



Final Report

Immunisation Data Quality Audit

Ethiopia

13 – 29 January 2003

Prepared by: The LATH Consortium*
On behalf of: Global Alliance for Vaccines and Immunisation (GAVI)
29 January 2003

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1. Introduction

The Data Quality Audit (DQA) is part of the Global Alliance of Vaccines and Immunisation (GAVI) programme. It has been designed to assist the countries receiving GAVI support to improve the quality of their information systems for immunisation data. In addition, it calculates a measure of the accuracy of reporting, the country's 'verification factor' for reported DTP3 vaccinations given to children under one year of age (DTP3 <1). In 2002, the DQA is being performed in 14 countries, and in an additional two countries in early 2003. It is hoped that participation in the DQA will assist each country in understanding the extent and details of the audit while providing guidance on how the country's system for recording and reporting immunisation data can be improved. It is the explicit goal of the DQA to build capacities in the participating countries.

This DQA was undertaken 13 – 29 January 2003 by two external auditors, Mr. Maxwell Moyo and Mr. Steven Perry, and two National Auditors appointed by the national EPI Programme, Mr. Tahir Mohammed and Mr. Yosef Tariku. The team worked at the National level before dividing into two teams and going to the Zones and Health Units (HU).

Based on Zonal reported DTP3<1 for the audit year (2001) at National level a random selection of four Zones was carried out in advance and the following were selected: East Gojam, South Wollo, Jimma and Hadiya. Information about reported DTP3<1 for the audit year at National level was provided by the National EPI Programme to facilitate the sampling. The list comprised all reported DTP3<1 for the audit year from 71 Zones as reported by Ethiopia in the "Joint Reporting Form (JRF)" to WHO and UNICEF. At Zonal level six Health Units plus one "Reserve" HU were selected randomly based on reported DTP3<1 for the audit year. The "reserve" HU was to be visited only in the event that one of the first six HUs was unreachable due to security issues or bad weather conditions (impassable roads). In the event, the reserve health unit was utilized in both South Wollo and East Gojam due to impassable roads along the flooded valley of the Blue Nile. One health unit in Jimma was not visited due to time constraints as this required a 30 kilometre round-trip walk which was not feasible within the time available. Three HUs had to be visited more than once due to locked doors upon first arrival and at one facility the Health Assistant in-charge used a crow bar to pry open a locked door on the second visit. In all, the DQA was conducted at the National level, four Zones and 23 Health Units.

Use of Zones

The Ethiopian health system is currently undergoing a decentralization process to make districts (Woredas) the focal level for decision-making and resource allocation. However, this goal is not yet achieved and Woredas are not yet fully functioning. Many staff are being transferred from the Zones, which will be less important when decentralization is complete, and many of the staff met at all levels below Regional were new to their post within the last year. This may have a bearing on institutional memory and record storage, and it was not uncommon that staff were not able to find complete reporting from the audit year (2001). Health staff at all levels emphasized commitment to decentralization, but also concern that Districts were generally not yet established enough for conducting a DQA.

The DQA is designed to work at the HU, District and National levels. However, on the first day of the DQA the Auditors learned that Zonal data, rather than Woreda data, had been used for the "district" sampling process. DQA Guidelines advise that in such a situation two of the Zones should be randomly selected and visited. At each of the Zones DTP3<1 data for the Woredas should be used for randomly sampling two Woredas. In Ethiopia the decision was taken to utilize the four previously sampled Zones for the DQA, rather than sampling Woredas within two zones, because the EPI Programme, and development partners, felt strongly that the Districts were not yet sufficiently organized to be the focal point of the DQA. A further

constraint to using Woredas for the DQA in Ethiopia is that a significant proportion of Woredas have fewer than six health units as required for the DQA. With over 500 Woredas and fewer than 3000 health facilities this issue may require further thinking for future implementation of the DQA in Ethiopia. It should be noted that the MOH and Regions are currently expanding the number of facilities through an aggressive facility-building programme and the EPI Programme Manager believes that Woredas will be a better functioning focal level in a few years time.

The agreement regarding use of Zones for the DQA was reached between the EPI Programme Manager, Dr. Asnakew Yigzaw, and Dr. Olivier Ronveaux of WHO/VAM in a teleconference on 13 January 2003. While necessary, the move to zones did present certain technical and logistical issues for the DQA. First, Woreda reports of HU performance, rather than HU reports of their own performance, were used for monthly HU performance. This may have increased transcription errors and widened the gap between reported and recounted values. A cross-check made at several Woreda offices indicates that there were transcription errors from HU to Woreda reports. However, it was not possible to visit all Woreda offices within the time limits of the DQA and Woreda data were never substituted for Zonal data.

Logistically, the use of Zones ate into the time available to complete the sample. Visiting two Woredas within each of two Zones is logistically easier than visiting four Zones. Moreover, Regions are extremely important in Ethiopia and needed to be visited for purposes of protocol, as well as information. Each team lost more than a full day in travel to and from Regions. Furthermore, visiting Woredas where possible to verify Zonal findings further cut into the tight schedule of the DQA.

The DQA and the Ethiopian Calendar

Ethiopia's calendar differs significantly from the Gregorian calendar. It is eight years behind, the first month of the year is September, and it is between seven and eleven days behind Gregorian dating each month. Furthermore, the Ethiopian MOH financial/reporting year runs from July to June (Gregorian). The Ethiopian calendar impacted the DQA in several ways. First, gathering data regarding the various antigens for the audit year (2001) required using reports for the last eight months of (Ethiopian) 1992 and the first four months of 1993. Where monthly reports were not available, as happened at times for the year (Gregorian) 2000, annual totals for 1992 were used, but it should be noted that these do not correspond exactly to the Gregorian year 2000. Because the monthly reporting period runs from the 20th of one month to the 20th of the next it is never possible to get exact matches with the Gregorian calendar, but where there was monthly reporting it is possible to come quite close. For exercises such as checking compilation and receipt dates against deadlines the External Auditors relied heavily on their National Counterparts.

