

Expanded Programme on Immunization (EPI) Review

Indonesia, 19-30 October 2009



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Expanded Programme on Immunization (EPI) Review

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Contents

	Page
<i>Acronyms</i>	v
<i>Executive summary and recommendations</i>	vii
1. Background	1
2. Purpose and methodology of the review	4
2.1 Context	4
2.2 Objectives	5
2.3 Methodology of the Review	6
3. Findings and recommendations	7
3.1 Immunization system	8
3.2 VPD surveillance	18
3.3 Vaccination for travelers	25
3.4 Expert Review Committee (ERC) and National Certification Committee (NCC)	26
3.5 Coordination and support	27

Annexes

1. Deployment of review teams and areas visited	29
2. Laboratory assessment	31

Acronyms

ADS	Auto-Destruct Syringes
AEFI	Adverse Event Following Immunization
AFP	Acute Flaccid Paralysis
BCG	Bacille Calmette-Guérin
CDC	Centers for Disease Control and Prevention
DT	Diphtheria Tetanus
DTP	Diphtheria Tetanus Pertussis
EPI	Expanded Programme on Immunization
ERC	Expert Review Committee
GSK	GlaxoSmithKline
HQ	Headquarters
HR	Human Resources
IEC	Information, Education & Communication
IgM	Immunoglobulin type M
MCV	Measles Containing Vaccines
MNT	Maternal Neonatal Tetanus
MoH	Ministry of Health
NCC	National Certification Committee
NPEV	Non-Polio Enterovirus
OPV	Oral Polio Vaccine
PCR	Polymerase Chain Reaction

SEARO	South-East Asia Regional Office
SOP	Standard Operational Procedure
TT	Tetanus Toxoid
UCI	Universal Child Immunization
UNICEF	United Nations Children's Fund
VDPV	Vaccine Derivated Polio Virus
VPD	Vaccine Preventable Disease
WHO	World Health Organization

Executive summary and recommendations

A team comprising national and international experts reviewed the Expanded Programme on Immunization (EPI) and Vaccine Preventable Disease (VPD) surveillance systems in Indonesia from the 19-30 October 2009. The general objective of the review was to determine the status of the programme, quantify achievements in vaccine preventable disease control and explore ways to improve implementation. The methodology for the review was adapted from *The Common Assessment Tool for Immunization Services*¹.

The team found that the health system has a good infrastructure with posyandus (health posts) as the main asset. Health staff are committed at all levels and actively involved in immunization delivery and VPD surveillance. The Ministry of Health developed and disseminated national standards for immunization delivery and VPD surveillance, which are available at all levels of the health system. The government of Indonesia is committed to procurement of vaccine and auto-destruct syringes (ADS) for the entire country.

In reading the executive summary and recommendations, it is important to remember that there is important variation from one province to another and from one district to another. However, the teams observed that the main challenges facing the immunization and surveillance programme were supervision and training, often related to high staff turnover and vacant positions. This has led to difficulties in the implementation of immunization delivery, monitoring and surveillance activities. The following are the key findings and recommendations:

Findings

Immunization delivery findings

- systems are in place and able to provide coverage >80% for most antigens

¹ WHO: Immunization, Vaccine and Biologicals (2002). *The Common Assessment Tool for Immunization Services*, Geneva: WHO.

- health infrastructure maintained with the posyandu (health post) as its main asset
- an Adverse Event Following Immunization (AEFI) system is in place that reports serious cases
- vaccines and auto-destruct syringes (ADS) are procured by the government
- health staff are committed at all levels
- increased dependency on sweeping activities in order to achieve immunization targets
- high staff turnover at the district and puskesmas (health center) levels
- variable involvement of the private sector in vaccine delivery and reporting
- lack of standardization of waste management, safety boxes not always used properly
- cold chain system intact however concerns with back-up power in some areas
- expired vaccine found in some districts and puskesmas.

VPD surveillance findings

- surveillance system in place at all levels with surveillance officers and contact personnel
- norms and standards are defined and available at all levels
- systematic weekly feedback on AFP surveillance
- coordination for cross notification well established across districts and provinces
- outbreak response adequate with systems in place and outbreak teams formed at the province and district level but not all outbreaks fully investigated
- coordination of AFP surveillance in hospitals insufficient
- surveillance visits not prioritized according to data

- measles outbreak thresholds not well understood at health facility level.
- limited analysis and interpretation of data especially at the district level for action
- inconsistency of data among different reports: C1, STP, W2 and W1

Laboratory findings

- Bandung, Jakarta and Surabaya polio laboratories are fully accredited
- Bandung, Jakarta, Surabaya and Yogyakarta measles laboratories are fully accredited
- capacity of measles laboratories is sufficient to meet the projected workload for case-based surveillance.

Recommendations

Crossing-cutting recommendations

- plan for refresher and induction training for health staff in EPI and VPD surveillance at province, district and puskesmas level
- plan for regular monitoring and supervisory field visits, prioritizing high-risk areas
- advocate at the district level (bupati/walikota) to ensure minimum standards for EPI and VPD surveillance are achieved (HR, operation and logistics costs)
- engage the private sector in reporting on immunization and VPD surveillance
- maintain social mobilization through community groups and village leaders
- improve distribution and variety of IEC materials available at the immunization delivery points.

Immunization delivery recommendations

- clarify and disseminate on vaccination policies on the over one-year-old
- maintain and strengthen the outreach strategy using posyandu and use sweeping technique as only a complementary strategy
- consider closing the immunity gaps for polio by carrying out supplementary immunization activities
- engage the private sector in delivery of immunization and reporting
- provide refresher training on sharps/waste management and universal precautions
- review cold chain infrastructure and capacity throughout the health care system.

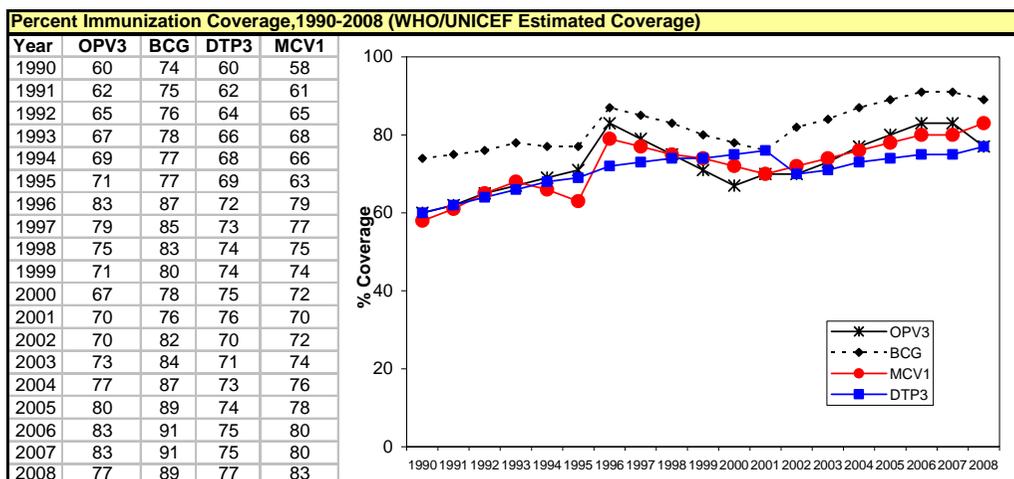
VPD surveillance recommendations

- give measles surveillance as high a priority as AFP surveillance
- improve active case finding through regular visits (active case search) to reporting units and documentation
- improve feedback mechanisms to ensure laboratory results are available at all levels
- analyze and share performance indicators at least on a monthly basis with surveillance officers from province to district and district to reporting units.

