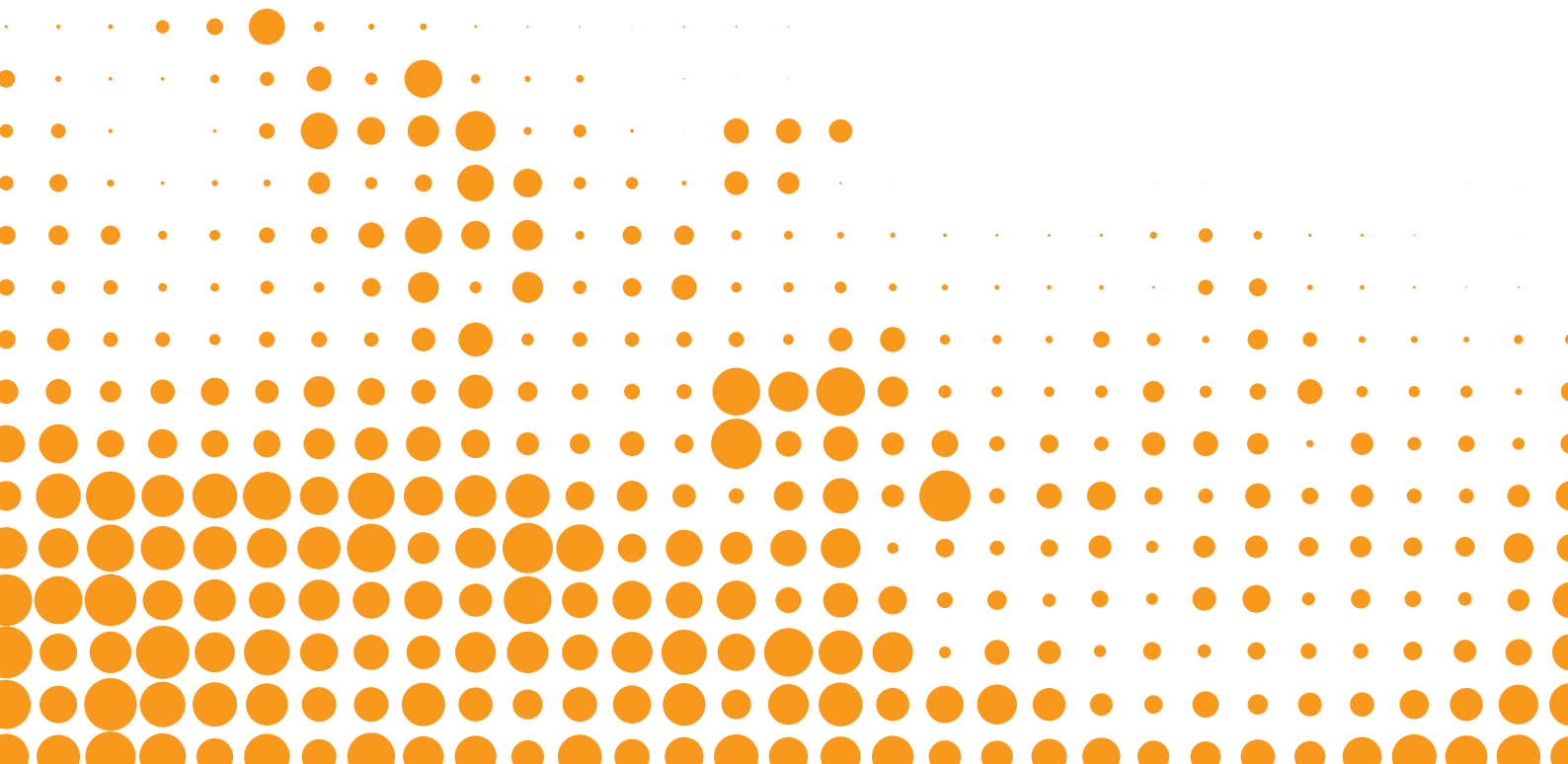


BEST PRACTICE FOR MONITORING THE QUALITY OF **POLIO** ERADICATION CAMPAIGN PERFORMANCE



**BEST PRACTICE
FOR MONITORING
THE QUALITY OF POLIO
ERADICATION CAMPAIGN
PERFORMANCE**

ACKNOWLEDGEMENTS

These best practices documents for polio eradication have been developed from the contributions of many people from all over the world. The people concerned have themselves spent many years striving to eradicate polio, learning from successes and failures to understand what works best and what does not, and quickly making changes to suit the situation. In writing these best practices the aim has been to distil the collective experiences into pages that are easy to read and detailed enough to be adapted for other health programmes.

'To strive, to seek, to find, and not to yield'

CONTENTS

ACRONYMS.....	iv
INTRODUCTION.....	1
THE PURPOSE OF THIS DOCUMENT.....	2
TECHNICAL INNOVATION: FINGER-MARKING PENS.....	4
TECHNICAL INNOVATION: HOUSE-MARKING.....	5
PRE-CAMPAIGN AND INTRA-CAMPAIGN MONITORING AND SUPERVISION.....	7
RAPID CAMPAIGN MONITORING.....	7
INDEPENDENT MONITORING.....	8
CLUSTERED LOT QUALITY ASSURANCE SAMPLING.....	12
OUT-OF-HOUSE MONITORING (MARKET SURVEYS).....	15
SUMMARY: ADVANTAGES, DISADVANTAGES AND BEST PRACTICES IN METHODS OF MONITORING CAMPAIGNS.....	17
THE TRIANGULATION OF DATA.....	18
CONCLUSIONS.....	20
ANNEX 1 GLOBAL DATABASE FOR POLIO CAMPAIGNS (POLSIA).....	21
ANNEX 2 EXAMPLE OF INDEPENDENT MONITORING IN-HOUSE FORM.....	22
ANNEX 3 LQAS EVALUATION.....	24
ANNEX 4 EXAMPLE OF INTRA-CAMPAIGN MONITORING CHECKLIST.....	27
ANNEX 5 EXAMPLE OF PRE-CAMPAIGN MONITORING CHECKLIST.....	29

ACRONYMS

AEFI Adverse event following immunization

AFP Acute flaccid paralysis

GPEI Global Polio Eradication Initiative

IPD Immunization Plus Day

LGA Local Government Area

LQA Lot quality assurance

LQAS Lot quality assurance sampling

mOPV Monovalent oral polio vaccine

NGO nongovernmental organization

NID National Immunization Day

NPAFP Non-polio acute flaccid paralysis

OPV Oral polio vaccine

POLSIA Global Database for Polio Campaigns

PPS probability proportional to size

RCM rapid campaign monitoring

SIA Supplementary immunization activity

SNID Subnational Immunization Day

SOP standard operating procedures

tOPV Trivalent oral polio vaccine

WHO World Health Organization

WPV Wild poliovirus



INTRODUCTION

DOCUMENTING BEST PRACTICES FROM POLIO ERADICATION

Objective 4 of the *Polio Eradication & Endgame Strategic Plan 2013–2018* calls for the Global Polio Eradication Initiative (GPEI) to undertake planning to “ensure that the investments made to eradicate poliomyelitis contribute to future health goals, through a work programme that systematically documents and transitions the GPEI’s knowledge, lessons learnt and assets”. As outlined in the Plan, the key elements of this body of work include:

- ensuring that functions needed to maintain a polio-free world after eradication are mainstreamed into ongoing public health programmes (such as immunization, surveillance, communication, response and containment);
- transitioning non-essential capabilities and processes, where feasible, desirable and appropriate, to support other health priorities and ensure sustainability of the global polio programme;
- **ensuring that the knowledge generated and lessons learnt from polio eradication activities are documented and shared with other health initiatives.**

THE SCOPE OF DOCUMENTING BEST PRACTICES

Best practice documents deal with technical aspects of polio eradication. The documents will include clear guidelines, case studies of effective programmes and processes, case studies of failures, and innovations developed at the national, regional and global levels, and will highlight areas where other programmes could benefit from the polio practices to achieve their health priorities. A series of technical subjects are being developed on:

- improving microplanning
- ensuring quality acute flaccid paralysis (AFP) surveillance
- monitoring the quality of supplementary immunization activities (SIAs)
- securing access for immunization in security-compromised areas
- targeting and planning for vaccination of older age groups during polio SIAs
- coordinating cross-border vaccination campaigns
- integrating other antigens or other interventions into polio SIAs
- targeting and planning for the vaccination of nomadic populations during polio SIAs
- benefiting from other relevant technical areas where WHO country, regional and headquarter polio teams have significant expertise.