The Child Health Card Exercise

The teams remained in Addis Ababa for the first two days due to the need for decisions on the use of zones, and the funding of the counterparts, as well as logistical arrangements and security briefings. The time required to visit the regions and the lack of air flights on the right days, as well as strict rulings about driving after dark, convinced the team that it would be difficult to complete the DQA, and of the need to save time where possible. Given the calendar differences the decision was taken to forego the child health card exercise because it would take more time than usual to conduct and in particular to quality assure. While there are many pocket calendars available that convert Ethiopian dates into Gregorian dates, we were not able to locate any for 2001 (Gregorian).

The De-briefing

The team were able to present their findings at a de-briefing meeting, held at an EPI Regional Workshop in Nazareth on 29th January 2003 and chaired by the Team Leader for Child and

Maternal Health Services. The participants appreciated the high level of analysis and information provided through the DQA exercise and validated many of the principal findings. Major comments and points of discussion are detailed below:

- There was concern that the four selected zones were all highland areas with better communications and good performance relative to other (lowland) Regions. No lowland/peripheral zones were represented which would have presented a much different picture. Many felt that a country as large and diverse as Ethiopia required a larger sample and more time to conduct the DQA and/or a sampling method that ensures both “good” and “bad” zones are visited.
- Chronic format shortages, particularly tally sheets, were compromising record keeping efforts. There was discussion of which administrative level should have responsibility for tasks such as provision of reporting formats,
- Tally sheet design; should there be separate tallies be for each service or integrated as at present?

A list of the persons met during the DQA including the de-briefing meeting can be found in Annex 1.

2. Background

According to projections based on the 1994 Census the total population of Ethiopia was estimated to be 63.3 million as of 2000, with women and children constituting two thirds of the total. The majority live in the highlands where farming is the chief occupation while in the lowland areas the populations are more spread out and primarily pastoral. The health system is underdeveloped and transportation problems are severe, particularly in the lowland areas. The majority of the population have little access to a health facility and it is estimated that up to 75% suffer from malnutrition or some type of communicable disease (National EPI Coverage Survey Report, 2001).

When EPI was launched in Ethiopia in 1980, the immunization coverage rate was estimated to be less than 1% and the goal was to provide service to ALL children under the age of two years. It was believed that by increasing coverage by 10% per year, Ethiopia would attain 100% coverage by the year 1990. However, that goal was not attained by the end of the century and Ethiopia continues to have one of the lowest immunization coverage rates in the world. The target was later (1986) revised to 75% and the target age group to under one only. In the 1995 coverage survey 37% of children under one had been immunized with DPT3 and the routine reporting system documented 40% and 43% for DPT3 under one for 1999 and 2000. The 2001 EPI coverage survey roughly validated these earlier findings and reported DPT3 coverage for under ones at 39.7 %. However, the 2000 DHS reported DPT3 to be only 21%. These earlier survey reports listed the primary constraints to higher coverage rates as “missed opportunities to vaccination, high drop-out rates, inaccessibility of the health services, deficiencies in the surveillance system, and weakness in IEC” (National EPI Coverage Survey Report, 2001).

Administratively, Ethiopia has a federal system of Government with 11 Regional States, 72 Zones, 7 Special Woredas and 521 Woredas. From the start, EPI was integrated into the general health services as part of PHC and vaccinations were given in static, outreach and mobile clinics. NGO and FBO facilities are also supplied by, and report back to, Woredas so that the performance figures include both Government and non-Governmental service delivery. Most, but not all, HUs visited had daily immunization and conducted monthly outreach to surrounding villages. Outreach is an increasingly important component of EPI services and accounted for the largest variations in monthly performance. The emphasis on outreach may account for why the teams were unable to observe vaccination at any of the HUs visited. HUs that did not provide daily immunization typically provided service once or twice a week.

Information flow

Administratively, the system is designed so that HUs report to Woredas, which report to Zones which report to Regions which report to National level. The primary reporting interval is monthly although quarterly and annual summary reports are also used in places. The government requires that all health records be kept for a minimum of three years, and that all NGOs and FBOs, as well as government facilities report on the standardized monthly report formats. EPI reports are a component of an integrated HMIS report that is submitted monthly from the HUs to the Woredas, and then to the Zones. Regions then submit quarterly to the National level. The EPI component of the report are processed and then stored by the EPI in-charge at the Woreda level and above.

A Registration Book is used to register the child and subsequent immunisations given to the child. At first vaccination a “Mother and Child Health Card” is issued. There are regional variations in Registration Books regarding which services are grouped together in a given Register. Variations in design within given regions were also observed, but appeared to be due to shortages of official books and lack of standardization in hand-drawing formats. There were no variations observed in Mother and Child Health Card formats.

All vaccinations are recorded on tally sheets, which are printed front and back and are integrated with MCH services including family planning. These are the formats most commonly out of stock and subject to the greatest interpretation when hand drawn. Hand drawn tallies rarely integrate services on the same form, and are often designed specifically for outreach. By design or by default many of the HUs observed used tallies only for static facility immunization and relied on the Registration Books to record outreach activities. Tally sheet and/or Registration Book data are summarized on the “Monthly EPI Plus Vaccination Reporting Form” for HUs which in turn are summarized on Monthly Woreda reports and so on. Regional reports are sent quarterly to the National level and can include the monthly Zonal reports. The EPI reports comprise one component of the integrated HMIS reports and are processed by “EPI Co-ordinators” at each higher level.

The national level data-base is maintained, in Excel, by the National EPI Programme Manager, and a WHO supported Data Manager, on both a PC and a lap-top. Zonal and Regional reports are also maintained in paper in sub-files organized by Region in the Programme Managers Office. The tabulations from this data-base were used for the JRF and for the DQA.

