GAVI
DATA QUALITY AUDIT

SUDAN

September 19th – October 3rd 2004

LIVERPOOL ASSOCIATES IN TROPICAL HEALTH, UK

in association with

EURO HEALTH GROUP, DENMARK

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Executive Summary

Objective of DQA:

The DQA 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.

Method:

The DQA was undertaken by one senior and two trainee auditors, who worked at national level of HMIS and EPI before visiting four districts and six health facilities in each district. All 24 health facilities were selected randomly. The standard DQA method (GAVI, 2003) was applied, which included use of interviews, administration of questionnaires and recounting.

DQA Indicator Dashboard:

	DQA Audit 2001	***DQA Audit year 2003***	***Change since 2001***
Verification Factor (>0.8) *(Compares recounted to reported DPT3)*	*0.69*	**0.96**	***+0.27***
Core Indicators:			
DTP3 Coverage	*70.9*	**73.9%**	***+3.0%***
Drop Out Rates	*17.9*	**17.1%**	***-0.8%***
Safety of Injections and Vaccine Safety	Yes	**Yes**	
Wastage Rate Administrative System	NA	**19.3%**	
Completeness of Reporting	80.2%	**84.4%**	***+4.2%***
Vaccine Stock-Outs	NA	**No**	
Action Plans for Districts		**Yes**	
QSI at National Level	51.1%	**90.6%**	***+39.5%***
Average QSI for Districts	54.4% (39.3-74.2)	**77.1%**	***+22.7%***
Average QSI for Health Units	41% (14.8-73.3)	***82.0%***	***+41%***

Summary of principal findings and prioritised issues:

A tabulated overview of key findings and priority issues are attached as annex 4. The table above presents a summary of key findings and priority issues. The subjects dealt with cover the three different levels audited (HU, District and National). However, the focus for improvements are recommended to be primarily at the District Level, where the DQA has identified problems in defining the organisation of health facilities and the flow of reporting.

Main Recommendations:

- ✓ Redefinition of health structures for levels below districts,
- ✓ Possibly avoid sub districts,
- ✓ Redefinition of flow of reports to districts,
- ✓ Only standard monthly reports should be sent to and filed at the districts'

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- ✓ Out reach activities should be reported by tallies to, and filed at, fixed HUs'
- ✓ All fixed vaccinating HUs should keep vaccine ledger books

1. Introduction

The Data Quality Verification (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 2004 (for the audit year 2003), the DQA is being performed in up to 14 countries. It is hoped that participation in the DQA will assist each country in understanding the extent and details of the verification 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 in Sudan from the 19th September to 4th October 2004 by the following team:

Name	Position	Districts Visited
Knut Wallevik	External Senior Auditor	Umbada, Kadogli
Eduardo Macuacua	External Trainee Auditor	Umbada, Um El gura
Jet Njweipi	External Trainee Auditor	Umbada, Nahr Atbara
Abdel Rahim Mutwakel	National Auditor	Umbada, Kadogli
Nisreen Musa Widaa	National Auditor	Umbada, Um El gura
Shaza Mohie Aldin	National Auditor	Umbada, Nahr Atbara

All newly WHO trained auditors are accompanied by an experienced senior auditor in their first country DQA.

2. Background

Sudan is the largest country in Africa and the 9th in the world. The actual population based on projections from the latest census carried out in 1993 is estimated to about 35 million inhabitants. The political system in Sudan is Federal, and there are a total of 26 States and 134 Districts, which are called Localities. Since April 2003 the Administrative System has been restructured and the number of Districts (Localities) reduced from about 500 to 134. This administrative reform led to redefinition of catchment areas and target populations, at both District/Locality and HU levels. Any comparison of performance on EPI core indicators between 2003 with those from previous years, should consider the changes that have taken place on the catchments areas. For instance, one of the four States visited, (Al Gazera) had up to April 2003, a total of 34 Districts/Localities and, since the system changed the number of Districts were reduced to 7, with new catchment areas defined for Districts and HUs.

The Localities will be named as Districts in this presentation, in order to harmonize the present report with other GAVI DQA reports

The National EPI office is based in the Capital City (Khartoum) with State EPI offices in 23 of the 26 States, the remaining three States being controlled by rebels and therefore not easily reached by EPI activities.

Some of the major problems found in 2002 DQA, affecting the implementation of EPI activities are still present. These include:

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- Vast geographical areas with difficult access by road particularly in the rainy seasons,
- Continued conflicts in the Southwest States
- A nomadic population and internally displaced people because of the security problems.

The National EPI office (at the Federal Ministry of Health) is responsible for basic immunisation policy design, guideline preparations, strategy definitions, financing and overall monitoring and evaluation of immunisation activities. At the national level the EPI office also coordinate various aspects including diseases control, training and supervision of States/Districts, and logistics related to supplies of vaccines.

The States, (State Director General of Heath, State EPI Officer) are responsible for the whole delivery of EPI services at the state level, providing technical support and supervision to the Districts/Localities. Beneath each State there are two health providing levels: the Districts and the primary health care facilities (Health Units, Health Centres, Hospitals, Dispensaries, Outreach Clinics, mobile teams, etc.). While the Districts are responsible for the whole coordination, supervision and cold chain supplies at this level, the HU is the level in charge of vaccination activities and the basic recording and reporting on immunization activities. There still exists an intermediary (Sub-district) reporting level between Districts and HUs in some districts such as in Umbada.

At national level, GAVI is providing a full time National Advisor (a Medical Doctor), who has been instrumental in pushing the country to the desired level of performance. WHO and UNICEF provide technical support. UNICEF particularly furnishes the EPI with vaccines, syringes and cold chain equipment while WHO primarily focuses on r surveillance, training and supervision

2.1 NATIONAL CONTEXT

Reporting and Information Flow

Within the new administrative system, there are three main levels for reporting and flow of reports (from HU to District/Locality; District/Locality to State and State to Federal level). However, because of unclear definition of health facilities, there is still existence of some outreach and mobile teams, which reports directly to District, either by standard reporting forms or by tally sheets.