THE PURPOSE OF THIS DOCUMENT

THE RELEVANCE OF THIS DOCUMENT TO OTHER HEALTH INITIATIVES

Vast quantities of data and indicators on health interventions are created every day, but the question always arises regarding whether the data are reliable enough to make decisions and take action. All health initiatives must identify who are the people at risk, who is being left out and who is underserved. This kind of information may not be conveyed accurately by routine reports; it is often necessary to observe the action in detail, and sometimes independently to limit subjective bias. The best practices for monitoring performance described in this document are relevant to any health initiative that aims to reach a population at risk on an equitable basis.

THE SCOPE OF THIS DOCUMENT

This document describes best practices for monitoring the quality of polio eradication campaigns. It does not replace the many technical materials and guidelines that are available, but it does describe the advantages and disadvantages of a variety of methods. The document concludes that it is best to use several different approaches to arrive at a reliable result on monitoring campaign quality.

SIAs with oral polio vaccine (OPV) is the top strategy for eradicating polio. Monitoring the campaign results was the subject of much dispute and controversy in the earlier days of polio eradication. Coverage results were often delayed, incomplete and considered unreliable. While countries would report results of over 95% or even over 100% and claim success, poliovirus circulation would continue. Both numerators and denominators could be inaccurate by as much as 20%, and there was little real measurement of a campaigns' quality indicators and the actual problems to overcome.

From experience in many countries, it became clear that missing even 10% of the target population in a densely populated country would result in a rapid accumulation of susceptible children and would not be enough to arrest transmission. Thus, strong demand grew for more accurate and reliable methods of monitoring quality and taking rapid corrective action. These methods are described in this document.



SOME LESSONS LEARNT

Campaign coverage calculations determined using a numerator and denominator are unreliable mainly because of inaccurate numerators and population denominators. Aggregated numerators may include children of older age groups, and real denominators may in reality be greater or less than outdated official census data. In urban areas, the real population may be as much as 10% or even 20% greater than the official population numbers due to inward migration.

Whether vaccination campaigns are conducted at fixed sites or house to house, many children can still be found outside their household and around markets, streets or other crowded areas. These children need vaccination and monitoring wherever they can be found. Good-quality monitoring should be able to locate unvaccinated children for follow-up, and identify management and operational issues that need immediate correction.

Campaign in-process monitoring can provide real-time information and opportunities for local corrections, but are subject to bias if conducted by supervisors and other persons directly involved in the campaign. Monitoring is less biased when performed by independent monitors. Sample surveys can reduce bias and provide real-time information if they are conducted with precision, and can produce accurate and reliable results. However, sample surveys require resources to train and organize monitors.

Timely results are essential. Delayed campaign results, often due to the burden of collecting tally-sheet data, greatly impede the ability to make adjustments to improve quality. However, supervisors can take local action through arrangements such as evening meetings, where the day's data are shared and action is decided.

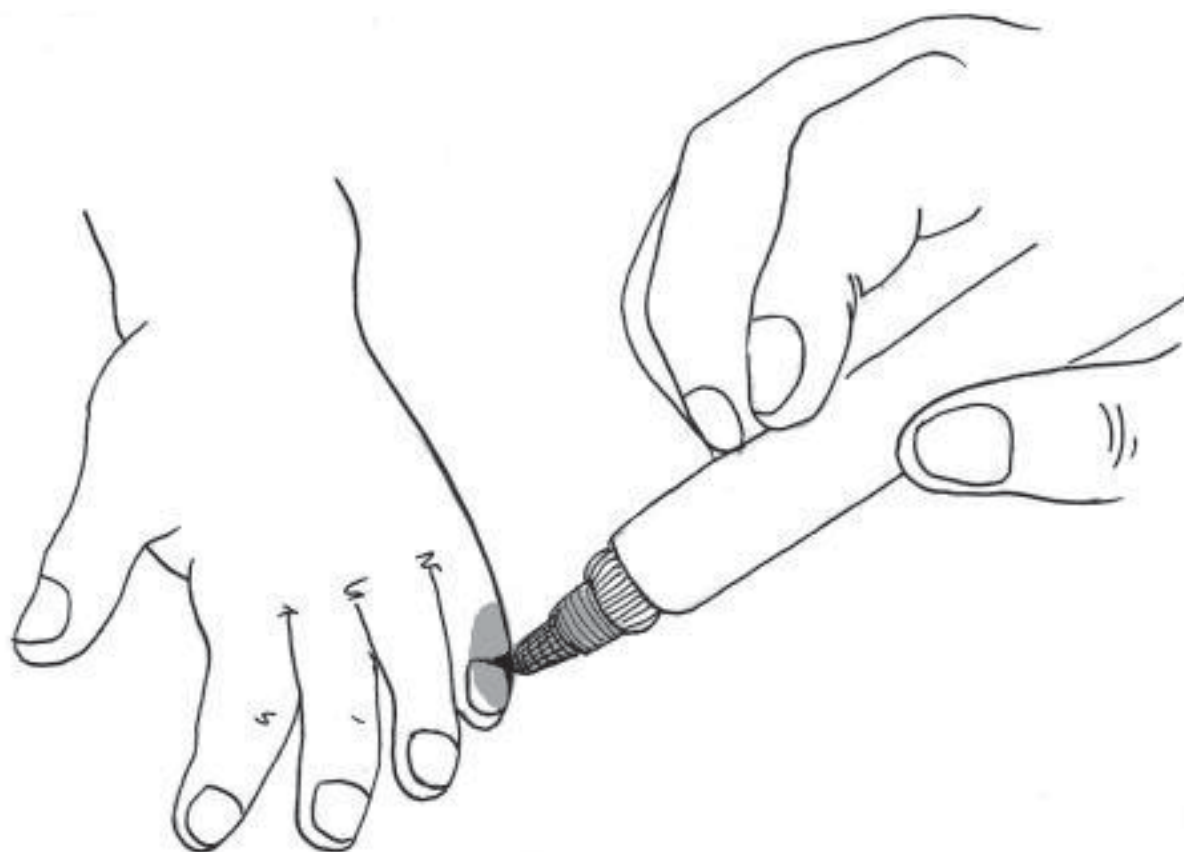
The creation of regional and global campaign databases has facilitated the timely sharing of country campaign information with all GPEI partners, often within two weeks of a campaign's completion.



TECHNICAL INNOVATION: FINGER-MARKING PENS

The use of finger-marking, especially the finger-marking pen, has transformed campaign monitoring and is now the basis for measuring immunization status. When applied correctly to the fingernail and skin of the left little finger, the mark will remain for several days. Other less convenient methods of finger-marking were initially used, including liquid gentian violet paint, but they proved less popular with vaccinators and are therefore less reliable.

Figure 1. Finger-marking – transforming campaign monitoring



TECHNICAL INNOVATION: HOUSE-MARKING

A well-implemented system of house-marking during SIAs is a very useful method of monitoring quality. In India, for example, houses were marked with the letter “P” or “X” in a prominent place with chalk. The system functioned as follows:

“P” houses (complete vaccination)

- A house visited by a vaccination team was marked with a “P” and the date of the visit on the following conditions:
 - all children aged under 5 years and staying in the house had received a dose of OPV in that round; or
 - no children aged under 5 years were staying in the house.

“X” houses (incomplete vaccination needing revisit)

- A house visited by a vaccination team was marked with an “X” and the date of the visit on the following conditions:
 - all or some of the children staying in the house had not received the OPV;
 - the reasons for not being vaccinated included absence of children at the time of the visit or refusal to accept vaccination; or
 - the house was locked and no one was inside.
- A list of “X” houses and their location was made on the tally sheet and given to the supervisor.
- All “X” houses required revisiting by the vaccination team later in the day when children aged under 5 years were expected to be at home.
- When the missed children were vaccinated, the house was marked with a “P”. This was monitored as “‘X’ to ‘P’ conversion”.