3. KEY FINDINGS

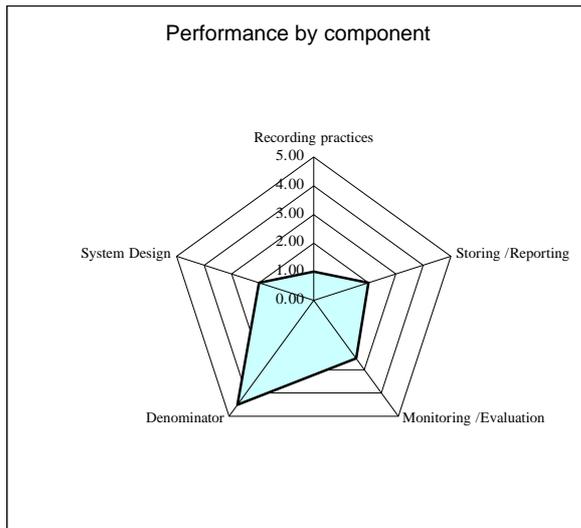
3.1 NATIONAL LEVEL

Part of the DQA is a Quality Index based on, for national level, five components with a number of qualitative observations/issues per component. The DQA Quality Index for National level is **52.3%** (see Annex 2 for the analysis worksheet).

The individual components are shown in the radar-graph below:

Recording Practices:

The National level receives Regional reports that include Zonal data. National does track completeness of Regional reporting and although the reports have compilation dates they do not have receipt dates. The reports are forwarded from the Regions to the National EPI Office where they are entered directly into the data-base by the WHO supported EPI Data Manager. This method ensures a high level of EPI Programme control over data entry and analysis. At all levels, including National, the EPI Programme operates a system of entering data from late reports into the performance figures for the month in which the report arrives, thus ensuring that performance data are not “lost”. Although this procedure is widely followed it is not written



down. All performance information, both in terms of numbers of vaccinations and coverage rates, are calculated for children under one for both 2000 and 2001.

The biggest recording constraints at National level are at the vaccine store which is actually located in the Oromia Regional Office (also in Addis Ababa). There were no current ledgers for any of the antigens, and no record of vaccine logistics for the audit year. The system had been computerized, but the computer was no longer functioning and the stores manager was aware that it had been down for at least six months, but not sure whether the problem was with the software or hardware. No back-up paper system was implemented since the

computer went down and none of the old paper records had been kept.

Storing/Reporting:

There are two intermediate levels between Woredas and the National Office and while there are no files (paper) specifically for Woredas, the National Office does have all regional reports chronologically filed in Region specific files. Zonal performance data are available with the Regional quarterly reports, but 3 out of a total of 16 expected quarterly reports for the 4 selected zones were unavailable.

Lack of written back up procedures and schedule are the principal issues constraining National storing/reporting scores. The main PC for the EPI data-base is backed up onto a lap-top, but there are no written back-up procedures and the data-base had not been backed up in the week preceding the DQA.

Monitoring/Evaluation:

A high level of analysis of data is undertaken of past and current performance which includes DPT3 for children under one, and for TT2+ for pregnant women. However, unlike at the lower levels, there were no performance charts and tables on display in the National EPI office. Lack of displayed National performance charts is the single biggest constraint on the monitoring and evaluation score.

The National office provides “ad-hoc” written feedback to Regions regarding EPI performance and copies of the letters were available in a file at the National office. If this system is regularized (say quarterly to all Regions) National will receive full marks for feedback.

Wastage is reported in the 2001 JRF (13%); presumably the computerized inventory control system was functioning at that point. Given that wastage is not reported from lower levels the rate is most likely based on National level inventory records only

Denominator:

Well-conceived and correctly calculated denominators (referred to as Target Populations in Ethiopia) are a major strength for the National EPI Programme. The denominators are adjusted annually in accordance with updated population estimates and health indicators. It should be noted that the last Ethiopian census took place in 1994, but the national statistics office was updating estimates annually and these updated figures are disseminated downward for making annual adjustments to the target populations for Regions, Zones, Woredas and Health Units. The definitions for both child immunizations and pregnant women are consistent with the WHO definitions. In only one of 72 zones did the coverage rate exceed 100% for child immunization, and all of the Zones reported TT coverage rates under 100%.

System design:

EPI reporting forms one component of the integrated HMIS reporting system. The HMIS reports are compiled monthly at the HUs and forwarded to the Woredas where they are used to produce Woreda reports that are also sent monthly to the Zones. At the Woreda level and above the reports are processed by an EPI Co-ordinator, or in-charge, and copies of the EPI component are stored in separate EPI files. Even at the National level, the EPI Office maintains separate files for the EPI component of the HMIS reports from the Regions, as well as maintaining the computerized EPI data-base. The National EPI office is supported with assistance in data management by a WHO funded EPI Data Manager. This data-base is used for the preparation of the Joint Reporting Form (JRF) and for current tabulations of performance.

The reporting system functions relatively well, but would be greatly strengthened by the production and dissemination of an easy-to-use “EPI reporting guidelines”, or Operations Manual that lists roles and responsibilities for staff at all levels and gives clear guidance on how to “hand-draw” reporting formats when they are out of stock. Such a manual (for both Government and the private sector) could cover reporting forms, completion of forms, reporting deadlines, flow of information, management of information (storing of data, duration of storage, signing and dating of forms, etc), zero reporting, handing over of information on staff transfers, etc.

The biggest variations in reporting were observed for NGOs which are required to report all the essential EPI data, but sometimes use own formats.

A lack of clarity was observed at the Health Unit level regarding the use of tally sheets. In some HUs they were used only for tracking vaccination at the static facility, and in other facilities they were not retained after they had been used to produce the monthly report. Facilities not using tallies for outreach did use Registration Books, but were not able to use them to accurately determine monthly performance. This may be one of the key reasons for the discrepancies between reported values and those recounted from tally sheets.