1. Background

The EPI programme in Indonesia began in 1979 and achieved Universal Child Immunization (UCI) status against the six “traditional” EPI target diseases in 1990. Figure 1 shows the routine immunization coverage estimates from 1990 to 2008. In 1991, Indonesia began the Polio Eradication and Suspected Poliomyelitis Surveillance programme. Since 1995, the programme transitioned to Acute Flaccid Paralysis (AFP) surveillance and in 1997 efforts were made to intensify AFP surveillance. Indonesia made remarkable progress in both surveillance and supplementary immunization activities, which have been the hallmark of the polio eradication strategy. Primary health care in Indonesia extends from static and mobile health units to community-based health services. All routine EPI vaccines are manufactured locally to WHO prequalification standards and financed by the government.

Figure 1: *Estimated routine immunization coverage, Indonesia 1990-2008*



Source: WHO/UNICEF Joint Reporting Form

In 2005, there were two significant polio outbreaks in Indonesia. An imported wild poliovirus from Nigeria via Saudi Arabia; and, a vaccine-derived poliovirus (VDPV) outbreak on the island of Madura in eastern Java. Prior to 2005, Indonesia had been without a polio case for almost 10 years. With considerable effort, the outbreaks were brought under control. The last VDPV and wild poliovirus (P1) cases were detected in October 2005 and February 2006, respectively.

Table 1 shows the AFP surveillance indicators from 2001 to 2008. Nationally, Indonesia has achieved the minimum AFP surveillance indicators requirement for non-polio AFP and adequate stool rates since 2005. Figures 2 and 3 give a graphic representation of the current status of the AFP surveillance indicator by province. Although Indonesia is meeting targets nationally, there are provinces that currently do not meet the minimum indicators.

Following the tsunami in December 2004, Indonesia made a substantial investment in the routine immunization programmes. In addition to a catch-up campaign for measles that covered children from the age of six months to 12 years old, immunization capacity building and trainings were conducted throughout the country.

Table 1: AFP surveillance indicators, Indonesia 2001-2008

Indicator	2001	2002	2003	2004	2005	2006	2007	2008 ¹
AFP Cases	660	848	749	782	1939	1526	1557	1684
Confirmed Polio Cases	0	0	0	0	349 ⁵	2	0	0
Compatibles	4	8	5	0	75	15	4	1
AFP Rate ²	1.02	1.32	1.22	1.26	3.12	2.48	2.52	2.75
Non-Polio AFP Rate ³	1.02	1.31	1.21	1.26	2.44	2.45	2.52	2.75
Adequate Stool Collection Rate ⁴	82%	84%	90%	92%	80%	83%	85%	84%
Total Stool Samples Tested	1228	1670	1473	1554	3760	2978	3020	3328
% NPEV	8	10	13	11	10	12	12	9
% Reported Within 14 Days	98	99	100	100	99	100	100	99

¹ For 2009 data, See the IVD VPD Weekly Bulletin.

Data as of 13 Jul 2009

² Number of AFP cases per 100,000 children under 15 years of age.

³ Number of discarded AFP cases per 100,000 children under 15 years of age.

⁴ Percent with 2 specimens 24 hours apart and within 14 days of paralysis onset.

⁵ Including 46 Type 1 VDPVs.

Figure 2: AFP surveillance indicators, Indonesia 2008

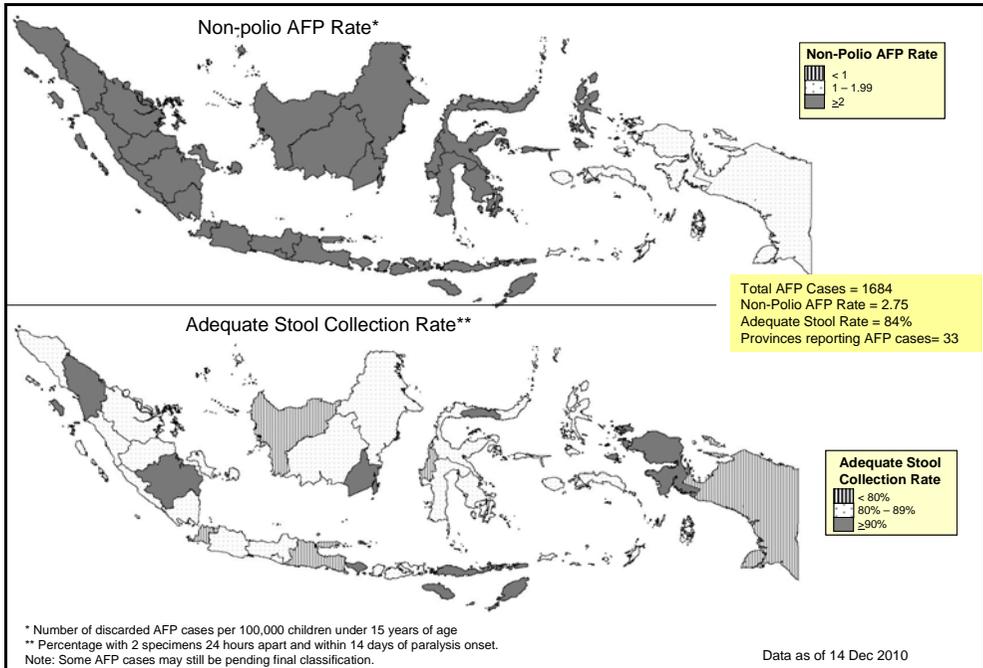
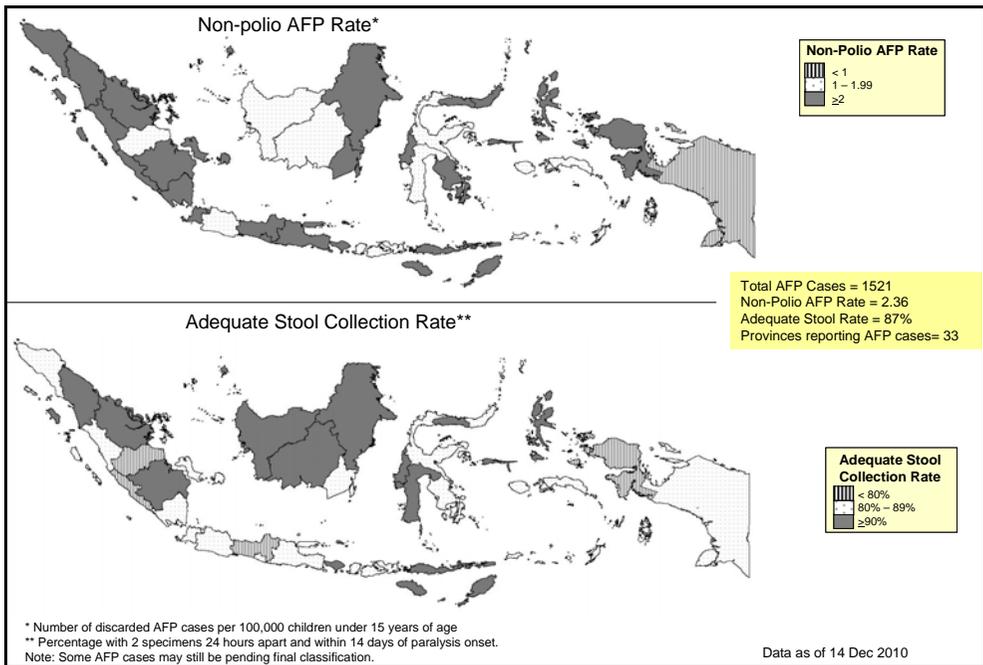


