

National EPI Review Report

Vietnam

30 March to 10 April 2009



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Acronyms

AEFI	Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
BCG	Bacillus of Calmette and Guerin
CBAW	Child Bearing Aged Women
CDC	Centers for Disease Control
CES	Coverage Evaluation Survey
CHC	Commune Health Center
CHW	Community Health Worker
CIF	Case Investigation Form
CRS	Congenital Rubella Syndrome
cMYP	Comprehensive Multi Year Plan
DTP	Diphtheria, Tetanus and Pertussis
Dt	Diphtheria Tetanus vaccine
EPI	Expanded Programme on Immunization
FIC	Fully Immunized Child
GAVI	Global Alliance for Vaccines and Immunization
IEC	Information, Education, Communication
HSS	Health Systems Strengthening
Hep B	Hepatitis B
Hib	Haemophilus Influenzae type B
ICC	Immunization Coordination Committee
JE	Japanese Encephalitis
JICA	Japan International Cooperation Agency
JRF	WHO/UNICEF Joint Reporting Form
MCV1	Measles Containing Vaccine, 1 st dose
MCV2	Measles Containing Vaccine, 2 nd dose
MMR	Measles Mumps Rubella
MR	Measles Rubella
MoH	Ministry of Health
MNTE	Maternal Neonatal Tetanus Elimination
NID	National Immunization Day
NIHE	National Institute of Hygiene and Epidemiology
OPV	Oral Polio Vaccine
PMC	Preventive Medicine Center
PW	Pregnant Women
SIA	Supplementary Immunization Activities
TBA	Traditional Birth Attendant
TT	Tetanus Toxoid
TTCV	Tetanus Toxoid Containing Vaccine
UNICEF	United Nations Children's Fund
VHW	Village Health Worker
VPD	Vaccine Preventable Diseases
VVM	Vaccine Vial Monitor
WHO	World Health Organization
WPRO	Western Pacific Regional Office, WHO

1. Executive Summary

Introduction: In order to identify progress achieved in Vietnam's national Expanded Programme on Immunization (EPI) since its evaluation in 2003, a comprehensive review of EPI was conducted 30 March to 10 April 2009. The key objectives of the 2009 EPI review were to assess the following:

- Status of management practices, including the EPI reporting system, disease surveillance, training and supervision, and provision of EPI services through hospitals and the private sector.
- Status of the implementation of safe injection and surveillance of AEFI, performance of the cold chain system and management of vaccines in the EPI

An immunization coverage survey was conducted in the same six provinces as the EPI review during the period 6-17 April 2009, and the complete findings are summarized in a separate report. Overall, the immunization coverage survey demonstrated very high levels of coverage for all vaccines except the Hepatitis B birth dose within 24 hours of birth, with slight delays in fully immunizing children by twelve months of age.

Methods: There were two main sources of information for this programme review:

(1) A literature review was conducted covering national health planning and program information including WHO/UNICEF Joint Reporting Forms 1998 to 2008, the comprehensive multi-year plan (2006 - 2010) the previous EPI review (2004) and recent GAVI applications and progress reports.

(2) A programme survey was conducted from data collected in six randomly selected provinces from the Northern mountains, Northern Delta, Central Highlands and South East. Six interview teams visited the provinces of Lao Cai, Ninh Binh, Khanh Hoa, Dac Nong, Lam Dong and Ben Tre. In total, the teams surveyed six Provincial Preventive Medicine Centers and six Provincial Hospitals, 12 District Preventive Medicine Centers and 12 District Hospitals, and 24 CHCs.

Standard questionnaires were designed and field-tested for each level (Province, District, Commune) prior to the review. The programme components assessed included immunization services; immunization information; vaccine management and cold chain; information, education and communication; immunization management; and immunization safety and adverse events following immunization. The questionnaires included evaluation of data quality and observational analysis. Key recommendations and findings were presented to the National Institute of Hygiene and Epidemiology and other Government stakeholders (Department of Preventive Medicine, Department of Planning) at a national debrief on 10 April 2009.

Main Findings of EPI Review: In 2008, > 95% coverage was achieved for 5 antigens nationally: BCG, Polio, measles first and second doses and DTP. AEFI episodes in 2006 and 2007 resulted in a decline in hepatitis B birth dose coverage in 2007 and 2008. The developments in the private sector and increasing social mobility (internal migration) are making it more difficult to track and monitor immunization records, AEFI and quality of services nationally. The trend towards health system strengthening in development assistance is presenting new challenges for the program in terms of linking to national human resource, planning and financing strategies. The planned 2010 introduction of *Haemophilus influenzae* type B vaccine into the routine schedule will require significant management effort. Finally, the development of the private sector, the impact of

adverse events following immunization will present ongoing risks to the sustainable financing and quality assurance of the national program (see Figure 1 for outline of main challenges)

In terms of *immunization services*, there is high coverage performance for all antigens for 2006-2008 in the reviewed provinces except for Hepatitis B vaccine birth dose. In some districts the temporary decrease in coverage of Hepatitis B third dose was observed (mainly in 2007) and some places achieved less than 80% coverage for two or more doses of tetanus toxoid (TT2+) in pregnant women (PW) and/or women of child bearing age (CBAW). The drop-out rates are generally less than ten percent. Reviewers observed the fundamental strengths of the immunization delivery system in rural areas, and in particular the strong social and health care networks established between village health workers and commune health staff. The implementation of the school-based measles second dose program also testifies to the strength of local area institutional and social networks in facilitating access of the population to health care services.

In terms of *immunization information*, reviewers observed in all six provinces the high quality and consistency of immunization reporting and accuracy of routine information and surveillance data. Although passive surveillance reporting systems are functioning well, there is concern that active surveillance in hospitals and communities may be limited by shortages of human resources and finance for operations.

Figure 1 EPI Challenges through 2015

- Maintaining high *immunization coverage* (especially in hard to reach areas)
- Maintaining *disease eradication and elimination goals for polio and maternal and neonatal tetanus* and achieving *measles elimination* by 2010 and *Hepatitis B control* by 2012
- Responding effectively to *adverse events following immunization*
- Introducing and expanding *new and underutilized vaccines* (Hib, typhoid, JE vaccines)
- In an era of *private sector* development, maintaining quality standards in both public (including non EPI vaccines) and private sectors, particularly in relation to vaccine management and AEFI
- Further developing *surveillance systems* in order to improve case response and validate elimination goals, and assess the impact of other vaccine preventable diseases (meningo-encephalitis, rotavirus)
- Strengthen collaboration between preventive and *hospital sectors*, especially for surveillance and immunization services (in particular Hepatitis b birth dose)
- Securing current and mobilizing new *finance* to cover increasing costs of operational costs and new vaccine introduction
- Building capacity and mobilizing resources to motivate the *health workforce* especially in remote areas
- Building links with *health systems* planning in order to sustain operational finance and human resource capacity in rural and remote areas

The provinces maintain a high standard of quality for *vaccine management and cold chain*. Adequate cold chain capacity, consistent electricity supply, temperature monitoring and forecasting methods were observed in all review provinces. A national vaccine stock out of measles vaccine in 2007 resulted in both national and provincial coverage drops in 2008. This being the case, it may be important to consider and review vaccine distribution from regional to provincial stores and consider the feasibility (logistics, capacity) of quarterly instead of bi-monthly supply intervals. Vaccine wastage monitoring could also be strengthened at all levels. The trend towards private sector immunization and non EPI vaccination by public sector workers

highlights the need to develop a more comprehensive vaccine management strategy for the country to prevent negative consequences on the EPI programme (e.g., potential AEFIs).

As noted above, the active collaboration among the community, village health workers and the commune health centers illustrates the effectiveness of the **information, education and communication strategy** in maintaining very high levels of immunization coverage in Vietnam. However, the impact of the mass media reported AEFI on Hepatitis B birth dose coverage demonstrates the need to develop an effective public marketing strategy for the safety and effectiveness of immunization in Vietnam. In response to the AEFIs in 2006 and 2007, most provincial staff undertook injection safety training in 2008, which is commendable. However, it is still noted that many of the health staff and parents remain very concerned about the potential side effects of Hepatitis B birth dose vaccination. This highlights the ongoing need for an effective communication strategy for immunization and a rapid response to adverse events following immunization.

In terms of **immunization management**, reviewers observed an overall high level of motivation and quality among the health workforce, but limitations in human resources are constraining performance in some areas, particularly active surveillance. There are also limitations to operational finances (e.g., transport), although it was observed by all reviewers that the incentive payment to fully immunize children was reaching all of the communes. The consistency in recommendations between the reviews conducted in 2003 and 2009 in relation to human resources and health financing highlights the ongoing need for dialogue and collaboration between the national health system and national health program planners

Nevertheless, reviewers observed a notable level of integration between EPI and other health care service programs. The strategy of “immunization days” at CHCs across the country ensures that the population can access a range of services during an immunization session. It was very rare to find any staff at the province, district or commune level that devoted 100% of his/her time to EPI. The implementation of EPI outreach “posts” in more remote locations also illustrates the potential for EPI to contribute to health system strengthening by facilitating delivery of services to hard-to-reach areas of the country. Strengthening the collaboration between the EPI program and the Department of Planning at national level in the implementation and evaluation of the GAVI health system strengthening initiative could be an important way to respond the changing health environment.

In conclusion, since its introduction in 1981, the EPI program in Vietnam has demonstrated outstanding public health impact. However, new challenges are emerging for the successful implementation of the program. Nevertheless, this review has concluded that the Vietnam EPI program is well-positioned to meet these challenges between 2010 and 2015. The fundamental structure of the program and national health system is built on a firm foundation of local health care networks and fixed immunization days at facilities with high demand and coverage. Vietnam can sustain program success provided sufficient national investment is undertaken in the financing of basic health service operations and health workforce development in rural areas. There also needs to be appropriate regulation of the private sector and administration of non-EPI vaccines through the public sector. Finally, the expanse and quality of disease surveillance systems and communication strategies could be improved in coming years to meet the challenges of attaining and verifying disease elimination and control goals

Key Recommendations

A summary of key recommendations as presented to the National Institute of Hygiene and Epidemiology and Government counterparts at the National debrief on 10 April 2009 are listed below. Full recommendations can be found in the body of the EPI Review report.

Immunization Services

1. Review the *national immunization schedule* to optimize for:
 - a. delivery of second dose measles vaccine
 - b. future accelerated rubella control
 - c. tetanus vaccination to protect all persons throughout life (expansion of childhood and/or adolescent booster doses)
 - d. protection against diphtheria and pertussis (DTP, DT, Td booster doses)
 - e. introduction of new vaccines
2. Identify future opportunities for *collaboration with the evolving private sector* (e.g. vaccination and reporting, disease surveillance)
3. *Assess the management of non-EPI vaccines* in view of the risk of AEFI and inadequate quality assurance
4. Facilitate the timely and quality delivery of the Hepatitis B birth dose (<24 hours after birth) with following:
 - a. Standard operating procedures for hospitals
 - b. Regular training of EPI hospital staff and EPI teachers in medical schools and secondary medical schools
 - c. Careful review of contra-indications established at hospitals
 - d. Regular meetings between EPI and hospital staff on problems and issues
 - e. Provision of vaccine carriers/refrigerators to hospitals
 - f. Education to mothers prior to delivery

Immunization Information

1. Provide line item budgets at provincial and district level for *surveillance of vaccine preventable diseases* that cover travel for case investigations, additional case finding and specimen transport costs; supervisory activities should also be funded
2. *Conduct training for surveillance and monitoring* using standard lesson plans and materials that address:
 - a. standard case definitions and key surveillance performance indicators;
 - b. data reporting, target estimation, descriptive epidemiological analysis
3. *Improve active surveillance* by conducting more frequent visits and more extensive record reviews
4. *Improve collaboration with Hospitals and private sector* through training and exchange of timely laboratory results
5. Consider revising measles surveillance case definition for suspected measles to “fever and rash”
6. Consider revising suspected measles case investigation forms to include pertinent *rubella* data (e.g., pregnancy, estimated delivery date, etc.)
7. Ensure *follow-up of pregnant women* infected with rubella to determine the outcome of the pregnancy and limit further transmission of rubella
8. *Consider establishing CRS surveillance* in selected sentinel sites (may first conduct pilot study in one site)

9. *Standardize regular supportive supervision* at each level should by using comprehensive checklists to monitor EPI performance and to identify cases of EPI diseases
 - a. Jointly planned with supervised staff
 - b. Agreement on findings and follow-up actions (defined responsibilities and time frames)
10. *Determine district (and commune) estimates of coverage*, drop out rates and timeliness of vaccination through regular reviews EPI registration book
11. *Monitor the completeness and timeliness* of immunization and surveillance reporting at each level

Vaccine Management and Cold Chain

1. Encourage provinces, districts and communes to *calculate, monitor and report wastage* on a monthly basis.
2. Evaluate 'real' wastage against current pre-defined wastage factors used in forecasting
3. Encourage health workers not to miss an opportunity to vaccinate any target child or woman
4. Begin exploring with local vaccine manufacturers and stakeholders the feasibility and relevance of:
 - a. VVM application on vaccine vials (beyond Polyvac measles)
 - b. supplying lower dose-per-vial presentations of certain vaccines, and specifically Hepatitis B into mono-dose vials
5. In collaboration with Ministry of Health, *assess vaccine management practices of non EPI vaccines* and develop coordinated strategy for advising on proper vaccine management of all vaccines
6. Coordinate with Ministry of Health to ensure *vaccine storage recommendations* are in accordance with NIHE recommendations (Regulation #23)
7. Strengthen cold chain management and temperature monitoring at hospital facilities. Include *hospital staff in EPI staff trainings on vaccine management*.
8. Develop a *national cold chain rehabilitation plan* and overall maintenance and repair strategy to ensure reliability of the system
9. Provide a sufficient *budget to all CHCs for fuel/transport to pick up vaccines* at the district level