Flow of reports

- -at the National level: Compilation and filing of the reports from the States with attached copies of District reports.
- -at the State EPI office you will find the original District reports and copies of reports sent to the National Office,
- -at the District (Locality) level you will find
    1) the “fixed” (= well established health centres with a refrigerator) HU reports on standard reporting formats,
    2) reports from outreach vaccination activities, either on standard reporting formats or tally sheets, depending on the status of the outreach health facility and
    3) tally sheets from the mobile teams.
- -at the HU level you find copies of the standard monthly reports and the original tally sheets. When reporting is by tallies the original tally sheets are sent to the District or to the HU, no copies are retained.

Data collection and recording of EPI activities are made according to the national SOPs. The child card, containing the main information about the child and its vaccination status, is kept by the mother.

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All reporting is monthly. The deadlines for reporting at the various levels within a State varies from State to State, while from the State to the Federal level it is fixed to the 15th of the next month.

From the year 2004 stationary related to EPI activities has been made free of charge to secure consistency in registration and reporting from Districts and HU's.

Reports are sent from State to Federal level through a contracted carrier (mostly DHL) and the same carrier is used for feedback reports.

Various logistical methods are used for sending reports from the HU level to the District and from the District to the State levels, which depend on the geographical terrain and degree of development of the area. Lack of transport can create problems with timeliness.

The completeness of State reporting to the Federal office was 76.7% and for timeliness 56.5 % in 2003.

There are written instructions for dealing with late reports, in that late reports should be sent as separate reports and not included in the next months' report.
80 % of Sudan's vaccination activities are administered by the MoH (EPI) and 20% by private health institutions (NGO's and Missions). The latter are supplied with vaccine from and report directly to the States who include the data into the monthly reports. The reporting is secured by the principle: No reports—No vaccine.

Supervision

Supervision at the National (Federal) and State level is well organised, documented and with written feed back.
Supervision schedule:
Federal – State: 1-4 times a year according to previous scoring and monitoring of performance
Federal – District: Each year 2 Districts are selected randomly within each State
State – District: 1 District and 3 HU per month.
Independent supervision by Short Term Consultants (STC's) from WHO. Check lists and reports in English. 1 District and 3 HU's/month, but different Districts and HU's than the ones supervised by the State.
The same checklists are used by the EPI and the STC supervisory teams. Checklists for Districts and HU level are different.
There is feed back from State to Federal, and from District to State level. STC reports also to Federal EPI office.

Funding of EPI activities:

UNICEF 40% (all vaccines, cold chain and vaccination safety),
WHO: 25%, (training, supervision, surveillance),
GAVI: 19% (outreach and mobile activities)
MoH:16 % (salaries, stationary)

2.2 Approach and Mobilisation

The team worked at the national level at the EPI office before going to the district and health facility levels. Based on DTP3<1 reported at National Level for the audit year, a random selection of 4 districts was carried out before arrival in Sudan. When visiting the Districts six Health Units (HU) were selected randomly in each district, also based on reported DTP3<1 at District/Sub District levels.

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Selected Districts	Selected and Visited Health Units	Remarks
➢ Kadogli	✓ Alum Kadogli, hospital Alhamia ✓ Kuak, ✓ Nagla OR, ✓ Murta, ✓ Almasanee7, ✓ Shat damam	Kadogli District is 1500 km south of Khartoum The District has 27 vaccinations sites registered at the District as reporting in 2003 of which only 11 were eligible for auditing, 3 were non eligible because of impossible road conditions in the rainy season, 9 were virtual outreach vaccinations sites (under a tree, the chief's house, a store), reporting directly to the District and registered as a reporting site, but could not be visited by the auditors as obviously no copies of the tallies are left at the locations. 3 HUs were destroyed and no paper or reports left at the sites. During the audit it was raining heavily and one of the selected HU could not be reached. The selected reserve HU was visited instead.
➢ Umbada1500	✓ Altibi alkhairi, ✓ Alhikma 15, ✓ Albir Aldawlia, ✓ Almanara, ✓ Badr alkubra, ✓ Sabaa Alkhairi,	The Umbada District, is in the Khartoum State with 3 sub districts in the district. Two were randomly selected and from each of these 3 HUs were sampled and visited. The reserve HU was selected from the remaining health units within the two selected sub districts. Only 34 out of the 66 HUs (reporting sites) listed for the two selected Sub districts were eligible. The high level of non-illegibility is related to the fact that many of these health facilities are outreach. Mobile teams submit tally sheets directly to the Sub districts and therefore it is not possible to visit a mobile team.
➢ Um El gura	✓ Um El gura hospital, ✓ Gefar Hospital, ✓ Al Furgan Hospital, ✓ Amart El bana, ✓ Al Feag Hospita,l ✓ Wad El mehady,	Um El gura District (Algazera State), in the centre of Sudan, has seven-fixed reporting sites and one mobile team, which also reports directly to the District. The mobile team was considered non-eligible for the same reasons explained above. The 7th HU was automatically selected as the reserve HU. Due to the long distances between the HUs, the auditors arrived at the second HU after it had closed, so there was nobody to receive the team The auditors had to return the day next. This situation altered the team's initial program for HUs visits.
➢ Nahr Atbara	✓ Halfa Hospital, ✓ The Factory Hospital, ✓ Hai Althawra HC, ✓ School Health HC, ✓ Dabarosa HC, ✓ 6 Arab HC,	The District is about 800 km to the north east of Khartoum in the state Kassala. The journey was delayed some hours by problems at a road security check point.

A debriefing meeting involving members of ICC was held on 3rd October 2004 at the EPI Office, with all EPI Heads of Departments, UNICEF and WHO representatives. A comprehensive list of persons met during the DQA and at the final debriefing are included in Annex 1 of this report. Major recommendations/action points discussed during the debriefing include the following:

- The issue of the denominator was said to be out of the control of the EPI;
- A new format of ledger book was being designed and will be used soon;
- The audience was informed that a model organogramme for the relations between Districts and connected health facilities, including suggestions for the flow of reports, had been developed by the National EPI office and was sent

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to the States. It can only be hoped that the recommended new organisation of health facilities will be introduced by the States, as the Federal EPI office only has advisory and supervisory status in relation to the States
- SOPs relating to the declaration and management of any AEFI is still being developed.