Figure 3: AFP surveillance indicators, Indonesia 2009



Three joint national/international AFP surveillance reviews have been conducted in Indonesia. The first review in December 1997 was composed of six teams, which reviewed the surveillance activity and performance in 10 provinces and three polio laboratories. The second review was held in June 2003 with 12 national/international teams and the third was held in July 2006 with 16 national/international teams.

2. Purpose and methodology of the review

2.1 Context

Justification

In a large country the size of Indonesia, aggregated national data often conceals areas of poor performance. These sub-national areas are typically more remote or face budgetary constraints for implementation of EPI and other programmes. With many remote and hard-to-access areas, analysis of sub-national data is critical to identify poor performing and high-risk areas. In addition to movement within Indonesia, there is significant movement of individuals between countries within the South-East Asia Region (Thailand, Myanmar, Timor-Leste) and the Western Pacific Region (Malaysia, Philippines, Papua New Guinea, Australia) increasing the risk for the spread of vaccine-preventable diseases to Indonesia.

The polio outbreaks in 2005 highlighted gaps in immunization coverage and reinforced the need for surveillance reviews. The basis of regional certification of polio-free status is high quality AFP surveillance. WHO/SEARO has been assisting Member States in strengthening AFP surveillance. As an integral component of this process, countries are encouraged to conduct internal reviews of AFP surveillance. This is complemented by periodic joint national/international surveillance reviews.

Since the last surveillance review in July 2006, which focused on AFP surveillance, Indonesia completed a measles immunization catch-up campaign and began a phased approach to both measles case-based surveillance and maternal neonatal tetanus (MNT) elimination. A coverage survey conducted in 2007 estimated DPT3 coverage at 75.4%, which represents nearly 1.15 million under-immunized children. A comprehensive review of the entire EPI and VPD surveillance programme has not been conducted in Indonesia.

2.2 Objectives

Specific Objectives of the Review

- assess strengths and weaknesses of immunization service delivery at all levels of the health care delivery system
- analyze managerial and administrative capacity for immunization at the national and sub-national levels
- assess strengths and weaknesses of current vaccine distribution mechanisms and cold chain management
- assess injection safety and waste management for sharps
- review priority setting for immunization programme sustainability
- review the capacity of the national surveillance system including laboratory support as applicable to detect and respond to vaccine preventable diseases (VPD) in a timely manner
- document the capacity for surveillance and management of adverse events following immunization (AEFI)
- assess training needs for immunization managers, surveillance staff and basic health workers (vaccinators) at all levels
- review the role of the private sector and civil society organizations, as providers of routine immunization services
- assess communication strategies, including advocacy, partnership, social mobilization and their implementation
- follow-up on the recommendations made in the national/international AFP surveillance review in 2006, ITAG meeting and EPI managers' meeting
- review the activities of the national committees involved in polio eradication (NCPPE, Expert Review, Laboratory Containment).

The review team aimed to answer the following questions:

- Is there capacity for timely and adequate response to VPD outbreaks?
- Does the system for the delivery of immunization work?

- Does the system for the surveillance of VPD work?
- Is AFP and measles surveillance integrated with other VPD?
- Can the laboratory network support VPD surveillance?

2.3 Methodology of the Review

The review took place from 19-30 October 2009, and was conducted at the national, provincial and district levels.

There were 16 teams with one national and one international participant. The national members were selected by the government of Indonesia. The external members were from WHO, UNICEF, CDC and consultants from South-East Asia Member States (Myanmar and Thailand).

The review was divided into three components:

- one-day orientation in Jakarta: team members were briefed on the Indonesia health system, EPI and VPD programmes and the assessment tools
- a seven-day field activity: each team, after review of the provincial capital, evaluated two to five districts during the course of approximately five days in the field
- the national level, the eradication committees, and the polio/measles network laboratories were review separately
- a three-day debriefing session was held in Jakarta: teams reviewed and consolidated the finding.
- a final debriefing was held with the government officials, the immunization and VPD sub-directorates, all regional directors of health and partners.

At each level the review activities included: interview of surveillance staff, review of hospital records and observation of immunization sessions. Using structured data collection tools developed for each level, the following technical areas were addressed

- immunization service delivery
- injection safety and waste management

- vaccine management (supply and cold chain)
- Vaccine-preventable disease surveillance (focusing on AFP and measles) including AEFI surveillance
- human resource/training capacity
- advocacy and communication.

One team focused specifically on the laboratory component of the VPD surveillance and looked at laboratory capacity and proficiency, global accreditation, logistics and linkages between laboratory and surveillance programmes.

In addition to the information collected during the review, the following information was also considered: immunization and VPD guidelines, recommendations from the 2006 surveillance review, line listing, aggregated surveillance data, and demographic data. The review team tried to ensure that the areas covered were representative of all the regions in Indonesia.

Limitations of the review

The review team acknowledges some limitations in the review process:

- time and logistics limited the number of provinces and districts reviewed
- a significant language barrier existed and the national team member contributed significantly in overcoming this obstacle.

3. Findings and recommendations

There are important variations from one province to another as geography and access differs. In addition, the autonomy of provinces and districts makes uniformity a challenge. The following summarizes the most common observations.

3.1 Immunization system

Universal Child Immunization (UCI) status for the six “traditional” EPI target diseases was achieved in 1990. The national immunization programme provides a birth dose for hepatitis B, BCG and polio at four weeks; DPT, hepatitis and polio at 8, 12 and 16 weeks; and, measles at nine months. Additional vaccination includes measles, DT and TT for school children, and TT for women of child-bearing age.

Some clear milestones have been set by the programme and include UCI in all villages by 2010, disease-specific targets and milestones for use of auto disable syringes (ADS) and waste management. Norms and standards are also available and include both technical and managerial standards. The immunization programme is one of the five sub-directorates (surveillance for communicable diseases, immunization, Hajj, quarantine, and matra health) under the Directorate of Epidemiology, Surveillance, Immunization and Matra² Health.

Immunization service delivery

Strategy

The national immunization programme has two main strategies to provide immunization services based on the availability of health facilities and health personnel in an area.