Information, Education and Communication

1. Promote *annual planning for specific IEC activities* at all levels, with adequate funding for implementation
2. Intensify current efforts to use community groups (e.g., youth, teachers and farmers) for promoting routine immunization, as well as campaign activities
3. Devise specific IEC strategies to reach hard-to-reach populations or ethnic communities to encourage completing immunization schedules
4. Develop the social mobilization skills of Village Health Workers and sustain incentives for their contributions
5. Provide health workers and parents with accurate information on potential reactions to immunization (revised EPI card)

Immunization Management

1. Develop and implement a *comprehensive human resource strategy* increase staff retention (at all levels)
2. *Strengthen supportive supervision* to include on the job training in order to transfer needed skills and practice to lower levels of the system

3. *Continue periodic refresher training* but expand training base (hospitals and more CHWs)
4. Enforce a *policy of regular supervisory visits* which is adequately funded
5. Strengthen commune and district level involvement in the *provincial annual EPI planning process*
6. Provide guidance and/or training to districts and communes on *key components of micro-planning for the hard to reach populations*
7. Provincial and District PMC to advocate for *additional resources to cover for operational expenses* (transport, supervision, surveillance etc) – particularly in the higher income rich provinces
8. Advocate to the People’s Committee for more *sub-national funding for EPI*
9. Establish closer linkages between the *GAVI HSS* program and EPI/NIHE, to ensure that HSS strategies contribute to sustainable improvements in EPI, particularly in hard to reach areas. Strategies that could be considered include:
 - a. Involvement of ICC in monitoring of the HSS program
 - b. Collaboration of EPI/NIHE with HSS Project in the design and implementation of joint surveys, monitoring and DQS activities in the 10 HSS Provinces

Immunization Safety and AEFI

1. *Prevent needle stick injuries* amongst vaccinators as an occupational hazard by explicitly addressing the issue in training materials to raise awareness
2. *Disseminate a clear written policy on proper waste disposal* as appropriate for different settings
3. In coordination with the Department of Therapy, *streamline EPI waste management policies* at CHCs with that of curative services
4. Establish a *public relations strategy on AEFI* through mass media, etc. Develop a clear response strategy to protect vaccinators against false claims of AEFIs and disperse fear amongst immunization providers
5. Develop terms of reference and establish *Provincial Scientific Committees* across the country, as articulated in Ministry of Health Regulation #23.
6. To identify and strengthen terms of reference (TOR) for a *National Immunization Technical Advisory Group*

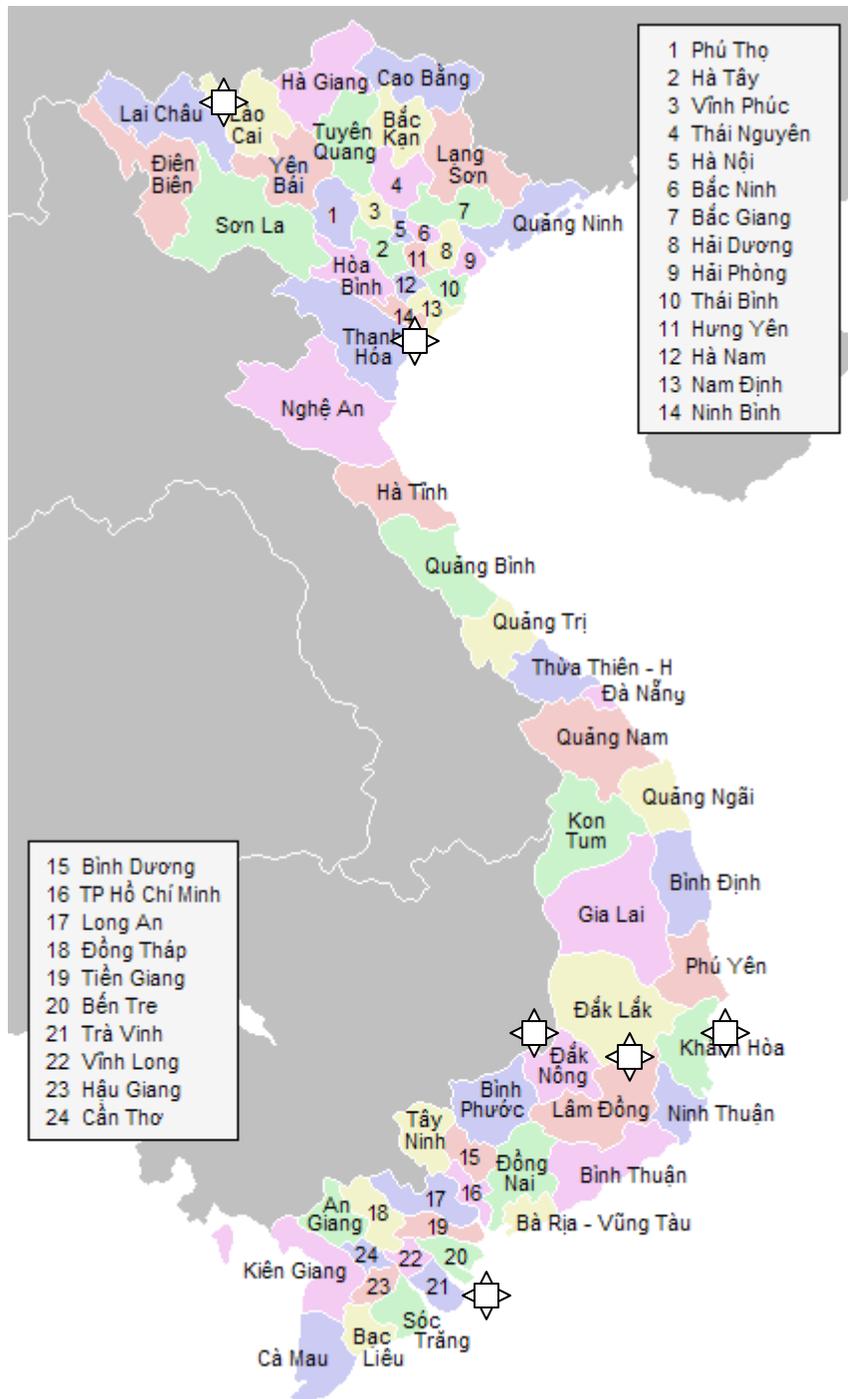


Figure 2 Map of Study Areas

Province	Population	< 1 Year	PW	CBAW
Lao Cai	612,664	13,453	12,694	8,091
Ninh Binh	942,487	14,159	14,364	14,312
Khanh Hoa	1,142,521	20,934	21,037	10,093
Dac Nong	522,048	11,906	11,946	14,326
Lam Dong	1,185,850	24,212	23,074	ND
Ben Tre	1,379,057	18,736	18,736	193,068

2. Background

A comprehensive review of Vietnam's national Expanded Programme on Immunization (EPI) was conducted 30 March to 10 April 2009. Six field investigation teams visited six provinces, with each team consisting of one to two international experts and two national and/or regional EPI staff. The study provinces are illustrated in Figure 2.

Each team visited the Provincial Preventive Medicine Center, two District Preventive Medicine Centers and four Commune Health Centers (CHC). Where possible the Provincial and District Hospitals were also visited. In total, visits were conducted at six Provincial Preventive Medicine Centers and six Provincial Hospitals, 12 District Preventive Medicine Centers and 12 District Hospitals, and 24 CHCs.

An immunization coverage survey was conducted in the same six provinces as the EPI review during the period 6-17 April 2009, and the complete findings are summarized in a separate report. Overall, the immunization coverage survey demonstrated very high levels of coverage for all vaccines except the Hepatitis B birth dose within 24 hours of birth, with slight delays in fully immunizing children by twelve months of age.

3. Objectives

The key objectives of the 2009 EPI review were to assess the following:

- Status of management practices, including the EPI reporting system, disease surveillance, training, supervision, & provision of EPI services through hospitals & the private sector.
- Status of the implementation of safe injection and surveillance of AEFI, performance of the cold chain system and management of vaccines in the EPI
- National EPI health policy and planning development and links to health system strengthening.

4. Methodology

Sampling and Data Collection Instruments

Figure 3 Province Level Review Questionnaire Contents

PROVINCE LEVEL REVIEW CONTENTS
Background Data
Immunization Services
Planning and Financing
Disease Surveillance
Reporting and DQA
Monitoring and Supervision
Immunization Safety (including AEFI)
Vaccine management (including vaccine wastage)
Cold chain management and Transport Logistics
Human Resources (including training)
Advocacy and communications
General impressions
Data quality at district level
District Cold Store Observations
Checklists for Refrigerators
In General for The Cold Stores:
District Hospital Observations/Questionnaire

Sample selection was executed according to the following procedure:

- In each province, districts were categorized and listed as easily accessible or remote, or alternatively, "well" or "poor" performing. Two districts were selected at random from these two categories in each selected province.
- In each district, communes were randomly selected by a set of interested criteria. Criteria to be used for selecting CHCs included accessibility, drop-out rate, coverage

rates, or the number of vaccine preventable diseases reported within the last three years. Alternatively, if the district officer in charge could categorise CHCs as “well” or “poor” performing facilities, this stratification was used. Two communes were then selected at random.

At the provincial, district and commune levels, surveyors utilized pre-tested questionnaire forms for the survey. A list of topic areas in the survey is included in Figure 3 (in this case Provincial level). The survey questionnaires were executed with EPI managers at Provincial and District Preventive Medicine Centers and with Commune Health Staff. Site visits were also conducted to cold rooms for vaccine and to provincial and District Hospitals (particularly in order to assess hepatitis B Birth dose introduction). National and Provincial EPI plans and documentation was also reviewed, and assessments of data quality also undertaken. Furthermore, two home visits were undertaken in each commune to assess parental participation in immunization, along with brief interviews of members of the Peoples’ Committee at the commune level.

Figure 4 Checking the BCG scar during household check – Khanh Hoa Province



Limitations of Review Methods

There were two important limitations of this study.

Firstly, in one Province, (Dac Nong) the full application of the random sampling selection for the districts could not be applied. The first district that was randomly selected was rejected on logistical grounds (would have involved travel time beyond the schedule of the survey). Secondly, due to the fact that the immunization delivery system is scheduled to one or two days per month, actual immunization sessions could not be observed consistently in all the Provinces.

Despite these limitations, the teams were otherwise able to gain free and full access to hospitals, commune health centers and family homes in the six provinces involved in the review.

5. National Policy and Planning Context – the EPI Program in Vietnam

Introduction

This section provides a background to the history and structure of the EPI program in Vietnam, and a description of the national context for assessment of EPI performance. Specific technical and management issues as identified in the management survey at sub national level are discussed in more detail in section 5.

Social and Health System Background

Vietnam (population 86 million) is bordered by China to the North and Cambodia and Laos to the East. There are 64 provinces and four regions (Northern, Central, Highlands and Southern Regions). Vietnam has enjoyed significant economic expansion in recent years, with up to 7% annual growth in GDP rates. Vietnam is ranked 105 on the Human Development Index with a life expectancy of 74 years. Under-five mortality rate is 19 per 1000 live births (UNDP 2008). For most development indicators including education enrollment, literacy, life expectancy and population malnourished, Vietnam compares very favorably with other countries of the region.

Table 1 Basic Demographic and Economic Data Vietnam

Population (UNDP 2008)	83,119,900	GDP per capita (UNDP)	\$3071 USD
Surviving Infants (WHO/UNICEF JRF 2007)	1,492,461	Infant mortality rate (UNDP 2008)	15/1,000
Percentage of GDP allocated to health (WHO 2007)	2.29%	Percentage of Government expenditure on Health (WHO 2007)	5.74%

The health system in Vietnam is a publicly funded system with an emerging social health insurance system and developing private medical care sector. The health care system consists of four levels -

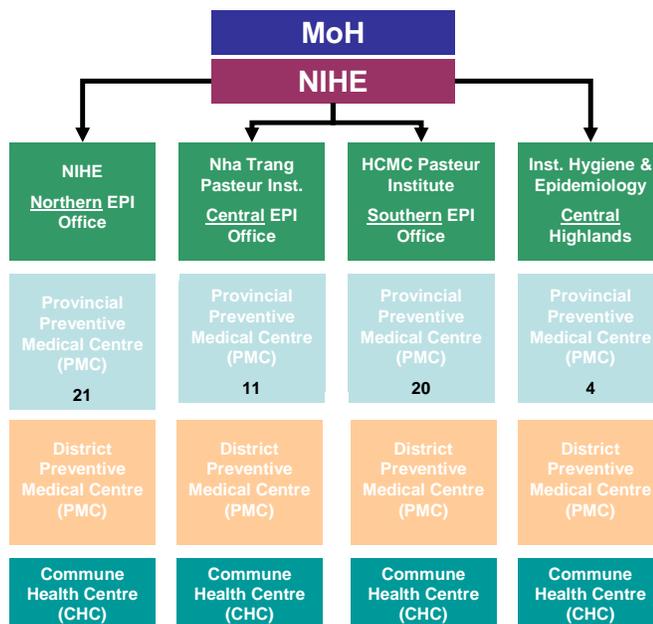
1. At the primary level of care, there are commune health centers and health posts.
2. The first referral level includes the District Hospital.
3. The Province level includes the Provincial Hospital, the Provincial Medicine Center (which coordinates preventive health programs including EPI services in the province).
4. Central Level General and Specialized hospitals.