Selection of HU's at the District with Sub-Districts

At the selected District (Umbada) with 3 Sub-Districts, the District office had only the compiled vaccination activity of the monthly Sub-District reports and no detailed information on the health facilities connected to the Sub-Districts (names, number or status of the HU's). The two Sub-Districts (from which to select the 6 HU), were selected according to the WHO "Immunisation DQA procedure, Sampling Guidelines" on the basis of the reported annual DTP3<1 from the 3 Sub-Districts. The two selected Sub-District were visited and their respective HU's recorded separately together with their annual DTP3<1. For each of the 2 Sub-Districts, 3 HU's were selected, again according to the WHO procedure for HU selection, and the "reserve" HU was selected among all the HU's within the two Sub-Districts. The two "largest" HU from each Sub-District were entered as Stratum 1, and the two smallest as Stratum 3, for the calculation of the Verification Factor. The auditing team then returned to the District and finished the "Quality Questions" and further district data collection.

3. Key findings

3.1 Data Accuracy

The Verification Factor (VF) is the ratio between the DTP3<1 recounted from tally sheets or registers during the DQA and the figures reported in the monthly summary reports: Recounts/ reported. The verification factor for Sudan was for the audit year determined to be **0.96** with a 95 % confidence interval of 0.89 to 1.03

The verification factor reflects a high level of data accuracy in the 24Hus visited. However we observed cases of both over- and under-reporting. A 7% less recount compared to reported in one case (Alum Kadogli Hospital) is explained by missing tally sheets. Slight under-reporting are more prominent (for 9 HU's out of the 24). There are clear transcription errors e.g. Halfa Hospital in Nahr Atbara District (4) where at district level the DTP3<1 for September has been read as 323 instead of 123 as reported from the HU, and 92 read as the 97 reported in November.

One case of a substantial difference of 30% (Alhikma, Umbada District) between DTP3<1 in copies of the reports at HU and the reports found at the District was explained by the district adding outreach/ mobile activities reported directly to the District to the catchment areas where they belong.

For the 3 Districts where the comparison is relevant there are differences between the DTP3<1 reported by the District and the eligible + non-eligible DTP3<1 sampled from the monthly reports (for Kadogli the difference is -646) The difference is explained by outreach and mobile vaccinations reported directly to the District and not registered, but included in the monthly District reports

In 3 of the 4 districts visited there was an appreciable number of non eligible Health structures. The basic reason for the non-eligibility are the same for the 3 districts and will be described for District 1 (Kadogli). Out of the 27 vaccination sites registered at the District as reporting in 2003 only 11 were eligible for auditing, 3 were non eligible because of impossible road conditions in the rainy season, 9 were virtual outreach vaccinations sites (under a tree,

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the chiefs house, a store), reporting directly to the District by tally sheets, and consequently registered as a reporting site, but could not be visited by the auditors as no copies of the tallies would be found at the vaccination site. 3 HU were closed (destroyed) and no papers or reports left at the sites.

9 mobile teams are active within the catchment area and report separately by tally sheets to the District. However the tallies are not filed separately, by the number of the mobile team and could thus not be identified.

If the outreach vaccination activities had been compiled into the HU reports, to which catchment area they belong, they would have been entitled for recounting and thus contributed to a more true/realistic estimation of the VF.

Results for recounts of DTP1<1, measles and TT2+ compiled from the visited HUs are presented in the table below.

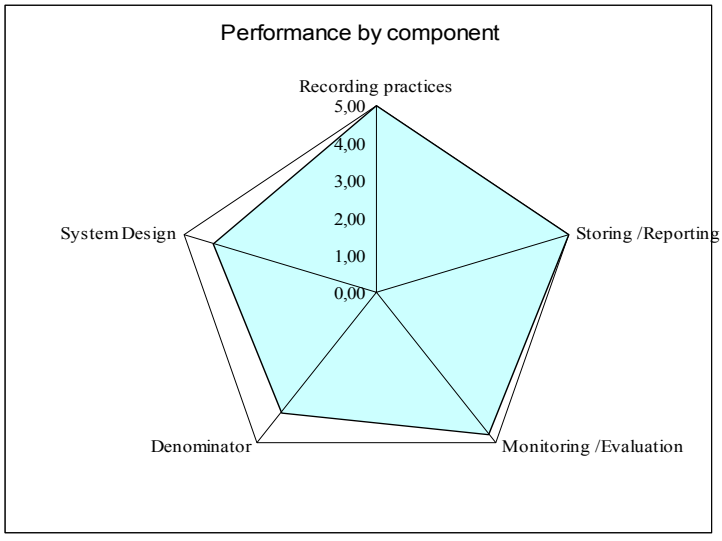
The difference registered between the measles reported and recounted in the table below is explained by the fact that the recounted figure does not include measles for the Altibi Alkhairi HU which was reported to 545. No recounting for measles was made for this HU. If the 545 reported for measles are added to the recounted figure the result should be a case of under reporting of 89.

Antigens	Total Reported	Total Recounted	Difference
DTP1<1	14,258	14,008	250
Measles	10,469	10,013	456
TT2+	5,078	5,102	(24)

In the JRF report the reported DTP3<1 in 2003 are in accordance with the latest tabulation found at the EPI office.

3.2 KEY ISSUES AT NATIONAL LEVEL

The national level quality index is 90.6%



The spider-web graph shows good performance on storing/ reporting, on recordings practices and on Monitoring/ Evaluation. However the remaining two aspects of QSI reflects the few problems encountered at the EPI at national level.

Recording practices

The data processing is one of the main tasks at the national HMIS Unit. The staff in charge of data entry for incoming reports do this immediately the reports arrive. For example, the audit team noticed that all July and August 2004 EPI data had been entered by the time of Audit.