Figure 2. Reasons for incomplete vaccination (X houses), Bihar, India, January and February 2017

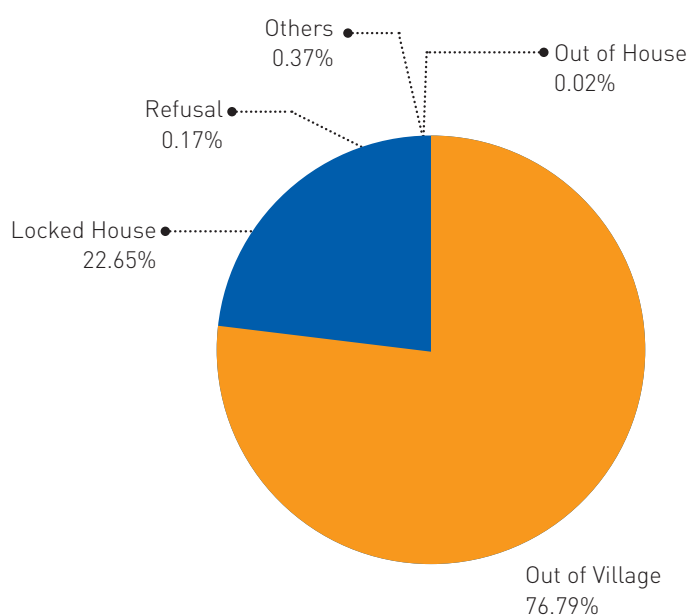
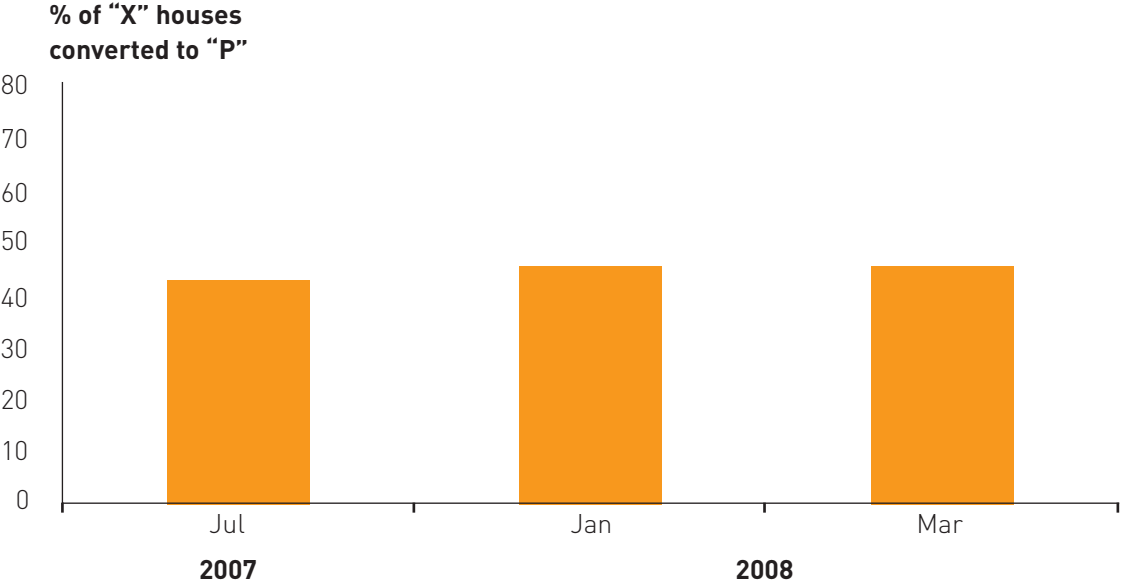


Figure 3. Continued emphasis on conversion of “X” houses by vaccination teams, Bihar, India (July 2007 to March 2008)



Source: Vaccinators’ tally sheets

The emphasis on monitoring missed (“X”) houses became a more useful indicator of the SIA’s quality than measuring coverage.



PRE-CAMPAIGN AND INTRA-CAMPAIGN MONITORING AND SUPERVISION

Pre-campaign and intra-campaign monitoring is usually conducted by supervisors who can take immediate corrective action based on their observations of campaign preparation. Checklists for intra-campaign and pre-campaign monitoring are included (Annexes 4 and 5).

RAPID CAMPAIGN MONITORING

THE PURPOSE OF RAPID CAMPAIGN MONITORING (RCM)

- To find and vaccinate missed children. Monitors can inform supervisors of missed children's location and request that a vaccination team visit the area and vaccinate them;
- To find weaknesses in the system, investigate their causes and quickly correct them.

Monitors conduct RCM in selected, and often high-risk, communities during and immediately after the teams have completed their work (same day or next day at the latest).

- Monitors should check 10–20 households, door to door, for the OPV status of children in the target age group (for example, 0–59 months) in those houses.
- A sample of 10–20 households is preferable to 10–20 children because a selection of different households will be more representative than taking many children in one house.
- Any community failing the RCM (one out of 10, or two or more children out of 20 missed) should be revisited by a vaccination team.
- If a child has not been vaccinated, the monitor can ask why and note the reason on the RCM form.

The RCM is a management tool; it does not use random sampling of the population and, therefore, will not produce statistically valid estimates of vaccination coverage. However, the RCM will identify weaknesses in service delivery and training that should be corrected immediately and for future rounds.



INDEPENDENT MONITORING

In the GPEI Strategic Plan 2010–2012, deficiencies in credible and timely SIA data to assess risks and guide improvements were recognized as obstacles to progress. Inaccurate numerators and denominators as well as field observation bias were listed as outstanding problems. The table shows the deficiencies in the quality of independent monitoring, which was obviously not truly independent.

Table 1. Independent monitoring analysis – findings 1

POLIO SIAs IN 18 REINFECTED AFRICAN COUNTRIES, JANUARY-OCTOBER 2009

Item	No.
No. of SIAs in reporting period	92
No. of SIAs with written SIA monitoring report (range: 0–100%)	58 (63%)
No. of SIAs reporting on h-h outcome monitoring	58
No. of reports with results from both h-h monitoring and outside monitoring (4 countries)	9/58 (16%)
No. of reports specifying independence in the selection and training of monitors	19/58 (33%)
No. of reports specifying that monitors are not involved in monitoring SIA implementation (3 countries)	7/58 (12%)

h-h: house to house

In response, the Plan’s recommendations were:

- to establish new guidelines on independent monitoring, especially in areas with significant differences between surveillance data and SIA monitoring data;
- to immediately recover areas with less than 90% coverage;
- to post the results of independent monitoring on international databases within two weeks of the campaign’s completion.

The objectives of independent monitoring are:

- to provide an objective independent source of timely and reliable quantitative data for each campaign;
- to identify why children are missed to guide future action;
- to spot problems with implementation and guide corrective measures;
- to identify data quality problems where discrepancies between administrative coverage and independent monitoring coverage results exist.

The types of independent monitoring are:

- house-to-house monitoring, where monitors visit clusters of houses and assess children’s vaccination status;
- out-of-house monitoring (also known as market surveys), a rapid way of checking children’s vaccination status in market areas and streets where people often congregate.



To ensure their independence, monitors should be selected from candidates who are:

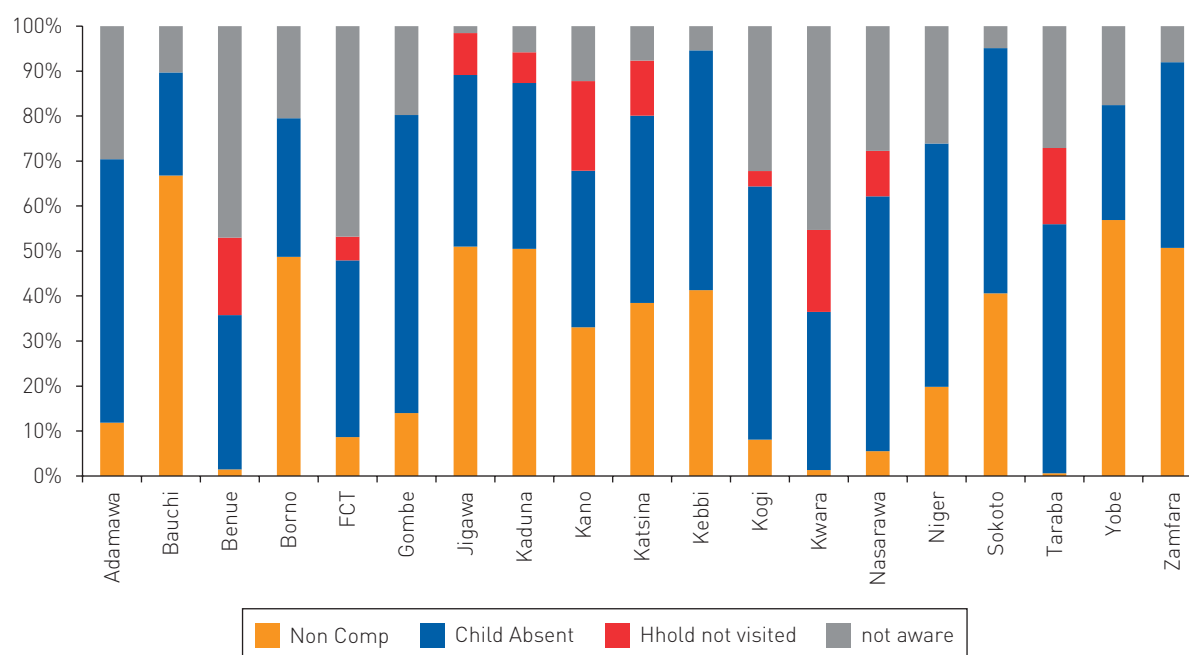
- nationals, especially women, who are familiar with the language and culture;
- totally independent of the polio eradication initiative activities and management;
- familiar with the areas to be monitored and of the same ethnic group, in countries where this is important for communication.