The Preventive Care system consists of institutes – these include 5 Central institutes and 6 Regional institutes. The Provincial level consists of 64 Preventive Medicine Centers. District level consists of Hygiene and Epidemic Control teams and other Health Prevention teams. The

Commune Health Centers (CHCs) implement all preventive programs at the commune level. (National Health Master Plan 2006).

The National Health Master Plan (2005 - 2010) identifies major health system barriers in the areas of human resourcing and health financing. The health sector suffers from chronic understaffing and often a poor staff mix. Low salaries and poor incentives are stated to impact on the efficiency of the performance of the health workforce (National Health Plan, Page 12). The Plan indicates however that 100% of communes are staffed with health workers, 65% of CHCs have a doctor and 80% of villagers have active community health workers (CHWs) (National Health Plan, Page 13). State budget allocations for the health sector are very limited, as are sources of financing through health insurance and user fees.

Figure 5 Structure of EPI System in Vietnam



Immunization Background

Major milestones in the history of the National EPI program include the following:

- In 1981 - commencement of the national EPI program in 1981
- In 1991 - provision of tetanus vaccine to pregnant women
- In 1997 - commenced local vaccine production with 9 out of 10 EPI vaccines by 2008
- In 1997 - introduction of Hepatitis B, cholera, typhoid and JE vaccines in high risk areas
- In 2000 - certification of polio elimination status
- In 2001 - introduction of measles case-based surveillance system
- In 2003 - introduction of hepatitis B vaccine nationwide with GAVI support
- In 2003 - introduction of auto-disable (AD) syringes
- In 2004 - 217 measles cases, reduced from 86,901 in 1980
- In 2005 - achievement and validation of elimination of maternal and neo natal tetanus
- In 2007 - commencement of school-based immunization of measles 2nd dose
- In 2008 - establishment of Adverse Events Following Immunization (AEFI) system

- In 2008 - proposed introduction of Hib vaccine (pentavalent) with GAVI support
- In 2010 - target for nation wide JE vaccine expansion
- In 2010 - target of measles elimination
- In 2012 - target for hepatitis B Control

Key national EPI Goals up to 2012, (see costed Multi-Year Plan) include the following:

- At least 90% of children fully immunized
- Maintaining polio-free status
- Maintaining maternal and neonatal tetanus elimination
- Achieving measles elimination by 2010
- Achieving hepatitis B control by 2012
- Introducing new vaccines as appropriate

Immunization services are provided in Vietnam through the lowest level of the health system which is the Commune Health Center, usually staffed by four commune health staff. The commune level links to communities through a network system of Community Health Workers (CHWs) who are responsible for social mobilization and community-based surveillance. The vast majority of vaccinations in Vietnam are provided through fixed immunization days at CHCs, typically one to two days per month. Additional outreach posts and mobile services are provided in more remote locations. More recently, hospital services in Provinces and Districts have commenced hospital-based immunization services for Hepatitis B Birth Dose and BCG vaccine.

At Province and District level in some locations, public sector staff provides a service of “Non-EPI” vaccines (i.e. vaccines outside the current immunization schedule) on a fee-for-service basis. This may include vaccines such as varicella, measles-mumps-rubella (MMR), Haemophilus influenzae b (Hib), or rabies. Reference to these Non-EPI vaccines is made periodically throughout the report.

Also, *private sector vaccinations* services have started to expand particularly in the major cities of Hanoi and Ho Chi Minh City, although the scope of this private sector activity remains undetermined. Management, technical and logistical support is provided through the Provincial Preventive Medicine Centers (PMCs) to the Commune Health centers. The PMC is technically and logistically supported by Regional Institutes and by the central EPI team at the National Institute of Hygiene and Epidemiology in Hanoi.

Immunization Schedule

There are currently 9 vaccines on the immunization schedule (excluding Vitamin A), some of which are administered nationally and others which are administered in high risk areas. The current schedule is outlined in the table below.

Table 2 National Immunization Schedule

Vaccine	Target	No. of doses	Location
BCG	birth	1	nationwide
DTwP	2, 3, 4 months	3	nationwide
HepB	Birth, 2, 4 months	3	nationwide
OPV	2, 3, 4 months	3	nationwide
Measles	9 months, 6 years	2	nationwide
TT	pregnant women	2	nationwide
TT	CBAW 15-35	3	high risk areas
Cholera	2-5 years	2	high risk areas
JE	1-5 years	3	high risk areas
Typhoid	3-10 years	1	high risk areas

Consideration is currently being given to the following schedule changes:

- Shifting measles 2nd dose from school-age (currently 6-7 years) to 18 months
- Introduction of Hib vaccine in DTP-HepB+Hib presentation (2009 or 2010)
- Booster of tetanus-toxoid containing vaccine at school-entry

Immunization Coverage

In Vietnam, there were sharp increases in routine coverage between 1986 and 1990, resulting in associated sharp declines in reportable vaccine preventable diseases (see following Disease Control and Elimination section).

In 2002, there was a sharp decline in DTP3 vaccine coverage to 74.8% from the previous year's 96.2% -- associated with a national stock-out of this vaccine -- with recovery to 99% the following year. Similarly in 2007, there was a 10% national measles coverage decline from 93% to 83%, also associated with a national stock-out of measles vaccine (related to delays in importation).

The nationwide media coverage of an adverse event following immunization of hepatitis B birth dose in 2007 resulted in sharp declines in coverage of hepatitis birth dose (27% in 2007 declined from 64% in 2006) and the third dose of Hepatitis B vaccine (67% in 2007 declined from 93% in the previous year). A follow-up investigation by a national AEFI Committee concluded that the reported AEFI were not linked to the vaccination but were coincidental deaths or were inconclusive.

Table 3 Immunization Coverage 1986 – 2008¹ (percentages)

Vaccine type	1986	1990	1996	2001	2002	2003	2004	2005	2006	2007	2008
Tuberculosis (BCG)	54.5	89.9	95.4	96.7	96.7	97	96	95	95	94	97
Polio3	44.7	86.5	94.5	96.4	91.6	96	96	94	94	92	96
DTP3	42.6	86.7	94.4	96.2	74.8	99	96	95	94	92	96
Measles 1	38.8	86.6	96	97.6	95.7	93	97	95	93	83	97
Measles 2									98	18	97
TT 2 Plus						91	88	93	91	91	89
Birth Dose Hep B< 24 hrs						55	60	62	64	27	25
Hep B 3						78	94	94	93	67	89

By 2008, both measles second dose and Hepatitis B third dose had recovered to 97% and 89% respectively. However, the Hepatitis B birth dose remains significantly lower at 25%, reflecting persistent nation-wide concerns regarding the safety of the administration of this vaccine within 24 hours of birth. Nonetheless, immunization coverage in Vietnam remains very high and testifies to the strength of the system in reaching the vast majority of the target population.

Disease Control and Elimination

Health information from the year 1980 demonstrates the impact of vaccine preventable diseases (VPDs) on the health of women and children in Vietnam. In 1980, there were over 86,901 measles cases and 96,577 pertussis cases. By 1990, following introduction of the National EPI program in 1981, DTP3 coverage had reached 87% and measles coverage 87%. This had then resulted in a significant public health impact with dramatic reductions in reported cases of VPD.

Polio

Between 1959 and 1960, polio outbreaks in Northern provinces infected 17,000 children and killed over 500. After introduction of the vaccines in the 1960s, incidence declined from 127/100,000 to 3/100,000. The last case of polio was reported in 1997, and polio eradication certification was achieved in 2000. Ongoing goals include providing resources required to maintain high quality surveillance and immunization and to ensure that a current national importation preparedness plan is in place and widely distributed.

Measles

In 1980, 86,901 measles cases were reported (see Table 4). 471 children lost their lives to the disease in 1982.² Following introduction of the routine immunization program in 1981, sharp declines in measles disease were observed between 1986 and 1990. However, despite a measles immunization coverage rate that has surpassed 93% since 1993 with a one-dose schedule, measles outbreaks have continued to occur periodically, with the most significant number of cases during

¹ Data sourced from 2005 EPI Review data subsequent to 2003 sourced from WHO/UNICEF Joint Reporting Forms

² Hien et al. 20 Years of EPI in Vietnam MOH/NIHE Hanoi

the period 1998-2001. In 2001, a WHO-recommended measles case-based surveillance system was introduced. Additionally in 2006, the country introduced the second routine immunization dose of measles vaccines at school entry in 43 out of 64 provinces, with a coverage exceeding 98%.³ Vietnam has set a measles elimination goal for 2010. It is aiming to achieve this by maintaining a high coverage with two routine doses of measles vaccine and supplementary immunization activities in persons or places at increased risk of infection.

Table 4 Number of Vaccine Preventable Diseases 1980 - 2008⁴

	Diphtheria	Measles	Pertussis	Neonatal Tetanus	Rubella
Year	Cases	Cases	Cases	Cases	Cases
1980	1730	86901	96577		
1985	2361	82231	44011		
1990	509	8175	4095	313	
1995	167	6171	2444	330	
1996	143	5156	1537	257	
1997	152	6507	1565	257	
1998	130	11690	1182	266	
1999	81	14134	903	219	
2000	113	16512	1426	142	
2001	133	12058	1242	104	
2002	105	6755	662	95	
2003	105	2297	716	76	
2004	49	217	328	46	
2005	36	410	194	35	3012
2006	25	1978	144	27	3403
2007	32	17	183	36	3530
2008	17	325	280	33	817

Very high coverage was achieved in the supplementary immunization campaigns conducted for measles in 2002 and 2003 targeting 15 million children between 9 months and 10 years.⁵ In 2007, an immunization campaign was carried out in 17 mountainous provinces in the North targeting 6- to 20-year olds (1- to 20-year-olds in five provinces with the highest risk) in response to the 2005 and 2006 outbreaks. In 2008, SIAs were conducted for 7-20 year olds in five provinces of the Central and Highlands regions, reaching 97% of the target population (1,008,325).⁶ However, in October 2008, a large measles outbreak began among university students in Ha Noi and in the first quarter of 2009 spread throughout the country with over 5000 confirmed cases likely. Epidemiologic and laboratory investigations are currently being conducted.

³ Epidemiological impact of a nationwide measles immunization campaign in Viet Nam: a critical review Hitoshi Murakami, Nguyen Van Cuong, Hoang Van Tuan, Katsuyuki Tsukamoto & Do Si Hien Bulletin WHO 2009

⁴ Data sourced from 2005 EPI Review data subsequent to 2003 sourced from WHO/UNICEF Joint Reporting Forms

⁵ MOH/NIHE Multi Year Plan for Immunization 2006 – 2010

⁶ NIHE/MOH Draft JRF Report 2008

Upon completion of the EPI programme review, options for accelerating measles elimination were discussed at the MOH plenary debrief conducted 10 April 2009 and included the following:

- Target high risk groups identified in the 2008-2009 epidemic (e.g., young adults 18-26 years old).
- Change MCV2 schedule to 15-18 months to prevent accumulation of susceptible children (while also providing a platform for DTP4, Vit A, anti-helminthics, etc.)
- Conduct follow-up SIA for children 12-71 months old to ensure a second dose of measles vaccine for those children that would be missed following the change in MCV2 schedule
- Establish a school entry requirement for documented immunization status

Rubella

Rubella outbreaks continue to occur in Vietnam with a majority of cases in adolescents and adults. In 2009, more than 60% of female cases were child-bearing age (i.e., 15-39 years old). Pregnant women continue to be infected. In 2005, during an epidemic year for rubella in Viet Nam, 104 (25%) of 430 pregnant women were infected with rubella in one factory outbreak (very high susceptibility) resulting in several cases of congenital rubella syndrome (CRS) among children born to these infected women. Given the periodicity of rubella epidemics, it is likely that another nation-wide epidemic may occur sometime between 2010 and 2012. The expected CRS attack rates (0.1/1000-4/1000 live births) suggest that approximately 149 CRS cases/year expected during endemic period. WHO/UNICEF Joint Reporting Forms indicate that between 2005 and 2007, more than 3000 cases of rubella have been reported per year, with the number dropping in 2008 to 817 cases (see Table 4).

Upon completion of the EPI programme review, options for accelerating rubella prevention and control were discussed at the MOH plenary debrief conducted 10 April 2009 and included the following:

- Introduction of rubella containing vaccine (RCV) such as measles-rubella or measles-mumps-rubella (MR, MMR) into the routine program
- Use MR during measles SIAs
- MR given with tetanus toxoid (TT) for 15 year old girls
- Include rubella in case-based measles surveillance
- Establish CRS surveillance in sentinel sites

Maternal and Neonatal Tetanus Elimination

In the 1980s, in Vietnam there were approximately ten neonatal deaths due to tetanus per 1000 live births. It is reported that 20 000 Vietnamese babies died annually of tetanus before the age of one month. Since 1991, tetanus vaccine has been routinely given to pregnant women throughout Viet Nam, along with accelerated immunization activities targeting women in high-risk districts of the country and pregnant women since 1993.⁷ WHO validated the elimination of maternal and neonatal tetanus in December 2005. The incidence of neonatal tetanus declined from 27 per 1000 births in 1985 to 0.4 per 1000 births in 2005. Reported cases have declined from 104 in

⁷ UNICEF Press Statement UNICEF, 2006 Accessed on the web 2009 http://www.unicef.org/media/media_31344.html

2001 to 33 in 2008 (refer to Table 5). The current maternal and neonatal tetanus elimination (MNTE) strategy focuses on childhood vaccination, immunization of pregnant women (with two doses of TT), SIAs in high risk areas, vaccination of CBAW high-risk groups and surveillance of neo natal deaths.