Nearly all reports observed (Regional, Zonal, Woreda and HU) were either signed, dated and stamped, or were accompanied by a cover letter that was. The dates provided were compilation dates, but there were not receipt dates on the reports which are required to determine reporting timeliness.

During 2001 shortages of supplies (principally Registration Books, tally sheets, and stationary) were reported, some of these items are still in short supply now. Where these supplies were out of stock staff developed hand drawn formats which were often different in design from the National formats. The current design of tally sheets integrates much MCH reporting on a single form printed front and back. In HUs observed the forms were exclusively used for reporting immunization data and the rest of the sheets were blank. The designated space for marking immunizations is quite limited resulting in many tally sheets being used for a single month by HUs with even limited numbers. Compounding the drain on tally sheets many HUs used a different tally for each outreach village for each month. Given that analysis was not being made of village specific outreach data it might be better to use a single monthly outreach tally for all villages.

The national monitoring system for monitoring injections (AEFI and safety) and supplies that will include AD syringes and safety boxes is not yet operational in Ethiopia, but was discussed by members of the ICC.

Performance Indicators:

Seven Performance Indicators are included in the DQA shown in the table below followed by specific comments to selected indicators. Please note that “District” figures are actually Zonal figures.

Calendar year	Reported DTP3 <1	Change in reported DTP3 <1	DTP3 <1 coverage rate	%Districts DTP3 <1 coverage >= 80%	%dropout DTP1 <1 to DTP3 <1	%District dropout < 10%	%DTP vaccine system wastage	Quality of the System Index Score
2000	1,129,040		42.1%	2.8%	16.1%	23.9%		
2001	1,200,578	71,538	51.0%	12.7%	19.3%	19.7%	missing	52.3%

DTP3<1 coverage rate (2000 and 2001):

The coverage rate has increased by 8 percentage points from 2000 to 2001, which is reflected in the large increase in the number of Zones achieving a coverage rate of more than 80%. Nonetheless, less than 20% of all Zones have achieved this target.

Drop-out DTP1<1 to DTP3<1 (2000 and 2001):

The DPT drop-out rate has increased slightly from 16.1% in 2000 to 19.3% in 2001, i.e. the number of children 'dropping out' before receiving DTP3 has increased.

DTP vaccine system wastage (2001):

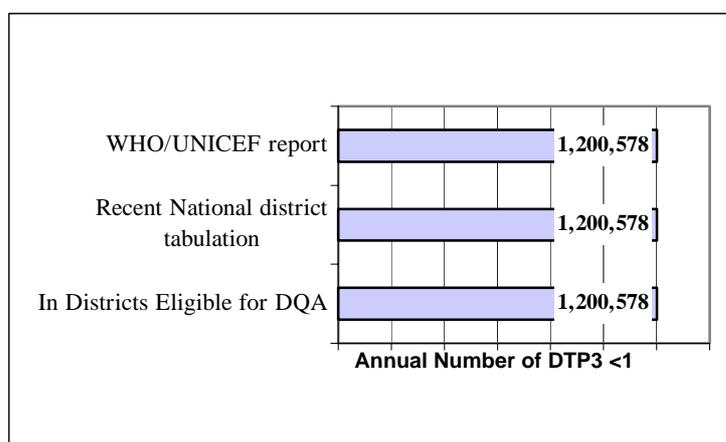
This indicator cannot be calculated as there were no available inventory records for 2001. The JRF 2001 report does list a wastage rate of 13% but can not be verified due to lack of data. The system does not currently allow for reporting of wastage from lower levels where use of vaccine ledgers is sporadic.

Completeness and timeliness of reporting from Districts to the National level:

Assessing the completeness of District reporting to the National level was not possible in Ethiopia for a number of reasons. Most importantly, the Districts do not report to the National; Districts report to Zones that report to Regions that report to the National. The 2001 JRF reports that the National received 92% of all expected reports, but these are not District (Woreda) reports. However it is safe to say that this 92% indicates that the actual DTP3<1 performance in 2001 was actually higher than what was reported in the JRF and in the tabulation (which was the same as the JRF reported figure). Please note that some of the Regions report monthly Zonal performance data while others report quarterly Zonal performance data which makes the "% District Reports at National Level" figures (as seen on each district analysis page) meaningless.

Assessing timeliness was also not possible because the reports do not get stamped or signed with a date of receipt. The reports do have a date of compilation as well as signatures.

Reporting consistency for Audit year (2001)(see also 3.6 Data Accuracy):



To review data consistency, three different (national) sources of reported DTP3<1 for 2001 are used. These are taken from: the national reported JRF 2001 figure (reported on 08/04/02), the most recent national tabulation for DTP3<1 for 2001 found at EPI HQ on the day of the audit (14/01/03), and the figure used for sampling in this DQA (03/12/02). These are shown in the chart above.

As can be seen there is complete

consistency between all three figures which indicates that no additional data were entered after 8th April 2002. This can have three possible interpretations.

- No 2001 reports arrived after this date,
- Late reports which did arrive were never processed.
- Late reported performance data were added to the performance data for the month in which they arrived (in 2002).