The SOPs and corresponding recording forms (tally sheets and reporting forms, vaccine ledgers books, child cards and vaccination registers, etc.) have been introduced and used with great success in Sudan. All Districts visited were sufficiently supplied with these forms.

The National Vaccine Cold Store is very well managed and there is an immediate up-date of all the receipts and issuing of vaccines and syringes. The ledger is computerised and registers batch numbers and expiry dates on all supplies and issues.

Storing and Reporting

The 100% score on Storing and Reporting is in line with the well equipped EPI Information Unit, with new computers and sufficient staff to care for data processing and filing. The computerized system is equipped with a functioning network able to transfer data from the 4 working points (desktops) and filing it to the main computer/server to create a backup. There are also written back up procedures for data storing and the backup is updated at the end of the working day. However no back up is secured outside the office.

National Standard Operational Procedures (SOPs) have been developed and distributed widely. They provide guidelines on the reporting format, period, retention deadline, the handling of incoming reports, late reports etc.

Monitoring & Evaluation

The national coverage DTP3<1 for the audit year is 73.9%, and the drop out rate is 17.1% down from 19.5% in 2002. The change in the reported DPT3 between 2002 and 2003 is 120,327.
Some of the southern states are controlled by “rebels”. No information is received at Federal level on vaccination activity in those States. However vaccinations are taking place and coverage of DTP3<1 is loosely estimated to be 25%
Key EPI data are displayed on charts and tables and annual reports.
The audit team noted some inconsistency in printouts, some not indicating dates of submission, others not printing dates.

Denominator

Denominators are a crucial issue only marginally influenced by the EPI management. Denominators are given by the CBS/UNFPA (a joint Government (Central Bureau of Statistics) and the UN agency Population Statistic Sector) and based on the projection of a census from 1993.

The denominators for each State are given by the CBS/UNFPA office every year; the States are thereafter responsible for calculating denominators for each District using the proportional distribution of population living in different areas. The States are responsible for reporting back to the EPI HQ the denominator adopted for each District. However, the designation of denominators is a continuous problem, beyond EPI influence. The denominator problems are reflected in the district coverage rates, which for certain Districts (13,6%) are higher than 100%. On the other hand, the civil war, internally displaced people together with continuously restructuring of the administrative system have contributed to the variability in coverage rates between some of the Districts, However the State coverage rates for DTP3<1 are all less than 100%.
Denominators for children less than one year and for pregnant women are according to WHO definitions, (birth rate for pregnant women).

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During the visits the team noticed, that three of the four Districts were using denominators that were different from the ones used at the national level, although the differences were too small to be of significance.

System Design

The organisation of the flow of reporting still needs revision, especially with regard to re-definition of the health structures below the district level .

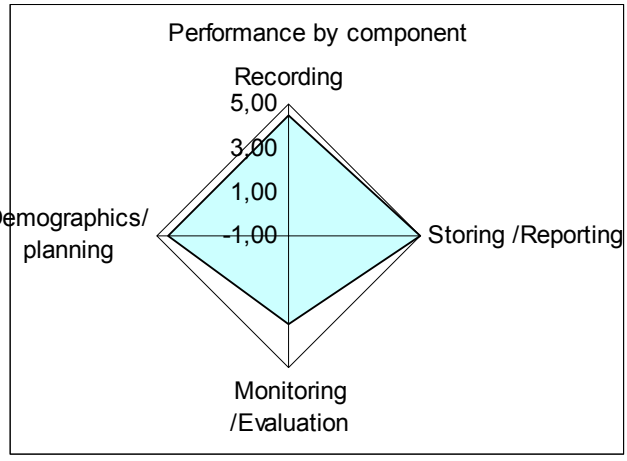
The National Health Information System or Disease Control of infectious diseases is weak in Sudan and an integrated reporting system does not exist.. EPI activities are reported separately including the reporting of Vaccine Preventable Diseases (VPD's). The EPI office is the only national authority dealing with registration of EPI data and related statistics.
There are 5000 registered primary health care facilities in Sudan, out of these 368 representative sentinel sits, reporting only for VPD's, are chosen: High priority sites report weekly, medium and low priority sites reporting once a month.

The completeness of State VPD reports for the period Jan-July 2004, is 80.7% and for the audit year 75%.

3.3 KEY ISSUES AT DISTRICT LEVEL

The system indices for the four districts are as follows:

DISTRICTS	Quality System Index
Kadogli	71.0%
Umbada	77.8%
Um El gura	81.3%
Nahr Atbara	78.4%
Average	**77.1%**



The main problem at the Districts is the classification of health facilities and definition of the flow of reports, including filing. It is a tedious and long term process to change administrative systems and it will need collaboration with both the State and Federal health authorities. The basic principles for a reorganisation should be that every health facility performing vaccination activities is equipped for primary health care within well defined premises ("fixed" HUs), report monthly on the standard forms to the district, and retains their own ledger book.

Outreach activities should be reported on tally sheets to the fixed HU within the catchment area and the activity included in the monthly report from the HU. The tally sheets should all

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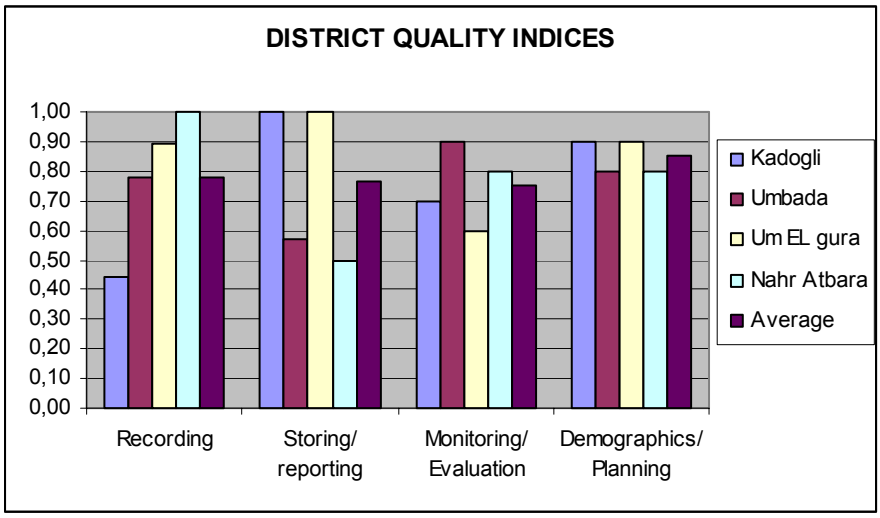
be filed together with the copy of the monthly report, by activity and date. The District office should ideally only receive standard reports.