Upon completion of the EPI programme review, options for maintaining elimination of maternal and neonatal tetanus were discussed at the MOH plenary debrief conducted 10 April 2009 and included the following:

- Maintenance of a five dose schedule (primary series of 3 doses at <1 year, + booster of tetanus-toxoid containing vaccine (TTCV) ideally at 4-7 years, + booster in adolescence, e.g. at 12-15 years. The exact timing of booster doses is flexible based on contacts with health services.
- With high school enrollment rates, school-based programs should be used for school-age boosters. Special efforts to reach non-school attendees are also needed.
- The option also exists for giving one extra dose of TTCV to adults for assurance of long-lasting, possibly lifelong protection. This 6th dose can be given at first pregnancy or during military service.

Table 5 Neonatal Tetanus Data 2001 – 2008

Neonatal Tetanus Control	2001	2002	2003	2004	2005	2006	2007	2008
TT2 +PW coverage	89%	89%	91%	90%	93%	91%	91%	89%
TT2+CBAW coverage in selected districts	95%	91%	93%	90%	99%	94%	91%	90%
Number of high-risk districts	14	25	28	4	0	0	0	0
Organization of SIA	Y	Y	Y	Y	Y	N	N	N
Cases	104	95	76	46	35	27	26	33

Hepatitis B

A range of studies have demonstrated that Vietnam is highly endemic for hepatitis B transmission, with hepatic B surface antigen positivity ranging from 9.9% in pregnant women (Tran et al 1993) to 9.6% in adults (Hipgrave et al 2003) to 5.4% in 12-18 month old children (Hipgrave et al 1993). The risk of developing chronic infection is associated with the age at acquisition of infection, with highest transmission of chronic disease occurring at the time of birth (90% of those infected during this timeframe develop chronic infection). In 2003, Hepatitis B vaccine was fully integrated into the EPI programme with GAVI support. The HepB third dose coverage increased from less than 20% in 2000 to more than 90% in 2005. Hepatitis B birth dose policy was changed from being provided in the first 3 days of birth to within 24 hours of births, and a coverage rate of 62.2% was achieved in 2005.

In 2006, following reported adverse events following immunization (AEFIs) of Hepatitis B birth dose vaccine in Ho Chi Minh City and Ha Tinh province, the coverage of Hepatitis B birth dose vaccine (< 24 hours after birth) declined sharply from 67% in 2006 to 24% in 2007. In 2008, the figure has continued to decline to 22%. However, Hepatitis B vaccine coverage at third dose has recovered nationally to 89%, suggesting that the initial dose of hepatitis B vaccine is being administered, but beyond the 24-hour period after birth. The current objective is to maintain hepatitis B coverage at more than 95% in all districts in country and increase the timely birth dose coverage to 0% by 2010. This in support of the national and regional hepatitis B control goal of reducing the HBsAg+ rate to 2% in children under the age of 5 by 2012.

Other Vaccine Preventable Diseases

Japanese Encephalitis: Japanese Encephalitis (JE) vaccine was first introduced in year 1997. During last plan, JE vaccination for children under five years of age was expanded from 15% in 2000 to 46.6% of the eligible population in 2005. In the new cMYP, it is proposed to expand JE vaccine to the whole country by 2010. A catch-up campaign for children 2-5 years will be implemented in the areas/provinces where the vaccine will be introduced for the first time. The 2008 WHO/UNICEF Joint Reporting Form records that 91% of the target population was reached with JE vaccination (1,100,568).⁸

Typhoid and Cholera: Vaccination for typhoid (3-10 years) and cholera (2-5 years) was maintained in high-risk areas achieving high coverage in the targeted group. Both vaccines have been provided since 1997. Typhoid vaccine is given in a single dose schedule to school children 3-10y ears old in high-risk areas in a campaign approach. Options that could be considered for typhoid and cholera vaccination include the following:

- Routine immunization in high-risk areas (with clear criteria for definition of high-risk)
- Provision at 2 years and 5 years of age (school entry) in high-risk areas only
- Regular monitoring of coverage and cases reported from these areas (syndromic reporting)
- Need for systematic vaccination of high risk groups such as food handlers
- More systematic impact assessment

Haemophilus Influenza B: (Hib) WHO has recently estimated that almost 1.9% of total under-5 deaths can be attributed to Hib infection (pneumonia and meningitis) in Viet Nam. Hib is estimated to cause 625 cases of meningitis, 107,565 cases of severe pneumonia and 235 cases of non-pneumonia and non-meningitis cases each year in Viet Nam.⁹ 1.9% (890) of total under-5 deaths can be attributed to Hib infection (683 pneumonia and 181 meningitis) 10-25% of Hib meningitis cases can have life-time residual disability. The immunization programme is awaiting regulatory approval to introduce DTP-HepB+Hib pentavalent vaccine in 2009 nationwide.

Rotavirus Vaccine: The vaccine has not as yet been introduced through the public sector in Vietnam. The 2008 JRF reports that there were 12,152 cases of which 18% were tested and 56% tested positive at 3 sentinel sites.

Vaccine Financing

Table 6: Health Expenditures in Vietnam¹⁰

Total Expenditure on Health as a % of GDP	6%
Per Capita Expenditure on Health	\$37 USD
Per Capita Government Expenditure on Health	\$10 USD

National Decree 36, issued in 2005, stipulates the rights of children under six years of age to free health care (therefore being exempted from paying user fees). Consequently, there is no charge for EPI scheduled vaccines in Vietnam. Table 6 provides basic data on health expenditures in

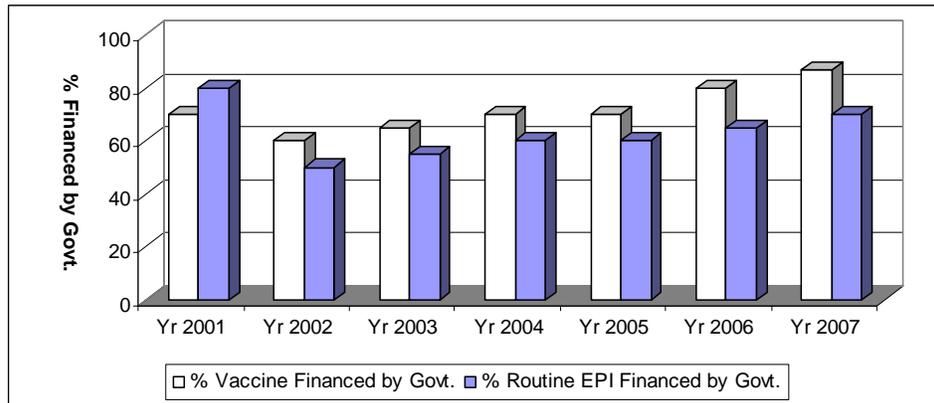
⁸ NIHE/MOH WHO/UNICEF Joint Reporting Form 2008

⁹ NIHE/MOH New Vaccine Application to GAVI 2008

¹⁰ WHO NHA <http://www.who.int/nha/country/en/index.html>

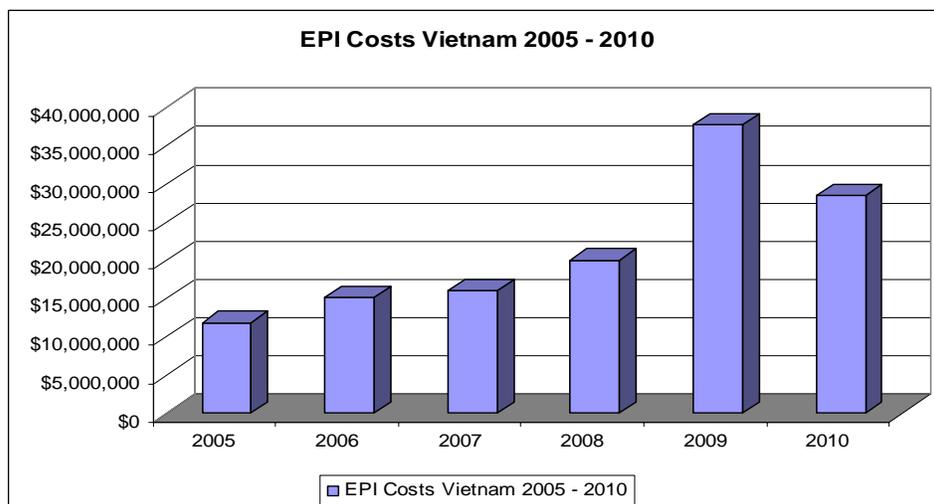
Vietnam. Vietnam has been domestically producing nine out of 10 vaccines currently used in EPI: OPV, BCG, DTP, HepB, JE, Cholera, since 1997 (cMYP). Substantial progress has also been made in terms of domestic measles vaccine production. Completion of this facility will help to achieve self-sufficiency in measles vaccine.

Figure 6 Government of Vietnam Financing of the National EPI Program ¹¹



There is a trend toward increasing financing of the National EPI Budget by the Government of Vietnam (see Figure 6). In 2008, 88% of vaccine financing was provided by the Government of Vietnam (\$4.2 M out of a total of \$ 4.7 M), and 70% of all routine immunization financing (\$7.4 M out of a total of \$10.5 M) (JRF 2008). As from 2009, this percentage of Government contribution may decline, as the new pentavalent vaccine will be financed by GAVI with a 30% Government of Vietnam co-financing. This results in a sharp increase in the EPI budget nationally, with annual costs increasing from \$20.1 M in 2008 to \$37.8 M in 2009 (see Figure 7).

Figure 7 Vaccine Program Costs 2005 – 2010 (Source - GAVI New Vaccines application 2008)



¹¹ Source JRF Reports 2000 – 2007 Health Financing Data Base WHO
http://www.who.int/immunization_financing/analyses/jrf_analysis/en/index.html

Health System Strengthening

In 2006, a GAVI Health Systems Strengthening (HSS) proposal was approved for three years (September 2007 to December 2010) with the total financial commitment of US\$16.285 million. In the proposal, Vietnam prioritized 10 disadvantaged provinces (population 10 million) with poorer health and socio economic indicators. In the proposal, health system barriers to EPI performance were identified in terms of a chronic lack of adequate funding for the CHCs. In particular, inadequate budgets and supervisory support for village health workers (VHWs) were identified, especially in disadvantaged areas of the country.

The main objectives and activities of the HSS strategy include increasing the number and quality of VHWs and expanding the reach of the commune health centers and strengthening health system management capacity. Main performance measures of the program include maternal and infant mortality, immunization coverage, deliveries by trained staff, & CDC coverage data and utilization rates at commune health centers.¹²

Findings of the 2003 and 2009 EPI reviews are consistent with this analysis of health system barriers. Both reviews highlight human resource and operational finance constraints, particularly in rural and remote locations. This provides a strong rationale for close collaboration between the EPI program and the Department of Planning at central level in order to respond in a coordinated way to these health system barriers and challenges.

In summary, the analysis of the national context highlights the following observations of EPI programming and priorities:

- Immunization coverage remains high and has demonstrated remarkable public health impact since the early 1980s
- Important disease elimination goals have already been achieved (polio and neonatal tetanus) and two more goals are on the immediate horizon (measles elimination and hepatitis B control)
- Immunization schedule options exist in relation to measles and neo natal tetanus
- New vaccines are soon to be introduced (Hib), are being expanded (JE) or are being considered for adoption at a later stage (Rubella and Rotavirus).
- With the introduction of new vaccines that are internationally funded, the financing profile of the EPI program will change, with a greater percentage of immunization programme costs being financed internationally.
- The development and implementation of health system strengthening initiatives will provide increased opportunity for improvements to EPI operations in more disadvantaged provinces.

¹² NIHE/MOH GAVI HSS proposal 2006 www.gavialliance.org

6. Findings Health Management Survey

6a. Immunization Services

Background

For background on the structure and function of immunization services (including immunization coverage nationally and immunization schedule), please refer to section 4 for details.

Main Findings

EPI services: There is a well established service structure in place with skilled and hard working staff; producing generally very high and sustained coverage for the basic routine immunization schedule.

Monthly EPI services are provided by commune health centers (CHC); mostly at fixed points over a one or two day period. Some CHC also conduct outreach activities at vaccination points closer to the community if distances to the CHC are far. Vaccination sessions are typically held during the morning; with community health workers requesting parents to bring eligible children identified in the immunization register as not yet having attended the session to attend later in the day. In some places vaccination sessions are held at times convenient to parents – e.g., from 6:00-8:00 in the morning and 5:30-7:00 in the evening. In some places sessions may be delayed for a few days during the rainy season or special holidays.

In some places EPI services are integrated with vitamin A distribution (e.g. every 6 months) for children and with nutrition services (weighing children at fixed session).