These criteria exclude supervisors and others directly involved in SIA operations, but can include people from local educational institutions, nongovernmental organizations (NGOs) and school teachers.

The duties of independent monitors are:

- to move house to house in selected clusters;
- to check vaccination status based on finger-marking;
- to collect information on unvaccinated children for follow-up;
- to collect information on sources of social mobilization;
- to report any observations, such as missed areas.

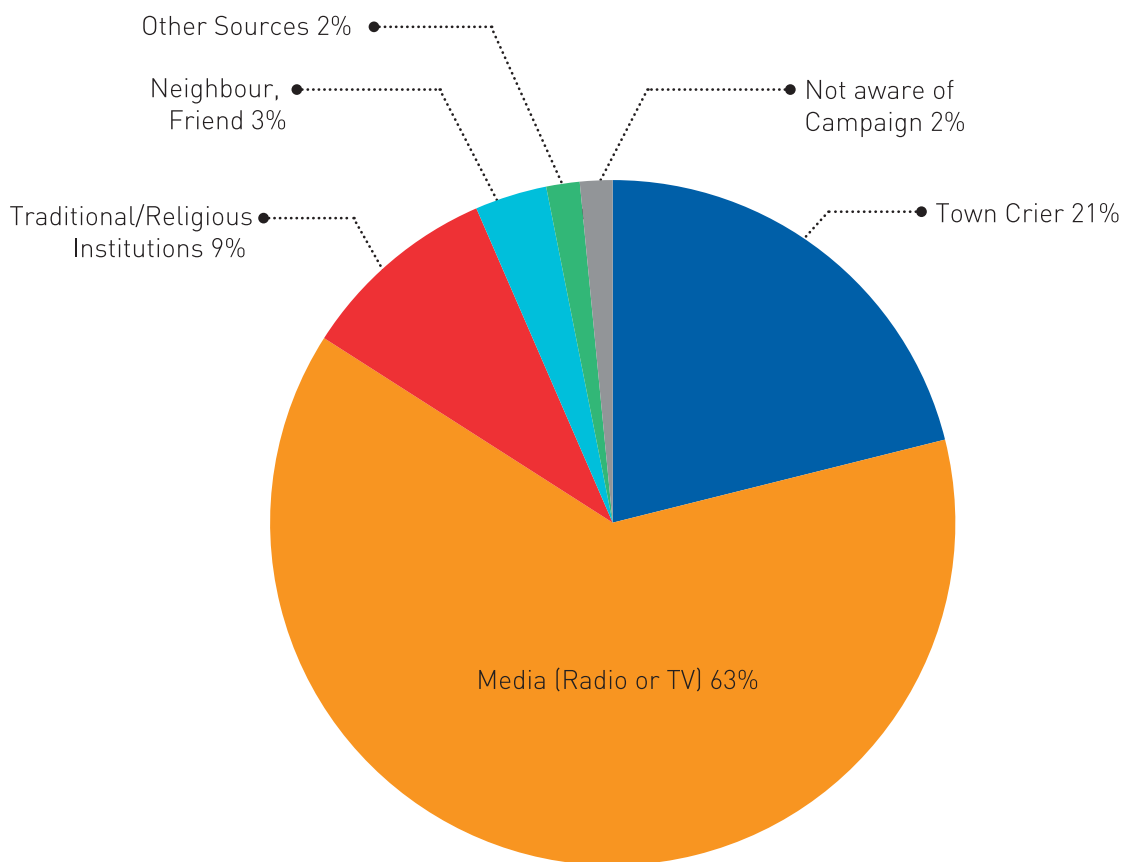
Figure 4. Reasons for unvaccinated children – end process monitoring, Nigeria



Source: Nigeria Expert Review Committee, November 2006, presented by WHO



Figure 5. Source of information – end process monitoring



Source: Nigeria Expert Review Committee, November 2006, presented by WHO

Independent monitors usually do not vaccinate missed children because this may introduce a conflict of interest and bias. The exception is in remote areas where vaccination teams have limited access.

Only households with at least one child aged under 5 years are included. Monitors usually visit four or five areas, each having seven households with eligible children.

Selection of areas for independent monitoring

As resources are insufficient to monitor every subdistrict, high-risk areas are usually selected using data from previous rounds or recent surveillance data. However, a random selection of areas to be monitored is often used to reduce bias.

Training and supervision

Hands-on training is required, including close supervision in the field involving visiting monitors as they work in each cluster.



Information provided by independent monitoring includes:

- areas covered;
- percentage coverage by finger-marking (children aged under 5 years and under 1 year);
- percentage of clusters and subdistricts poorly covered;
- reasons why children were not vaccinated;
- source of information on the SIA;
- percentage of houses correctly marked.

Corrective action using the data provided by independent monitors includes:

- revisiting and vaccinating missed children;
- improving microplanning for the next round, especially regarding missed areas;
- replacing inappropriately selected teams.

Providing timely results of SIAs includes:

- feedback and discussion of local information during evening meetings for corrective action;
- uploading results to the Global Database for Polio Campaigns (POLSIA), which is managed at WHO GPEI headquarters (Annex 1).



CLUSTERED LOT QUALITY ASSURANCE SAMPLING

The problems of bias and lack of random sampling associated with the independent monitoring method have led to the introduction of clustered lot quality assurance sampling (clustered LQAS).

Clustered LQAS is a rapid survey method that combines cluster sampling and the lot quality assurance (LQA) technique to quickly assess immunization performance in defined areas (known as “lots”) using a small sample size. It was originally introduced in the manufacturing industry to control the quality of a randomly selected batch of goods that was either approved or rejected depending on certain criteria.

The LQAS technique helps to identify whether a given area (lot) is meeting a defined minimum acceptable level of vaccination performance so that timely corrective action (mop-up activities) can be taken to improve vaccination performance in the lots not achieving their targets.

Method (Annex 3) and published LQAS guidelines

The population is divided into a number of discrete lots.

- Individuals are randomly selected and checked for vaccination status.
- Statistical calculations are made to determine the sample size needed to measure whether the accepted level of vaccination performance has been achieved.
- For example, if 95% is considered the accepted level, then 50 children aged under 5 years need to be checked. (The LQAS technique requires 10 children in five different lots to be sampled).
- Using the clustering technique, 10 children in five different lots can be checked.
- If more than four unvaccinated individuals are found in the sample of 50, the lots will be rejected, concluding that the vaccination programme is probably not achieving 95% coverage.
- Underperforming lots can be investigated for underlying causes.

The limits of LQA

- The LQA sample size is not intended to calculate a meaningful coverage estimate for any given lot.
- The LQA sample size does not have sufficient statistical value to draw conclusions about associated factors, such as reasons for non-vaccination, or vaccination distribution by age and sex.
- Clustered LQAS does not replace independent monitoring or other coverage assessment tools, but can be used as an additional source of information.

The results of LQAS

LQAS provides a binary classification of the areas (lots) under study. They are classified as acceptable or unacceptable vaccination coverage areas according to specific programme targets, identifying areas where mop-up vaccination action is needed.

An example of results

Five lots were rejected for low vaccination coverage by the LQAS rule because they exceeded the threshold of four unvaccinated individuals out of 50, based on the documented vaccination status. Mop-up was immediately recommended in the five rejected lots.