If mobile activities takes place outside the catchment area of a HU, the mobile team should fill in their own monthly standard report, hand it over to the District office and retain a file copy. However if the mobile teams continue to report to the District by tally sheets, the tallies should all be filed by the team and by date.

At the Districts, ledger books for 2003 do either not exist or are incomplete. In November-December 2003 the State and District vaccine store managers were at a training course on stock keeping at EPI-HQ in Khartoum. The positive outcome of the training has been that for 2004 the ledger books for all vaccines were complete and up to date, with an indication of batch numbers and expiry dates.



Regular monthly meetings for Vaccinators are held only in two of the four Districts. Written minutes are taken, but no written feedback is provided.
None of the districts submit annual status reports.
The following issues should be addressed and defined at this level:

- the consistency of reporting to the district by the lower units;
- the standard format for reporting;
- the flow of reporting from outreach and mobile vaccination sites;
- the updating of the denominators.

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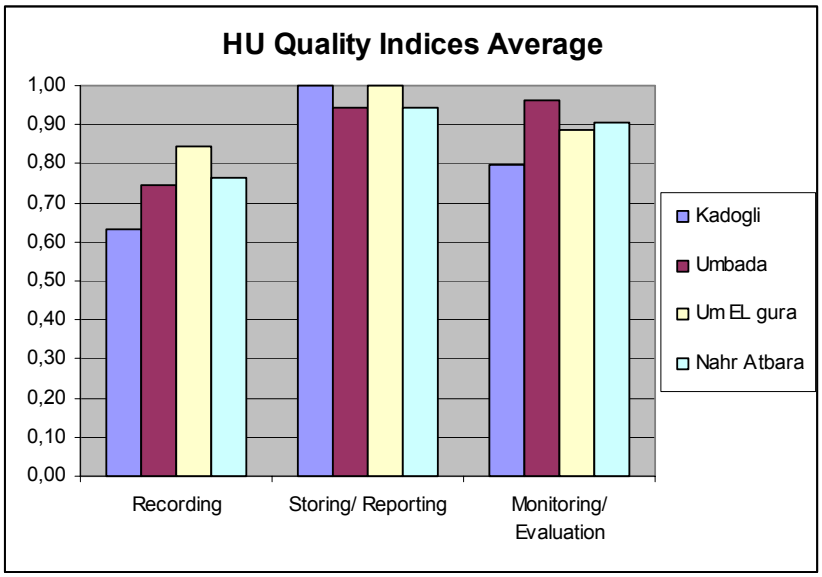
3.4 KEY ISSUES AT HEALTH UNIT LEVEL



The general impression has been that the performance at HU level is satisfactory, an impression which is supported by the Quality Indices.

The major problem at the health units seems to be vaccine stock keeping, which varies depending on the category of a HU.

HUs with refrigerators: Ledger books for the audit year were often incomplete or non existent. For 2004 the ledger books are complete and up-to-date with an indication of batch numbers and expiry dates.
HUs without refrigerators: (Up to now defined as outreach). No registration of vaccine receipt. The vaccines are brought from and returned to the district vaccine store by a person approved by the community on the day of vaccinations. The District Vaccine Store, register for each health facility the consumption of vaccines and calculates the wastage. A vial opened at one health facility can be used in the coming days at other health facilities which gives an overall low administrative vaccine wastage but constitutes a problem in vaccination safety.
Outreach and Mobile activity: Same procedure as for HUs without refrigerators.

The following issues should be addressed:

- maintaining up-to-date vaccines ledger books;
- all vaccinating health units should keep ledger books;
- records for syringes, safety boxes and other supplies;
- annual tabulations of vaccination activities.

3.5 CORE INDICATORS

Vaccine Safety

AD syringes are used for all vaccinations and disposable syringes for reconstitution. Syringes and safety boxes are distributed according to the number of vaccine doses ordered.

Stock outs of vaccines at the Districts and HU's are monitored during the supervisory visits and by regular telephone calls from the national vaccine store. Vaccine stock-outs at National-State-District levels have not been recorded. 4-12% of the HU's reported stock outs of some vaccines in 2003-2004.

There have been no standard guidelines for reporting adverse reactions to vaccinations (AEFI). AEFI has generally been regarded as a medical problem, not as an EPI issue. No serious AEFI has been registered to date and AEFI are regarded as very rare. The National EPI HQ is in the process of creating national guidelines and reporting forms for handling AEFI and it is hoped that the SOP's will be nationally accepted and functioning by the end of 2004.

Wastage

Table 1 DQA Vaccine Wastage Rates (Weighted Means)

	Kadogli	Umbada	Um El gura	Nahr Atbara
District WR (unopened)	Na	Na	0%	0%
Average WR for HUs (opened and unopened) [1]	na	Na	Na	na

National WR (unopened): 0%
Weighted Mean of the 24 HU wastage rates: na

State system wastage is monitored monthly in the National Vaccine Store computer. No system wastage is monitored for 2003, but in 2004, 29 vials of 20 doses DTP were frozen during transport. National administrative wastage for 2003 is reported as 19.8% but is not calculated according to WHO regulations.

Most HU vaccine ledger books for 2003, do not provide sufficient information to permit the calculation of WR.

