Annex: Programme Performance

Subnational Level

7

Basic examples of triangulation to assess programme performance for the district and health facility levels

World Health Organization, UNICEF, & U.S. Centers for Disease Control and Prevention

TRIANGULATION FOR IMPROVED DECISION-MAKING IN IMMUNIZATION PROGRAMMES
Working document: July 2020

Background

Triangulation is the synthesis of two or more existing data sources to address important questions for programme planning and decision-making.

Triangulation can include putting different data together in one graph, or stitching information from several graphs together with a story. Triangulation requires critical thinking and basic analysis skills, but the activity goes beyond making graphs — it's about turning data into reliable information for action.

This guidance will walk you through an example of using the 4-step triangulation process for **assessing programme performance** at the **district or facility level.** Other guidance can be found online at the https://tinyurl.com/triangulation-July2020.

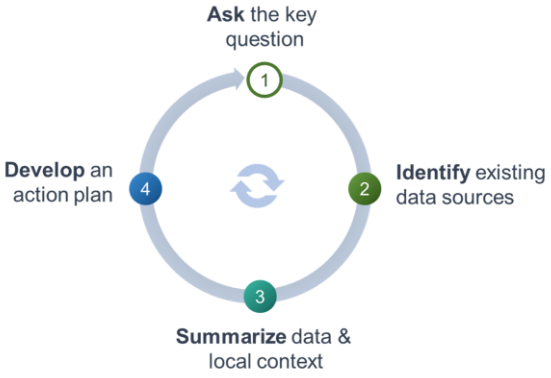


Fig. The 4-step EPI data triangulation process, starting with a key question and ending with action. The process can be repeated in cycles.

INTRODUCTION

Monitoring immunization data is critical for identifying if there are unvaccinated and under-vaccinated children and improving programme performance. However, monitoring immunization programme performance may be challenged by poor data quality, which can hide performance issues. For this reason, it is helpful to monitor both performance and data quality.

Subnational programme managers play a key role in data monitoring, including routine validation and correction of data errors, on-the-job training of staff and improvement planning. Triangulation can help you identify health units that should be prioritized for follow-up.

You should examine coverage and surveillance data, and also the underlying numerator and denominator, by month and across areas to identify data errors in reporting. A common experience is that the source of reporting errors is often just one or a few staff. Aggregate data at the national, regional or district level may hide issues at the health facility level. Looking by health facility and month reveals differences normally hidden by only looking at annual aggregate totals for higher levels. Triangulation of coverage, vaccine stock, surveillance, and other programme data can help reveal unreliable data and provide a deeper understanding.

QUESTIONS TO ASK

- How can data triangulation help me with routine monitoring as part of my job?

Example: What is the problem?

Country X has a robust health management information system in the District Health Information System (DHIS2), including vaccination coverage and vaccine stock data. Most of the training to date has focused on data entry into the system, rather than analysis and use of the data. Supervisory visits occur regularly, but they are known to not be very effective. There are known issues with the quality of the data in DHIS2, and programme gaps highlighted by vaccine stock-outs and VPD outbreaks. Are there ways that the data could be better used for immunization programme improvement?

ASK the key question

Reflect on whether there are known issues or questions you have about the reported immunization data in your area. Developing specific questions based on the common problems you have experienced could help direct the analysis and/or make it more relevant for your work.

- What are the key questions you hope data triangulation will help you address?

Examples of key questions
? Do the immunization and surveillance data in my area reflect any difference in access and utilization of vaccine services across health units?
? Which health units under my supervision have poor programme performance or inconsistencies in data quality requiring follow-up?
? Is administrative coverage compatible with other measures of program performance (e.g., stockouts, vaccination sessions) and impact (reduction in disease)?

IDENTIFY existing data sources

Next reflect on the data sources available to you. Commonly available at the subnational level are reported data on vaccine doses administered (used to calculate coverage) and data on vaccine doses received, distributed, and used (stock). These data provide an opportunity for ready comparison, particularly for vaccines given in single dose vials and/or where vaccine wastage is low. For example, the following can be compared:

- Single-dose pentavalent vial used ≈ one dose administered
- Two-dose pneumococcal vial used ≈ two doses administered

- What data are available to address the question?
- Which data sources are most reliable?
- Which indicators are most relevant for analysis?