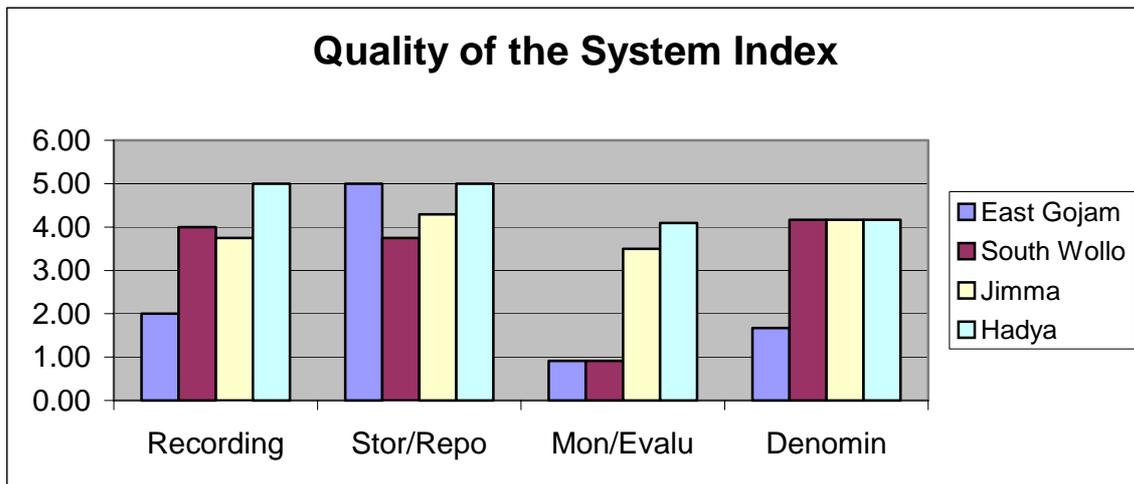
Given observation of consistent late report processing procedures throughout the selected Zones and HUs the Auditors believe the third explanation is the correct one.

3.2 ZONAL LEVEL

The “Quality of System Index” for the four districts is (see annex 1 for the analysis worksheets):

East Gojam: 44.0%, South Wollo: 53.8%, Jima: 77.8%, Hadiya: 88.9%

The four components of the quality system index are shown below for the four zones including the average value. As can be seen, one zone is weak in three of the four components, i.e. recording, monitoring and evaluation and denominators. All the other three zones are strong in all the components except one zone.



Recording:

A high level of consistency of reporting is seen from the Woreda to the Zone, however it is not possible to assess if the reports are complete as number of HUs reporting is not captured on the monthly reporting form.

None of the Zones included report received dates for the reports from the Woredas making it impossible to track reporting timeliness.

Surprisingly, none of the four Zones had a complete vaccine ledger book for the audit year. No recording or calculation of vaccine wastage (system as well as administrated wastage) is undertaken at the Zonal level. This is a clear indication that the Zones are not monitoring wastage. Most of the vaccine control books observed did not begin before June 2002.

None of the Zones monitored vaccine safety supplies

There is a practice of using a “vaccine control book” where one Zone is serving as a focal point for distribution to other nearby Zones. The vaccine supply data for all the Zones are captured in one ledger book making impossible attempts to distinguish receipts and issues for a specific Zone.

Storing/Reporting:

Almost all of the covering letters on the Zonal reports were signed and dated by the Zonal Health Desk Heads who are now the pilots for all health activities at the Zonal level. However, these can become detached, hence not one hundred percent reliable in ensuring that the reports have been seen by the person in charge. Similarly, the Woreda reports found at Zones included stamped, signed and dated cover letters.

Many Woreda monthly reports were missing at the zonal level particularly in East Gojam and South Wollo. This was attributed to the down-sizing of the Zone resulting from the rather rapid decentralization programme which has seen many officers moved to new places, particularly Woredas. Many of the Zonal officers met had been in place less than half a year. There are strong indications of loss of institutional memory at the Zonal level which will hinder a smooth transition during the decentralization process. However, the staff at the Zones are very resourceful, willing to work in very tough conditions with meagre resources (particularly human). It is worth noting that in two Zones storage of reports was very encouraging, with most of the reports well organized and placed in one place and thus had most of the twelve months reports available.

Monitoring/Evaluation:

Two zones “score” relatively low on this component whereas the other two are quite strong.

Issues to be addressed in Monitoring and Evaluation include the following:

- Lack of supervision from the region to the Zone. There was no record by supervisors regarding objectives of the visit, findings, observations, issues arising and the recommendations taken to enable health workers follow-up later.
- There was lack of evidence of routine (periodic) written feedback with evidence of any analysis of data. This was compounded by the lack of a vaccine stock ledger for the audit year in all the four Zones
- None amongst the four zones had a written realistic schedule for supervision. Again, this may be seen as affected by the decentralization process as staff were well aware that they needed routine supervision, but due to resource constraints largely looked for “targets of opportunity” to provide supervision and feedback.
- Two Zones did display EPI performance charts whereas the other two did not. The two Zones that did not have charts were both in one Region.
- All Zones had a target (referred to as the “plan” in Ethiopia) for children under one year, but two Zones did not have a target for pregnant women (for TT2 plus booster). The two Zones without targets for pregnant women mentioned that the region had a campaign for TT in the area hence did not see any reason of setting targets for this group.
- Three Zones had annual reports for the audit year with information on the Zones performance.

Denominator:

Different denominators are used at the Zonal level and National level for the Zones for both infants and the pregnant women. The reason behind this is that the Zonal denominators are calculated by the Regions. The Regions utilize fixed percentages of the two age groups in the population as guided by the planning office in the region whereas the national level is based on pregnant women and surviving infants as calculated by the EPI office. All the primary “health indicators”, including the infant mortality rate (IMR) and the crude birth rate (CBR) are calculated for each Region on an annual basis. Regions set Zonal denominators using Region specific values for IMR and CBR rather than the National standard.

Reporting completeness and timeliness:

The reporting completeness and timeliness is based on the Zonal reports found during this DQA at national level. Timeliness is based on the “date received” as stamped or recorded at EPI HQ vis-à-vis the reporting deadline. In a perfect situation all the reports from the Zonal reports should be filed at the national level. As the reports are not date stamped on receipt at the national level it is not possible to measure timeliness of reporting. Completeness is measured based on monthly/quarterly reports from the zone received at national level. This does not measure if the reports were complete with reported data from all vaccinations in the zone for the month. One zone did not have any single copy of a report despite having tabulated figures in the national worksheet.

