



THE GLOBAL ALLIANCE FOR
VACCINES & IMMUNIZATION

How to Prepare for a Data Quality Audit

Briefing Paper



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ABBREVIATIONS

DQA	Data Quality Audit
DTP	Diphtheria, Tetanus and Pertussis
DTP1	Diphtheria, Tetanus and Pertussis, 1st injection
DTP3	Diphtheria, Tetanus and Pertussis, 3rd injection
EPI	Expanded Programme for Immunization
GAVI	Global Alliance for Vaccines and Immunization
HMIS	Health Management Information System
HU	Health Unit
ICC	Interagency Coordinating Committee
JRF	Joint Reporting Form
QI	Quality Index
VF	Verification Factor
WHO	World Health Organisation

DEFINITIONS

Health Unit: This refers to where vaccinations are given, e.g. dispensary, health post, health centre, clinic, private clinic, hospital etc.

District: This refers to the sub-national administrative level closest to the operational level where annual values are available at the national office.

Reporting Period: This is the frequency with which one administrative level will report to the next administrative level, e.g. health unit to district or district to national level. Normally this will be on a monthly or quarterly basis.

Current year: The year when the audit takes place

Audit year: The previous calendar year which is the year audited

1. INTRODUCTION

Accurate immunization records are essential for EPI managers to track and improve programme performance, and are the basis for the "Data Quality Audit" (DQA). In the year 2001, the DQA tools and methods were piloted by an external audit company in 8 countries (Uganda, Pakistan, Tanzania, Mali, Kenya, Cote d'Ivoire, Rwanda and Liberia) on behalf of the Global Alliance for Vaccines and Immunization (GAVI). The purpose of this paper is to provide GAVI participant countries with a clear guideline for national EPI programme managers and district level staff on how to prepare for a "Data Quality Audit". This briefing paper is a synthesis of the lessons learned from the DQA pilot experience.

Because both GAVI and DQA are new concepts this paper firstly describes what is GAVI, and what are the objectives of the DQA. The following section explains how a DQA is conducted and what are the key performance indicators that the DQA measures. On a practical level the next section describes how participant countries can prepare for a DQA and what the roles, responsibilities and timings are for conducting the DQA. The final section describes the most common problems encountered with immunization reporting systems in the 8 pilot DQA countries.

2. WHAT IS GAVI?

When the World Health Organization (WHO) launched the Expanded Programme for Immunization (EPI) in 1974 only 5% of the world's children were immunized against the six main target diseases, diphtheria, tetanus, whooping cough, polio, measles and tuberculosis. By the time of the World Summit for Children in 1990, UNICEF declared that global coverage had increased to 80%. The 1990 conference documented a high water mark for global immunization but unfortunately the last decade has witnessed a decline in coverage. By 2000, global coverage for the six traditional vaccines had dropped to 75% and in 19 countries, mainly in Africa, the coverage rates for diphtheria, tetanus and pertussis (DTP3) dropped below 50%. An estimated 3 million people are dying annually from diseases that could be prevented with currently available vaccines and it is recognized that children in the poorest countries are the least protected (Anita Hardon, HAI Europe, March 2001, Vol.6, No1).

The Global Alliance for Vaccines and Immunisation (GAVI) was formed in 1999 with the mission of ensuring that every child in the world will be protected against vaccine preventable diseases. GAVI exists as a mechanism for co-ordinating and revitalising immunisation programs at international, regional and national levels. Having a billion dollar tool, the Vaccine Fund, at its disposal GAVI provides support to countries with below \$1,000 per capita GNP (currently numbering 74). By significantly expanding the reach and effectiveness of immunisation programmes the GAVI partners expect to help decrease the burden of disease globally.

A cornerstone of the GAVI approach is performance-based programming whereby national EPI programmes are rewarded for actual increases in the number of children immunized. The reported numbers of children receiving DTP3 has been selected as the best measurement of performance. DTP3 is chosen because, though not perfect,

it is considered the most reliable measure of the number of fully immunized children. However, the accuracy of reporting of the coverage of other antigens is also checked.

Reporting Requirements for GAVI

1. Countries are expected to maintain a reporting system that includes the permanent recording of each vaccination given. This can be done either by tallies or by daily records based on registers.
2. Countries are expected to keep all records and reports (at the respective administrative level) dealing with immunization data (vaccinations, vaccine stock, disease surveillance) over the life of the share allocation system.
3. Countries are expected to complete the annual Joint Reporting Form (WHO/UNICEF) on time.