Vaccine-preventable disease surveillance is also likely available. In settings with poor surveillance quality, small populations, and/or where active disease transmission is not occurring, surveillance data may be less useful for highlighting immunization performance gaps.

If available at the subnational level, coverage survey data, local population estimates, other health program data (e.g., antenatal care, birth registration) and even health insurance data should be considered. Be sure to note the time frame of the data and compare it with administrative coverage data from the same time period.

For each data source, it is important to note the data collection methods, strengths and any limitations. Ascertain if you have complete and timely reporting by reporting unit. For coverage and surveillance data, it will also be important to note the source of target population estimates used for calculating indicators. It is also important to consider contextual information that will be relevant to interpret the data and target programme improvement activities (e.g., changes in reporting system, recent trainings).

- Are there issues like reporting completeness & timeliness that limit interpretation?
- Which health units have <80% complete & timely reporting?
- Which health units have blanks or zero reports? For how long & which months?
- Are there any facilities left out of reporting?

Example: What data sources are available?

A district has the following immunization data sources that can be used for data triangulation:

Data Source	Key Considerations for Data Source
Immunization data in DHIS2 for 2017-2018	Reliable reporting in DHIS2 since 2017, some missing reports and data recording/entry errors
Vaccine stock data in DHIS2 for 2017-2018	(Same as above)
Case-based VPD surveillance data for 2017-2018	Surveillance performance indicators for district were not met in 2017
Aggregate VPD surveillance data for 2017-2018	There were a number of health facilities in the district that did not report.

SUMMARIZE existing data and local context

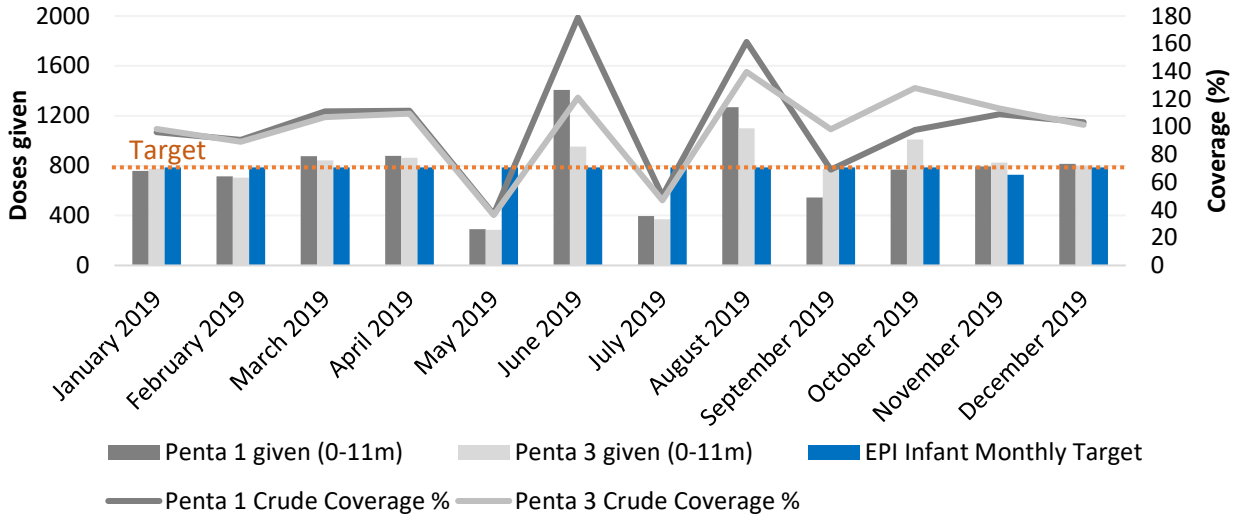
Analyze data for each health unit before summarizing across the overall catchment area. We suggest classifying **each key finding as being a data quality issue, a programme issue or both.**

A. Examine coverage, vaccine doses (numerator), and program target (denominator) across antigens by month and health unit.