- a fixed strategy where vaccines are delivered at the health facility and the number of immunization sessions per week varies from one facility to another
- an outreach strategy where vaccines are delivered once a month at an integrated service health post (posyandu) established by the community

² The Matra Health Sub-Directorate is focus on health issues of individuals or groups related to movements or change in environment during a finite time period with specific exposures (i.e., refugees/IDPs, pilgrims, migrants, flight surgeons, travelers, and scuba divers).

- additional strategies include:
 - sweeping: catch-up campaign on a regular basis for children less than 12 months to complete their routine immunization
 - backlog fighting: catch-up campaigns, conducted on an ad hoc basis for hard to reach areas, targeting children >12 months old who have not completed their routine immunization
 - supplementary immunization campaigns against diseases targeted for elimination/eradication (measles, polio, MNT).

The review team observed that overall it appears that the immunization system is able to provide coverage greater than 80% for all antigens. The infrastructure is excellent and overall well maintained. The posyandu remains the main asset of the system providing regular and sustainable outreach strategy to communities. As described above there is some flexibility and provision for hard to reach areas.

However, it was noted that there was an increased dependency on sweeping activities at the expense of the more regular and sustainable outreach strategy. Although sweeping is a good strategy for catching up children who have missed their vaccination, it should only complement the two main strategies for delivery of vaccine. Sweeping is not a sustainable strategy and gives a false sense of security by boosting the coverage rate once a year.

The review team also noted that even though norms and standards are available, there was some lack of guidance on immunizing and accounting for children over 12 months. For example, surveillance data shows that the majority (87%) of routinely reported measles cases were in children over one year of age, 87% (see Table 2).

Table 2: Routinely reported measles cases by age, Indonesia 2008

Age Group by year	Cases	
	#	%
<1	1,947	13
1-4	3,933	26
5-9	4,460	30
10-14	2,210	15
<15	2,459	16
Total	15,009	100

*Source: Indonesia Monthly Measles Report

The review team observed that staff at all levels were committed to the immunization programmes with midwives as the driving force in providing services. Volunteers were also highlighted as particularly important at the village level for mobilizing communities to use the posyandu.

The involvement of the private sector varies from district to district. In some places they were fully involved by receiving their vaccines from the national immunization programme and reporting coverage data. In other places, they were completely separate from the government system.

Data reporting and coverage

Data reporting is done on a monthly basis: hard copies are sent from health facilities to districts and then from districts to provinces. A web-based system is used to transmit information from provinces to the central level. Some provinces are working on a web-based system from health facilities to provinces. Completeness and timeliness of reporting is being monitored.

At the national level, coverage of all antigens was above 80% for 2008, based on country reporting and around 75% based on WHO/UNICEF best estimates (see Table 3). However, both official and WHO/UNICEF coverage estimates mask some discrepancies at provincial and district levels. In 2008, DPT3 coverage ranged from 61% to 107% at

provincial level with more extreme variation at the district level (see Table 4). This vaccination gap is further underlined by two examples: (1) the number of reported diphtheria cases from 2007-2009 as shown in Table 5, and (2) the OPV status of non-polio AFP cases, as shown in Figure 4. The percentage of under immunized cases has been increasing steadily since 2006 reaching approximately 20% in 2009.

Table 3: Routine immunization coverage, Indonesia, 2005-2008

Antigen	Percent							
	2005		2006		2007		2008	
	Country Official	WHO UNICEF (estimate)						
BCG	97	89	93	91	92	91	91	89
MCV1	91	78	88	80	88	80	80	83
DTP3	90	74	87	75	88	75	75	77
OPV3	91	80	84	83	84	83	83	77

Source: WHO/UNICEF Estimates and Country Official Estimates (WHO/UNICEF JRF)

Table 4: Percent DTP3 coverage by province and range by districts, Indonesia 2008

Province Name	Number of Districts	Number of Live Births in 2008	%DTP3 Coverage	% Range of DTP3 Coverage in Districts	
				Min	Max
BALI	9	60,166	101	95	111
BANGKA BELITUNG	7	25,259	92	86	111
BANTEN	7	222,276	90	86	96
BENGKULU	9	40,783	88	70	93
DI YOGYAKARTA	5	44,766	95	85	104
DKI JAKARTA	6	192,563	107	77	116
GORONTALO	6	23,745	96	88	107
JAMBI	10	68,279	97	84	110
JAWA BARAT	26	939,620	88	70	113
JAWA TENGAH	35	580,171	100	87	116
JAWA TIMUR	38	610,279	98	83	118
KALIMANTAN BARAT	14	99,336	82	61	98
KALIMANTAN SELATAN	13	72,521	89	58	100
KALIMANTAN TENGAH	14	52,494	85	59	98
KALIMANTAN TIMUR	13	76,140	94	71	106
KEPULAUAN RIAU	6	36,990	96	85	104
LAMPUNG	11	174,794	85	73	97
MALUKU	9	37,149	81	0	108
MALUKU UTARA	8	22,554	86	69	102
NANGGROE ACEH DARUSSALAM	23	107,209	72	45	99
NUSA TENGGARA BARAT	9	105,282	96	78	105
NUSA TENGGARA TIMUR	20	117,418	75	36	108
PAPUA	20	50,675	61	2	120
PAPUA BARAT	9	18,079	83	7	172
RIAU	11	132,406	92	84	109
SULAWESI BARAT	6	26,003	80	37	107
SULAWESI SELATAN	23	174,552	97	78	116
SULAWESI TENGAH	10	51,546	97	81	115
SULAWESI TENGGARA	12	54,824	89	61	113
SULAWESI UTARA	13	46,737	90	60	116
SUMATERA BARAT	19	106,599	85	53	111
SUMATERA SELATAN	15	171,818	91	75	99
SUMATERA UTARA	28	318,623	90	37	102

*Source Government of Indonesia Annual EPI reporting

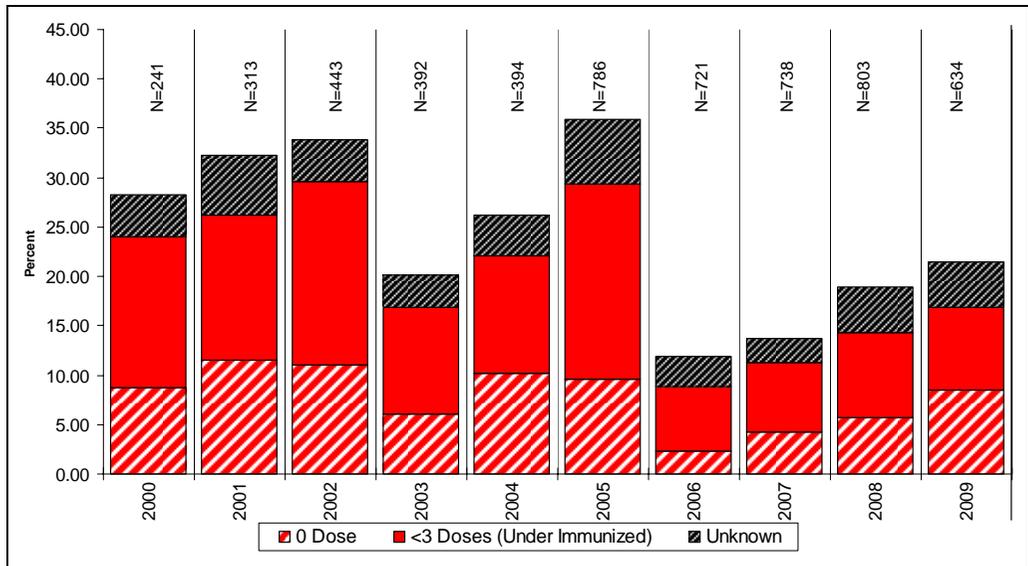
Table 5: Diphtheria cases by age group, Indonesia, 2007-2009