3. WHAT IS A DQA?

The DQA was conceived as a means to verify reported performance as well as enhance immunization monitoring and reporting systems. It reviews both the numbers of children reported to have received a DTP3 injection and the accuracy of the EPI reporting system. Effective programmes with accurate data recording and reporting systems receive the most credit in a DQA.

Objectives of a DQA

1. Assess the quality, accuracy and completeness of administrative immunization reporting systems
2. Audit the number of DTP3 vaccinations given to infants
3. Provide practical feedback to health staff on how to improve the quality of reported data.

Three reasons for accurate recording and reporting practices are:

1. managers of immunization services need correct and timely information to detect improvement or decline in performance
2. partners of the GAVI Alliance working at all levels need reliable information to judge the impact of new efforts and new resources on performance
3. GAVI award money according to a system of "shares", one share being earned by the country for each additional child reported to have been immunized relative to the previous or baseline year

There are many pitfalls that can be avoided if the critical elements of quality are in place. The information collected from a DQA enables auditors to offer advice to health workers, managers and national leaders of EPI programmes. DQA is a powerful capacity building tool for immunization information systems and is a good example of the way in which GAVI can assist country programmes to achieve their own objectives.

Methodology

The DQA country visit focuses on reporting practice at national level and in a sample of four districts and six health units in each district (24 health units in all). Two “external auditors” from the audit company work with two “internal auditors” selected by the EPI or HMIS programme management to conduct the DQA. The Audit team will check:

- accuracy of recording of the number of immunizations (for the audit year)
- transcription and aggregation of these numbers
- reporting from level to level in the system

This involves a thorough analysis of recording and reporting practices at national, district and health unit level.

Example of Auditor Checks

- recount data from tally sheets or registers at the health unit level
- observe immunization sessions taking place
- retrieve monthly reports at all levels and compare values
- check graphs and tabulations for accuracy
- check vaccine and syringe stock ledgers for completeness

To minimize auditor error, the auditor maintains a logbook and all data are collected and entered into a computer laptop on a daily basis. National, district and health unit summary sheets are computer generated which include key indicators of immunization performance. This provides an immediate and valuable form of feedback for staff at each reporting level.

Indicators Used in the DQA

As mentioned in the previous section, key indicators of performance are calculated for each administrative level that is assessed. These are the measures of the quality, accuracy and completeness of the immunization information system that impact the outcome of a DQA.

Key Indicators

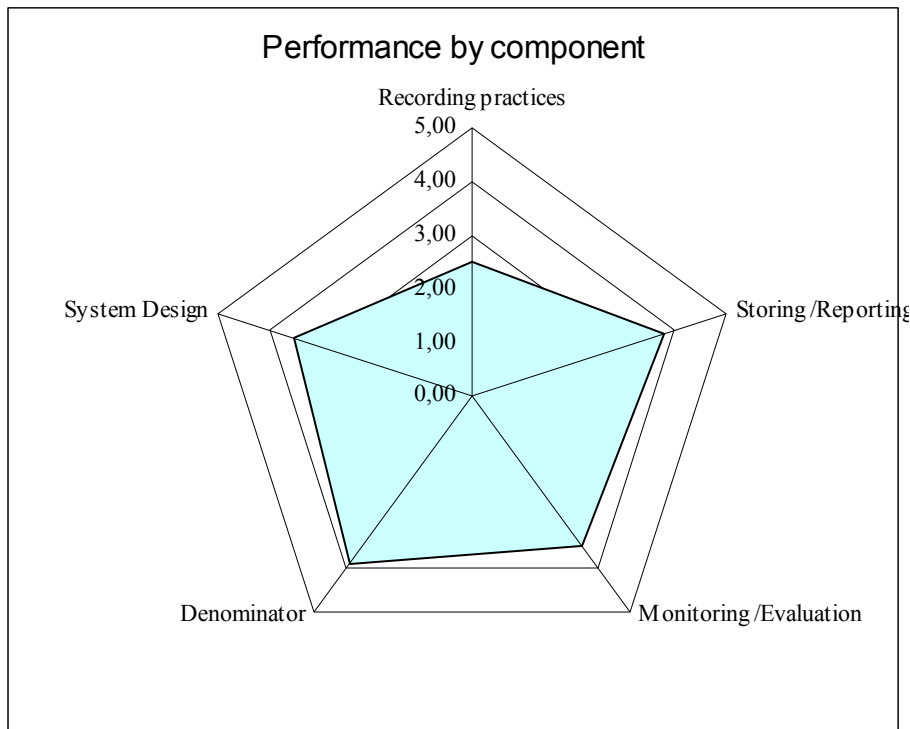
- Quality of the system index
- % DTP vaccine wastage
- % Dropout DTP1 to DTP3
- Timeliness of reporting
- Completeness of reporting
- Change in reported DTP3
- Coverage in reported DTP3