Completeness of Reporting

The completeness of reports at national level in the audit year is 84.4%, an increase from previous year's of 80.2%. Some Districts are still hampered by conflicts. At district level, the completeness and timelines for HU reporting is being registered for 2004, but not consistently for 2003.

An attempt was made in one of the Districts (Kadogli) to determine the completeness of reporting for 2003 from the number of filed 2003 reports, but this was not possible due to the inconsistency in filing and the different ways of reporting (monthly reports or tally sheets).

3.6 CHANGES SINCE LAST DQA

The improvements in vaccination management performance are considerable, when comparison is made between the first DQA for the audit year 2001 (Report: Immunisation Data Quality Audit, Sudan, 21 February – 9 March 2003) and the present audit for the year 2003.
The improvements are at all 3 administrative levels audited (National-District-HU) and are clearly reflected in the key quality indicators depicted in the table below.

[1] Weighted mean of the 6 HUs in that district. Note beginning balance + receipts – ending balance = total use. Total units used (at all 6 HUs)/Total wasted (at all 6 Hus) = weighted mean for district

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Quality indicator	Audit year 2001	Audit year 2003	Comments
Verification Factor (VF)	0.69	0.96	Tally sheets introduced and used at all HU's
95% Confidence interval	0.18-1.22	0.89-1.03	Performance at HU level has become more homogeneous, thanks to National SOP's
QI, National	51.1 %	90.6 %	Improvements within all aspects
QI, District Mean of 4	54.4 % (39.3-74.2)	77.1 % (71.0-81.3)	
HU level, mean of 24	41% (14.8-73.3)	81.9% (61.5-92.8)	
Coverage rate DTP3‹1	70.9 %	73.9 %	

4. RECOMMENDATIONS

4.1 PRIORITY RECOMMENDATIONS

- ✓ Redefinition of health structures for levels below districts
- ✓ Possibly avoid sub districts
- ✓ Redefinition of flow of reports to districts
- ✓ Only standard monthly reports should be sent to and filed at the districts
- ✓ Out reach activities should be reported by tallies to, and filed at, fixed HUs
- ✓ All fixed vaccinating HUs shall keep vaccine ledger books

4.2 OTHER RECOMMENDATIONS

Recording

- ✓ A national standard should be introduced for ledger book
- ✓ Keep records of all supplies including syringes
- ✓ Monitoring & recording of HU vaccine stockouts by district
- ✓ Records kept of timeliness and completeness of reporting
- ✓ Training of vaccinators on ledger book keeping

Storing/Reporting

- ✓ Districts should be encouraged to produce annual reports/publications of EPI performance
- ✓ Backups for EPI data should be preserved at a secure place outside the EPI building.

Monitoring/Evaluation

- ✓ A written feedback format should be designed for use at district level;

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Monthly coordination meetings for HU's,

Demographic and Planning

- ✓ A plan for revision of denominators should be developed and agreed with other partners involved in the calculation of denominators
- ✓ The denominator used should be consistent at all levels

System Design

- ✓ Sub-Districts should be avoided and a simplified hierarchy for flow of reports introduced: HU—Locality (=District)—State—Federal (=National).
- ✓ All "fixed" out- reach health facilities now reporting to the district, should be treated as independent, reporting HU's and their catchment areas defined accordingly . Outreach activities shouldl be included into the HU reports.
- ✓ Introduce national SOPs and standard formats for AEFI reporting
- ✓ Computerization of the districts

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5 ANNEXES

I. **Key Informants** - names and functions of those seen/visited and place and time of each visit to a facility: includes central and district staff, those attending the debriefing, and a list of the facilities visited*, but not* the names of each HU staff.

II. Quality Index Analysis Table

III. **Core Indicator Tables** (national and 4 Districts)
a. National, district and HU performance indicators (any additional analysis that is not presented in the body of the report) represented by facility, district and country of the data quality questionnaire.

IV Key District Information

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ANNEX I

KEY INFORMANTS (DISTRICT AND NATIONAL) AND HEALTH UNITS VISITED

Health Units by District

Kadogli	Umbada	Um El gura	Nahr Atbara
✓ *Alum Kadogli, hospital*	✓ *Altibi alkhairi,*	✓ *Um El gura hospital,*	✓ *Halfa Hospital,*
✓ *Alhamia*	✓ *Alhikma 15,*	✓ *Gefar Hospital,*	✓ *The Factory Hospital,*
✓ *Kuak,*	✓ *Albir Aldawlia,*	✓ *Al Furgan Hospital,*	✓ *Hai Althawra HC,*
✓ *Nagla OR,*	✓ *Almanara,*	✓ *Amart El bana,*	✓ *School Health HC,*
✓ *Murta,*	✓ *Badr alkubra,*	✓ *Al Feag Hospita,l*	✓ *Dabarosa HC,*
✓ *Almasanee7,*	✓ *Sabaa Alkhairi,*	✓ *Wad El mehady,*	✓ *6 Arab HC,*

District 1

Kadogli Locality	**Position**
Dr Bashir Ibrahim	Minister of Health, South Kordofan
Dr Elfati Abdelrahman	DG Health, South Kordofan
Ismil Hamied	State EPI Operation Officer
Safa Abdelsalam	Kadogli Locality EPI Officer
Zenab Mergani	Cold Chain Officer
Alum Kadogli Hospital	
Ihsan Husein Ali	Vaccinator
Alhamia	
Zenab Omer	Vaccinator
Kuak	
Fatuma Abdelgadir	Vaccinator
Nagla OR	
Raga Monammed	Vaccinator
Murta	
Umguma Khames	Vaccinator
Almasanee	
Maka Mohammed	Vaccinator

District 2

Umbada Locality	**Position**
Dr. Khalid Osman	PCH Director (Locality)
Dr. Abd Allah Mohamed	MCH Director
Hafiz Mohamed Farag	Locality Operational Officer
Gamal Aldin Mohammed	Kharthoum State Operational Officer
Mohammed Abd Allatif	Cold Chain Officer

