

**REPORT ON THE
DATA QUALITY AUDIT (DQA)
COVERING THE YEAR 2002
KINGDOM OF CAMBODIA**



Photo credit Save the Children Norway



PricewaterhouseCoopers is pleased to submit herewith its report on the DQA of the year 2002 by our office in:

The Kingdom of Cambodia

(Phnom Penh, 5 September 2003)

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Introduction

From 4 to 17 August 2003, PricewaterhouseCoopers (Cambodia) Limited performed the first GAVI Data Quality Audit (DQA) in Cambodia. Together with a team of internal auditors from the National Immunisation Program (NIP) office, we assessed the quality of Expanded Program on Immunization (EPI) data and systems and audited the reported number of doses of DTP3<1 administered in the year 2002, through visits to a random sample of health care administrations, including:

- NIP office
- Four operational district (OD) level administrations: Srey Santhor, Koh Thom, Prey Veng and Prey Kabass. These ODs were randomly sampled from the list of seventy-one eligible ODs (two ODs, Kep and Pailin, were considered ineligible because they contain less than six health centres).
- Twenty-four health centres (6 in each OD, including hospitals, health centres (HC) and any other facility where immunisations are administered).

The findings of this audit are included in this report and were also discussed on a debriefing meeting with the Interagency Coordinating Committee (ICC) on 19 August 2003.

Summary of findings and conclusions

The Data Quality Audit (DQA) was implemented smoothly with full support from EPI management and staff. The result of the DQA is very good with a high verification factor at 98%.

Good reporting, monitoring and evaluation systems are in place. Our findings indicate that Quality of the System Index (QSI) is very good at all levels. The QSI at each level is as follows:

- QSI at the national level: 86%
- Average QSI for the 4 districts: 75%
- Average QSI for the 24 health centres: 71%

Nothing has come to our attention to believe that the current reporting system is not reliable. However, we have pleasure in reporting minor recommendations where we believe it is appropriate for management to consider improvements in areas which are: (1) Lack of written back up of immunisation data procedures; (2) Inconsistency of infant denominators used for the calculation of vaccination coverage; (3) Inadequate monitoring of the drop out rate from DTP1<1 to DTP3<1 at operational district and health centre level; (4) Inefficient control over vaccine wastage rate at operational district and health centre level (5) Insufficient control over recording stock of vaccines and AD syringes (6) No procedures and guidelines introduced to ensure timeliness and completeness of the immunisation reporting system from health centres.

The details are provided in the *findings and recommendations section* at each review level.



National context

The information system for the programme is fully integrated with the Ministry's overall Health Information System (HIS), and reports are received at a centralised location within the Ministry of Health. The EPI programme then receives computerized information with specific immunisation information. EPI staff has no direct access to the reports.

The programme faces specific challenges as the majority of immunisations are administered through outreach sessions. This leads to very high wastage rates, and performance is under pressure following budgetary concerns, as the necessary resources for travel are not always available.

Acknowledgements

We would like to take this opportunity to express our appreciation for the co-operation and courtesy afforded to us during the DQA. We especially would like to thank Dr. Sann Chan Soeung, Director of Cambodia NIP, many staff members of Cambodia NIP, Provincial Health Departments of MoH, Operational Districts and Health Centres.



Background

Cambodia is one of the countries supported from the immunisation services sub-account of the fund established by the Global Alliance for Vaccines and Immunization (GAVI). This fund has been established to assist eligible countries to strengthen routine childhood immunisation programmes. As funding levels are linked to the number of third dose diphtheria, tetanus and pertussis vaccinations delivered to children under the age of one year (DTP3<1), countries are being encouraged to strengthen vaccination reporting systems. The DQA tool has been developed by World Health Organisation (WHO) to assess the quality of vaccination systems and improve their reporting, evaluation and monitoring systems. The Cambodian NIP is one of the country programmes selected for the 2003 DQA for the audit year 2002.

Objectives of the DQA

The overall goal of the DQA is to ensure that management of immunisation services and the allocation of GAVI funding are based on sound and accurate data. This goal is met by:

- Assessing the reliability and accuracy of administrative Immunisation Reporting Systems, but not immunisation service delivery.
- Auditing the reported DTP3<1 vaccinations for the audit year 2002 and estimating the national verification factor (ratio of recounted / reported vaccinations) for use in the allocation of GAVI Fund shares.