Look at the following indicators over time (e.g., by month) and across health units to identify possible issues:

- Access issues (low DTP1 coverage)
- Utilization issues (high DTP1-DTP3 dropout (DOR))
- Potential data quality issues
  - Large drops or increases in doses administered or target for a month
  - Data frequently ending in 0 or 5, or frequently matching the previous month or other antigens
  - Coverage >100% from inaccurate population estimates or changes in population served
  - Negative drop-out rates from changes in the target population, recording errors, or other issues.

- Are doses administered/ coverage patterns consistent over time?
- Are there health units with coverage >100%?
- Units with negative drop-out?
- Are there any months with missing or zero doses administered?
- Why do you think this is occurring?



Example 1. Monthly time series of program target, vaccine doses (Penta1 and Penta 3), and vaccine coverage, Health Facility X month-wise view, you can see anomalies in reporting during May through October 2019. In May and July, Penta 1 and Penta 3 much lower than the target, which could reflect a vaccine shortage. The higher Penta doses given in June and August could ref activities. Triangulating with vaccine stock data and vaccination session data could help with understanding what happened.

B. Examine coverage and drop-out rates. Looking at specific drop-out rates across the vaccination schedule such as BCG-MR1 (or DTP1-MR1), DTP1-DTP3, and MR1-MR2 can be helpful in assessing at what stage in the schedule most of the dropout is occurring. To help diagnose whether facilities have issues with access or utilization (or both), it may be helpful to graph DTP1 coverage (access) vs. DTP1-DTP3 drop-out (utilization).

- What areas have access and utilization issues?