DTP3<1 coverage, drop-out and change:

The table below gives the DTP3<1 coverage rates for the audit year (2001), the drop-out rate from reported DTP1<1 to reported DTP3<1 for the audit year and the change in reported DTP3<1 from 2000 to 2001 for the four districts in the DQA:

District	DTP3<1 coverage 2000	DTP3<1 coverage 2001	Change in reported DTP3<1	Drop-out rate 2000	Drop-out 2001	District denom. 2000	District denom. 2001	National denom. 2000	National denom. 2001
D1	81.7	81.9	6274	8.0	8.6	67418	74883	83202	73432
D2	93.1	100	-2799	4.6	2.2	83415	74824	104003	91962
D3	40	58.6	13421	22.2	28.4	61687	64917	101624	90335
D4	50.9	34.6	1654	Missing	26.4	31102	50487	43510	49647

The DTP3<1 coverage rate is based on the zone tabulated reported figure and the denominator found at zonal level. One district has 100% coverage but has a negative change in reported DTP3<1. The Officer responsible could not explain reasons behind the drop of the targets from 2000 to 2001 whereas the denominators were going up. However, it was discovered that there is no use of previous years’ achievement data when setting new targets which has led to under estimation or too ambitious plans at times.

As discussed above (“National level”) both the figures for Zonal denominators and National denominators for the zone differ. Three zones have higher denominators at the National level than those at the Zones. The denominators at the Zones are calculated at the Region, whereas those at the national level are generated at the EPI national HQ. All offices use 1994 projected census figures which are adjusted for different growth rates to set the denominators.

The drop-out rate is very high in two zones (Z3 and Z4). Two zones (Z1 and Z3) registered increase in drop out rates whereas one zone ((Z2) show a tremendous improvement. The situation for Z4 could not be established as information for 2000 was missing.

The change in reported DTP3<1 is measured as a change in the reported DTP3<1 figures for 2000 to 2001. It is encouraging to see a positive change in three zones except one.

3.3 HEALTH UNIT LEVEL

The DQA comprised twenty-three health facilities selected from the four zones. The health facilities ranged from health centres, health stations and health posts. Each health facility has outreach stations varying in number depending on the catchment area of the facility. The static clinics are manned by clinical officers, nurses, health assistants and other front-line health workers. The outreach clinics are usually conducted by the health assistants who are assisted

by the community health workers.

Quality of system

Each HU was evaluated according to the “Quality System Index Questions” for recording, storing and reporting and monitoring and evaluation. The score varies from 38.1% to 90.0% with an average score of 64%. While the average score is not bad there are clearly areas that need work and zones which require attention.

Recording and Storing/Reporting:

There were several reasons that contributed to the strengths and weaknesses in this area that varied from zone to zone amongst which were:

- General shortages of formats, but particularly tally sheets and vaccine balance sheets, is a key determinant of poor record keeping scores as well as problems with reported versus recounted consistency.
- In Z1 and Z2 which were in the same region, most of the tally sheets were in use and available for most parts of the year which was contrary to the other two zones. In Z4 in particular, tallies were largely unavailable, and (as in Z3) when they were they did not match well with the numbers being reported for the specified month.
- Many HUs only used the tallies for static facility vaccinations and in two facilities they used hand-drawn tallies for outreach but discarded the tallies after making the monthly report.
- HUs not using tallies for outreach immunization claimed to use the Registration Book to record and later to compile the monthly report. However, the design of the Registration books makes it extremely time consuming and inaccurate for tracking monthly outreach totals.
- Where tallies were used for outreach many HUs used a different tally sheet for each outreach village for each month which was not justified by the numbers being vaccinated and leads to over-use of tallies.
- Registers were in use for both infants and for TT in most of the health facilities.
- Almost 100% of the monthly reports to the Woreda were signed by the in-charge of the health facilities.
- Monthly reports are hand-delivered to the Woreda as the health facility personnel visit the Woredas almost weekly for some purpose (i.e. payroll, supplies, meetings). However, the auditors did not have a chance to verify this with every Woreda because of the primary use Zones for this DQA.
- One major problem was the availability and completeness of vaccine balance sheets. HUs in two Zones did not begin using them until mid 2002, and HUs in the other 2 Zones have not yet begun to use them consistently.
- Incomplete or non-existent vaccine balance sheets for the audit year made it impossible to measure vaccine wastage at the HU level. In two facilities that did not have cold boxes they collected and then returned vaccine stocks on each immunization day, but did not themselves track use with vaccine balance sheets.
- Transcribing errors are common (from tallies to reports) and often very large. Reported and recounted totals were in most months different.

Monitoring and Evaluation:

- Health facilities scored highly on the use of targets for children and pregnant mothers and posting of charts for child immunization. However charts for pregnant women were not available in the two northern Zones.

- This component also was constrained by lack of routine supervision and written feedback. In some Zones there was evidence of irregular supervision and feedback written into the Visitor's book, but overall this was a problem.
- Monitoring of EPI supplies do not include AD and non AD syringes, safety boxes and TST spots.

3.4 VACCINE AND INJECTION SAFETY

Vaccination safety

The "Guidelines on the National Expanded Programme on Immunization" (April 2001) includes a paragraph on AEFI: "EPI at different levels should monitor Adverse Events Following Immunization, (AEFI). Each adverse event should be documented, investigated and efforts should be made to determine its cause. Appropriate treatment and communication should follow the detection of immunization adverse events with parents, health workers, and other persons affected within the community." This is a relatively new policy and does not appear to have been implemented yet. To date there were no forms for AEFI and staff at the HU level were not yet monitoring AEFI.

Injection safety

At present routine EPI are using both reusable needles and syringes, as well as AD syringes and safety boxes. Again, the 2001 EPI Guidelines do include injection safety and detail the equipment and procedures to be followed as well as a statement of intent to phase out sterilizable injection by 2002 in favour of AD injection. The transition to AD syringes has not yet been completed although safety practices were observed for both AD and non-AD injection. Safety boxes were largely available, and needles and reusable syringes were being buried and/or incinerated at different facilities.