The above objectives are achieved by examining data and the information system in operation at all levels of administration – from collection of data at the point of vaccination to the periodic compilation of this data at district level and at national headquarters. This is done on the basis of randomly selected samples of administrative levels.

Furthermore, in practice the DQA is also a capacity-building exercise, and an opportunity for exchange of experience between the external auditors and the national counterparts.



Our approach

Our approach was to apply consistently the DQA methodology developed in 2000 by WHO.

The PwC team members were from our office in Phnom Penh, in the interests of cultural and linguistic proximity, acceptance by auditee, ease of travel, and cost-effectiveness. PricewaterhouseCoopers is a federation of partnerships, and we have therefore worked through this network in order to build up our teams.

In preparation for the DQA, we applied country-by-country training, in which the quality assurance manager for each region travelled on-site to train both the PwC teams and the national counterparts appointed by the Government. We used this training option in the spirit of the DQA, so that it not only provides objective results to GAVI and its stakeholders, but also enforces the capacity-building aspects.

Summary of work done

Two audit teams were formed, comprising one PwC auditor and one national auditor. The teams worked together at national level and then split up, each visiting two operational districts (OD) and twelve health centres (HC).

We carried out the tasks detailed in the DQA methodology, which included among others:

- Random selection of four operational districts and twenty four health centres.
- Discussion of the immunisation system in place including system design (national level only), denominator issues (national and district levels only), recording, reporting and storage practices, monitoring and evaluation
- Recount of vaccines administered for DTP3<1 (at least) at health unit level, and comparison of recorded with reported figures at all administrative levels.
- Review of the cold chain at all administrative levels.
- Review of vaccine supply and stock procedures in place.
- Review of the procedure for reporting and investigating Adverse Effects Following Immunisation (AEFI) at all administrative levels.
- Performance of the Child Health Card exercise or observation of a vaccination session.



Mobilisation

Prior to commencement of the DQA, PwC briefed officers of the Expanded Programme on Immunisation (EPI) and Ministry of Health (MOH) on the objectives, purpose and methodology of the exercise. During the same sessions, the EPI and MOH briefed the PwC auditors on the national context, including major public health and vaccination and immunisation issues and policies.

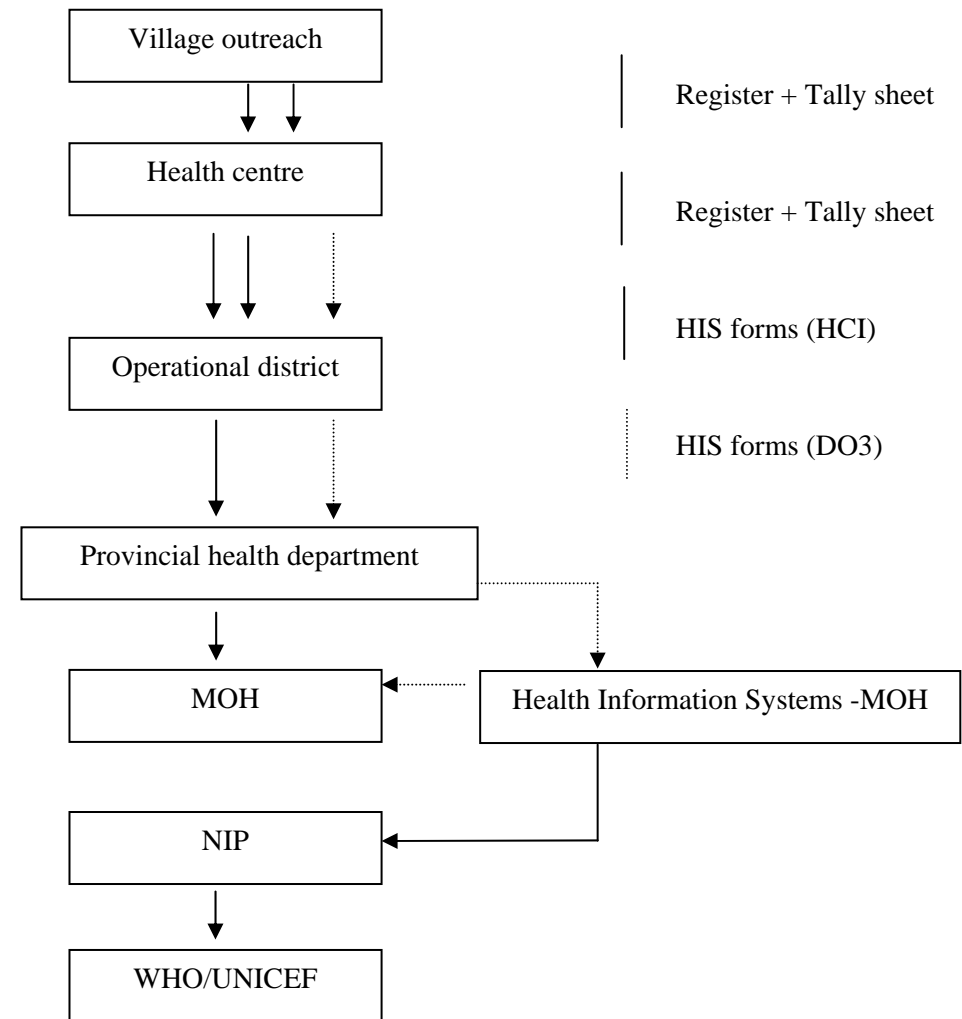
The team for the Cambodia DQA was composed of:

Name	Title	Location
Khoy Kimleng	PwC, senior auditor	PwC Cambodia
Ou Sophanarith	PwC, senior auditor	PwC Cambodia
Ya Nareth	NIP staff	NIP Phnom Penh
Chheng Monn	NIP staff	NIP Phnom Penh
Sao Sambo	NIP manager	Srey Santhor District
Chhorn Dara	NIP manager	Prey Veng District
Chhum Yaren	NIP manager	Koh Thom District
Prak Kry	NIP manager	Prey Kabass District
Jan Grevendonk	PwC trainer / QA manager	Phnom Penh



National – findings and recommendations

Information/data flow and organisation of EPI for the country





Each health centre is required to prepare a monthly report, known as HC1. These are prepared from source documents consisting of tally sheets and registers that detail all the necessary information. These reports, tally sheets and HC1, are kept at operational district and health centre levels.

The operational district officer updates the annual tabulations and monthly report, known as DO3, for reporting to the provincial level. Monthly reporting to the Ministry of Health is also carried out by the operational district officer. The NIP office receives monthly reports and prepares the annual tabulation, annual report and joint report.

Verification Factor

The verification factor is calculated based on data collected during the DQA (recounted / reported vaccinations) and is a measure to verify the reported performance at national level. It compares the number of vaccinated doses recounted from the health centre tally sheets or register to the vaccinations that were reported to the higher levels. The verification factor for the audit year 2002 is **98%**, an almost perfect score.

The consistency between data found at national, district and health unit level was very high, with only a minor difference in tabulations (2%).

Quality of the System Index

QSI at national level:	86%
Recording practices	5.0 / 5.0
Storing and reporting	4.0 / 5.0
Monitoring and evaluation	4.4 / 5.0
Denominator	4.0 / 5.0
System design	4.2 / 5.0

Strong points

Cambodia's NIP reporting, monitoring and evaluation systems are very effective (see QSI below) given limited resources and there is consistency in the reported vaccination at all levels of the reporting system, as reflected in the 98% verification factor. Throughout the process of verification, we understand that NIP pursues effective planning, direction and implementation in strengthening immunisation programmes.

Areas for improvement

Although we believe that the reporting, monitoring and evaluation systems in place are strong, we have some minor recommendations where we believe it is appropriate for management to consider improvements. They are as follows:

Storing and reporting

Issue observed	NIP office uses a computerized database to process and store vaccination and immunisation data. However we noted that no written back-up procedure is set up. There is a risk of loss of data due to unexpected circumstances, such as power outage, fire or any other mishaps.
Recommendation	NIP management should introduce a back-up policy at all levels where data are processed electronically. This policy will help management to protect valuable information and avoid the loss of effort should any unforeseen circumstances cause the loss of data.
EPI management comment	Fully agreed at National level. However, for provincial, OD and HC level, there should be a common effort through out the health system because all the reports are integrated in the Health Information System (HIS) at all those levels.