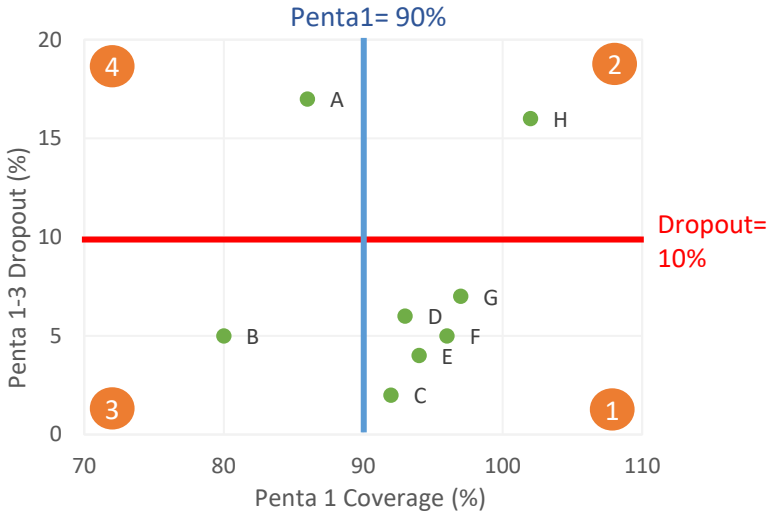


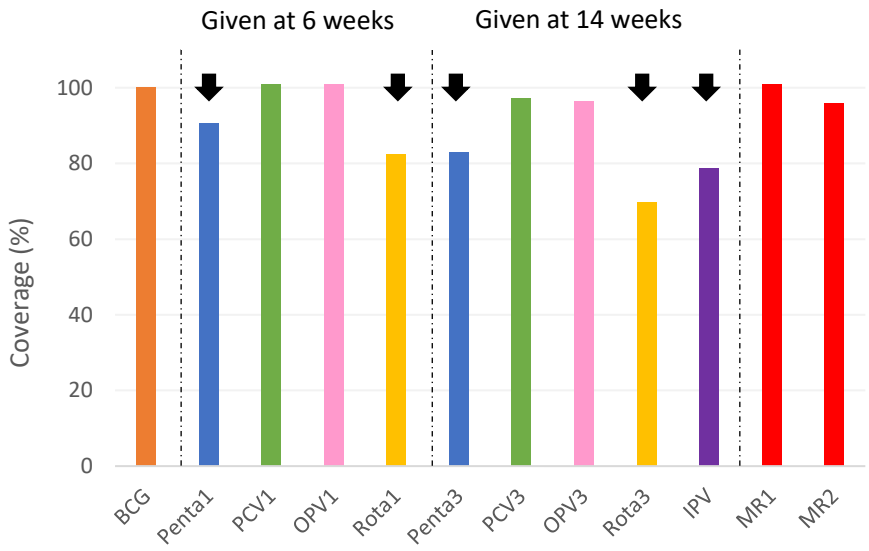
FIGURE LEGEND

1) High DTP1 coverage (+90%) & low dropout (-10%) = NO access and utilization issues
2) High DTP1 coverage but high dropout = utilization issues
3) Low DTP1 coverage but low dropout = access issues
4) Low DTP1 coverage and high dropout = access and utilization issues

Example 2. Scatter plot of Penta1 coverage (access) versus Penta1-Penta3 dropout rate (utilization) by health facility. The interpretation for health facilities in the four quadrants of the graph is detailed in the figure legend on the right.

C. Compare across antigens given at same time and/or given close together in the schedule. Children showing up for immunization visits should receive all antigens due for their age, based on the schedule. For example, comparing Penta1 vs. PCV1 or OPV1, and Penta3 vs. PCV3 or OPV3, could be helpful to reveal anomalies. Large differences may be data entry errors, or could be the result of vaccine stock-outs, or false contraindications.

- Are there unexpected trends or anomalies in the data? Does this occur consistently? In one health unit or across multiple areas?
- Are there recent vaccine stock-out or supply issues in my area?
- Any issues with false contraindications to vaccination in my area?



Example 3. Annual coverage by antigen, Facility X, District A, 2019. Coverage with Pentavalent (Penta) vaccine 1 and 3 and Rotavirus (Rota) vaccine 1 and 3 coverage are lower, compared with Pneumococcal-conjugate vaccine (PCV) 1 and 3 and oral poliovirus vaccine (OPV) 1 and 3. Inactivated poliovirus vaccine (IPV) is also low compared with PCV3 and OPV3.

The supervisor knows that were some district level stockouts of Penta and IPV in 2019. Also, since Rota vaccine introduction in 2017, there have been issues with low Rota coverage related to vaccinators not carrying vials in their vaccine carriers during outreach because of the space they require. The supervisor plans to visit the facility to explore the root causes for the particular issues and discuss ways to address them.

D. Assess vaccine wastage and consistency across doses administered, vaccine stock and supply data. Vaccine wastage for all antigens should be included in program monitoring.

- Most vaccines typically have <10% wastage, or close to nil for single dose vials.
- High wastage for 10-20 dose reconstituted vaccines (e.g., BCG, measles) is acceptable because it can reflect sacrificing doses to vaccinate all children.
- Unexpected low wastage for multi-dose vials is often an indication of ignoring multi-dose open-vial policy, especially when coupled with low reported coverage in areas with lower population.
- Negative vaccine wastage is not expected and should be flagged for further investigation.

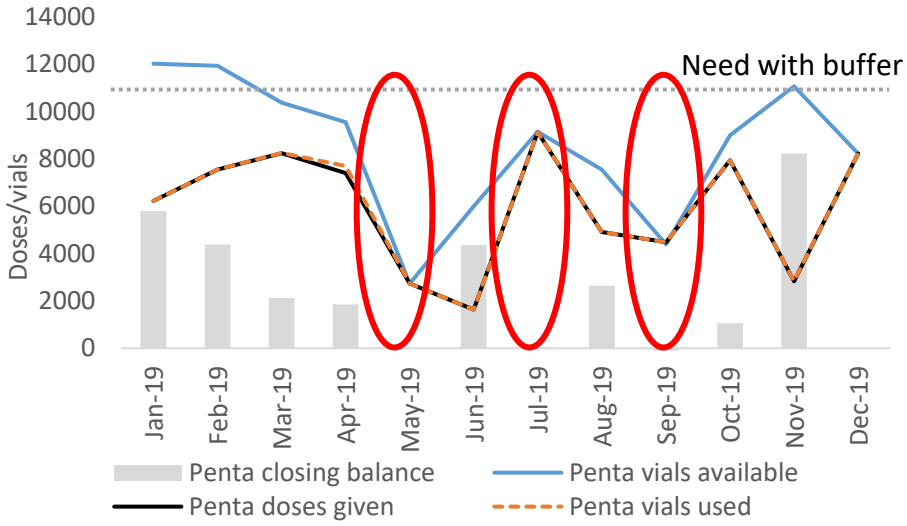
- What size vaccine vials are used?
- Are children batched before opening a multi-dose vaccine vial, or is the multi-dose vial only opened one day per week?
- What vaccines have low wastage or presentations easy to compare to doses administered?