Quality of the System Index

This refers to the quality of the immunization reporting system. The quality index (QI) score is based upon a series of questions that the auditor will score after interviews with staff, observation checks and assessment of the records and reports at each administrative level. These questions are grouped into 5 distinct categories:

1. Recording
2. Reporting and storing
3. Monitoring and evaluation
4. Denominator issues (district and national level)
5. System design (national level only)

Example: Quality of the System Index by Component



This is an example from national level and shows graphically the performances for each category of the reporting and monitoring systems. In this example the national level scored a total of twenty-five out of a possible thirty-seven questions giving a quality index score of 67%. The formula used for calculating this index is:

$$\text{Quality of the system} = \frac{(\text{Count of yes's}) \times 100}{(\text{Count of yes's} + \text{count of no's})}$$



Ideally the target for the quality of the system index is 100%

% DTP Vaccine Wastage

The computation of the vaccine wastage at the HU for DTP vaccine is based upon the reported number of DTP immunisations administered (all doses and ages) and the recorded receipt of DTP vaccine during the audit year. The formula used for calculating this indicator is:

$$\% \text{ Vaccine wastage} = \frac{(\text{Doses of DTP stock recv'd} - \text{Reported DTP vacc'ns}) \times 100}{(\text{Doses of DTP stock received})}$$

Where:

Doses of stock recv'd = (Balance 1/1) + (stock recv'd during year) – (Balance 31/12)



Countries should aim to minimise vaccine wastage.

% Drop-out DTP1 to DTP3

This indicator compares the number of children reported receiving DTP1 to those receiving DTP3. Thus if 800 infants (80% of all infants in a certain area) received the DTP1 shot and only 600 (60%) received the DTP3 shot, those only receiving the first shot “dropped out” resulting in 25% dropout in accordance with the formula below. The formula used for calculating this indicator is:

$$\% \text{ dropout DTP1 to DTP3} = \frac{(\text{No. DTP1} - \text{No. DTP3}) \times 100}{\text{No. DTP1}}$$



Ideally the target for this indicator is 0%

Timeliness of Reporting

Timeliness is measured as the proportion of reports with a receipt date that is within the programme’s reporting deadline, and the total number of reports that should be received in a reporting year.

$$\text{Timeliness of reporting} = \frac{(\text{No. Reports received on time}) \times 100}{(\text{No. Reports in a calendar year})}$$



Ideally the target for this indicator is 100%

Completeness of Reporting

Completeness is the percentage of all reports that were actually received, regardless of whether they were received within the programme's reporting deadline.

$$\text{Completeness of reporting} = \frac{(\text{No. Reports received}) \times 100}{(\text{No. Reports in a calendar year})}$$



Ideally the target for this indicator is 100%

Change in reported DTP3

Change in reported DTP3 compares reported DTP3 values between the audit year and the previous year.

Coverage in reported DTP3

Coverage is calculated as the percentage of infants who were reported to be immunized with DTP3.

Verification Factor

Once all data have been collected a national verification factor is calculated based on all DTP3 records and reports that were audited at health unit and district level. This is calculated to verify reported performance at national level. Records are distinguished from reports in the following way:

- **Records** are the primary data forms filled in when a client is seen and as such they stay at the service delivery points (i.e. tally sheets and child registers)
- **Reports** summarize the record data, typically on a monthly basis, and are sent from one level to the next (i.e. monthly health unit immunization reports or integrated HMIS health unit reports).

The indicator is based on the ratio of recounted number of infants receiving DTP3 from the primary data source (the records) on the number reported as receiving DTP3 in the monthly summary reports from all the health units visited.

$$\text{Verification Factor} = \frac{\text{Sum of the recounted DTP3 in the 4 clusters}}{\text{Sum of the reported DTP3 in the 4 clusters}}$$



Ideally countries should aim to achieve a verification factor (VF) of 1. A VF of 1 means that there is a perfect match between what is recorded and recounted by the auditors at the primary data source (tallies and registers) and what is reported at the district level.