Table 2. Example of LQAS results

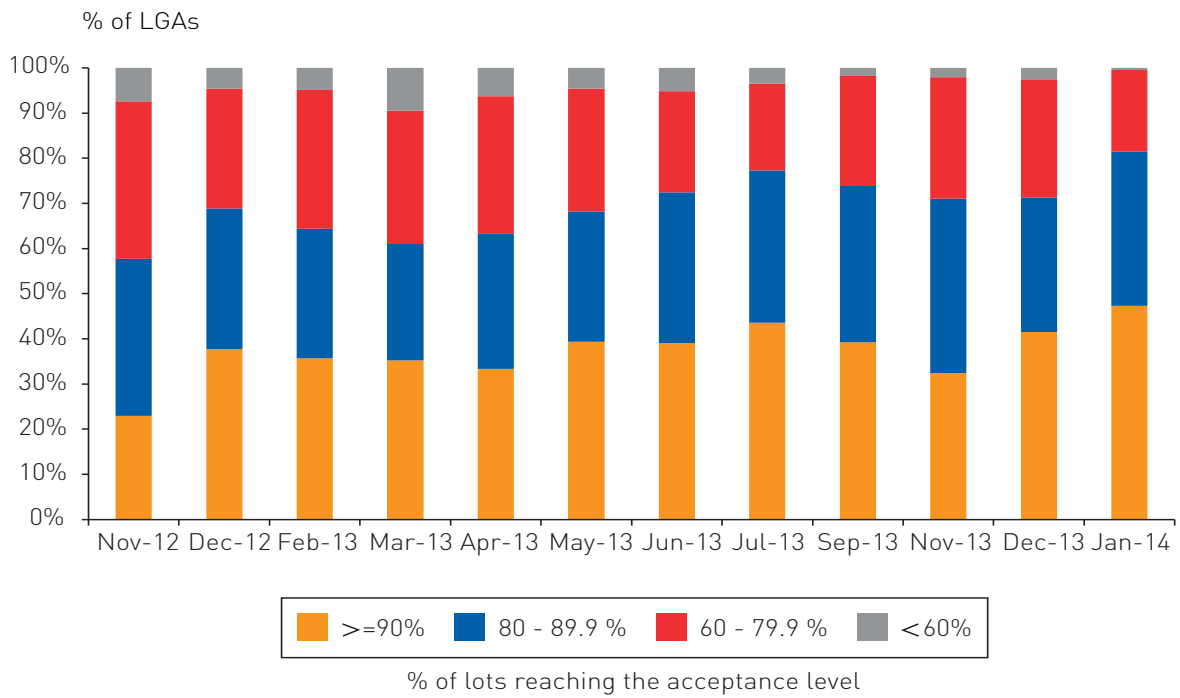
District	Lot no.	Absence of card (unvaccinated)/50	Decision
A	1	2	Accepted
B	2	4	Accepted
C	3	0	Accepted
	4	0	Accepted
D	5	6	Rejected
	6	10	Rejected
E	7	18	Rejected
	8	7	Rejected
	9	11	Rejected
F	10	2	Accepted
	11	2	Accepted
	12	1	Accepted

Systematic use of LQAS

The consistent LQAS method can be systematically applied over a period of time to show trends in SIA performance. The figure shows the proportion of local government areas (LGAs) surveyed that achieved a satisfactory (or acceptance) level. The decreasing trend in the number of LGAs that achieve less than 60% of lots reaching acceptance level is apparent.



Figure 6. LQA trends in 11 high-risk states, Nigeria, 2012–2014



	Nov-12	Dec-12	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Sep-13	Nov-13	Dec-13	Jan-14
LGA's surveyed	161	151	143	159	174	173	174	172	168	145	195	205
>=90%	23%	38%	36%	35%	33%	39%	39%	44%	39%	32%	42%	47%
80 - 89.9 %	35%	31%	29%	26%	30%	29%	33%	34%	35%	39%	30%	34%
60 - 79.9 %	35%	26%	31%	30%	30%	27%	22%	19%	24%	27%	26%	18%
<60%	7%	5%	5%	9%	6%	5%	5%	3%	2%	2%	3%	0%

Data as of 05022014



WHO and national monitors checking finger-marking for polio vaccination status



OUT-OF-HOUSE MONITORING (MARKET SURVEYS)

Many children are not at home for much of the day, since they may be with their mothers and older siblings in markets or other places where people congregate.

METHOD

Check the finger-mark of 50–100 randomly selected children accompanied by parents, older siblings or other family members. The monitoring sheet uses one line per child:

If the child **is** finger-marked, put an “X” in column B and proceed to the next child.

If the child **is not finger-marked**, ask the parent, older brother or sister:

- if the child was vaccinated. If yes, put an “X” in column C; if no, put an “X” in column D;
- in which village/neighbourhood the child lives. Enter this information in column E.

Follow-up vaccination

If a village/neighbourhood appears more than once in the last column indicating the residence of unmarked children, ensure teams do a mop-up in that location.

Figure 7. Monitoring sheet

Child number (A)	Finger-marked (B)	Not finger-marked		If not vaccinated according to parent, place of residence (village, neighbourhood) (E)
		Vaccinated according to parent (C)	Not vaccinated according to parent (D)	
1	X			
2		X		Village G
3	X			
4			X	Village F
5			X	Village G
6				
Total 5	2	1	2	

Measuring the proportion of **unvaccinated** children:

- low estimate: $D/A = 2/5$ or 40% not vaccinated
- high estimate: $(C+D)/A = (1+2)/5 = 3/5$ or 60% (based only on finger-marking)

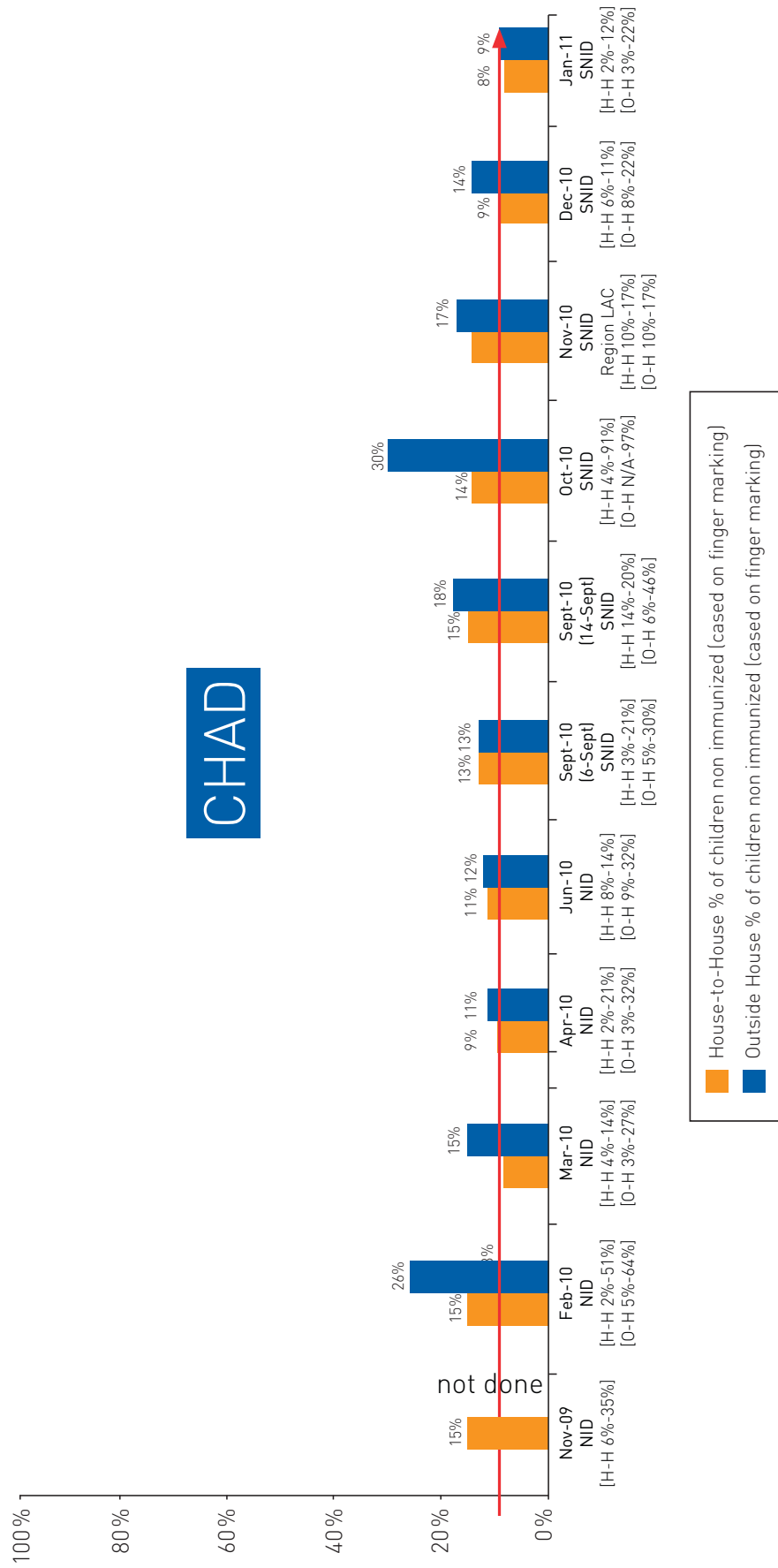
Areas requiring follow-up/mop-up: Village G

Conducting both house-to-house and out-of-house monitoring is always worthwhile because results often contain differences, which can lead to mop-ups in missed areas and improvements in management.