System design



Issues observed	<ol style="list-style-type: none"> 1. We understand that reports are sent from the provincial health department to national level on a monthly basis. We noted that there was no written procedure to deal with late reporting. 2. There is no official written regulation regarding the reporting of immunisation from health centres.
Recommendations	<ol style="list-style-type: none"> 1. NIP should set up a written procedure to deal with late reporting from lower levels. This can be used to strengthen the reporting deadline. It would help management to have up-to-date information all at once for decision making. Should there be any problem corrective action can be taken in good time. 2. To facilitate regular reporting, NIP should set up a formal written regulation regarding the reporting system from all health centres. This can be used as a guideline and instructions or written forms and reports used or an immunisation manual and training hand book etc., especially when there is a replacement of staff.
EPI management comments	<p>NIP agreed with the recommendations; however, it should be strengthened through out the MoH reporting system because HC report to OD using the HIS reporting system called HCI format and the OD report to the Provincial Health Department using DO3 format.</p>

Denominators

Issue observed	<p>There was inconsistency on the use of infant denominators at national level and district levels. NIP reported the infant denominators based on the number of total population derived from the Ministry of Planning's census whereas at district level information on the target population is compiled based on current local administrative data and then estimated infants under the age of one year at the rate of 3.4% of projected district total population. Our review indicated that infant</p>
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	<p>denominators used in two selected operational districts were not consistent with the national report.</p> <table border="1"> <thead> <tr> <th></th> <th><u>ODs</u></th> <th><u>National</u></th> <th><u>Difference</u></th> </tr> </thead> <tbody> <tr> <td>Srey Santhor</td> <td>5,112</td> <td>4,847</td> <td>265</td> </tr> <tr> <td>Prey Kabass</td> <td>4,950</td> <td>5,470</td> <td>(520)</td> </tr> </tbody> </table>		<u>ODs</u>	<u>National</u>	<u>Difference</u>	Srey Santhor	5,112	4,847	265	Prey Kabass	4,950	5,470	(520)
	<u>ODs</u>	<u>National</u>	<u>Difference</u>										
Srey Santhor	5,112	4,847	265										
Prey Kabass	4,950	5,470	(520)										
Recommendation	<p>NIP should ensure that denominators of infants under one year targeted for vaccination and immunisation programs at both levels are calculated using the same source of information.</p> <p>The consistency of the denominator is of more importance in the calculation of vaccination coverage.</p>												
EPI management comment	Agreed with the recommendation. There has recently been discussing to sort out the underlying issue.												

Monitoring and Evaluation

Issue observed	We understand that NIP properly prepared the tabulation for drop-out rate of DTP1<1 to DTP3<1 by each operational district. However it was not on display at the NIP office.
Recommendation	The tabulation of drop-out rate of DTP1<1 to DTP3<1 should be on display in the NIP office where it can be viewed by interested people. This would facilitate proper monitoring of the vaccination program status.
EPI management comment	Agreed with the recommendation.



Vaccine wastage rates

The DTP vaccine wastage rate in 2002 is 38.4% at National level. The vaccine wastages mainly result from most immunisation being administered in outreach sessions.

Reporting Adverse Effects Following Immunisation (AEFI)

There is no system in place for the aggregate reporting of AEFI. However, guidelines exist as to what to do on a case-by-case basis. The NIP has instructed the lower levels to investigate and report AEFI on a separate form.

Availability and completeness of reports

All district information required is available at national level. The reporting system allows for the control of completeness of the reports from all provinces.

Operational districts – findings and recommendations

Operational district context

In the audit year, Cambodia operated seventy three operational districts. Out of the total, seventy one ODs controlled more than six health centres. Four operational districts were selected for the DQA test and they belong to four separate provinces.

In general, a refrigerator is located at district level to keep vaccines since most health centres possess nothing but a cool box that can only store vaccines for a short period of time.

Data accuracy

Health centres' reports could be found at operational district level and district tabulation is subsequently prepared. The tabulation indicates the level of consistency with the health centre reports.

Monthly reports (HC1) from health centres are available at district level. This is the formatted report that health centres can use for monthly reporting purposes. No significant inconsistencies were noted during the course of our audit.

Quality of the System Index

Average QSI at district level:	75%
Average score recording:	3.8 / 5.0
Average score storing and reporting:	3.6 / 5.0
Average score monitoring and evaluation:	3.6 / 5.0
Average score denominators:	4.3 / 5.0