The monitoring of injection and injection safety supplies was sporadic at best, and EPI Co-ordinators and others in charge of immunization supplies responded that EPI vaccines were their responsibility, but the injection supplies were under the authority of the Pharmacy department. As with the vaccines themselves, there were no ledgers at the lower levels for monitoring the use and availability of these supplies. One ICC member stated that this was an area which was being discussed and would be put into place in the near future. These supplies were not being monitored at the national vaccine store although it is possible that this is due to the computerized inventory system that has been non-functional for at least the past six months.

3.5 VACCINE WASTAGE

In the calculation of vaccine wastage a distinction is made between **System wastage** and **Administrative wastage** where:

- System wastage is doses of vaccine damaged by breakdown in the cold chain, poor management (expired vaccine) or accidents (breakage, etc). DTP system wastage calculation is applicable for National and Zonal levels.
- Administrative vaccine wastage is the unavoidable waste due to the administration of multi-dose vaccine vials where "left-overs" will have to be discarded and is applicable at the Health Units Level.

Global wastage is the combined system and administrative wastage and is applicable for the Health Units.

The JRF report for 2001 does report a national wastage factor of 13% which is likely to have been based on systems wastage figures from the national level only. It was impossible to confirm because there were no current or historical vaccine supply records available at the

national vaccine store. However, the computerized inventory system at National level was reportedly functional for the audit year and because there is little or no reporting of wastage from lower levels.

There was no observed system in place to measure the losses due to 'system', administrative or global wastage at the lower levels and report to higher levels. Most importantly, even if such a system were in place the non-use of vaccine balance sheets of ledgers would deny its implementation. As mentioned above, there were no vaccine inventory ledgers at the national level. At Zones, only one of the four visited had any vaccine supply records for the audit year and these were incomplete, and only four of 23 HUs visited were able to present vaccine balance sheets for DPT for the audit year.

3.6 DATA ACCURACY

The verification factor (VF) is the ratio between (adjusted) DTP3<1 recounted during the DQA from tally sheets and the figures reported in the monthly reports: (adjusted) Recounts/ reported. The verification factor for Ethiopia for the audit year 2001 based on (adjusted) recounted/reported DTP3 is **0.807**.

The national reported DTP3<1 (Re: JRF 2001), the national figure used for sampling of four districts and the most recent national tabulation for DTP3<1 for 2001 are as follows:

JRF 2001:	1,200,578
Sampling for the DQA:	1,200,578
Most recent tabulation found at the national level:	1,200,578

As stated above, there is complete consistency between all three figures which indicates that no additional data were entered after 8th April 2002. This can have three possible interpretations.

- No 2001 reports arrived after this date,
- Late reports which did arrive were never processed.
- Late reported performance data were added to the performance data for the month in which they arrived (in 2002).

Given observation of consistent late report processing procedures throughout the selected Zones and HUs the Auditors believe the third explanation is the correct one.

The four sampled districts reported or recorded DTP3 for 2001 in the National tabulation is as follows

	National tabulation	Zone report at National	Zone tabulation	Zone report at Zone	Difference National tabulation-Zone tabulation	Difference National tabulation-Zone report at National	Missing zone reports at National
East Gojam	64,224	64,224	61,356	na ¹	2,868	0	0
South Wollo	74,450	74,450	74,822	na	-372	0	0
Jimma	42,109	32,088	na	24,646	na	10,021	1 ²
Hadiya	17,488	8,436	na	17,488	na	9,052	2

The largest reported figure of DTP3 found in the "National tabulation" or the "Zonal reports at national level" is used in the formula for the verification factor (to achieve "adjusted" figures as

¹ There were no reports available for the audit year at the zone itself. There were regional tabulations for the zone available at the region.

² Refers to quarterly reports for both Hadiya and Jimma.

mentioned above). The first two Zones have same figures both in the “National tabulation” and “Zonal reports at national”, thus any of the two figures applies, a positive impact on the VF. The other two zones have higher figures in the “National tabulation” than in “Zonal reports at National” due to one missing quarter of reports for Jimma and two missing quarters of reports for Hadiya. The values used in the verification factor for the four zones are: 64,224; 74,450; 42,109 and 17,488. The differences were only recorded in the last two zones and the reasons are recorded below:

- The missing quarter of data for Jimma was captured by the national headquarters through the phone and thus a difference of 10,021 between the tabulation and the available reports at National level. It was difficult to establish the exact months and the actual facilities the data belonged to as sampling was done based on a randomly selected three months (there are more than fifty facilities in the zone without any annual tabulations) and much of the data was missing. This is a problem of using zones as opposed to districts and can have a negative impact on the VF.
- There were only two quarterly report for the Hadiya zone at the national level. The “National tabulation” was electronically captured from the regional data.
- Unfortunately no Zonal reports were found at two of the Zones (East Gojam and South Wollo), which makes “data consistency” analysis difficult for this DQA.

The verification factor confidence interval is very wide (0.317 to 1.254) and probably reflects outliers in the sampling frame. There are both inter-cluster and intra-cluster causes of the large CI.

- Intra-cluster: where there are large differences between recounts and reports for given HUs, but which balance out for the cluster (zone) total between under-reports and over-reports.
- Inter-cluster: Despite a good overall score for the combined four clusters, in terms of recounts versus reported DTP3<1, there is a relatively large disparity between three “good” clusters and one “bad” cluster.