Monthly service delivery appears adequate in view of the staffing situation (limited human resources and all EPI staff having multiple responsibilities) and financial constraints. Parents and women appear to be accustomed to monthly EPI services and community demand remains high; with few exceptions.

It was noted that the People's Committee/Vice-chairperson responsible for health can play an important link between community and health workers to encourage information about and participation in immunization services but this depends on regular interactions and orientations.

Immunization coverage: There is high coverage performance for all antigens for 2006-2008 in the provinces reviewed except for Hepatitis B birth dose. In some places also temporary reduction in the Hepatitis B third dose coverage was observed (mainly in 2007) and some places achieve less than 80% coverage for two or more doses of tetanus toxoid (TT2+) in pregnant women (PW) and or women of child bearing age (CBAW). The drop-out rates are with few exceptions less than 10%. In some cases negative drop-out rates and coverage over 100% were observed; these data quality aspects will be discussed later in the report.

Table 7 Immunization Coverage in the 6 Review Provinces (source of data: health facilities)

Antigen	Dac Nong			Lam Dong			Ben Tre		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
BCG	96	95	98	90	92	95	94	94	101
DTP 1	97	95	98	97	92	102	97	95	105
DTP 3	96	91	95	96	96	101	96	95	99
HepB birth dose	44	16	11	68	25	15	83	28	49
HepB 3	97	75	95	97	62	99	96	62	110
MCV1	97	78	95	99	97	102	96	89	108
MCV2	99	95	97	98	95	97	98	87	ND
FIC	96	78	94	99	94	99	96	87	110
TT2+PW	94	91	91	87	95	94	90	85	88
TT2+ CBAW	91	95	91	92	96	98	68	78	68
Drop-out rate DPT1-3	1.6	4.6	2.9	0	-4	1	1.13	-0.6	3,21

Antigen	Lao Cai			Ninh Binh			Khanh Hoa		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
BCG	102	99	101	100	99	99	98	98	98
DTP 1	99	97	99	100	99	99	98	98	99
DTP 3	101	96	102	99	99	99	98	97	97
HepB birth dose	0.3	1.6	1.4	71	18	22	86	35	56
HepB 3	99	76	116	99	73	0	98	75	97
MCV1	101	95	99	99	79	98	98	90	98
MCV2	99	98	0	99	100	97	98	98	99
FIC	99	97	98	99	95	98	98	90	97
TT2+PW	59	67	76	98	101	99	97	95	100
TT2+ CBAW	100	100	99	91	99	98	98	99	100
Drop-out rate DPT1-3	0.62	0.24	-3.21	1	1	0.26	0.22	0.55	1.85

Hospital EPI services: The system for delivering the Hepatitis B birth dose to those children delivered in hospitals is established. The Hepatitis B birth dose is provided at provincial and district hospitals and at CHCs equipped with refrigerators. Usually, the PMC or district health offices provide vaccine, syringes and safety boxes to the hospitals (but not refrigerators) and train hospital staffs on relevant immunization aspects including AEFI.

In most places CHC staff obtain data on Hepatitis B birth dose immunization either from EPI cards or from hospital immunization records. The exchange is facilitated by regular meetings between EPI and hospital staff. It was reported that in large hospitals with nurses organized in shifts, nurses communicate which newborns need to receive the birth dose when their shifts change. While Hepatitis B birth dose is supposed to be provided to all newborns within 24 hours after birth, strategies at hospitals differ, with some having established a list of contraindications. In Lam Dong province, QuikTests were conducted on all pregnant women to give vaccination priority to those babies of infected mothers.

Non EPI vaccination services: It was widely reported that only limited private sector services exist for EPI vaccines, although the breadth is undetermined. However, among the provinces visited, a large range of non-EPI vaccines is provided *for a fee* by the public sector at provincial, district and sometimes commune level. Availability of vaccine formulations differs greatly in places. The following vaccines were observed to be available, although the list is not exhaustive: Hepatitis A, Hepatitis B (beyond target infants), Hib, influenza, HPV, JE, meningo A+C, mumps, rabies, rubella, TT (beyond targeted women) and varicella.

Figure 8 “Non EPI” immunization (MMR) Bao Loc Lam Dong Province



The provision of these non-EPI vaccines is not linked with the routine EPI programme, although in some places (provincial and district level) non-EPI vaccines were stored in the EPI cold chain. Vaccines often seem to be procured by the provider directly from drug companies and there is no system in place to assure quality control in the various aspects of vaccine management. Nevertheless, fears were expressed that when AEFI occurs for non-EPI vaccines, EPI staff still have to conduct the investigation and address the potentially harmful perceptions resulting from the incidents.

Reporting coverage: The methodology for estimating target populations is not standardized across provinces, districts and CHCs and often the next higher level has difficulties to retrace how the numbers were derived. Some communes may adjust their target population in April (e.g., estimated population is pregnant women for January and February in the upcoming year plus children born March to December from previous year). Other communes use General Statistics Office (GSO) estimates multiplied by the population growth rate. There is also use of denominators as provided by the CHCs or use of denominators based on the ratio of the previous year's newborns/GSO population, applied against the upcoming year's population as provided by GSO.

For coverage achievements, reporting is based on doses administered/estimated population as well as doses administered/reported population. Negative drop-out rates were found in several places and explained by health staff as being due to migrating populations who transited in and out of the province, mainly due to agricultural labour.

It was often observed that the coverage of fully immunized child (FIC) is higher than the coverage for the lowest routine antigen, which is counter-intuitive. For several antigens coverage over 100% is reported, indicating inaccuracy in the target population; another possible reason could be that the numerator is not in accordance with the denominator; e.g. catch-up children or children from other communes are included in the numerator but not reflected in the denominator. In particular, coverage for CBAW (where the denominator usually is girls entering child bearing age) is often reported >100%; apparently the numerator calculation adds TT1, TT2 and TT3 doses together, resulting in double-counting. It is not clear how reported coverage is being checked for accuracy.

Hard to reach populations: At most facility levels, hard to reach populations were not identified. Most of the population is reached via the mobilization of village health workers and through the fixed site sessions at the CHC (with posts in remoter locations if required). However, some factors were identified that resulted in some populations being harder to reach; this included geographical barriers, some populations not wanting to be identified by commune authorities, shortage of staff in the communes, limited capacity of village health workers and refusal in isolated cases.

Unregistered populations: Migration patterns exist in some areas, making it difficult to identify certain populations. Changes in the target populations can occur quickly without being noticed by the local authorities. Some migrants are in forest areas and are clearing land without permission, making it difficult for them to register legally with local authorities. As a result, the population may be underestimated. Due to a high immigration rate and number of unregistered populations, and administrative changes (e.g.. division of communes and districts as the province expands) tracking the target population in some areas is problematic.

Measles 2nd dose: The second dose of measles vaccine was introduced in 2006 nationwide and is provided at school age (grade 1). At all locations, staff reported successful implementation with the main factors for success being a) high school enrollment rates b) effective collaboration between the staff at district and commune level with the school authorities and c) good defaulter tracking by the CHC. Occasionally, the service is delayed until late in the school year because of vaccine shortages.

In provinces or districts where measles supplementary immunization activities (SIAs) were conducted in 2007 and 2008, measles immunization for 6 year old children at school was not given, resulting in a small decrease in routine coverage for measles second dose. Both measles first and second dose coverage levels declined in the last quarter of 2007 and first quarter of 2008 due to a temporary vaccine stock-out at national level. However, coverage recovered later in 2008.

Hepatitis B and birth dose: In all sites visited, staff referred to the negative impact in 2007 of adverse events following immunization (AEFI) after Hepatitis B immunization, which led to the suspension of Hepatitis B vaccine administration by the Ministry of Health (MOH). In consequence, sharp declines in Hepatitis B birth dose coverage occurred in 2007 and 2008. Nevertheless, there were indications in five of the six provinces reviewed that coverage levels of Hepatitis B are recovering. The birth dose immunization programme has also recommenced in almost all locations visited, following letters of instructions from the MOH and Provincial Health Services in 2008. Still, fears of recrimination of AEFI continue to exist among health workers such that they expressed reluctance to immunize, particularly with the birth dose.

While a significant number Hepatitis B birth dose is given at hospitals, in some places implementation of immunization within 24 hours is still not enforced and reporting/recording is poor. There appears limited understanding among nurses of the important reasons why Hepatitis B vaccine should be given as soon as possible after birth.

Several hospitals have developed lists of "contraindications" for Hepatitis B birth dose, such as low birth weight, prematurity or acute infections. There are still no systems for the birth dose to be given at home deliveries attended by skilled health workers and traditional birth attendants (TBAs), or by deliveries at maternity/private clinics. Commune health workers have overall reluctance to open a two-dose vial to immunize one child because the MOH permits wastage levels of only five percent.

Maintaining maternal and neonatal (MNT) elimination: Provinces, districts and communes implement a programme that includes vaccination of children and pregnant women, as well as child bearing age women (CBAW) in high-risk areas. The target population for CBAW is mostly adolescent girls entering child bearing age (15 years) who should receive two to three doses of tetanus toxoid (TT). Delivery systems include vaccination in school, SIAs and catch-up at the CHC. Neonatal deaths (ND) cases are also investigated.

Reaching adolescent girls entering child bearing age for TT vaccination is often challenging, particularly when attempting to provide three doses of TT during one academic year; proper interval spacing between doses is important. Also, significant drop-offs are observed between the first TT dose (TT1) and the third TT dose (TT3). Apparently no TT vaccination is offered for pregnant women during antenatal care (ANC) in the places visited, although some hospitals would like to do so.

Figure 9 Lam Dong Provincial Hospital



Key Recommendations Immunization Services

National immunization schedule

- A review of the current schedule should be undertaken to optimize it for second dose of measles, future accelerated rubella control, tetanus vaccination to maintain MNT elimination (childhood, adolescent booster doses), improve protection against diphtheria and pertussis (DTP, DT, Td booster doses) and introduction of new vaccines.

Reporting coverage

- Guidance should be provided to districts and communes on a standardized method for identifying target population and reporting denominators and numerators consistently up the reporting chain. Determining the most realistic denominators in a uniform manner and documenting the method would not only facilitate data interpretation but also calculation of vaccine supply and immunization coverage.

Service delivery

- Provinces and districts should identify the best way to collaborate with the private sector (e.g. vaccination and reporting, disease surveillance) in the future. Since private sector immunization service delivery is still in its early stages, this could occur in the form of a roadmap with key milestones and indicators to measure impact of activities. National guidance is likely to be required for such systems development issues.
- Assessing the management of non-EPI vaccines should be given priority, particularly in view of the risk of AEFIs and inadequate quality assurance.

Second measles dose

- NIHE should review the feasibility of shifting second dose of measles from school age to the 2nd year of life to prevent the accumulation of susceptible children and decrease the risk of outbreaks. Verification of fully immunized status should be a requirement for school entry.

Hepatitis B birth dose

- Timely and quality delivery of the Hepatitis B birth dose (<24 hours after birth) should be supported by the following:
 - Standard operating procedures for hospitals
 - Regular training of EPI hospital staff
 - Careful review of contra indications established at hospitals
 - Regular meetings between EPI and hospital staff on problems and issues
 - Provision of vaccine carriers/refrigerators to hospitals
 - Education to mothers prior to delivery
- To increase the Hepatitis B birth dose coverage, practical guidance should be provided to health workers on the use of the 2-dose vial despite the risk of wastage, to ensure that no opportunities are being missed. In this context NIHE should analyze the cost-benefit and feasibility of providing Hepatitis B in one dose vials (more costly) versus two dose vials (higher wastage). At the moment, it is not clear if there would be cost savings of going to a monovalent formulation.
- NIHE should consider conducting an assessment of central and provincial hospitals to understand hospital practices for the Hepatitis B birth dose, particularly in pre-screening mothers for hepatitis B infection (with Quick test or ELISA) and document lessons learned.
- Identify an effective strategy to protect health workers in the event of an AEFI, with guidelines made available on the use of funds available for compensation.

Maintaining MNT elimination

- NIHE should evaluate a long-term transition to DT or Td booster doses in the national programme; this would expand protection nationwide to both males and females, and confer protection at an earlier age.

6b. Immunization Information

Background

Performance of vaccine preventable disease surveillance in Viet Nam has met or exceeded most standard performance indicators. On this basis, Viet Nam is considered as having one of the best performing vaccine preventable disease surveillance systems in the Western Pacific Region.

Viet Nam's AFP surveillance performance indicators have consistently met certification standard criteria, with NPAFP rates of 1.8, 1.6 and 1.17 and stool specimen collection rates of 89%, 89% and 93% from 2006-2008, respectively. A total of 383 AFP cases were reported in 2008.

Case-based measles surveillance performance in Viet Nam also has been one of the best in the Western Pacific Region, with discarded measles rates of 4.9, 6.0, and 1.9 per 100,000 population (target =2.0) and adequate specimens collected from 78%, 67% and 77% of suspected cases (target=80%) from 2006 to 2008, respectively. The current measles epidemic has tested the surveillance system, with 8418 suspected cases reported in 2009 as of April 7, of which 5206 (61.8%) have had adequate specimens, and an estimated discarded measles rate of 2.7 per 100,000.

Neonatal tetanus surveillance is also performing well. From 2006 to 2008, the percentage of estimated neonatal deaths that were reported increased from 49.9% to 59.8% to 67.5% (assuming that 1/3 of infant deaths occur in the neonatal period); similarly, the percentage of reported neonatal deaths that were investigated has remained extremely high at 96.7%, 99.6% and 100% from 2006 to 2007, respectively. In 2008, a total of 5235 ND cases were reported and investigated.