Recording



Issues observed	<ol style="list-style-type: none"> 1. There is no procedure to control the timeliness of submission of reports from health centres. We noted that there is no date written or stamped on the reports received from the health centres. 2. During the course of our audit, we noted that stock cards of vaccines and AD syringes were not updated at some ODs. Actual inventory on hand at the date of our visit could not be reconciled to the stock cards.
N° of districts in which these were observed	<ol style="list-style-type: none"> 1. All operational districts selected for our DQA 2. Two out of four operational districts
Recommendations	<ol style="list-style-type: none"> 1. NIP management should ensure that an effective mechanism is put in place to control timeliness of submission of the reports received from its lower levels. The receipt date should be written or stamped on the report when it is received. 2. NIP management should provide proper instructions on the use of stock card/stock ledger. Subsequent follow up action should also be taken to ensure the proper use of stock card/ledger. <p>The balance in the stock card should be the same as the physical stock balance at all times. Stock cards should capture all necessary information such as lot number, description, stock receipts and issuance, wastages, expiry date etc.</p> <p>Proper updating of the stock cards would help management to update the month end report and have better control over vaccines without spending additional unnecessary time. Out of stock and expired vaccines could also be easily monitored.</p>

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EPI management comments	Agreed with the recommendations.
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Storing/Reporting

Issues observed	<ol style="list-style-type: none"> 1. It was observed that immunisation electronic data for the audit year could not be retrieved from the computer or from the back-up made. There is no written back-up procedure in place and no back-up medium available. Valuable data could be lost. 2. The chart or tabulation of immunisation data at all selected ODs did not bear the date of printing which makes it difficult to keep a track of updated data to be reported.
N° of districts in which these were observed	<ol style="list-style-type: none"> 1. Three out of four ODs have no back-up of immunisation data procedure in place. 2. All selected ODs.
Recommendations	<ol style="list-style-type: none"> 1. NIP management should introduce a back-up policy at all levels where data are processed electronically. This policy will help management protect valuable information and avoid the extra effort and cost that will be needed should any unforeseen circumstances causes the loss of data. 2. The chart or tabulation of immunisation data should bear the date printed in order to facilitate future referencing.
EPI management comments	Agreed with the recommendations.

Denominators/planning



Issue observed	The infant denominators used by two operational districts are not matched with national level denominators
N° of districts in which this was observed	Two out of four districts selected.
Recommendation	Please refer to the above finding and recommendation made at national level.
EPI management comments	Agreed with the recommendation.

Monitoring and Evaluation

Issues observed	<ol style="list-style-type: none"> 1. We understand that EPI ODs prepared the tabulation of drop-out rate of DTP1<1 to DTP3<1. However, we noted that certain ODs did not update them and they were not on display at EPI OD office. 2. We noted that one OD had no written schedule for supervision activities, although we understand that the supervision activities were carried out. 3. There was no written mechanism to monitor vaccine wastage rates at ODs level.
N° of districts in which these were observed	<ol style="list-style-type: none"> 1. Two out of four ODs 2. One out of four ODs 3. All selected ODs
Recommendations	<ol style="list-style-type: none"> 1. The up to date chart/tabulation of the current year immunisation coverage of drop out rate of DTP1<1 to DTP3<1 should be updated monthly together with the preparation of the monthly report and put on display to facilitate proper monitoring of the vaccination program status. 2. A written schedule of supervision should be established at ODs in order to gain



	<p>effective and efficient monitoring of NIP's program. This can be used to compare the actual monitoring activities to those planned. The top management could also review the work performed against the planned work.</p> <p>3. Vaccine system wastage should be computed and reported at ODs in order to ensure the effective immunisation program and to understand the need of cold chain system improvement.</p> $\text{DTP wastage} = \frac{(\text{Doses of DTP wasted})(\text{unopened vials})}{(\text{Doses of DTP issued})} \times 100$ <p>where:</p> <p>Unopened vial doses of DTP may result from a breakdown in the cold chain (turned VVM, frozen DTP etc), poor management (expired vaccine), loss or written off, or accidents (breakage etc) or missing inventory.</p> <p>Doses issued = Stock beginning of year + doses received during the year - doses end of year.</p>
EPI management comments	Agreed with the recommendations.

Vaccine wastage rates

No information was available on vaccine wastage rates for the audit year 2002 at operational district vaccine stores. In addition, we cannot calculate the DTP vaccine system wastage rate. However, during the course of our audit, the EPI chief at the district level confirmed that there was no system wastage during the audit year.

Reporting Adverse Effects Following Immunisation (AEFI)

A reporting system and procedure on surveillance and investigation of AEFI exists at the district level. There were no cases reported during the audit year or in the current year (2003), and hence no reports.

Availability and completeness of reports

Reports on all the selected health centres were available at the four selected operational districts.