Figure 8. Differences in independent monitoring

Independent monitoring results, Chad, 2009–2011: house-to-house vs out-of-house monitoring



NID: National Immunization Day; SNID: Subnational Immunization Day

SUMMARY: ADVANTAGES, DISADVANTAGES AND BEST PRACTICES IN METHODS OF MONITORING CAMPAIGNS

Method	Advantage	Disadvantage	Best practice
Coverage calculation	Simple to use and publish results	Distorted by inaccurate denominators and numerators	<ul style="list-style-type: none"> Use a denominator consistent with recent campaigns rather than census data Increase denominator in crowded urban areas Exclude older children from the numerator
Finger-marking	Very visible indicator of vaccination	Proper technique important; must be monitored to avoid marking being removed; pens dry out if left uncapped	<ul style="list-style-type: none"> Use purposely manufactured finger-marking pens only; always mark the same place, and cap the pen after marking
House-marking	Useful for supervising team movements and following up on missed children	Can be difficult to interpret markings after many rounds in the same area	<ul style="list-style-type: none"> Use a system that clearly identifies houses that must be revisited, such as the "X" house-marking
Rapid campaign monitoring	Simple to organize and implement; can immediately identify missed children and missed areas if conducted during the campaign	Does not use random sampling so can introduce bias; results may be biased by involvement of vaccinators and others in the campaign	<ul style="list-style-type: none"> Use RCM as a management tool to detect missed children and other weaknesses, and take rapid corrective action
Independent monitoring	A standardized method that can reduce bias in monitoring results	Often is not truly independent because of involvement of monitors active in SIAs	<ul style="list-style-type: none"> Manage training and supervision carefully for this to work best
<ul style="list-style-type: none"> House-to-house 	Can precisely identify missed children and direct teams to missed houses/areas; can document information on reasons for missed children/refusals; can reduce bias by random selection of areas	Areas monitored may have selection bias; results may be delayed, preventing the rapid follow-up of missed children; monitors often miss children out of the house in the area assigned	<ul style="list-style-type: none"> Provide monitoring teams with a detailed workplan that has start and end points Use local guides not from vaccination teams
<ul style="list-style-type: none"> Out-of-house 	Provides useful data that may differ from house-to-house results and give a more complete assessment of quality	Limited by the availability of monitors in densely populated areas where many children are out of the house; more difficult than house-to-house method to conduct follow-up vaccination	<ul style="list-style-type: none"> Ensure a snapshot of campaign quality Use data for follow-up vaccination in areas of origin of missed children
LQAS	Uses random selection and precise technique that provide a statistically valid result on quality of areas surveyed	Does not provide a valid estimate of coverage	<ul style="list-style-type: none"> Repeat over a period of several campaigns to give a valid measurement of progress over time



THE TRIANGULATION OF DATA

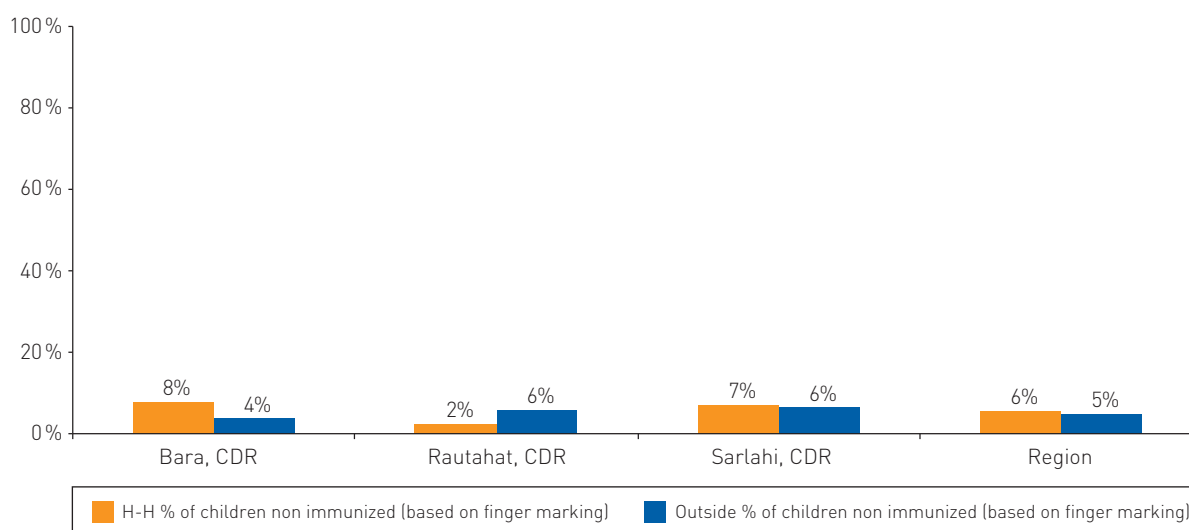
USING A VARIETY OF DATA SOURCES TO PROVIDE THE MOST USEFUL RESULT

Every method of measuring the quality of SIAs has its advantages and disadvantages. The question is not which measurement gives the most favourable result, but which method exposes problems that must be corrected and therefore is most useful in making progress towards interrupting poliovirus transmission. The answer is to use a variety of data sources together to identify the nature and location of problems to overcome.

USING INDEPENDENT MONITORING DATA

RCM and independent monitoring will provide immediately usable results and can both be implemented, whether in house or out of house. Results can be made available rapidly and posted on the Internet.

Figure 9. Monitoring Nepali results on the Internet



Regions	Districts	Total population < 5 years in the district	House to house monitoring			Outside house monitoring		
			# < 5 monitored	# < 5 with finger marked	# < 5 missed children	# < 5 monitored	# < 5 with finger marked	# < 5 missed children
CDR	Bara	94,064	1,643	1,516	127	1,083	1,044	39
CDR	Rautahat	92,567	1,797	1,753	44	852	803	49
CDR	Sarlahi	102,773	1,619	1,505	114	399	374	25
Region	3	289,404	5,059	4,774	285	2,334	2,221	113

CDR: Central Development Region; H-H: house-to-house



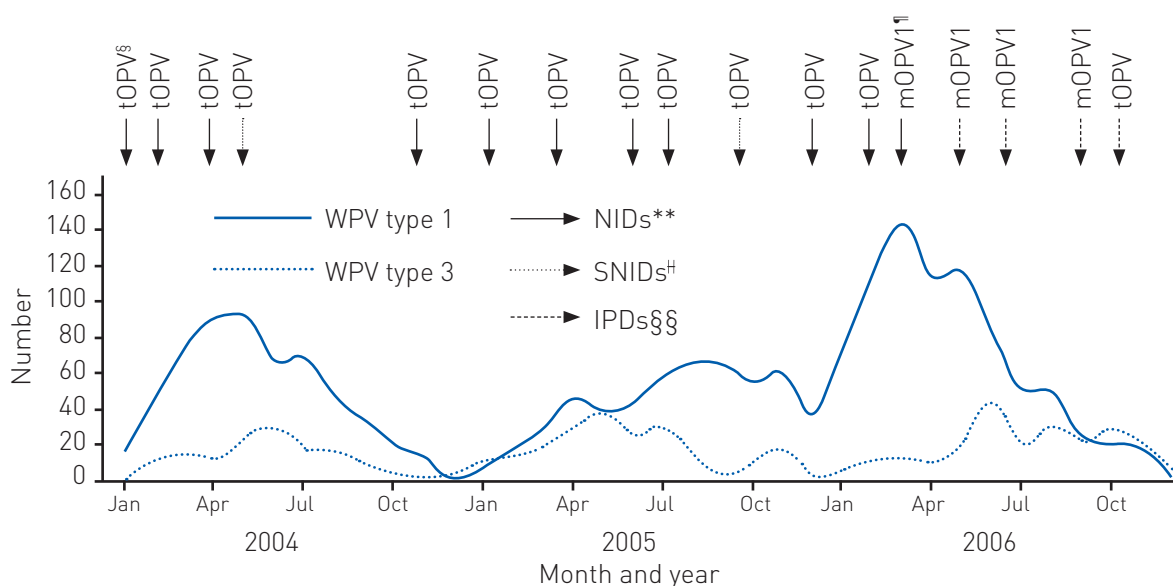
USING SURVEILLANCE DATA TO MEASURE CAMPAIGN QUALITY

Other sources of information can include surveillance data. Obviously, the continued transmission of poliovirus may indicate the presence of under-immunized children and thus of poor-quality SIAs. Data from AFP surveillance can also indicate campaign quality in specific areas. The immunization status of non-polio AFP (NPAFP) cases can also be used. High-quality SIAs should result in a decline in the number of zero-dose children.