As part of assessing data quality, it can be helpful to compare **Total Pentavalent doses given** (Penta1 + Penta2 + Penta3) with **Pentavalent vials used** and **Pentavalent vials received** at the service delivery level, or lowest level of data available. Examining the number of **Pentavalent doses available (Open + Received)** and **closing balance** is also helpful to view in a time series to evaluate issues of unreliable stock and shortages.

- Are there health units having unexpectedly high or low vaccine wastage rates?
- Do any report giving more doses given than vials used?
- Do any health units appear to have stock shortages? Why?
- If a stockout was reported, did the doses administered increase after stock was restored (e.g., catch-up)?

Examine total reported values for the year by health unit. The expectation is that Pentavalent vials received and used should be the same as or exceed the number of children given Pentavalent doses. Viewing month-wise EPI and stock reports can reveal differences over time, and should be done for all health units.

Fear of MCV wastage and stock outs can be a significant issue for health workers. Therefore, even though policy may be to vaccinate at all opportunities, many facilities only provide MCV on one day per week. Comparing MCV coverage, MCV wastage, and DPT3-MCV drop-out could be helpful for finding reasons for low coverage. For vaccines with diluents (e.g., MR), comparing the number of vaccine vials used and diluent vials, and syringes used may reveal errors in stock data.



Example 4. Comparison of Penta doses given and vials available, used, and closing balance, Sub-district Y. In some months (May, July, September), the sub-district used all of the Penta doses available and ended with zero closing balance (red circles). Also, more Penta vials used were reported than doses given in April 2018.

E. Compare coverage and surveillance data. Review the available active and vaccine preventable disease surveillance data. For case-based surveillance, make simple tables or charts to assess the area of residence, age group and vaccination status of cases (vaccination status of discarded cases may also be useful). Age groups for analysis should reflect vaccination schedule.

If eligible children are unvaccinated or under-vaccinated, consider why these children are being missed. It is expected to have some confirmed cases that were previously vaccinated, and this

proportion will grow as coverage improves. Some children may be ineligible for vaccination based on age (e.g., age <9 months for MR vaccine).

Ability to capture vaccination status in case-based surveillance varies by age. Older individuals may be unaware of their vaccination status and may not have vaccination records. For children, surveillance staff are encouraged to confirm vaccination status either in home-based health records, clinic records or registry data.

- Are there specific areas with more confirmed cases?
- Which age group has the most cases?
- Given your vaccination schedule and coverage data, does the age and vaccination status of your cases make sense?
- What are some explanations for these trends?

In terms of assessing the quality of case-based surveillance data, review whether surveillance in your area is meeting performance indicator in targets. Additionally, if aggregate and case-based surveillance systems exist for the same vaccine-preventable disease, compare and examine and discuss discrepancies.

F. Incorporate any other available data and local knowledge of context. Local knowledge should be incorporated into the interpretation about immunization program quality (e.g., shortages of vaccine supply or vaccination staff), community awareness and vaccine demand, vaccine vial size and open-vial policy vs. practice, underutilization due to proximity to other health centers in neighboring districts, and community risk (e.g., issues of population density, vulnerable populations, internal and external migration, social deprivation, maternal education). There may be local data available from other sources including findings from recent supervisory visits or reviews (EPI/surveillance reviews and post-introduction evaluations).