Awards

The GAVI Board has decided that the DQA will be used to classify the immunization reporting system as 'validated' or 'not validated' so that:

- in countries where reporting systems are classified 'validated' by the DQA conducted during the third year of investment, the reward payment in the subsequent year will be based on reported DTP3 figures endorsed by the ICC; and
- in countries where reporting systems are classified 'not validated' by the DQA conducted during the third year of investment, a second DQA will be conducted in the subsequent year. If the system is again classified as 'not validated', the reward payment will be deferred until reporting is improved or validated by another method (vaccine coverage surveys) as outlined in the methodology.

The first planned ISS reward (for DTP3 increase over baseline) will be converted to a third investment (\$10/child projected DTP3 increase) for all countries. Subsequent reward payments will be based on validated increases in DTP3

4. HOW TO PREPARE FOR A DQA

A DQA is based on country immunization records and reports and follows them along a "paper trail" from the health units to districts and finally to the national level.

If records and reports are missing or poorly organised the performance indicators calculated in the DQA will reflect this, resulting in a low verification factor. All records and reports should be kept for the period of GAVI support, although if government policy is longer then this should be followed. Furthermore, the immunization records and reports should be well organized for ease of retrieval and use.

The principal records and reports used in a DQA are listed below by level in the system. Please note that the health unit level includes any health facility (government, NGO, private) that provides and reports immunization of children, and that the district level is expected to aggregate immunization data from all HUs in the district, including hospitals. Note that if this is not the case, then it should be transparent and consistent in how district and regional hospital data are included in the national database.

Principal Records and Reports used in a DQA

Health Unit

- **Primary records:** Tally sheets & immunization registers
- **Reports:** Monthly/quarterly health unit EPI reports or health unit HMIS reports
- **Vaccine stock records:** ledgers, bin cards, inventory control cards

District

- **Reports:** Monthly/quarterly EPI/HMIS reports from all the HUs in the district, Monthly/quarterly district EPI/HMIS report, annual EPI/HMIS district tabulation or report
- **Vaccine stock records:** ledgers, bin cards, inventory control cards
- **Electronic Data Base:** Computerized data base of immunization data (if computers are used) including computer back up files

National

- **Reports:** Monthly/quarterly EPI/HMIS reports from all districts, quarterly/annual national level summary reports, WHO/UNICEF Joint Reporting Form (Audit year)
- **Electronic Data Base:** Computerized data base of immunization data including computer back up files
- **Vaccine stock records:** ledgers, bin cards, inventory control cards, electronic inventory control system

Note that for all levels, all records and reports should be kept for at least three years. In addition district figures that are used to compile the reported immunization numbers in the Joint Reporting Form should be kept at national level.