Age Group by year	2007		2008		2009*	
	#	%	#	%	#	%
<1	2	1	14	6	1	1
01-Apr	55	30	75	34	29	32
05-Sep	84	46	63	29	31	34
Oct-14	16	9	31	14	16	18
>14	26	14	36	16	14	15
Total	183	100	219	100	91	100

*Data as of 15 Sep 2009

Source: Indonesia Monthly Measles Report

Figure 4: **Percent under-immunized non-polio AFP cases six months to 5 years, Indonesia, 2000-2009**



*Source: SEARO Weekly AFP data

Injection Safety and Waste Management

From the central level, the government procured all the safety boxes and 80% of the AD syringes, leaving the regions to procure the remaining 20%. The review team observed that overall, injections were administered in a safe manner. Availability and use of AD syringes were observed in all selected locations. In terms of waste management, safety boxes were also available but not always used properly (re-used, opened) in some areas. There was a lack of standardization for disposal of waste: in some areas safety boxes were collected and sent to hospitals for incineration while in other areas, they were being burned, buried or simply stored. There is also great variety in the quality of these activities, and it did represent a safety hazard in some areas.

Suggestions for improving immunization delivery

- clarify and disseminate policies on over one year old vaccination

- maintain and strengthen the outreach strategy using posyandu; use sweeping as only a complementary strategy
- consider closing the immunity gaps for polio by carrying out supplementary immunization activities
- engage the private sector in delivery of immunization and reporting
- provide refresher training on sharps/waste management and universal precautions.

Adverse event following immunization (AEFI)

The AEFI system is in place: definition, reporting mechanisms and validation is standardized and documented. The review team observed that the system is in place at all levels with consistent reporting of serious cases. Minor cases do not get reported in a systematic manner through the system.

Suggestion for improving adverse events following immunizations (AEFI)

- conduct refresher training in AEFI management and reporting for staff at the province, district and health centre level.

Vaccine supply and cold chain management

The Government of Indonesia procures its own vaccines. All routine EPI vaccines are manufactured locally by BioPharma and have met WHO prequalification standards. The National Immunization Programme estimates the quantity of vaccines needed for each province as well as the central buffer stock. There is no central cold store and BioPharma keeps all vaccines until dispatched to the provinces.

The review team observed stock-out of different vaccines at the district and province level, in some areas. It was unclear whether the issue was a lack of supply from the manufacturer or an under estimate of vaccine needs at the province or district level. The methods to calculate wastage rate and vaccine consumption was not always well understood at field level.

In terms of the cold chain, some norms and standards exist at central level for human resources and cold chain material (number and specifications); however these minimum standards have yet to be met in the field. Based on the data analysis done by the national immunization programme:

- 26 of the 33 provinces (79%) have a well functioning cold room
- of the 30,176 fridges used for immunization, 58% were well functioning, 32% not in use, and 10% did not have the right specifications (home fridge and solar panel)
- Three of the 33 provinces (9%) have both a cold chain and a vaccine officer; 22 provinces (66%) have either a vaccine or a cold chain officer; 8 provinces (24%) do not have any vaccine or cold chain officer

The review team observed some variable quality of cold chain, with some concerns with back-up power in some provinces.

Suggestions for improving vaccine supply and cold chain management

- conduct refresher training in cold chain procedure, and vaccine inventory management
- advocate at province and district level to ensure that minimum standards for cold chain logistics and management are implemented
- review and conduct refresher training on the methods for calculating the vaccine requirements at the provincial and district level.

Social Mobilization and Communication

IEC materials were displayed in health facilities. However, IEC materials for routine immunization were limited in number. As a result; the programme was not very visible, especially at puskesmas level (health centre). Local authorities have been supportive of community mobilization. Their role should be further strengthened and recognized as it is the key to the success of outreach vaccination (via the posyandu). With over 80%

coverage for DT and TT, the school health programme (BIAS) is also a good opportunity to deliver vaccines to children/teenagers.

Suggestions for improving social mobilization and communication

- distribute social mobilization tools focusing on routine immunization
- continue to engage communities through the National Woman's Movement, (*Pendidikan Kesejahteraan Keluarga* PKK) at the village, sub-district and district levels
- continue to engage schools health programme through teachers.

Managerial aspect

The autonomy of districts makes uniformity a challenge, especially as staffing and operational costs are the district's responsibility.

Staffing

The key service provider for EPI is the midwife who is based at the health facility level. As mentioned above, there is a high level of commitment by the staff to immunization services. However, the staffing levels vary from one district to another. The review team observed a high turnover of staff at district and puskesmas levels in some places. At the central level, the position of Immunization Sub-Director has been vacant since January 2009.

Training

The level of knowledge of the field staff was variable. Although most had basic knowledge, a lack of up-dated knowledge at district, hospital and puskesmas level was observed. Refresher training, as well as induction training for new staff is definitely needed, especially given the reported high turnover of staff.

Monitoring and supervision

All review team members emphasized that supervision was limited and irregular at all levels: from central to province, from province to districts and districts to puskesmas. Generally, supervisory visits are not done with a standard checklist to conduct systematic supervision. Supervision is generally not done based on priority or risk.

Financing

The Government of Indonesia procures all of its vaccines. Since decentralization, the provinces and districts have greater autonomy and the responsibility for funding the operations, human resources and logistic costs of immunizations.

Even though minimum standards exist under a Ministerial decree for Universal Child Immunization, and non-polio AFP rate with additional norms defined by the national immunization programme, there is no mechanism ('law requirement') to ensure implementation of those standards. As a result, some districts put health and immunization as a priority, which results in good immunization infrastructure, sufficient level of staffing and operational funds; while other districts do not put health as a priority resulting in a limited number of health staff, inadequate funding for operations and limited service delivery.

Suggestions for improving the management of the Immunization system

- advocate at district level (bupati/walikota) to ensure minimum standards are maintained in EPI (HR, operational cost, logistics)
- conduct refresher training focusing on EPI knowledge and skills at the district and puskesmas (i.e., cold-chain procedures and vaccine inventory management; micro-planning, monitoring and evaluation; AEFI management and reporting; Waste management and injection practices)
- conduct induction training for new health staff
- plan and implement regular monitoring and supervisory visits including field supervision prioritizing high risks areas

- conduct supervisory visits to identify and document future training needs
- fill the sub-director position for EPI as soon as possible.