Health Centres – findings and recommendations

Health Centre context

We have randomly selected six HCs from each OD. Although most of them are formally HCs, some facilities ran their administrative office out of a private home.

The programme faces specific challenges as a majority of immunisations are administered through outreach sessions. Performance is under pressure following budgetary problems, as the necessary resources for travel are not always available. No refrigerators are available at the health centre level, and thus HC staff have to travel to the OD to get vaccines. A cool box is used to store vaccines for a short duration until they are used.

The denominators used at HC level are from various sources, but the estimate for infants less than one year is at the rate of 3.4 % of the total population. In most cases the denominator used are thought to be higher than the actual number of children in the year, which makes the vaccination coverage low.

Data accuracy

At most health centres, tally sheets and registers were available for a recount of reported data. The monthly reports at health centre level were also available.

We were able to perform recounts of the vaccinations in tally sheets/register and noted the consistency between recounted and reported numbers.



Quality of the System Index

Average QSI at health centre level:	71%
Average score recording:	3.6 / 5.0
Average score storing and reporting:	3.7 / 5.0
Average score monitoring and evaluation:	3.3 / 5.0

Recording

No significant issues noted.

Storing and reporting

Issues observed

1. We understand that health centres are instructed in the reporting system and procedure on surveillance and investigation of AEFI. However, AEFI forms are not distributed to HC for their reporting if a case of AEFI occurs.
2. We noted that at certain health centres, there were no tally sheets available for our review and recount of the number of vaccinations for certain months. Inadequate tally sheets could lead to incomplete and inaccurate vaccination data reporting to the higher level. Although we could recount the register, the recounted DTP3<1 vaccinations were not matched with the HC1 reports for those months:

Months	April	November	October	May	May	November
HC	A	B	C	D	E	F
Per report	30	40	7	11	49	9
Per register	11	51	10	16	51	11
Differences	19	-11	-3	-5	-2	-2

We understand that the legitimate reasons for the above discrepancies are mainly due to children from outside the HC catchments being immunised and their entries being recorded in the register but not reported.





N° of health centres in which these were observed	<ol style="list-style-type: none"> Twenty out of twenty health centres. Six out of twenty four health centres.
Recommendation	<ol style="list-style-type: none"> Our review revealed that health workers are well aware of AEFI and the system of reporting should a serious AEFI occur. However they have no AEFI form at their office. We further understand that no such cases were reported during the audit year and current year in the visited health centres. We recommend that NIP should disseminate the form to all health centres for them to be ready to report to the higher level should a case occur. This would ensure that all AEFI are reported for appropriate management action and decision. The tally sheet and register authenticate the same vaccination evidence and are of equal importance, as each presents certain advantages. Information in the HC1 report can be immediately referred to a tally sheet other than the register. We recommend that both the register and tally sheet be maintained properly for easy reference in future. This will enhance monitoring of storing and reporting.
EPI management comments	Agreed with the recommendations.

Monitoring and evaluation

Issue observed	<ol style="list-style-type: none"> We noted that certain health centres did not compute drop-out rates of DTP1<1 to DTP3<1. Most HCs did not control vaccine wastages. It will be difficult for management to keep control over the wastage rates and assess the efficiency of vaccine usage at health centres level. It was observed that health workers did not properly make use of stock cards. This
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	indicates insufficient control over stocks at HC level.
N° of health centres in which these were observed	<ol style="list-style-type: none"> 1. Fourteen out of twenty four HCs 2. Twenty out of twenty four HCs 3. All selected HCs
Recommendations	<ol style="list-style-type: none"> 1. NIP management should ensure that the drop-out rates for DTP1<1 to DTP3<1 are calculated and displayed, ideally on the same chart of DTP3<1 vaccination coverage. The drop-out rates calculation helps to explain why some children discontinue their course of vaccination. Although the information is provided in the monthly report for analysis at the higher level, health workers should also perform the calculation at HC level and report their own figures, since they have a better understanding of the underlying issues. We understand that the health workers at HC level understand clearly how the drop-out rate is calculated. 2. NIP should develop procedures to monitor vaccine wastages at all health centres. Health centres should report vaccine wastage to higher level in the monthly report. The vaccine wastage at health centre level can be calculated as follows: $\text{DTP wastage} = \frac{(\text{Doses of DTP issued less doses of DTP administered}) \times 100}{(\text{Doses of DTP issued})}$ <p>where:</p> <p>Doses of DTP issued = Doses beginning of year + doses received during the year - doses end of year; and</p> <p>Doses administered = total number of DTP vaccinations given to children during the year (all DTP).</p> 3. Management should ensure that stock cards are used at all health centres to properly monitor vaccines and syringes. Other information such as batch number and expiry date of vaccines should be recorded in the card. This would facilitate the monthly accumulation of data for reporting to higher levels. It also helps in



	controlling wastage and can be used for future references.
EPI management comments	Agreed with the recommendations.