Four types of disease surveillance reporting systems exist in Viet Nam:

1. **Monthly EPI Disease Report** – passive, aggregate monthly reporting of 12 vaccine preventable diseases: suspected measles, pertussis, AFP, diphtheria, NT, other tetanus, TB meningitis, other TB, hepatitis, meningitis, cholera and typhoid. Case counts are stratified by age group (<12 months, 1-4, 5-9, 10-15 and 16+ years) and vaccination status (fully, partially, not vaccinated, unknown); forms are submitted through Provincial Preventive Medicine Centers (PMCs) by communes and aggregated by district, province, and then submitted to national EPI.
2. **24 Infectious Disease Report** – passive monthly case count of 24 “infectious” diseases (including EPI diseases) submitted by commune health clinics and district and provincial hospitals to their respective district and provincial health services; these reports are copied to PMC at district and provincial level
3. **Active weekly surveillance** for 24 infectious diseases, including vaccine preventable diseases, conducted by district and provincial epidemiologists in district and provincial hospitals; in some areas, active surveillance is also conducted monthly by district PMC staff in commune health centers. No reports are generated from active surveillance.
4. **Immediate passive reporting** at every level and by public and private facilities for measles, AFP and suspected NT; district and provincial EPI officers then investigate with standard case investigation forms (CIFs) and also ensure specimen collection

Case-based line listing forms are completed for AFP and ND identified through any of these surveillance mechanisms, but not for measles because of a belief at the national level that an excessive number of suspected measles cases would overwhelm the system.

In some provinces, the private sector reports EPI diseases through the PMC and also has been included in EPI training.

For the last three years throughout the provinces, there is regular monthly reporting of “zero” cases. Vaccination coverage reports, vaccine usage and logistics reports, and the four surveillance reports are submitted from commune to district by the 5th of each month, district to province by the 10th of each month, and province to NIHE by the 20th of each month. Reports are often hand carried from commune to district when commune staff come to pick up vaccine prior to immunization activities at the beginning of the month.

Main Findings

Surveillance

General Surveillance Issues: There are several different surveillance systems in place that overlap in reporting the same cases of disease. In several provinces, the quality of the surveillance has deteriorated (e.g., in missing cases) for a number of reasons including lack of funds for case investigations, additional case finding, transportation and shipping of specimens. Surveillance staff is limited in number at every level; turnover is high. The quality of surveillance varies throughout the provinces. Military hospitals do not report to the PMC or NIHE, but have a separate parallel reporting system; nor are military hospitals or private clinics visited by PMC staff. Some military hospitals may report to the district or provincial health service.

EPI surveillance: While many communes in several provinces have reported 0 cases of any vaccine-preventable diseases for the last three years, it is possible that cases are being missed. Because of an ‘expectation’ of zero-cases, some CHC’s are sending monthly case reports within the first week of the month rather than at the end of the month. Additionally, in several provinces, surveillance data analysis and performance indicator monitoring were not observed at any level; no spot maps, charts or tables were observed anywhere. CIFs and specimens are submitted to province level which then sends to NIHE hand-carried by messenger; no funds are provided for this.

Active Surveillance: The quality of active surveillance varies by province. In one province, a designated EPI staff visited the hospitals at least once a week. In some provinces, there are designated staff in the hospitals responsible for collecting and reporting data to EPI. In other provinces, the frequency of active surveillance visits has decreased to monthly or longer, rather than weekly. Moreover, the hospital disease surveillance system appears ad-hoc in some provinces, with no specific surveillance officer assigned to coordinate collection of communicable disease and VPD surveillance data, and unclear level of coordination among the units of pediatrics, intensive care unit and communicable disease control.

AFP: In some areas, EPI staff have limited knowledge on the standard case definition for AFP and the key performance indicators. Hospital staff claim that they report on suspected measles or AFP immediately, but many Provincial/District health staff say they do not receive information in a timely fashion.

NNT surveillance varies throughout the provinces. The standard case definition used is not always clear. In some provinces, neonatal deaths are reported and investigated with detection of NT; in other provinces, the number of reported neonatal deaths is substantially less than the expected number and few of these are investigated. Low numbers of reported neonatal deaths may occur in areas with a large number of home deliveries resulting in missed NT cases.

Measles: Confusion exists regarding the surveillance case definition of "suspected measles". Most provinces in the South Region have been using a surveillance case definition of "Rash and Fever" instead of the clinical case definition of "Rash and Fever and one or more of the following: cough or coryza or conjunctivitis" as is recommended by the National EPI. "Rash and Fever" reportedly was used to increase sensitivity of detecting both measles and rubella cases beginning in 2004 and 2005. In the North Region, some provinces have also modified their suspected measles case definition to "Rash and Fever".

Figure 10 Commune Health Center Lam Dong Province



A review of suspected and confirmed measles and rubella cases reported from Vietnam to WPRO from 2004-2009 reveals that the South had higher rates of discarded measles and rubella than the North in three of the past four years, and that the South had a greater percentage of suspected cases with confirmed rubella than the North in three of the past four years. Moreover, the increased numbers of suspected measles and rubella cases identified in the South and that required investigation were not unmanageable.

In some provinces, reported suspected measles cases are not always investigated. Those that are investigated may not be fully investigated, blood specimens may not be collected, and additional case finding or contact tracing may not occur regularly.

In some cases, feedback of laboratory results to the hospitals and PMC is slow, and may not occur at all for the private sector. Other laboratory and/or national level issues include

- The lab line listing reports for measles from NIHE and Pasteur Institute Labs to EPI-NIHE are in different formats. The formats and codes should be standardized for all reporting labs and include separate columns/fields for location of case (province, district, commune with the sname spelling, sex [M or F], Age, date of rash onset, date of specimen collection, date last vaccinated (dates should always be recorded as dd/mm/yyyy) and lab result codes (e.g., 1-postive, 2 –negative, 3-equivocal, 4-pending, 5-unknown);
- National reporting of measles data to the WHO Western Pacific Regional Office (WPRO) does not include all investigated cases, only those with completed case investigation

forms. This leads to a substantial under-reporting of lab-confirmed measles cases to WPRO. All cases should be reported to WPRO; updates with more complete data may be provided subsequently.

Rubella: The detection of rubella is a byproduct of the measles case-based surveillance system. When a rubella case is laboratory confirmed, further investigation and case finding, particularly for potentially infected pregnant women that may miscarry or deliver babies with congenital rubella syndrome (CRS), is usually not conducted. In most provinces and districts, no systematic approach was apparent to follow-up pregnant woman with suspected or confirmed rubella infection or infants with suspected birth defects compatible with CRS.

Data Quality

Immunization cards: Recently introduced 9-page immunization cards were thought to be superior to the single page blue cards in provinces where they were introduced, and were associated with increased card retention. The new cards may result in better coverage as they include dates for subsequent doses of vaccine. In some districts, the old single page vaccination cards are being continued until the supply is exhausted, preventing new card benefits. Maternal immunization cards (TT) were often lost. They are not stored together with the childhood immunization cards.

Data management: Commune staff and district supervisors use the EPI registration books extensively to identify drop outs and monitor data quality. Coverage and surveillance data recorded at the commune and district level was generally the same as that recorded at the district and provincial level, respectively. Submission of coverage and surveillance reports was usually timely and complete. Denominator data were based on various sources including office of statistics, a standardized algorithm, village health worker head counts, population collaborator head counts, and others. Data inconsistencies were occasionally found in some areas:

- Some discrepancies were found in dates of vaccine administration by card compared with registration books
- DTP3 figures were sometimes greater than DTP1 at the commune level; measles coverage was also sometimes greater than DTP3.
- Absolute numbers of children immunized increased by year whereas the reported annual population growth rate was decreasing.
- There were instances when the number of MCV1 doses exactly matched the number of fully immunized children (FIC), or where coverage for the third dose of Hepatitis was lower than FIC coverage; however, FIC coverage should be no higher than the antigen with the lowest coverage.
- The reported number of births sometimes exceeded the reported number of pregnant women, raising questions regarding target population data accuracy.

Monitoring & Supervision

Supervision occurred at every level occurred despite lack of funds to support this activity. However, supervision from district to commune level was variable: supervisory visits from district to commune occurred monthly, bimonthly and quarterly; supervisory checklists (samples of which are available in the Vietnamese Immunization in Practice textbook) were often used, and included active surveillance for AFP, measles and ND cases at the commune level. Some compared current checklist findings with prior findings to monitor improvement. Quarterly written feedback reports included vaccination coverage and surveillance data and sometimes also included analytic results and recommendations for improvement. Supervision from region to

province occurred, but with no visits reported for the previous six months in some provinces. No budget is provided for monitoring and supervision; travel costs must be borne by the respective staff, thereby restricting movement; staff identified this as a main reason for infrequent field visits. *EPI review meetings* are held periodically in some areas for commune staff at the district level and district staff at provincial level; when these meetings occur, they are often included in a broader agenda. *Monitoring charts* were often posted. However, several communes did not complete monitoring charts correctly, making them of little use. Checklists used by district supervisors were of variably quality; some did not include analytic results or recommendations. Supervision from province to district occurred on an ad hoc basis; checklists were not commonly used.

Key Recommendations Immunization Information

Surveillance systems

- PMC budgets and work plans should include line items for surveillance activities such as active surveillance, case investigations and additional case finding, specimen collection, and specimen transport.
- Basic descriptive epidemiologic analysis of EPI surveillance data including epidemic curves, spot maps, and tables of cases by age group and vaccination status should be conducted at district and provincial levels; surveillance performance should be monitored using standard indicators recommended by WPRO at least at the provincial level.
- Laboratory line list reports from NIHE, Pasteur Institute, and other laboratories should use standardized report formats.
- Mechanisms to strengthen collaboration of private, public and military health facilities as well as provincial and district health services with preventive medicine centers should be developed. Specific strategies for enhanced collaboration with the private sector are recommended to improve vaccine administration monitoring and disease surveillance.
- Improve active surveillance by conducting more frequent visits (e.g., at least weekly) to provincial and district hospitals to identify potential case of EPI disease from relevant sections. Active surveillance includes checking outpatient and inpatient log books and records, visiting relevant wards and interviewing the respective staff. Staff should search for any case of fever and rash, or its corresponding ICD-10 code, for further investigation.
- Active surveillance reports should be submitted weekly to district and provincial PMC authorities and monitored for completeness and timeliness at all levels.

Surveillance for AFP, NT, measles and rubella:

- The surveillance case definition of "suspected measles" may be changed to "suspected measles or rubella" and include "any person with fever and rash or a person suspected by a health care professional as having measles or rubella." However, in accordance with WHO recommendations, a fever and rash case without a blood specimen should not be classified as clinically confirmed unless the case also has one or more of the following: cough or coryza or conjunctivitis.
- The measles CIF may be modified to a measles and rubella CIF that includes pertinent rubella information such as infection in/or contact with pregnant women; such cases should be followed-up by 'measles CIF.'¹³

¹³ Refer to a sample measles-rubella case investigation form Dr David Sniadack's WHO mission report for Vietnam EPI Review, April 2009

- Surveillance for congenital rubella syndrome (CRS) may be established at selected sentinel surveillance sites, prioritizing provinces in which a majority of rubella cases are identified.
- Data from suspected measles cases identified in line lists but without completed CIFs should be added to the database so that a comprehensive list of suspected cases may be analyzed. This updated list should be shared with the Western Pacific Regional Office of WHO by the 10th of every month.
- Case definitions for AFP, measles, and ND/NT should be standardized and widely available, such as in the form of posters targeted to health care providers.

Data Quality

- Timeliness and completeness of periodically submitted monitoring and surveillance reports should be recorded at the respective levels with regular feedback and follow up for late- or non-reporting communes, districts and provinces provided.
- National EPI may consider national expansion of the 9-page EPI booklets currently used in selected provinces. A study could be conducted to evaluate card retention, timeliness of immunization and drop out rates among these new EPI booklet holders, as compared to the single-page EPI blue card.
- EPI monitoring charts should be displayed on CHC walls and updated monthly; suspected and confirmed measles and ND/NT case spot maps should also be displayed; staff should review the Immunization in Practice guidelines for correct completion of monitoring charts.
- District (and commune) estimates of coverage, drop out rates and timeliness of vaccination should be determined based on EPI registration book review rather than summary monthly report forms; denominators derived by Office of Statistics estimates may be revised if EPI registration book data indicate a larger number of children residing in the respective commune.
- Service providers may be instructed to record non-EPI vaccines on the EPI card, EPI registration books and EPI Report forms so that a full immunization profile of the child is recorded and monitored.
- Guidelines and standard methods for assessing population should be prepared at the national level. Quarterly review of People's Committee birth records may be conducted at the commune level and compared with EPI registration lists to ensure that all newborn children are included in registration lists and to obtain more accurate target population data.

Training and Supervision

- After adopting the revised surveillance case definition for suspected measles and rubella, EPI surveillance, monitoring and supervision training should be conducted at all levels, with subsequent periodic refresher training every few years afterwards. National EPI staff may prepare standard lesson plans and materials to ensure uniformity of training in topics including: surveillance case definitions, case classification mechanisms, how to conduct descriptive epidemiologic analysis of core data, surveillance performance indicators, operational requirements of EPI surveillance, methods for population estimates, EPI registration book analysis, vaccine management analysis (including wastage reporting), and use of supervision checklists.
- Specific budget line items may be considered to cover transport costs for monitoring and evaluation in addition to surveillance (above).