3.2 VPD surveillance

The surveillance for communicable diseases is one of the five sub-directorates (surveillance for communicable diseases, immunization, Hajj, quarantine, matra health³) under the Directorate of Epidemiology, Surveillance, Immunization and Matra Health.

There are three main surveillance systems: (1) surveillance for 29 communicable diseases, (2) surveillance for outbreak-prone diseases (early warning system) and (3) special surveillance for avian influenza, AFP and measles. The reporting is dependent on the type of surveillance and can be monthly, weekly or immediate (24 hours) for outbreaks. Outbreak response within 24 hours is part of the health minimum standard as defined as part of a ministerial health decree.

In terms of implementation, the review team observed that the surveillance system is in place with surveillance officers and contact details available in most of the health facility visited. The involvement of the private sector in epidemiological surveillance was reported as required by law, but implementation was variable.

In terms of coordination and feedback, there is a coordination meeting with the other sub-directorates on a monthly basis, and weekly technical meeting between the surveillance and immunization sub-directorates with other coordination meetings organized based on specific diseases. Coordination meetings with provincial surveillance officers are reported to take place once or twice a year.

³ The Matra Health Sub-Directorate is focus on health issues of individuals or groups related to movements or change in environment during a finite time period with specific exposures (i.e., refugees/IDPs, pilgrims, migrants, flight surgeons, travelers, and scuba divers).

AFP surveillance

AFP surveillance is given considerable priority at the provincial, district, health centre and health post level. The AFP surveillance programme was established in Indonesia in 1997. It has been the hallmark of vaccine preventable diseases surveillance in the country. Systems are in place for reporting laboratory results and linking information with surveillance data and the management of the programme is well understood at all levels. However, the review team did find a few areas of the system worth additional consideration: AFP surveillance indicators and AFP surveillance guidelines.

Non-polio AFP rate indicator

In order to operationalize the non-polio AFP rate, the expected number of non-polio AFP cases is being estimated at different levels throughout Indonesia. Based on the population of a particular area (province or district), the number of expected non-polio AFP cases for the year is being calculated using 2 cases/100,000 population. As most populations are not exact integers of 100,000, the number of expected cases is rounded up or down to the nearest whole number. While using expected cases is a good managerial tool, it should not be substituted for calculating the actual non-polio AFP rate. The review team was concerned that once the expected number of cases was achieved, sites were likely to stop looking for cases resulting in missed AFP cases. Calculating the actual non-polio AFP rate is important to ensure consistent comparability between districts and provinces.

Adequate stool collection rate indicator

The adequate stool collection rate is calculated based on the collection and transportation of the two stool specimens collected 24 hours apart within 14 days of the onset of paralysis. Indonesia has added an additional requirement to the indicator: condition of the stool specimen upon arrival at the lab. Data from areas that are under performing should be analyzed to see what is the cause. Again as with calculation the non-polio AFP rate, consistency is important for comparability.

AFP surveillance guidelines

As part of the central level visit, the AFP surveillance guidelines were reviewed. The current guideline is available only in Bahasa Indonesia. Translation of this guideline and future version should be considered to help facilitate reviews, recommendations and consistency with global and regional standards.

The following are three sections of the guideline reviewed during the visit to the central level:

- *AFP Differential Diagnosis:* The differential diagnosis in the guidelines is inclusive of 39 conditions. The more inclusive the differential diagnosis, then the more sensitive the surveillance system and the greater the expected AFP rate. While Indonesia is achieving an adequate non-polio AFP rate national, a higher non-polio AFP rate would be expected with such a broad case definition.
- *“Hot case” definition:* For the three “hot case” definitions currently in the guidelines, the main criterion is non-adequate specimen. The purpose of the “hot case” definition is to make the surveillance system more robust in its ability to identify AFP cases and increase the likelihood of identifying polio. “Hot case” definition varies from country to country and should be tailored to meet the needs of the country. Given that the purpose of labeling a case as “hot” is to identify a polio case as quickly as possible and ensure early and appropriate interventions expansion of the case definition should be considered (i.e. removing the non-adequate specimen criteria).
- *Active Surveillance Sites:* Currently, active surveillance is being conducted in hospitals. The percentage of AFP cases being reported by hospitals in 2008 was 48%, while the percentage of AFP cases being reported by health clinics in 2008 was 42%. Active surveillance is a way to ensure that all cases meeting the case definition are being reported. The expansion of the active surveillance sites to include health centres (puskesmas) should be considered.

Suggestions for improving AFP surveillance

- review the method of calculating non-polio AFP rates by the provinces and districts and conduct refresher training if necessary to ensure consistency in actually calculating the non-polio AFP rate across the country
- review the method of calculating adequate stool collection rate and check reasons for under-performing areas
- translate current version of the AFP guidelines into English
- review the AFP surveillance guideline and consider updating sections on AFP differential diagnosis, “hot case” definition and active surveillance sites if necessary to enhance AFP surveillance indicators.

Managerial aspects of AFP surveillance

Staffing and training

The level of knowledge of staff at all levels was good. However, high staff turnover showed the need for regular refresher and induction training to guarantee a high quality, functioning system.

Monitoring and supervision

Supervision for the AFP surveillance system was well established. Regular surveillance feedback was provided through a weekly bulletin and direct communication from the central level to the province and then the districts.

Data for action

The review team noted that there was a clear and established system for linking cases with laboratory results. Laboratory results were simultaneously sent to the provinces and district health offices (not the same system for measles surveillance).

Financing

Since decentralization, the provinces and districts have greater autonomy and the responsibility for funding the operation, human resources and logistics costs for epidemiology surveillance. Support varied with some areas having fully funded programmes and other areas struggling to fund the basics.

Measles surveillance

Following phased catch-up measles campaigns from 2005-2007 and surveillance training, the programme initiated case-based measles surveillance in the provinces of Bali and Yogyakarta in mid-2008. An additional 10 provinces started case-based measles surveillance in 2009. The remaining provinces are scaling up for measles case-based surveillance.

Measles surveillance guideline

A measles surveillance guideline is available in which norms and standards are defined:

- The review team observed that although the case definition for measles seems well known, there is some limited knowledge on definition of outbreaks, and little understanding on rubella versus measles cases
- The outbreak thresholds are not well understood at health facility level. As a result the number of measles cases reported routinely is very high while the number of measles outbreaks reported is rather low. The outbreak threshold varied from one district to another
- There is still some misunderstanding about case-based measles surveillance and the number of specimens needed to be collected.

It is worth noting that, based on the laboratory assessment; the capacity of the measles laboratories could easily cope with an increased workload and is as of now being under utilized.

Managerial aspects of measles surveillance

Staffing and training

The review team noted that the system for outbreak response seems to be in place with outbreak teams formed at district and province level. However, not all outbreaks are investigated and some are inadequately investigated (key information missing). It was observed that there was a shortage of staff with EPI training at the district level. The level of knowledge of the field staff was also variable. The review team appreciated that the case-based measles surveillance was just starting. Refresher training, as well as induction training for new staff, and supportive supervision is definitely needed, especially given the reported high turn over of staff and the need to scale up case-based measles surveillance.