- Do you think local target population estimates are too high or low?
- Are special populations included in microplans?
- Are there issues with service delivery like lack of staff or cold chain?
- Are there issues with vaccine hesitancy or false vaccine contraindications?
- Do results make sense given what is known about the program and community in these areas?

DEVELOP an action plan

After examining multiple data sources, outline the key findings. Each key finding should be classified as a data quality issue (e.g., data entry errors, non-reporting), program issue (e.g., stock-out, immunity gaps) or both. Based on your understanding of the issues, develop simple key messages and actions for each level. Providing examples of issues and why it is important would be helpful to support your message.

Next, it is important to develop an action plan for what you will do with your triangulation results to improve the program in your area. There may be actions that need to be taken at your administrative level, or at levels above or below. Consider availability of resources and involve those in charge of implementation in developing potential action items. Think creatively. Actions can be prioritized based on what is feasible for the short-term versus what is feasible for long-term or will take more time to address. Your action plan may also include conducting regular triangulation analyses in the future (e.g., automated data quality dashboards).

- Did your analysis help identify health units that require a visit?
- What specific issues could be addressed through targeted mentoring of health staff?
- What program issues identified required help of higher level supervisors to address?
- What are some longer-term efforts that could to improve the quality of the program?
- Should additional information/ data be collected in the future to better inform program improvement?

Example: Developing an Action Plan

District X has an annual EPI target of 400 children less than one year of age. After looking at coverage, dropout rates, and vaccine stock across catchment areas, they identified one peri-urban catchment area with a DTP1-DTP3 dropout rate of 15%. Because the drop-out rate is higher than 10%, the health workers in the peri-urban area assessed the reasons for these high drop-out rates:

- Supply and storage issues: vaccines with early expiration; old refrigerator; stock-outs
- Staff issues: not trained in vaccine vial monitors (VVM) or new vaccine introduction; staff shortage
- Service & demand issues: outreach sessions not always held & low attendance; not many mothers receiving antenatal care (ANC)

They then identified the following action items to address some of the issues within the next year:

- Staff training on VVM and new vaccine introduction at next monthly meeting
- Discuss concerns about early expiration dates of vaccines with supervisors and vaccine depot
- Meet with village leaders monthly – ask for help in increasing awareness of vaccination services
- Hold additional outreach sessions in low coverage areas – combine with malaria outreach; promote ANC at outreach sessions
- Develop educational material for health centers and make public announcements about immunization

Reference: WHO & UNICEF. 2002. "Increasing Immunization at the Health Facility Level". https://apps.who.int/iris/bitstream/handle/10665/67791/WHO_V&B_02.27.pdf;sequence=1

Resources

WHO. Immunization in Practice: A practical guide for health staff:
https://www.who.int/immunization/documents/mlm/en/

Analysis and use of health facility data: Guidance for Programme Managers (February 2018 working document) Available at: https://www.who.int/healthinfo/tools_data_analysis_routine_facility/en/

WHO. Increasing immunization coverage at the health facility level (2002):
https://apps.who.int/iris/bitstream/handle/10665/67791/WHO_V&B_02.27.pdf;sequence=1

Reaching Every District (RED) strategy:
https://www.who.int/immunization/programmes_systems/service_delivery/red/en/

WHO. Training for Mid-Level Managers (MLM):
https://www.who.int/immunization/documents/mlm/en/

WHO. Handbook on the use, collection, and improvement of immunization data (June 2018 draft):
https://www.dropbox.com/s/8ivdiu0g5xvnlbc/handbook.pdf?dl=1
[Updated version available by request at vpdata@who.int]

WHO. Data Quality Review (DQR) Toolkit (2019). Available at:
https://www.who.int/healthinfo/tools_data_analysis/dqr_modules/en/

PAHO. Tools for monitoring the coverage of integrated public health interventions: Vaccination and deworming of soil-transmitted helminthiasis (2017). Available at:
http://iris.paho.org/xmlui/handle/123456789/34510

WHO Regional Office for Europe. Tailoring Immunization Programmes (TIP): www.euro.who.int/tip

WHO Effective communication of immunization data: www.euro.who.int/datacommunication

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