- Supervision should be conducted on a regular basis, jointly planned with staff to be supervised, with agreed upon findings and follow up actions (with responsibilities and timeframe identified). Supervision should be supportive, use examples of best practices, focus on weak performing units when funds are limited and include on the job training of staff in technical, management and communication skills.
- District level monitoring and supervision of commune level EPI activities, provincial level supervision of districts, and regional supervision of provinces, may be conducted using customized checklists specific for respective level of supervision, and also incorporate active surveillance for AFP, suspected measles, ND/NT cases and outbreaks of any vaccine preventable diseases. District supervisory visits to communes should be conducted monthly, provincial and regional supervisory visits to districts and provinces may be conducted quarterly.

6c. Vaccine Management and Cold Chain

Background

There has been significant investment in development of cold chain systems in Vietnam in recent years. The cMYP also outlined the objective of government funds being used to replace 10% of cold chain equipment each year at provincial and district level. JICA has been providing support to set up nine cold rooms at national and regional levels in 2006. Funds from both the Government and from the Government of Luxemburg will be used for maintenance cold chain equipment at all levels. There are plans to provide or replace electric fridges at commune levels beginning from 2008 covering 20% of the 10,000 communes each year (cMYP 2006). The last Effective Vaccine Store Management assessment (EVSM) was conducted in May 2005. A plan has been prepared for the replacement of refrigerators at provincial and district levels

Main Findings

Cold chain capacity

Since the last EPI programme review conducted in 2003, several thousand units of Electrolux RCW50 chest refrigerator-freezers as well as Dometic TCW 3000s have been provided to NIHE by the Government of Luxembourg, to equip all levels of the cold chain. Furthermore, in 2008, through grants from the Government of Japan, UNICEF and JICA supplied over 20,000 vaccine carriers and 46,000 thermometers to the immunization programme (for district and CHC level). The observations from this 2009 review found that refrigeration and freezer capacity was sufficient at six provincial and twelve district stores visited. The majority of cold chain equipment was well-maintained and in good working order.

Of communes observed, some CHCs were in possession of Electrolux RCW50s, while others with domestic refrigerators. In Ninh Binh, no communes visited had refrigerators. Those CHCs equipped with refrigerators typically only run the refrigerators for several days per month, clustered around EPI day; after EPI days are completed, the units are turned off until the following month's immunization session. In Ben Tre, most communes use vaccine carriers.

In Lam Dong, Ninh Binh, and Dac Nong and other provinces, cold chain focal points were also responsible for storing and handling vaccines that are not in the EPI routine programme, but offered by the Preventive Medicine Department for a fee. This includes vaccines such as varicella, rabies, Hib liquid, measles-mumps-rubella, among others. These vaccines are stored in the same cold space as EPI, although not necessarily in the same refrigeration units.

Electrical Supply

Electrical supply to all provinces is relatively stable and voltage regulators were in evidence during the assessment. While power cuts are not unusual, and in Lam Dong reported as frequent, all health workers stated that the power cuts were typically short in duration (less than six hours). Health workers were well-versed in how to handle the vaccines in the case of a prolonged power outage. In Lam Dong and Ninh Binh, written contingency plans were in place.

Temperature Monitoring

Temperature monitoring at provincial, district and commune level is notably improved since the previous EPI programme assessment. At all levels, thermometers were in place for refrigerators, freezers, cold boxes and vaccine carriers. Temperature monitoring charts were completed and temperatures were recorded twice daily, although not always on weekends. In Ninh Binh, Ben Tre and Lam Dong, freeze indicators were seen in many if not all refrigeration units at provincial and district levels and health workers could interpret them. There were no observations of vials discarded at any level due to expired vaccine vial monitors (VVMs) or due to freeze damage. Because of intensive trainings conducted in 2007-2008, health workers were adequately trained in proper vaccine storage and handling practices, knew correct temperature norms, understood how to interpret VVMs and could explain how to do the shake test. It should be noted, however, that there were very few vaccines in the field attached with VVMs (as procurement of Lucky Green Cross Hepatitis B has ceased and locally produced vaccines do not yet have VVMs), and no health worker interviewed had actually conducted a shake test.

Guidelines for proper handling of non-EPI vaccines were not observed. In Lam Dong province and in Da-Teh district, non-EPI vaccines were loaded incorrectly into refrigeration units.

Cold chain management at provincial and district hospitals was generally not as skillful as that witnessed in the Preventive Medicine Department. At the hospitals, the pharmaceutical supply departments do not have refrigeration units which are solely dedicated to storing vaccines, nor are the units WHO pre-qualified, and knowledge of hospital staff on proper vaccine handling is less complete than that of health workers. Proper use of temperature monitoring records was inconsistent.

It should be noted that Regulation #23 dated 7 July 2008 by the Ministry of Health (Appendix 2) prescribes storage of oral polio vaccine (OPV) at the district level at -15°C to -25°C . This recommendation is not consistent with NIHE policy and is not in concordance with WHO recommendations, which permits storage at district level at $+2^{\circ}\text{C}$ to $+8^{\circ}\text{C}$. For those districts which do not have adequate freezer space, Regulation #23 may not be practically feasible.

Forecasting

Vaccine wastage rates are not estimated at any level, but are standardized and indicated by NIHE. For this reason, wastage factors used in forecasting do not accurately reflect the actual consumption in the field. This is notably true in the case of Hepatitis B, which must be provided as a birth dose at commune level, and for which achieving 5% wastage is nearly impossible. Wastage factors for syringes and safety boxes were universally applied at 1.11.

Table 8: Wastage Rates for Vaccines

Vaccine	Presentations supplied	Wastage Rate	Wastage Factor
BCG	10 dose or 20 dose	65%	2.8
OPV	20 dose	35%	1.5
DTP	20 dose	35%	1.5
Measles Vaccine	10 dose	35%	1.5
Hepatitis B	2 dose	5%	1.05
Tetanus Toxoid	20 dose	35%	1.5

In Lao Cai Province, even higher wastage factors are applied than indicated by NIHE, to support reaching a large number of remote areas: BCG: 3.94; OPV: 2.5; DTP: 2.5; MV 2.4; Hep B: 1.21; TT 2.6.

At the provincial level, the methodology for vaccine forecasting is variable. While certain provinces reported ordering based upon estimated target population figures given by the General Statistics Office, others reported basing forecasting on the previous year's consumption or actual need as articulated by the districts and communes. Districts order vaccines on a monthly basis as a cumulative order of the CHCs. At commune level, monthly vaccine requests were typically based on the upcoming number of children expected to receive vaccine in the following month, as tallied in the EPI registration books. If outreach is conducted, then an additional vial per session is included.

During the review period, there was insufficient time to assess whether the quantities forecasted and ordered corresponded with the level of programme coverage achieved, or to evaluate the discrepancies.

Wastage Rates

Health staff at all levels understood the relevance of vaccine wastage in the programme, yet often did not calculate the rate. Universally, wastage rates are not recorded in the system at any level. Nevertheless, health workers seemed over-sensitized to controlling wastage rates, to the point of delaying or missing giving vaccinations for fear of wasting doses in an opened vial. This was particularly true of the Hepatitis B birth dose. Health workers resisted opening up the Hepatitis B (in two-dose vials) until they could 'cluster' two children together. This would in turn mean that one, or both, children would receive the birth dose after 24 hours rather than before.

Health workers, particularly at fixed-sites, perceived the wastage rates to be high and believed wastage could be reduced if they were supplied with lower dose presentations per vial.

Distribution

Overall, the vaccine distribution chain functions well. Vaccines are transported from regional stores to the provincial stores every two months in refrigerated trucks or in cold boxes. Districts order and receive their vaccines on a monthly basis. In Dac Nong, Lao Cai, Ninh Binh, Lam Dong, the districts come to the Provincial store to collect their monthly vaccine supply. During the assessment, those health workers requested to demonstrate the preparation of a cold box for distribution did so correctly.

All communes typically come to the district store to collect their vaccines for EPI day, either on the day itself or the day before. In Dac Nong, during rainy season, the district distributes vaccines to the commune. Commune health workers, however, are not supplied with transport or fuel to pick up vaccines at the district. Furthermore, several health workers reported that the ice packs provided do not fit in the vaccine carrier, therefore requiring them to purchase and use wet-ice.

In Ninh Binh and Khanh Hoa, CHCs that are not equipped with refrigerators report returning any unused vials to the district. In Lam Dong and Lao Cai, even those CHCs equipped with refrigerators report returning any unused vials to the district and turn off their refrigeration units for the rest of the month.

Vaccine Supplies and Stock Management

No over-stocking of vaccines was observed at any level and there were no reported vaccine stock-outs that were directly due to poor stock management practices at the provincial or district level. However, in 2007-2008, there were stock-outs of measles reported in Dac Nong, Khanh Hoa and Ninh Binh due to problems with the measles vaccine supplier at the national level. In Dac Nong, the measles stock-out lasted five months at provincial level (2007) and two months (Jan-Feb 2008) at district level, and contributed to the overall decline in provincial coverage.

Due to reported AEFIs in 2007 following Hepatitis B injection, certain lots of Hepatitis B were recalled, leading to shortages of Hepatitis B vaccine in some provinces lasting from one to four months in 2007-2008. However, many communes adjusted by conducting catch-up immunizations with Hepatitis B once supply was restored.

The provision and storage of adequate buffer stock, generally recommended as the equivalent of 25% stock during a given supply period, was not consistently practiced in provinces and districts.

Overall stock management is satisfactory, with stock registers 'current-to-date' seen at virtually all levels. In Khan Hoa, some old stock register forms were still in circulation at the commune level. In Lam Dong, a computerized stock management software (access-based) was developed by the former PMC Director and is used routinely. Dates of receipt/issuance, lot numbers, manufacturers and expiry dates were generally recorded in registers. The exception to this was in hospitals, where stock recording was less than optimal.

Physical inventory checks of BCG, BCG diluent and Hepatitis B vaccine matched those recorded in stock registers, and there were no discrepancies in vaccine and diluent counts. Validation of distribution-receipt records from province, district and commune level revealed no inconsistencies in all six provinces surveyed.

Five of six provinces reported adequate quantities of immunization related supplies, with no stock-outs in 2007 and 2008. Sufficient quantities of safety boxes, syringes, EPI cards and reporting forms were witnessed at all levels. Lam Dong reported stock out of BCG syringes in 2007 at the provincial level, but no district or commune visited reported shortages. All levels reported that if they had shortages of vaccines or supplies, they could order additional supplies from the higher level easily.

No expired vaccines or vaccines with expired VVMs were observed during the assessment. In general, cold chain focal points were well-trained. They could read expiry dates, properly recorded relevant information in stock registers, loaded their vaccines by vaccine type and lot numbers, and applied the first-expiry-first-out policy in rotating stock.

Inventory and Maintenance

Cold chain equipment inventory lists were available and updated in the provinces reviewed. However, age of equipment was not always detailed, which limits the ability to track the need for rehabilitation or replacement of equipment. In Ninh Binh, the freezers at the district level were older than 15 years and in poor condition.

Overall, the cold chain system in observed provinces was in good working condition and relatively well-maintained. In Lam Dong, cold chain technicians are available at the PMC and

circulate in the province to conduct regular preventative maintenance. In Lao Cai and Binh Ninh, technical support to maintain and repair equipment is limited and local technicians must be hired.

Transport

In most provinces, there are no EPI-dedicated vehicles. Transport vehicles are typically shared across PMC programmes, or staff use their own transport for official EPI duties. Financial constraints for transportation are reported in Khanh Hoa and Dac Nong. Commune health workers are not supplied with sufficient, if any, transport means or fuel to pick up vaccines at the district. In Ninh Binh, there is a small provision of 5,000 VND per month in the budget for transport, which only partially covers the cost of collecting vaccines.

Key Recommendations Vaccine Management and Cold Chain

Vaccine Management

- Improve coordination with the Ministry of Health on issues concerning vaccine handling and management, so field recommendations from both divisions are consistent.
- In collaboration with Ministry of Health, assess vaccine management practices of non EPI vaccines and develop coordinated strategy for advising on proper vaccine management of all vaccines (EPI and non-EPI) at all levels. Temperature monitoring practices and devices should be uniform.
- In collaboration with the curative sector, strengthen cold chain management and temperature monitoring at hospitals. Include hospital staff in EPI staff trainings on vaccine management.

Temperature Monitoring

- Furnish all refrigeration units at provincial and district level that contain freeze-sensitive vaccines (EPI or non-EPI) with freeze indicators, and train staff where to appropriately place the devices.

Forecasting

- Provide national guidelines on methodology for forecasting vaccine at provincial, district and commune levels. Describe pros and cons of using target population method versus consumption method at various levels, and indicate acceptable sources of data for estimating target population.