Drop-out rates

The average drop-out rate of children under the age of one year for DTP1<1 to DTP3<1 for the twenty four health centres selected is 4%. This is viewed as a low drop-out rate.

Vaccine wastage rates

Generally vaccine wastage rates are not calculated at each health centre. However we believe that the wastage rate is probably quite high, given that most vaccinations are administered through outreach activities.

Reporting Adverse Effects Following Immunisation (AEFI)

A reporting system and procedure on surveillance and investigation of AEFI exists. Our review revealed that health workers are well aware of AEFI and the system of reporting should an AEFI occur. However they have no supply of AEFI forms at their office. We further understand that there were no such cases reported (AEFI) during the audit year and current year.

Availability and completeness of reports

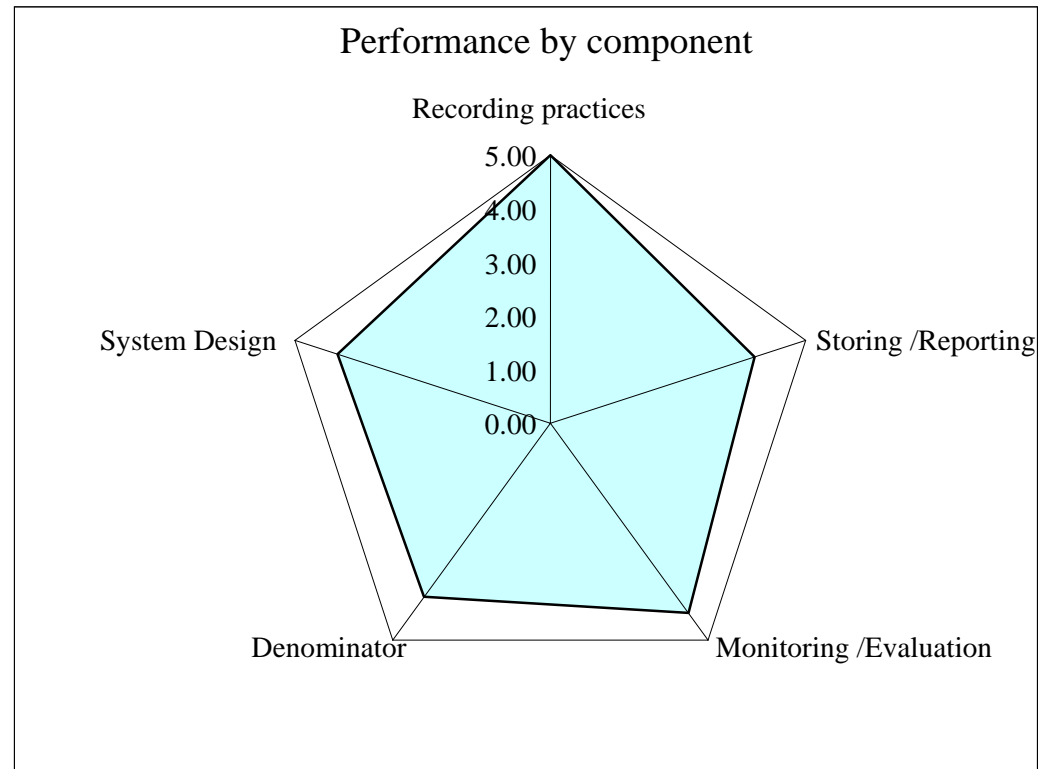
Overall, all HC reports are available at the operational district level. We did note, however, that there is no receipt date written on the reports.

Wrap-up

On completion of the DQA, a debriefing was held on 19 August 2003 for – ICC, EPI managers, MoH officers, UNICEF and WHO representatives, to present the preliminary conclusions.