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Sadig Seba	ALSALAM operational Officer
Dr. Hadi Maghrabi	Chief of Alamir Health Area
Aliskan Alkhairi HU	
Ahmed Osman Abdu	Medical Director
Omer Abd Alrahma	Vaccinator
Manal Alhaj	Volunteer Vaccinator
Alsalam 15 (Alhikma)	
Iman Adam Ali	Vaccinator
Essa Guma Al Dekhair	Medical Assistant (Volunteer)

District 3

UmeLgra Locality	**Position**
El Rasheed Said Ahmed	El Gazera State EPI Officer
Al-Rayah Al-Basheer	District EPI Officer
Azhary Hassan Ali	District Cold Chain Officer
Um Elgura Health Center	
Azhary Hassan Ali	HC Manager
Azeza Adam	Vaccinator
Gafar Hospital	
Albadny Hussien Babeker	Hospital Manager/Vaccinator
Amira Osman	Vaccinator
Wad El Nehady	
Eaiz Eldeen Elfaley Eltaher	Vaccinator
Al Furgan	
Ranya Abd Elrazeg	Vaccinator
Amart Al Bana	
Suha Ahmed Ali	Vaccinator – Volunteer
Bothaina Yaseen	Vaccinator – Volunteer
Hanan Adb Alwahab	Vaccinator – Volunteer
Al Feag	
Asha Abas	Vaccinator

District 4

Nahr Atbara Health District	**Position**
Ali Kanon Ali	EPI operation officer
Dr. Adam Fadel Elmola	Director of District Health Services
El Rasheed El Hay Omer	EPI East Zonal Coordination
Moneera Basheir	EPI State Operation Officer
Dr. Ahmed Abdel Hamid	WHO STC Kassala
Dr Sharaf Eldein Mahdi	Locality Commissioner

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Halfa Hospital	
Omer Karap	Administrator/ Director
Salwa Hassan	Vaccinator
Ibtisam Alsir	Vaccinator
Factory Hospital	
Alhuguira Yousif	Medical Director
Husnia Abu Bakr	Vaccinator
Mariam Khidir	Vaccinator
Hai Aithawra Health Centre	
Haleema Admed	Vaccinator
Silwan Tairab	Vaccinator
School Health Centre	
Muneira Idriss	Vaccinator
Fatima Abd Alwahab	Vaccinator
Dabarosa Health Centre	
Fawzia Abd Algabir	Vaccinator
Sumia Mustafa	Vaccinator
Amal Ibraheem	Nutrition Officer
6 Arab Health Centre	
Mahasin Mohammed	Vaccinator
Muna Dafa Alseed	Vaccinator
Amal Ahmed	Nutrition Officer

National Level	
Name	**Position**
Dr. El Tayeb Ahmed Sayed	National EPI Manager
Dr. Amani Abdelmonien Mahmoud	National GAVI Advisor (Sudan)
Dr. Shaza Mohie Aldin	Head Of EPI Information Department
Dr. Abdel Rahim Mutwakel	EPI/AFP Surveillance Officer
Dr. Nisreen Musa Widaa	Deputy National EPI Manager
Salahuddin Elagib	National Cold Chain Officer
Debriefing	
Name	**Position**
Dr. Amani Abdelmoniem	National GAVI Adviser
Salah Haithami	WHO
Dr. Nisreen Musa Widaa	Deputy EPI Manager
Dr. Kehinde T. Craig	UNICEF
Dr. Mainul Hasan	UNICEF
Dr. Faton Mehoundo	UNICEF

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Mohamed Abdalla Ismail	EPI
Dr. Wafaa Tana Ibrahim	EPI Surveillance
Dr. Elsadiz Malgub	AFP Surveillance National Coordinator
Dr. Aisha Gailani	EPI/AEFI Unit
Dr. Abdel Rahim Mistwakel	EPI/AFP Surveillance
Dr. Shaza Mohie Aldin	EPI/ Head of Information Unit
Hibat Abbas	EPI/AFP Surveillance Unit
Ekhlas El Mohammed	EPI/Operation Unit
Khalda Abedelgani	EPI/Operation Unit
Maha Sead Mehanni	Training Depart.
Awad Omer Moh	Head of Operation Section
Samira Moh Osman	Head of SIAs Section
Fathe Irahman Elpadri	Operation Section
Aisha Elmaleah	Information
Eshraga Osman	SIA
Khadiga Hussein	SCC
Wafa Muzzammil Babiku	Training
Aziza Abdulgadir	Information
Mona Khalil Mergani	EPI/Information/Sec
Sally Seiguizzeldir	EPI/Information
Ahkam Bical	EPI - SCC
Isam Ehsin Ahmed	AEP Data man
Samia Ali Mustafa	Information Section
Khadiga Abdullah	Operation Section
Selma Abdulla	Information Section
Sarah Ahmed	Secretary
Nalila Mousa	EPI - F
Sattana Ahmed Elsayed	Social Mobilization Officer
Kuut Wallevik, Dr.	Senior GAVI auditor
Eduardo Macuácua	GAVI Auditor
Njweipi Jet	GAVI Auditor

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ANNEX II

CORE INDICATORS TABLES

Core indicators at National level

	JRF	Reported at time of audit
Districts with DPT3<1 coverage > 80%	55	50
Districts with measles<1 coverage > 90%	21	na
Drop-out rate	38	29
Type of syringes	AD	AD
Districts with AD syringes	100%	100%
Introduction HVB	no	no
Introduction Hib	no	no
Vaccine wastage DPT	19.3%	12.4%
Wastage rate HVB	Na	NA
Wastage rate Hib	Na	NA
Interruption in vaccine supply 2003		no
Number of Districts with interruption in vaccine supply 2003		0
% District disease surveillance reports received/expected		80.7%
% District coverage reports received/expected		77.3%
% District coverage reports received on time		59%
Number of District supervised at least once in 2003		na
Number of Districts which supervised all HUs in 2003		2
Number of Districts with microplans including routine immunisation	111	111

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Core indicators at District level