Reported Vs Recounts

The following table highlights the reported DTP3<1 against recounted figures for the 24 HUs: (in reality only 23 as one HU was not visited)

Reported vs recounted DTP3 for 2001

Zone	Reported	Recounted
East Gojam	5122	5162
South Wollo	4074	3121
Jimma	4168	3756
Hadiya	3226	1023

Under, as well as over-reporting, was observed in some HUs, mainly due to transcription errors or calculation errors from tally sheets to monthly immunization reports. The ratio of recounted/reported for the 23 visited HUs is: 0.775 (13,062 recounted/16,854 reported). This is in itself an encouraging “VF” considering that it is the first DQA and first time gone through the process. As mentioned above, the recounting was based on the tally sheets found in the health facilities from both the static and outreach stations. It should be noted that the very poor showing in Hadiya Zone (where most tallies were missing leaving recounts of 0) was more than compensated for by much higher consistency in the other zones which had higher levels of performance and were thus weighted higher in the overall VF.

A difficult task that could not even be exercised by the health workers themselves was to recount from registers as they had to go back and forth and failed to complete recounting even

for a single month after an hour or so. Worse still the recounts were different from the reported.

The team did not observe any evidence of “inflated” figures or any sign of “creative accounting” with impact for the DQA. Staff met were aware of the DQA and very supportive.

4. RECOMMENDATIONS

The EPI is well established in Ethiopia and has been operating since 1980. It currently benefits from strong management as well as support from many stakeholders participating in the ICC. Given that this was a first (pilot) DQA the programme has done very well – particularly in regards to the verification factor. As was discussed, a VF greater than 0.80 is considered by GAVI to be a “passing” score. However, it is important to note that there are many areas requiring immediate as well as longer-term attention to enable the Programme to achieve its own goals for coverage and for improving immunization reporting and safety. As requested at the debriefing the recommendations below begin with a short section on “immediate” recommendations followed by a larger section with all recommendations presented by DQA component areas.

The challenge for EPI is to maintain the momentum of programme activities and to ensure that services are delivered and that timely and accurate information is reported throughout the system. As stated by a management expert in his publication ‘The Goal’, “if you can’t measure it, you can’t manage it” which is important in the management of any programme.

“Immediate” Recommendations

1. Institute vaccine and injection supplies monitoring (balance sheets or ledgers) at EVERY level. This is the policy, but was not observed as practice.
2. Ensure that ALL HUs use tally sheets and then save them for at least three years as is MOH policy.
3. Re-introduce routine supervision schedules for all levels and ensure that feedback is documented in Visitor’s books, meeting minutes, or other feedback format.
4. Improve the supply of all reporting formats – particularly tallies – at the HUs.
5. Implement a report “receipt” date policy at all levels.

Recording practices:

- Given the high levels of staff turn-over due to decentralization ensure a proper “handing over” process before staff are transferred.
- Review the current integrated tally sheet format to determine how to get more use out of each page. Only a small proportion of each page is now used for immunization tracking and most of the rest of the tally is left blank requiring many more tallies used than necessary.
- Institute “paper” ledgers for the National vaccine store until such time as the computerized system is repaired. Ensure that the future computerized system is backed up weekly in case of further hardware or software problems.
- Ensure that completeness of reporting (i.e. percentage of HUs reporting to a given Zone in a given period) and not just availability is captured at national level.
- Ensure that batch number and expiry dates are captured in the vaccine control ledgers and that regular physical stock checking takes place, i. e. at the national level at least on an annual basis, and with more frequency at the lower levels.
- Use supervisory visits to strengthen knowledge on use of tallies, the vaccination schedule, monitoring the correct completion of the vaccine ledger, calculation of wastage, proper maintenance of the registers, etc.

- Ensure timeliness of reporting and review the deadlines for reporting at each level if necessary.

Storing /Reporting:

- Write down (formalize) the “late report procedure” being used.
- Introduce wall charts for tracking timeliness and completeness of reporting.
- Develop and disseminate easy to use Guidelines for EPI recording and reporting. The guidelines should include procedures for re-ordering formats and for hand drawing formats when no other source is available.
- Institute written back-up procedures for the National EPI data-base and ensure it is backed-up routinely.

Monitoring/Evaluation:

- The National level EPI office should maintain EPI performance wall-charts (targets/plans/performance) as seen at two Zones and most HUs. Encourage universal implementation of the wall charts in all Regions/Zones/Woredas
- Review the procedures for setting targets (called plans in Ethiopia) to ensure that each year’s targets take into consideration the past year’s performance. Some Regions might want to rethink setting their plans (targets) at 100% of targets (denominators)
- Monitor the completeness and timeliness of reporting.
- Ensure that TT2+ is monitored in all Regions/Zones.
- Wastage should be monitored and reported from every level. National wastage rates, as reported in the JRF, should state what level/s the wastage data came from and how complete it is.
- The National and/or Regions may need to assist the Zones and Woredas in developing different feedback formats and supervision checklists.
- Encourage the completion of ‘annual reports’ at least at Zonal level.

Denominators

- If the Regions are to continue to set denominators and targets for Zones these figures should be provided to the National office annually and used in the National EPI data base.

System design:

- The current reporting formats do not include a space for reporting of Adverse Events Following Immunization (AEFI), reporting of wastage from un-opened vials (expiry, breakage, cold chain failure, etc) of vaccines, and number of health units reporting in a given Woreda or Zone in a given period. EPI should review current formats and determine how best to incorporate additional data.
- Review procedures, information needs and use, reporting, flow of information, storage of data, wastage, AEFI, injection safety, etc. in order to define clear national policies and guidelines. Include in an overall EPI Operations Manual (of which the Reporting Guidelines can be a stand-alone chapter) and disseminate widely with training.
- Further develop the policies and procedures for AEFI reporting and vaccine and injection safety, as initially developed in the 2001 EPI Guidelines, and develop implementation and monitoring plans,

ANNEXES

- 1. Key Informants (including those attending the debriefing)**
- 2. Summary Worksheets (national, 4 zones and 23 HU)**
- 3. PowerPoint presentation from debriefing**