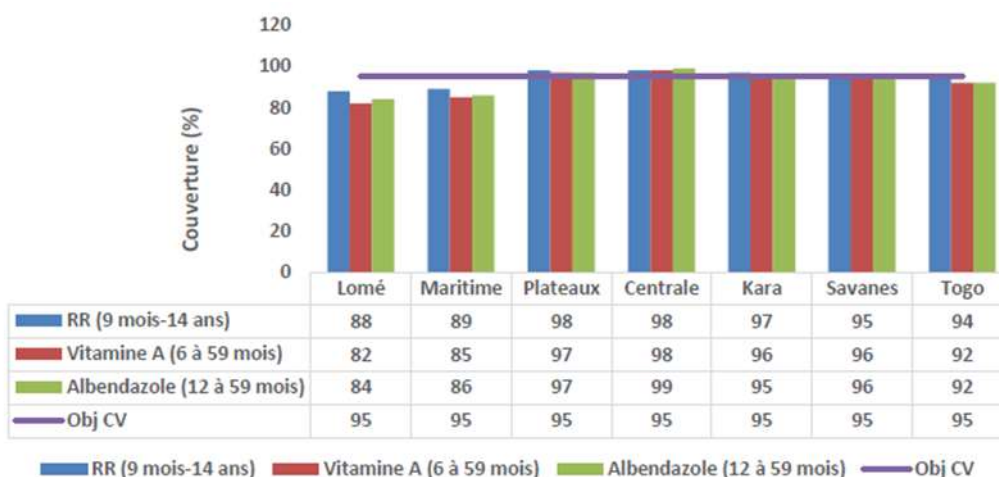
Other examples

Vitamin A and deworming

Post-campaign measles coverage vs deworming by region

Commune	VACCINATION									DEPARASITAGE		
	Population cible			Couvertures						Cible	Déparasi tés	Couvert ure
	1-6 ans	7-14 ans	Total 1-14 ans	1-6 ans		7-14 ans		Total 1-14 ans	CV Globa le	2-14 ans		
				Vaccin és	CV	Vaccin és	CV	vaccin és				
ARTIBONITE	193966	246625	440591	168264	87%	240946	98%	409210	93%	408308	243056	60%
CENTRE	44068	56031	100099	43884	100%	64998	116%	108882	109%	92765	73568	79%
NIPPES	5266	6696	11962	5921	112%	9175	137%	15096	126%	11006	1298	12%
NORD	90986	115687	206673	89445	98%	118313	102%	207758	101%	191519	116025	61%
NORD-EST	17198	21868	39066	25579	149%	33416	153%	58995	151%	36204	51733	143%
NORD-OUEST	33680	42824	76504	27709	82%	47644	111%	75353	98%	0	0	0%
OUEST	662819	842766	1305585	487459	74%	750215	89%	1237674	82%	576602	217948	38%
SUD	38661	48158	87819	25994	67%	42415	86%	68409	78%	81384	62521	77%
SUD-EST	33792	42967	76759	24842	74%	45362	106%	70204	91%	71134	49227	69%
PAYS	1120437	1424621	2545058	899097	80.25%	1352484	94.94%	2251581	88.47%	1469012	815376	56%

Haiti JA, 2019