Roles, Responsibilities and Timing

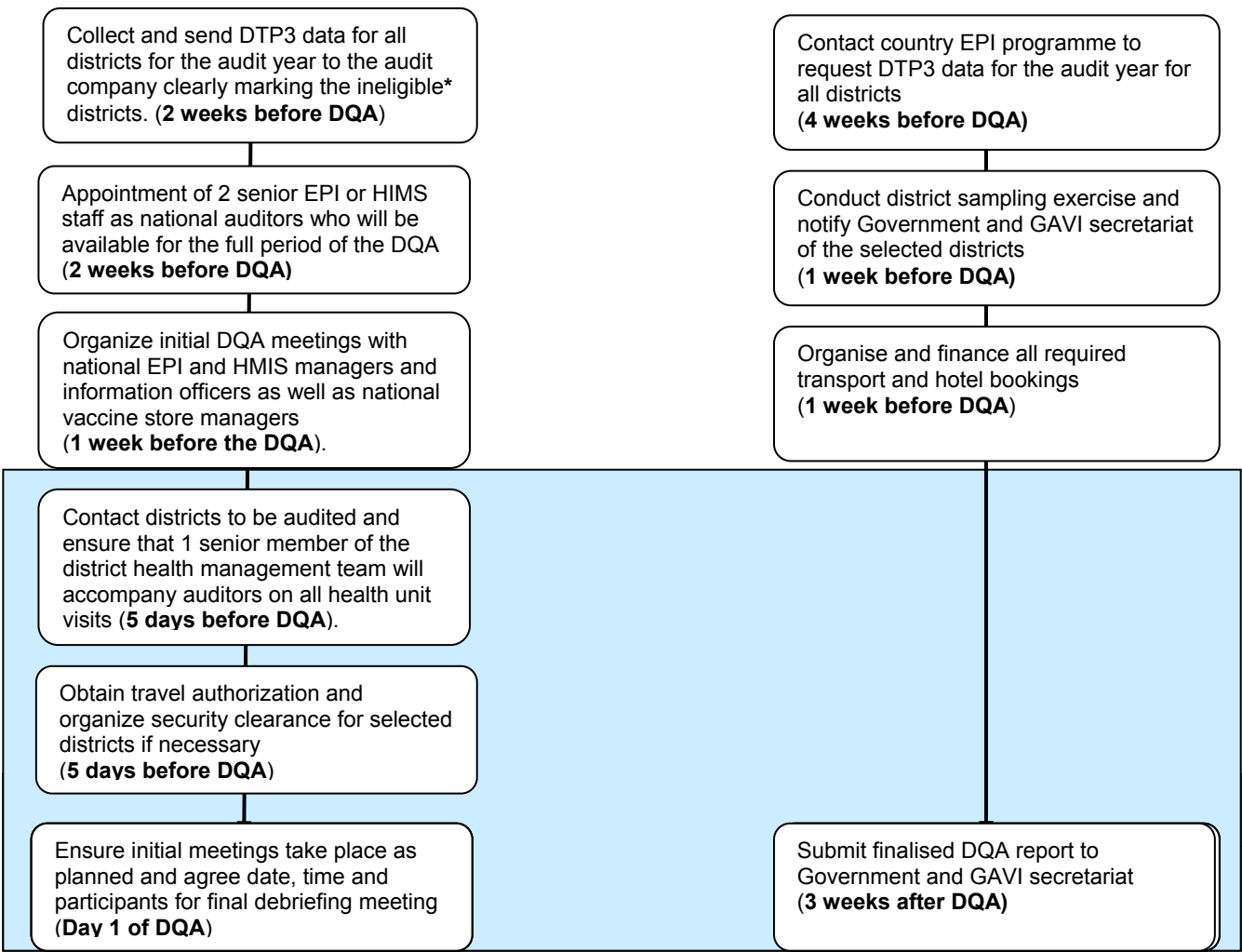
Each DQA is conducted by two “external” auditors who work with two “internal” auditors selected by the EPI programme management from senior EPI and/or HMIS staff. The audit is planned to take a total of 16 in country days to complete the audit, prepare and deliver a national level debriefing, and draft a concise report which is left in country. The roles and responsibilities of the audit company (external auditors) and the Government (internal auditors) are listed in the flow chart below, along with the timing of each task.

Government Responsibilities & Timing

Audit Firm Responsibilities &



Timing



*** Ineligible districts include all districts that pose security threats. Do not include difficult access districts in the ineligible selection.**

5. COMMON PROBLEMS

The DQA has been tested in eight countries within Asia and Africa. From this multi-country experience common problems concerning the immunization reporting systems were encountered in all countries.

Problems that are commonly encountered at all levels in the health care system

- Organisation, filing and storage of reports
- Electronic data storage
- Dating and signing reports
- Keeping records up-to date
- Report completeness
- Analysis of EPI data and provision of feedback
- Report timeliness
- Dissemination of EPI policies and use of guidelines

Many of these problems do not require additional resources but re-organisation of work processes and the systems within which we work. If these problem areas are tackled it follows that countries can expect to see improvements in the quality, accuracy and completeness of their administrative immunization reporting systems and hence achieve better performance indicators.

Missing Reports

Missing reports and records (especially tally sheets) was a common problem in the countries visited during the pilot DQA. It is very important that when reports or records are missing that you do not try and rewrite them based on other data sources. If they are missing it is best to report that they are missing. In the pilot DQA a few cases were found where reports and records had been rewritten especially for the DQA. We urge you not to do this because in such a situation where auditors encounter false or rewritten records and reports, they will not be included in the DQA, resulting in a "zero score" for that administrative level.

6. WHO TOOLS AND MANUALS

WHO have developed a variety of tools to measure EPI performance and some of these include standard wall charts and tables covering for example, immunisation coverage for each antigen. These tools are flexible and should be adapted to the local context, by adding your own targets and HU information. The modules are available from WHO (reference number WHO/EPI/MLM/91.1 – 11). A set of videos is also available (reference number AV/1-8).

Why not visit their website to find out more about their publications on www.who.int/vaccines-documents.

We hope that this guide helps you to prepare for an external DQA and that you find it a fruitful and useful capacity building experience.