		D1	D2	D3	D4
District DPT3 coverage	At national	91.4%	58.7%	90.7%	106.1%
	At District	91.8%	59.6%	90.7%	106.1%
District measles coverage	At national[2]	82.5%	22205	5543	11233
	At District	25.3%		5543	
District Drop-out DPT1-3[3]	At national	25.3%	12.9%	-1.9%	7.1%
	At District	25.3%	11.6%	- 1.9%	7.1%
Syringes supplied in 2002	At national	na	na	na	
	At District	na	156000	27500	
Number of District coverage reports received/sent	At national	12/12	36/12	12/12	12/12
	At District	na/12	36/12	12/12	12/12
Number of coverage reports received on time/sent on time	At national	12	12	12	
	At District	na	12	12	12
Number of HU coverage reports received/sent	At national				
	At District	na	36	92	178
Number of HU reports received/sent on time	At national				
	At District	na	36	92	178
District vaccine stock out	At national	no	no	no	no
	At District	no	no	no	no
Has the District been supervised by higher level on 2003	At national	yes	yes	yes	yes
	At District	yes	yes	yes	yes
Has the District been able to supervise all HUs in 2003	At national				
	At District	na	no	yes	yes
Did the District have a microplan for 2003	At national				
	At District	yes	yes	yes	yes

[2] Information not collected at national level.
[3] Unable to estimate due to the fact that the HMIS does not routinely collect DPT1 data.

ANNEX III

QUALITY INDEX ANALYSIS TABLE

District Quality Indices and District average (over 5)

	Recording	Stor/Repo	Monitoring	Demo/Pla
D1 KADOGLI	2.2	5	3.5	4.5
D2 UMBADA	3.9	2.9	4.5	4
D3 UMELGRA	4.4	5	3	4.5
D4 NAHR ATBARA	5	2.5	4	4
District Average	3.875	3.85	3.75	4.25

HU Quality indices and HU average (over 5)

D1 KADOGLI	Record.	Stor/Rep.	Mon/Eval
HU 1	2.86	5	3.33
HU 2	2.86	5	3.89
HU 3	4	5	5
HU 4	2.5	5	3.33
HU 5	3.9	5	5
HU 6	2.86	5	3.33
HU average	**3.16**	**5**	**3.98**

D2 UMBADA	Recording	Stor/Repo	Mon/Eval
HU 1	3	5	4.44
HU 2	3.67	5	5
HU 3	4	5	5
HU 4	4.33	3.33	4.44
HU 5	3.67	5	5
HU 6	3.67	5	5
HU average	**3.72**	**4.72**	**4.81**

D3 UMELGRA	Record.	Stor/Rep.	Mon/Eval
HU 1	4.29	5	4.44
HU 2	4.33	5	5
HU 3	4.33	5	3.89
HU 4	4	5	5
HU 5	3.67	5	4.44
HU 6	4.67	5	3.89
HU average	**4.22**	**5**	**4.44**

D4 NAHR ATBARA	Recording	Stor/Repo	Mon/Eval
HU 1	4	5	4.44
HU 2	4	3.33	4.44
HU 3	3.33	5	4.44
HU 4	4	5	5
HU 5	3.93	5	3.89
HU 6	3.67	5	5
HU average	**3.82**	**4.72**	**4.54**

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Category	Positive	Key Issues
National Level	✓ The standard operational procedures (SOPs) for EPI activities have been worked out, ✓ National standardized formats for registration and reporting ✓ Completeness and timeliness of reports monitored ✓ EPI data processing and filing of reports excellent ✓ Charts and tabulation on core EPI indicator displayed ✓ Good surveillance of VRD ✓ Written monthly feedback ✓ Monthly monitoring of stock outs of vaccines in districts by telephone; ✓ Vaccine ledger well kept and updated; ✓ Annual reports produced	✓ The denominator used and disseminated is based on a long time census and projection so may not be up to date, ✓ Backups only made on the EPI server; ✓ No national SOPs or formats for reporting AEFI; ✓ No integrated reporting
District Level	✓ Completeness of reporting to higher levels is excellent, ✓ Monthly reporting of VRD, ✓ Regularly supervision using the existing supervision checklist, ✓ Proportion of children to be vaccinated by strategy is known (microplans), ✓ Vaccine ledger books for 2004, according to international standards, ✓ Monitoring of the vaccine batch numbers and expiry dates, ✓ New reporting forms used in all Districts for 2004, ✓ Standard cover letter for dealing with late reports.	✓ Health structures reporting to Districts not consistently defined, ✓ Report formats from HU level inconsistent (some on standard formats, others on tally sheets), ✓ Flow of reporting from outreach and mobile vaccination sites needs redefinition, ✓ Denominator for Districts not up to date (13.6% of districts have DPT3<1 coverage higher than 100%), ✓ 3/4 Districts use denominators different from the national one, ✓ No feedback format from district to HUs (oral feedbacks), ✓ Inconsistent monitoring of completeness/timeliness of incoming reports, ✓ No annual report/publication established, ✓ No coordination unit for social mobilization at district level, ✓ Vaccine stock out not recorded in some districts, ✓ *Irregular coordination meetings for HU staff (2/4 have monthly meetings).*
HU Level	✓ The SOPs and standard formats for vaccination are being used, ✓ All reports for audit year available, ✓ Tally sheets are being used and filed according to SOPs, ✓ Reports and tallies also filled in when no vaccination activity, ✓ Supervision regular as evident by the supervision exercise books, ✓ Midwives` registers for new births, ✓ Vaccination registers complete and well kept, ✓ Registers for tracing defaulters, ✓ Vaccine ledger books being introduced in 2004, ✓ No vaccines stock outs in 2003 - 2004 ✓ *The vaccination monitoring charts displayed.*	✓ Inconsistency definition of vaccination sites, ✓ No standards for reporting from vaccination sites to the Districts, ✓ Few vaccine ledger books updated, ✓ Vaccine ledgers incomplete for audit year, ✓ Generally, no record keeping of syringes and safety boxes, ✓ Few annual tabulation of vaccination activity, ✓ *Stock outs noticed for EPI forms.*

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