Monitoring and supervision

All review team members emphasized that supervision was limited and irregular at all levels, and was generally not done based on priority or risk. Feedback on performance was also limited at multiple levels and for example no feedback on measles was done from the central level (as opposed to AFP).

Data for action

The review team observed that there was some limited capacity to analyze and interpret data (especially at the district level) and a lack of action following investigations. The review team noted that at the province or district level there were measles cases reported in April to July 2009 that still had pending laboratory results in October 2009. It was unclear whether the issue was a reporting problem from the laboratory to the province/district or disconnect in the flow of information between the different levels of the surveillance unit. Critical analysis to guide actions or strategic decisions was not regularly carried out: an example would be regular descriptive analysis of age breakdown and vaccination status of measles cases. Despite most of the cases being over one-year of age, no specific action was taken to address that immunity gap (see policy on over one-year old in the immunization section). Data quality checks are done on a regular basis at central and provincial levels but inconsistencies exist between cases reported through the routine system or via the case-based

measles surveillance (monthly measles report, C1 and the integrated disease surveillance report, STP).

Financing

Since decentralization, the provinces and districts have greater autonomy and the responsibility for funding the operations, human resources and logistics costs for epidemiologic surveillance.

As a result there is inconsistent support and achievement from province to province and district to district.

Suggestions for improving measles surveillance

Supervision and monitoring

- include case-based measles surveillance in a refresher training for puskesmas and district level as well as in any induction training for new health staff
- plan and implement regular monitoring and supervisory visits including field supervision, prioritizing high risks areas - use those supervision visits to refresh the knowledge of health staff
- use supervisory visits to identify and document future training needs.

Advocacy

- advocate at district level (bupati/walikota) to ensure minimum standards are maintained in VPD (HR, operational cost, logistic)
- engage the private sector in reporting on measles cases, and on following the SOPs (standard operating procedures) for specimen collection.
- raise the level of priority for measles throughout the health system (as it is for AFP).

Technical issues

- improve feedback mechanisms:
 - laboratory results should be available to doctors (and if possible caretakers)
 - performance indicators can be analyzed and shared on a monthly basis with surveillance officers from the province to the district and district to reporting sites
- scale up measles surveillance to enhance collection of specimens from as many suspected measles cases (routine cases) as possible
- linelists of routine cases to be sent to the national level and SEARO in addition to the outbreak linelists.

3.3 Vaccination for travelers

Sequencing data suggests that the last outbreak of poliomyelitis in Indonesia was due to an importation of wild poliovirus of Nigerian origin, likely to have come via Saudi Arabia. Every year, Indonesia organizes the travel of around 200,000 Hajj pilgrims to Mecca. The Hajj sub-directorate is one of five sub-directorates (surveillance for communicable diseases, immunization, Hajj, quarantine, matra health) under the directorate of Epidemiology, Surveillance, Immunization and Matra health. This sub-directorate coordinates all health aspects for the pilgrims traveling to Mecca. This system is standardized with a web-based data management collecting key health information on every single pilgrim travelling to Mecca. Information is shared with the health authorities in Saudi Arabia.

The standard operating procedures for potential pilgrims includes:

- an initial health exam is conducted at the health centre level (with referral to hospital if necessary)
- two months prior departure, a second health exam is required at the health centre level and includes immunization for meningitis (quadrivalent-GSK) and seasonal influenza

- twelve hours prior departure, pilgrims are quarantined under medical supervision to detect any severe conditions
- upon return from Mecca, pilgrims are under health surveillance for two weeks.

Polio immunization is a requirement for individuals under 15 years of age who are going on pilgrimage to Mecca; however, this does not apply for Indonesia, as the government of Indonesia requires pilgrims be over 18 years of age.

Meningitis and seasonal influenza vaccines are procured by BioPharma (overseas procurement), and funded by the Religious Ministry.

The review team noted the level of standardization and coordinated management system between the different parties at all levels (from health centre to central level, and across ministries) was excellent. The review team also noted that with such a smooth and well functioning system, providing only two types of vaccinations was a missed opportunity, especially for polio vaccine, given the recent outbreak, but also for other vaccine preventable diseases. It would be worth considering adding other immunizations (polio, measles, TT, etc.) as it would boost population immunity, without over burdening the system in place.

Suggestion for improving vaccinations for travelers

- consider including polio and other immunizations in the vaccine requirements for travelers to Mecca.

3.4 Expert Review Committee (ERC) and National Certification Committee (NCC)

As part of the review of the central level, the review team met with the Expert Review Committee (ERC) and the National Certification Committee (NCC). The ERC meets on a regular basis to classify AFP cases. The technical composition of the committee was appropriate and included paediatricians, neurologists and paediatric neurologists. The NCC is providing the region with annual updates on certification and is actively participating in regional meetings as required. The only concern during the review of these two bodies was that NCC members were participating in

the ERC case reviews. As the NCC certifies the country's polio-free status, members should be independent. A possible conflict of interest could arise particularly if NCC members are involved in the classification of AFP cases.

Suggestion for improving the ERC and NCC

- review membership of these two bodies and determine appropriate participation based on expertise and the need for transparency and independence.

3.5 Coordination and support

WHO-Indonesia

As with the other parts of the review, the recommendations for the WHO-Indonesia country office follow the recurrent theme for increased supervision and training. The review team felt that WHO has a lot to contribute to these two areas. Specific recommendations for the WHO-Indonesia EPI team follow this theme and are intended to maximize supervision and training opportunities.

The current technical structure for the WHO-Indonesia EPI section consists of an EPI Manager, three surveillance officers and one immunization officer all located in Jakarta. These three surveillance officers provide support to the 40 provincial surveillance officers financially supported by WHO.

WHO, the Immunization Sub-Directorate and Surveillance Sub-Directorate have the country subdivided differently. WHO should support the government in re-aligning and harmonizing the way that the country is subdivided. This realignment would allow WHO and the sub-directorates to synergize supervision, monitoring and training activities.

In order for WHO-Indonesia to provide more comprehensive support that parallels the decentralized system of the government of Indonesia, the national officers currently posted in Jakarta should be embedded in the areas of the country that they support. This will give the national officers the ability to provide more comprehensive support that parallels the decentralized government structure. Additionally, the number of national officers should be increased from four (three surveillance officers and one

immunization officer) to five. The terms of reference for all five national officers should be redefined to include responsibilities for both immunization and surveillance.

WHO-Indonesia is providing technical and financial support for AFP and measles surveillance through surveillance officers posted at the provincial level. Considering the vital role and link that these individuals provide, their terms of reference should be re-evaluated and expanded to include EPI activities.

As supervision and training is an important role for WHO, the vacant CDC-seconded Surveillance Medical Officer post should be filled immediately. This position would provide critical and timely supervision of the national and provincial surveillance officers and support the extensive training needs of the country.