In 2005, Nigeria conducted four rounds of SIAs, and another four in 2006. Despite these campaigns, poliovirus circulation increased. An analysis of the surveillance data showed that despite the SIAs, up to 50% of NPAFP cases had received no doses of OPV. Although this is only a subset of the population, it is convincing evidence of the SIAs' poor quality at that time.

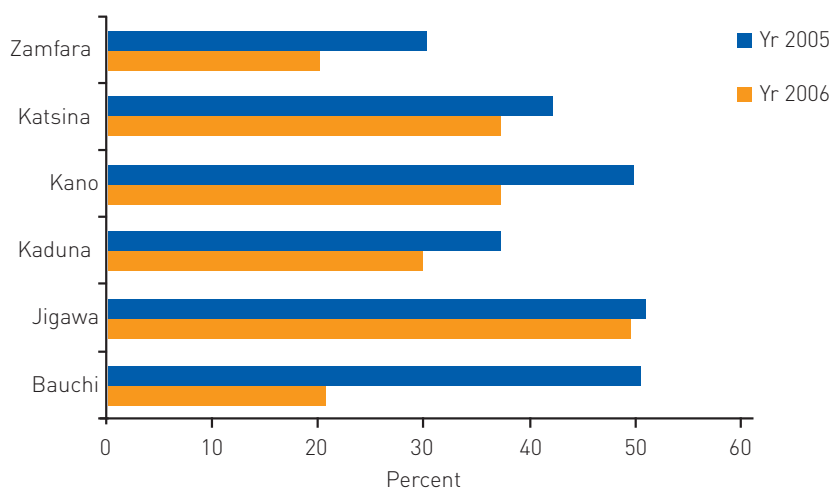
Figure 10. Number of confirmed poliomyelitis cases, by type of wild poliovirus, Nigeria, 2004–2005

Including month of onset, type of SIA and type of vaccine administered



mOPV: monovalent oral polio vaccine; tOPV: trivalent oral polio vaccine; WPV: wild poliovirus; NIDs: National Immunization Days; SNIDs: Subnational Immunization Days; IPDs: Immunization Plus Days

Figure 11. Proportion of zero-dose OPV children among NPAFP children aged 6–59 months in high-risk states, Nigeria, January 2005–October 2006



CONCLUSIONS

Monitoring polio campaigns was once confined to measuring coverage at various levels and eventually publishing data when all field results and reports had been compiled at the central level. However, as the GPEI progressed and transmission continued, it became evident that coverage measurements alone provided little information on who was being missed and why.

The *Polio Eradication & Endgame Strategic Plan 2013–2018* calls for strengthened monitoring and accountability measures, with data that can be made available locally to supervisors and to all partners in a timely manner so that corrective action can be taken. This has led to a variety of methods with the aim of reducing bias and rapidly providing usable information in defined areas. Survey methods have been introduced to reduce bias and provide a standard method and accurate results that can be compared over time and between countries. The LQAS method meets these requirements and has been adopted worldwide, with results currently published online in the POLSIA.

While reducing bias may be desirable, biased information can also be seen positively. Lessons can be learnt if vaccinators and supervisors can prioritize monitoring in areas they know have problems and can balance these with better performing areas. Where missed children are found, it is useful to collect some simple information on their location and factors related to the reasons they were missed.

Another concern is monitoring children who are not at home when campaigns take place as they risk being missed. This has led to regular monitoring using street, market and transit point surveys, through which many children can be quickly checked for finger-marking.

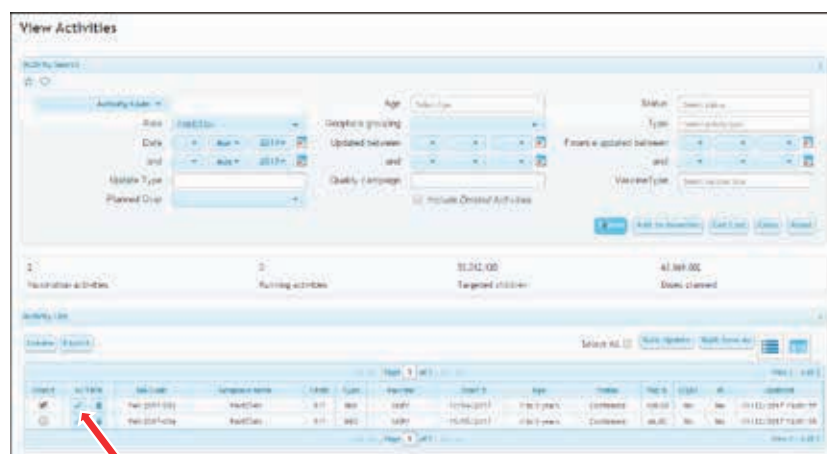
Since all methods have advantages and disadvantages, the best approach is to use several methods to measure the quality of each campaign. In this way, problems will be identified and action taken during the campaign, or before the next round. When comparing the outcome of several monitoring methods, the question to answer is whether the results are consistent or if discrepancies exist. Inconsistent data should be carefully analysed to determine whether problems in service delivery need to be addressed.



ANNEX 1

GLOBAL DATABASE FOR POLIO CAMPAIGNS (POLSIA)

These three screenshots show how the planning and implementation of national polio supplementary immunization activities (SIAs) are monitored at WHO headquarters.



When we click here, we have the campaign details (see next slide)

POLSIA: activity search



ANNEX 2

EXAMPLE OF INDEPENDENT MONITORING IN-HOUSE FORM

ANNEX		POLIO SIA INDEPENDENT MONITORING/EVALUATION FORM (IN HOUSE MONITORING)									
Region/Province:		Date of monitoring:									
District:		Name/Number of vaccination teams:									
Sub-district:		Name of monitor:									
Village:		Profile of the Independent Monitor (Education Institute, NGO, other, Please Specify)									
For each cluster, visit at least 7 households and check if households were visited by vaccinators and if every child under five years old was vaccinated (marked). Change the form every time you change the cluster.											
VARIABLES	Order of houses visited										TOTAL
	1	2	3	4	5	6	7	8	9	10	
A	Was the household visited by the vaccinators?										
B	Was the house marked by the vaccinators?										
C	Was the house correctly marked?										
D	Number of under 5 years old children checked in the household										
	0-11 months										
	12-59 months										
E	Total										
	Number of children under 5 years vaccinated and marked										
	0-11 months										
F	12-59 months										
	Total										
	Number of children under 5 years not marked (D-E)										
Total											

VARIABLES	Order of houses visited										TOTAL		
	1	2	3	4	5	6	7	8	9	10			
G Reasons why children were not vaccinated (one reason only per child not marked)	1 - Absent												
	2 - Refusal												
	3 - House not visited												
	4 - House not re-visited												
	5 - Child visiting the house												
	6 - Omission by vaccinator												
	7 - Other (to be specified)												
H If Refusal, what reason for refusal (one reason only)	1 - Religious beliefs												
	2 - Child sick												
	3 - I am not the one who decides												
	4 - Vaccine is dangerous												
	5 - No response												
	6 - Other (to be specified)												
I Was the parent informed about the campaign before the vaccinators' visit (Yes/No)													
	J How did they get information about the current polio campaign?	1 - Radio											
		2 - Town/public criers											
		3 - Religious/traditional leaders											
		4 - Vaccinators/health workers											
		5 - Social mobilization											
		6 - TV											
7 - Community based organization													
K Name of area not or poorly vaccinated by vaccinators													



ANNEX 3

LQAS EVALUATION

Background

The GPEI considers LQAS as the gold standard for assessing the quality of SIAs in polio-endemic countries.¹ Since the initial pilot in Nigeria in 2009, LQAS has been widely used in polio-infected countries to identify areas with inadequate campaign quality. Implementing LQAS in the field is straightforward and rapid. If the number of unvaccinated individuals in a sample exceeds a preset decision value, the area is classified as having an unsatisfactory level of vaccine coverage and mop-up activities are recommended. Further details on the LQAS methodology and implementation can be found in the GPEI LQAS field manual.²

As fewer and fewer polio cases are reported, maintaining the quality of LQAS as a tool to track trends in SIA quality has become increasingly important to effectively address any remaining immunity gaps. The method's field implementation must be periodically evaluated for quality assurance. In particular, the quality of training and level of knowledge of the surveyors, as well as the randomness of the sample, should be assessed to ensure the continued reliability of LQAS results.