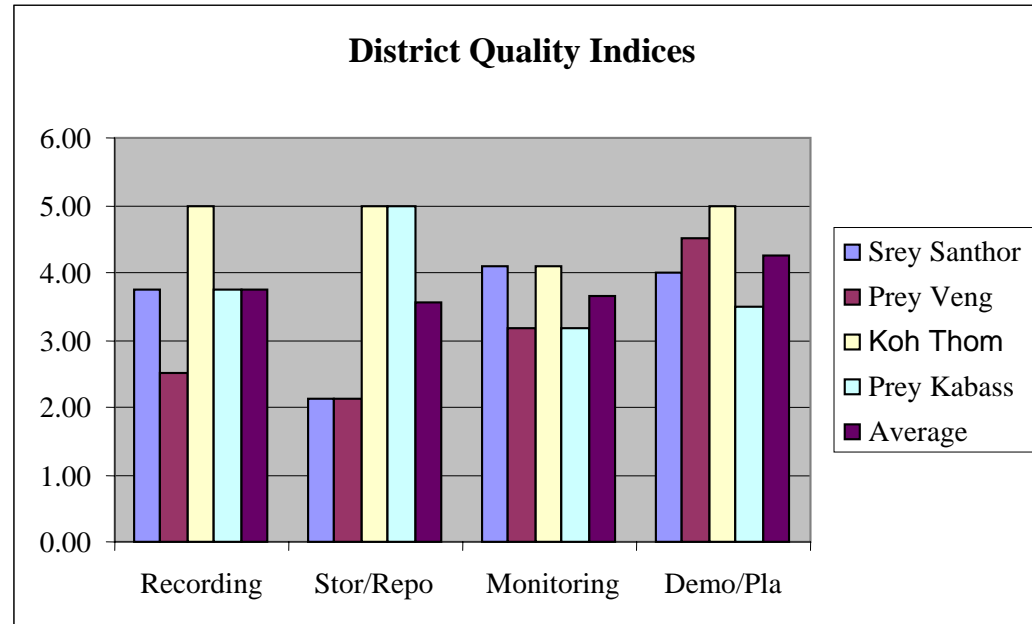
The audit was very successful. We take this opportunity to express our sincere appreciation to the NIP management and staff for their full cooperation and support during the course of our DQA audit.

APPENDIX I. NATIONAL PERFORMANCE INDICATORS



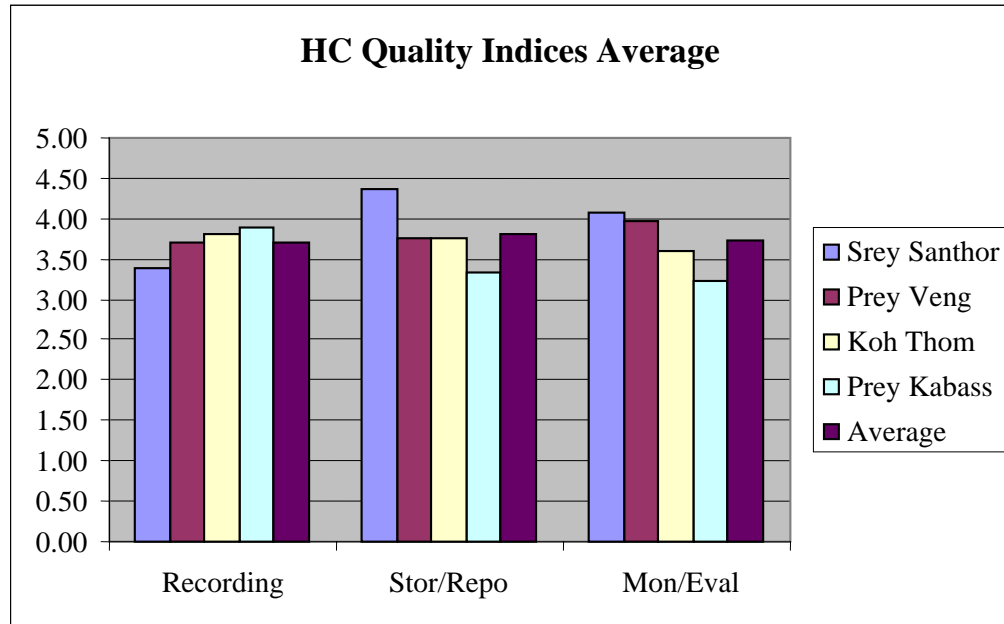
On a scale from "0" to "5".

APPENDIX II. DISTRICT PERFORMANCE INDICATORS



On a scale from "0" to "5".

APPENDIX III. HEALTH CENTER PERFORMANCE INDICATORS



On a scale from "0" to "5".