Suggestions for improving coordination and support from WHO-Indonesia

- realign coverage of the country to parallel immunization and surveillance sub-directorates
- increase support to provinces by decentralizing posting of national surveillance officers and expanding their responsibilities to include both immunization and surveillance
- expand the role of provincial surveillance officers to include EPI in addition to AFP and measles surveillance activities
- fill vacant surveillance medical officer position to increase supervision and meet training needs.

Annex 1

Deployment of review teams and areas visited

Table 5: Joint review team

International Reviewer	Partner Agency	National Reviewer	Province
Ms Claire Chauvin	WHO/HQ	Dr E.S. Herini, SpAK	Jakarta/Central
Dr Patrick O'Connor	WHO/SEARO	Ms Olivia E Simbolon, MKes	Banten/Central
Dr Sunil Bahl	WHO/India	Dr Isman Ramadi	East Nusa Tenggara
Dr Yogesh Choudhri	WHO/SEARO	Dr Triyunis Miko, MPH	South Sumatra
Dr Madhav Ram	WHO/SEARO	Drs Sukardi Pangide	Aceh
Dr Vibhour Jain	WHO/India	Mr Handoko, SKM	Riau
Dr Ravendra Banpel	WHO/India	Prof Ismoediyanto, SpAK	West Kalimantan
Dr Mainul Hasan	WHO/Bangladesh	MR Sudjono, SKM	South Sulawesi
Dr Ohn Kyaw	MOH/Myanmar	Dr M. Nadhirin	West Java
Dr U Win Htin	MOH/Myanmar	Ms Ramah Surbakti, SKp	East Kalimantan
Dr Ravendra Karna	WHO/Nepal	Dr Aida Fatmi	Lampung
Dr Piyanit Tharmaphornpilas	MOH/Thailand	Mr Rizal Kosim, SKM	West Nusa Tenggara
Dr Ondrej Mach	CDC-Atlanta	Mr Jonny Hutahayan, SKM	West Papua
Dr Abhijeet Anand	CDC-Atlanta	Dr Mujiani, SpAk	North Sulawesi
Dr Vinod Bura	UNICEF	Dr Eko Priyono, MKes	East Java
Dr Nalini Ramamurty	WHO/SEARO	Prof Agus Syarurachman	Polio/Measles Labs
Dr Tapani Hovi	MOH/Finland	Prof Agus Syarurachman	Polio/Measles Labs
<i>International Reviewer was unable to travel.</i>	<i>International Reviewer was unable to travel</i>	Prof Soemarmo and Ms ilik Endahwati, MKes	North Sumatera

Annex 2

Laboratory assessment

Activity 1: As part of the surveillance review, the polio and measles laboratories that support surveillance were reviewed for accreditation.

Indonesia is served by three polio laboratories and four measles laboratories:

- National Institute of Health Research and Development, Jakarta (polio and measles)
- Biofarma Laboratory, Bandung (polio and measles)⁴
- Provincial Public Health Laboratory, Surabaya (polio and measles)
- Provincial Health Laboratory, Yogyakarta (only measles).

The laboratories were reviewed using the standard WHO accreditation check list. All laboratories are performing at very high standards and achieved 100% in the proficiency testing and over 90% during the onsite review of work performance, internal and external quality assurance and management practices. Details of the findings, technical guidance and recommendations for improvement are elaborated in Table 6 and 7.

Salient findings:

- the polio and measles laboratories are accredited
- Bandung National Polio Laboratory has successfully implemented the new real time PCR methodology for intratypic differentiation of poliovirus for which training was provided in March 2008
- the measles laboratories have adequate capacity to handle the increased workload for serology and virus isolation as a consequence of implementation case based surveillance

⁴ The laboratory serves as a reference laboratory for Intratypic differentiation (ITD) of virus isolates for the three polio laboratories in the country

- surveillance medical officers are encouraged to collect samples for virus isolation and genotyping measles and rubella viruses in order to build the country's data base of indigenous circulating genotypes to analyze any importation when measles control is achieved.

Main challenges identified:

- referral of poliovirus isolated to regional global specialized laboratory in Mumbai, India for sequencing and resolving discordant viruses that could probably be vaccine-derived poliovirus (VDPV)
- referral of measles and rubella virus to the regional reference laboratory in Bangkok, Thailand for genotyping
- linking the measles laboratory and surveillance data has to be addressed by the surveillance unit.

Activity 2: At the request of the government to establish sequencing capacity in the country, assessment of the national laboratories at Jakarta and Bandung was undertaken along with Dr. Tapani Hovi, consultant from the Research Institute in Finland. Assessment was made based on a prepared questionnaire covering the infrastructure (space), availability of equipment, capacity and training.

Findings: Both laboratories fulfill most of the criteria for undertaking sequencing and require specific training. The Bandung laboratory is better suited for sequencing as it already is an accredited laboratory for ITD which is a prerequisite for sequencing. However, the government will need to make the final decision.

Table 6: Polio laboratories accreditation status, Indonesia 2009

Accreditation criteria (Target)	Bandung (ITD)	Jakarta	Surabaya
Number of samples for virus isolation (150)	925	1462	992
Timeliness of reporting primary virus isolation results within 14 days (80%)	98.7%	99%	100%
Timeliness of referring isolates for ITD within 7 days (80%)	N/A	100%	100%
Timeliness of referring wild and suspected VDPV for sequencing within 7 days (80%)	0%	0%	0%

Accreditation criteria (Target)	Bandung (ITD)	Jakarta	Surabaya
Virus isolation proficiency test score (90%)	100%	100%	100%
ITD Proficiency test score (90%)	100%	N/A	N/A
Accuracy of virus isolation (90%)	100%	100%	100%
Onsite review scores (80% NPL, 90% ITD)	99.5%	97%	96%

Table 7: Measles laboratories accreditation status, Indonesia 2009

Accreditation criteria (Target)	Bandung (Isolation and serology)	Jakarta (Isolation and serology)	Surabaya (Isolation and serology)	Yogyakarta (Serology)
Number of samples for serology (50%)	155	811	303	1157
Timeliness of reporting measles IgM results within 7 days (80%)	72.9%	46%	61%	69.8%
Measles Proficiency test score (90%)	100%	100%	100%	100%
Rubella Proficiency test score (90%)	100%	100%	100%	100%
Accuracy of measles and rubella IgM detection (90%)	Not referred	97%	Pending	Pending
Virus detection and genotypic results are completed within 2 months of receipt of samples (80%)	No	No	No	Not done
Onsite review score (80%)	93%	93.5%	94.5%	93%

WHO assists Member states of the South-East Asia Region to periodically review their surveillance systems and national immunization programmes. These reviews provide an insight into the programme strengths and limitations. Additionally, WHO encourages countries to identify strategies to harness strengths and utilize the available resources to improve the quality of surveillance and immunization. In October 2009, national and international experts reviewed the Expanded Programme on Immunization (EPI) of Indonesia and also the surveillance system that was in place for detecting vaccine preventable diseases

This report summarizes the progress made in vaccine preventable disease surveillance, immunization service delivery and coverage, injection safety, vaccine supply, cold chain management, and advocacy and communications. It also provides recommendations for the consideration of the Government of Indonesia and development partners in their efforts to achieve the national goals for immunization.



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