Objectives

- To assess the knowledge, attitude and practice of LQAS surveyors;
- To assess the implementation of procedures to ensure the random selection of the sample.

Methodology

A multipronged assessment is proposed to evaluate LQAS implementation and adherence to LQAS best practices:

1. Survey planning and sampling methodology at the national level

The statistical soundness of LQAS results depends on the random sampling of 10 settlements for each lot/LGA from a full list of settlements and settlement populations based on probability proportional to size (PPS).

- Has the country nominated a senior focal person to oversee the LQAS implementation?
- Who chooses the samples and at what level are they selected?
- When are the samples released to the surveyors, and by whom?
- Is the sampling frame complete? The list of settlements and populations should be updated periodically to include previously missed settlements and to revise population data.

1 Global Polio Eradication Initiative. *Polio Eradication & Endgame Strategic Plan 2013–2018*. Geneva: World Health Organization; 2013 (http://polioeradication.org/wp-content/uploads/2016/07/PEESP_EN_A4.pdf, accessed 8 October 2017).

2 Global Polio Eradication Initiative. *Assessing Vaccination Coverage Levels Using Clustered Lot Quality Assurance Sampling: Field Manual*. Version edited for the Global Polio Eradication Initiative (GPEI); 27 April 2012 http://polioeradication.org/wp-content/uploads/2016/09/Assessing-Vaccination-Coverage-Levels-Using-Clustered-LQAS_Apr2012_EN.pdf, accessed 8 October 2017).



- Is the selection of settlements conducted according to the PPS methodology described in the GPEI LQAS field manual? According to the standard methodology, sampling from the list of settlements is based on a sampling interval computed from the total LGA population and the number of settlements to be selected, the cumulative population of settlements and a random starting point for the selection.
- Are supervisors designated for a group of surveyors?
- Who receives and manages the incoming data (noting and documenting the time lag between the LQAS and the data received at the central level)?

2. Training surveyors and preparing field implementation at the provincial/state level

Qualified and well-trained surveyors are essential to successfully implementing LQAS. Surveyors should be familiar with the local customs and culture of the people living in the area, and speak the local language. However, surveyors should not be assigned to conduct LQAS in an area under their responsibility if they also work for the programme or are otherwise involved in the SIA to be assessed. Training should be thorough, include both theory and field practice of LQAS implementation and, if applicable, use mobile phones and Magpi software for electronic data collection. Refresher training courses should be conducted periodically.

- Are surveyors appropriately assigned to places outside their area of responsibility (if they are also responsible for SIA implementation)? Are surveyors rotated geographically?
- When was the last training conducted?
- Does surveyor training include both theory and field practice? Can each surveyor practise selecting a starting point and using house selection methods in the field practice?
- How frequently are refresher trainings conducted?
- When was the last refresher training conducted?

3. Observation of surveyor teams in the field

Surveyor teams should be observed to assess whether field implementation adheres to the correct LQAS methodology and best practices. In particular, the starting household must be selected randomly in a random sector of the settlement (rather than selected based on convenience), and both the correct house selection methodology (skip one or two houses depending on the size of the settlement) and procedures for deviations must be followed. The selection of one child in each household should also be random.

- Are surveyors moving alone or are they accompanied by a local?
- Is at least one female member accompanying the surveyor?
- Are surveyors covering the correct preselected settlement? (Settlements covered in the LQAS are selected in the survey planning phase.)
- Is the starting household selected randomly? (Selecting a sector and starting point based on convenience will lead to biased results.)
- Is the surveyor making every effort to determine the correct number of families (mothers) living in the household and of children per mother in the household?
- Is the surveyor making every effort to talk to the mother(s) or at least the father if he is present at the time of the survey?
- Are the procedures for house selection and deviations being followed? (Incorrect application of the methodology will also lead to bias.)
- Is the child selected randomly for each household? Is the child's immunization status being assessed according to finger-marking and not parental recall?



The use of LQAS findings

- What action is taken as a policy when LQAS findings do not reach the predetermined decision value?
- Is LQAS regularly presented and findings discussed in the review meetings at national, provincial/ state and district/LGA levels?
- Is a trend analysis of LQAS over a period of time being carried out and maintained regularly by the country and provincial/state offices?

RESOURCE REQUIREMENTS

Activity	Expected time	Budget
Assessment of the survey planning and sampling methodology at the national level	2-3 days	
Observation of surveyor training, desk review of survey preparation and interviews with state focal points	4-5 days (depending on the length of training)	
Observation of surveyor teams in the field	2-3 days	
Report finalization	2 days	



ANNEX 4

EXAMPLE OF INTRA-CAMPAIGN MONITORING CHECKLIST

Intra-campaign monitoring checklist question	Yes/No					Comments
	Team 1	Team 2	Team 3	Team 4	Team 5	
Community engagement						
Is the post clearly identified by banners and posters?						
Are health workers/volunteers actively searching for every eligible child, in house or out of house?						
Cold chain/supplies						
Are vaccines stored in vaccine carriers with two ice packs?						
Are sufficient vials of OPV inside the vaccine carrier?						
Are there any stock-outs of OPV?						
Are sufficient marker pens available?						
Are sufficient tally sheets/recording forms available?						
Organization of the post						
Is the post well organized, with good client flow?						
Are sufficient vaccinators and volunteers available? Does the post have enough people?						
Recording and reporting practices						
Are tally sheets being used correctly?						
Is every child being finger-marked?						



Intra-campaign monitoring checklist question	Yes/No					Comments
	Team 1	Team 2	Team 3	Team 4	Team 5	
Are missed children listed on the back of the tally sheet for a house revisit?						
House-to-house operation						
Does the team have a plan and map?						
Is the team going house to house according to plan?						
Are houses being marked correctly?						
Are teams asking for all mothers and all children?						
Are teams working morning and afternoon according to plan?						
High-risk communities						
Are teams visiting high-risk communities?						
Are community leaders and volunteers involved in house-to-house operations?						
Are local leaders engaging the community appropriately?						
House revisiting						
Are teams revisiting houses at the end of the day where children were previously absent?						



ANNEX 5

EXAMPLE OF PRE-CAMPAIGN MONITORING CHECKLIST

At the health centre: check each item for campaign readiness	Comments
Microplan	
All villages are included in the district plan	
All items are included according to the template, with correct calculations	
Any supply shortfall has been identified, with the action needed	
Maps show catchment areas and location of posts/teams/supervisors per day	
Budget has been accurately calculated	
High-risk areas/RCMs	
High-risk areas have been identified	
Rapid campaign monitoring plan is available with supervisors/monitors/sites/dates	
Supervisors understand RCM methods	
Cold chain logistics supply	
Adequate vaccine storage space for OPV is available in regional and provincial stores	
Adequate vaccine carriers/ice packs/freezer capacity is available at each level	
Logistics/supply transport plan is available to supply all areas	
Standard operating procedures (SOP) are in place for replenishment in health centres if stocks run low	
Advocacy	
Local politicians have been informed and are ready to participate/contribute	
Local NGO meetings are held to enlist their support for monitoring and for the transport of supervisors/teams	
Social mobilization	
Each region/province has a local media plan to promote/advertise SIA	
Any other local social mobilization materials are available	
A plan for community volunteer training is available	
A plan for involving community officials and volunteers is available	
A plan for identifying community engagement focal points is available	
Immunization safety	
All supervisors know how to report adverse events following immunization (AEFI)	
AEFI investigation forms and SOPs are available to supervisors	



At the health centre: check each item for campaign readiness	Comments
Team management	
A plan for team training is available with simple training materials/tally sheets	
A team strategy, with fixed post in the morning and mobile post in the afternoon, is in place	
Teams are available for mop-up if RCM fails	
A team/post distribution plan is available	
Supervisor management	
The plan shows available supervisors or a shortfall	
A plan for training supervisors, including RCM training, is available	
A supervisor mobility/transport plan is available to follow an assigned area	
Supervisors have checklists	
External supervisors have a system for calling teams to do mop-ups when RCM fails	
Reporting system	
A system for the daily collection and consolidation of tally sheets into reports is available	
A computerized database for the consolidation of reports and their dispatch by email to provincial/regional/national offices is accessible	
Monitoring system	
Regions/provinces have a system for the daily monitoring of results	
The health centre has a system to react daily to a failed RCM by ordering an immediate mop-up	
A system exists at the national level to receive and react to regional reports on at least a weekly basis	











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