Monitoring Wastage Rates

- Provinces, districts and communes should be encouraged to calculate, monitor and report wastage on a monthly basis. This would assist in evaluating the accurateness of current pre-defined wastage factors used in vaccine forecasting. Health workers should be encouraged not to miss an opportunity to vaccinate any child.
- To facilitate vaccine management and decrease concerns about wastage levels, begin exploring with local vaccine manufacturers and stakeholders the feasibility (scientific, economic) and relevance of:
 - VVM application on vaccine vials
 - supplying lower dose-per-vial presentations of certain vaccines, including Hepatitis into mono-dose vials

Cold Chain

- NIHE should explore how to optimize use of refrigerators at CHC level so EPI can be offered more than once a month. Units are currently under-utilized and unopened vials are returned to the district after EPI day. For those CHCs not yet equipped with refrigerators, analyze whether usage levels would justify being equipped with a unit.
- For CHCs equipped with refrigerators, review cost-effectiveness of the provincial/district policy requiring CHCs to pay transport costs to return unopened vials to the district level after EPI day.

Distribution

- Review vaccine distribution from regional stores to province and consider feasibility (logistics, capacity) of quarterly instead of bi-monthly supply period. Similarly, explore whether vaccine distribution from provincial stores to district stores could be changed to bi-monthly instead of monthly. Establish clear guidelines for provincial and district stores on keeping buffer stock (e.g., 25% of supply period).
- Provide a small budget to all CHCs for fuel/transport to pick up vaccines at the district level.

Inventory and Maintenance

- In coordination with provinces, establish a management information system to help develop A) a national cold chain rehabilitation plan and schedule and B) an overall maintenance and repair strategy for cold chain equipment and transport. Plans should be properly resourced (staff and financial).

Figure 11 : Examples of the Cold Chain in Ninh Binh Province



* The Electrolux TCW 3000 model of refrigerator. Each Province and District Health Center has been provided with this equipment in 2008 donated by the Government of Luxembourg. Some Commune Health Centers are also equipped with this model given that electricity is good in Vietnam.

There is sufficient capacity in the cold chain all the way down the system to District Health Centers. Districts are supplied monthly by provinces. It is possible this supply interval could be extended in certain districts, which could save on transportation costs.



* Contingency plan cold box in case of power failure and also for monthly distribution of vaccines from the province to the district stores.



* The freezers are very old. On average, 15 years and falling apart.



6d. Information, Education and Communication (IEC)

Background

Many sectors are involved in social mobilization for the immunization programme: Women's Association, the Red Cross, Farmer's Union, Youth Union, People's Committee and even the Army. The Teachers Association is particularly important for raising awareness for measles 2nd dose and tetanus toxoid immunization. Key community members, such as village or religious leaders, are also involved in promoting immunization. In Ben Tre, family planning staff also supports EPI staff in promoting EPI.

A range of media is also used to educate communities, including print media (posters, leaflets, brochures), television, newspapers and radio spots. Villages use loud-speakers provided by the People's Committee to announce EPI day(s). Immunization posters on immunization schedule, injection safety and on general EPI – designed and supplied by NIHE -- were observed at facilities during the assessment.

At the commune level, the village health workers (VHW) are essential to the programme in disseminating information and education, and in mobilizing communities. VHWs meet on a monthly basis with commune health workers to identify target groups for immunization (pregnant women, adolescent girls and children). VHWs remind the community members of the immunization schedule, the dates of EPI day, track defaulters, and in some cases, help organize immunization sessions. The VHW may conduct house-to-house visits to find mothers and children and in Dac Nong is also used to report on suspected illnesses in the community. They receive a small monthly incentive for their contributions, and the Ministry of Planning has recently decreed an increase equivalent to about 50% of a health worker's base salary.

Main Findings

There is little written information provided to parents on the potential side effects of immunization, either mild or severe, nor how to appropriately respond in such a situation. The only exception to this is in the newly revised EPI booklets that have been piloted in ten provinces. The revised EPI booklets are a significant improvement to the current EPI card in that they additionally provide:

- information on potential side effects to immunization
- detailed information and schedule on each vaccine
- a place to remind parents of the date to return for the subsequent dose
- a place to record non-EPI vaccinations

Planning for Information Education and Communication (IEC) activities is not conducted at provincial, district or commune level, and there is very minimal if any budget available for such activities. This constraint is particularly problematic for identifying special strategies to reach out to minority ethnic communities or hard-to-reach populations.

The recent national crisis provoked by AEFIs underlines the critical importance of advocacy and communications in diminishing rumours and ungrounded fears. A proper communication and advocacy strategy is necessary to ensure that parents and communities, as well as health workers, are properly informed of the benefits and limited risks of immunization.

Key Recommendations Information Education and Communication

- Develop and implement a comprehensive strategy to provide health workers, communities and parents with accurate information on the benefits of specific vaccines and the potential reactions to immunization, both minor and severe.
- Promote annual planning for specific IEC activities at all levels, with adequate funding for implementation. This includes printing of EPI materials, pamphlets, leaflets, posters; use of mass-media such as radio, television and loud-speakers; supporting village health workers and community mobilization efforts.
- Intensify current efforts to use the Women's Union, Red Cross, People's Committee and other community groups (e.g., youth, teachers and farmers) for promoting routine immunization, as well as campaign activities. Where regionally relevant, involve religious leaders in promoting EPI day.
- Devise specific IEC strategies to reach hard-to-reach populations or ethnic communities to encourage completing immunization schedules. Parents should be oriented not only on the benefits of immunization in general, but also on the value of specific vaccines.
- Explore ways to develop the social mobilisation skills of Village Health workers and sustain incentives for their contributions in identifying women and children to be immunized and tracing drop-outs.
- Evaluate user acceptability and retention rates of revised EPI booklet (used in ten provinces) and consider national scale-up.

Figure 12 Fully Immunized Child at Da Teh Commune Health Center, Lam Dong Province



6e. Immunization Management

1 - Background

Human Resources

In Vietnam, the absolute level and amount of human resources for immunization is relatively good. At each level of the system, there is a clearly identified staff person responsible for EPI services. Generally, there are two to three EPI staff located at the provincial level depending on its size – one or two EPI focal point(s) and one vaccine store keeper/manager. At district level there is on average three to five staff involved with EPI: one EPI focal point, one vaccine store keeper/manger, one pharmacy staff, one nurse midwife and one other health care provider. At the commune level there is usually one EPI focal point. However, almost all CHWs in the CHCs participate in EPI during the monthly EPI days from the preparation, the implementation, monitoring/supervision and reporting.

It is important to highlight that CHWs rely heavily on village health workers (VHWs). Their responsibilities include identifying pregnant women and mothers that recently delivered. They attend monthly meetings with CHCs and also have a strong role in IEC, motivating parents to bring children for immunization, following up on defaulters and informing commune staff of AEFIs. VHWs seem to be the cornerstone to the success of the Vietnamese immunization programme and are found in 80% of villages overall, although this varies substantially by commune.

Planning and Financing

At the *national level* there is a comprehensive five year plan for EPI (cMYP). The budget allocated to the national level is used for funding key components of the EPI programme including purchasing vaccines, injection supplies, IEC activities, disease surveillance and campaigns (see Background section for details of costing). Only a limited amount of funds are made available for the purchase of cold chain equipment. For the most part this is supported by external donors (Governments of Luxembourg and Japan).

Funding is also provided to the regional and province levels; this is generally the major source of EPI-related funds for provinces (with the exceptions being wealthier provinces). However, the national EPI budget does not cover salaries or the bulk of allowances, or other shared costs at provincial and district levels (ex: transportation and building overheads).

The *provincial level* generally relies on the national level for most of their EPI funding and has annual costed EPI plans. However, some of the wealthier provinces are able to contribute additional funds (ex: for allowances, incentive payments and specific campaigns). These wealthier provinces can also provide additional bonuses to their health workers. But since provinces are not required by law to notify the MoH of their budgets - there is limited information on provincial health budgeting.

Main budget categories at the provincial level are for communication, transport, training, supervision, surveillance vaccine transport and storage and anti shock boxes (in case of AEFIs). Disbursements from the province to lower levels are done quarterly.

District level have EPI plans but without costing. Other than for salaries that come from the central level, the district level generally do not receive any additional funding for EPI from the provincial level for operational costs.

At the *commune level* there are also EPI plans which are not costed. The budget allocations to the commune health centers (CHCs) are done at the provincial level.

Main Findings

Human Resources

All EPI staff hold multiple responsibilities and virtually none are dedicated full-time to EPI. At the provincial level, EPI staff devotes on average 75% of their time to immunization activities. At the district level the percentage drops to 50%, and at commune to 20%. All have shared responsibilities in the preventive and curative sectors. While human resources are generally considered as adequate, a shortage of staff was being reported. At the provincial level, workers state that they would like to have a specific person dedicated to surveillance activities. At the district level, human resources were generally considered as low and the allocation of time spend on EPI too low. Districts expressed needs for a least another staff to help with EPI, vaccine management and surveillance.

At the CHCs, human resources was not perceived to be a problem (on average there are 6 CHWs in the districts visited). The main issue was related to staff turnover and retaining CHWs given the low salaries and incentives. Staff turnover is high in some areas, and new staff rarely receive training for their new position. One district reported over 90% of staff turnover within a period of two years. As such there is many new and inexperienced EPI staff at the CHC level.

At commune levels and below, staff motivation continues to be high despite low wages, and many displayed a good sense of duty and are willing to go out-of-pocket to pay for EPI expenses (ex: transportation). The VHWs are very much the foundation of the Vietnamese EPI programme and ensure that mothers are well-informed and educated about the benefits of immunization. The VHWs are the reason for which immunization is mainly demand driven with good health seeking behaviors from households. This is commendable.

Staff training is regularly undertaken and covering all levels of the system. In 2007 and 2008, EPI trainings were conducted for provincial, district and commune EPI staff in a number of key areas: AEFI surveillance and response, injection safety, IEC, service delivery, immunization in practice, cold chain and vaccine management. EPI staff was knowledgeable and reference and training materials were widely observed. Nevertheless, staff still expressed the need for continuing training, particularly for surveillance and data management at the CHCs. EPI training at the CHC level was perceived as an issue partly not only due to high staff turnover, but partly due to the fact that all CHW get involved in the monthly EPI days. As such, training would need to be extended beyond the specific EPI CHW.

Supervision is carried out at all levels, with regular monthly meetings between each level and the one below it (mainly for submitting coverage reports...). However, supervision remains weak, is irregularly carried out, and misses opportunities to conduct in-service training for CHWs. This is mainly due to a lack of funding

Planning and Financing

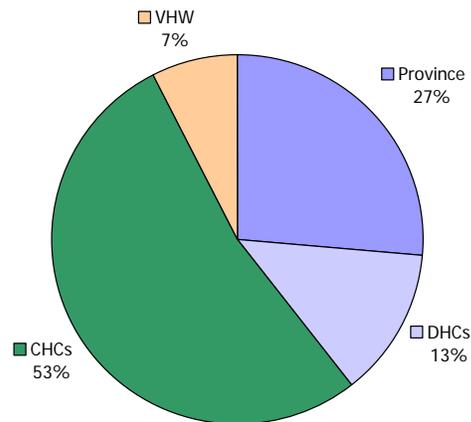
Disbursements of monies from the central level to provinces are regular and timely (once a year in April). Planning and budgeting for immunization is regularly undertaken with standardized planning formats and the disbursement/flow of funds down the system is generally regular and on time. This is an improvement from the last EPI review where delays in disbursements were more frequently observed. Reported immunization financing has been one characterized by an increasing trend, with the exception of one province (Lam Dong). The increase was mainly due to the fact that the budgeted amounts per FIC for allocating CHCs budgets doubled since 2008 (from 1500 VND to 3000 VND and 3000 VND to 6000 VND). There were no reported cases where user-fees were applied for EPI vaccinations. User fees are common however, for the delivery of non-EPI vaccines.

The salaries of the health workers come from the national government. From the provincial level, budgetary allocations to the CHCs is calculated based on a budget amount per fully immunized child (FIC). The amount varies from 3000 VND per FIC in an easily accessed area, to 6000 VND per FIC located in mountainous and harder access areas. For pregnant women and CBAW vaccinated against TT, the allocation varies from 2000 VND to 4000 VND per PW/CBAW depending on where they are located (easy versus harder access areas). CHCs also receive 50,000 VND (<\$2.5) per month for other operational costs including for transportation need to collect vaccines from the District Preventive Medicine Center (PMC).

For non-EPI activities and non-routine immunizations (ex: JE, Cholera and Typhoid), CHCs are partly funded through user fees. Despite these sources of funds, there is often limited capacity at this level to pay workers for work-related expenses (ex: the fuel they use in their motorcycles) and for such routine expenses as electricity.

At the village level, monthly compensation to VHWs ranges from 30,000 to 50,000 VND depending on the classification of the village. The relative shares of EPI budget allocations across the levels of the system are represented in Figure 13.

Figure 13 Average relative share of the EPI budget by level of the system (incl. salaries)



Planning for EPI follows a standard format and work plans were available at all sites visited; at the CHC plans require approval by the CHC head and People's Committee, after which they are sent to the district.

The planning and budgeting process is top-down and does not allow much micro-planning at commune level to estimate real costs of programme. Yet, this is inherent to the system in place and one that is system-wide rather than EPI specific. It is common that many operational expenses, particularly for transportation at lower levels, tends to be out-of-pocket financed due to the lack of funding. This can be a big disincentive. At the provincial level, the same issue was raised in terms of the financial constraints and lack of operational budgets for transport, training, IEC, surveillance and drug kits for AEFI (adrenaline).

Likewise, districts do not have an annual funded plan and receive very little financial resources other than those to cover for staff salaries. As such there is little, or no operational budget at the district level to support surveillance, supervision, monitoring, and transport. The latter is the reason why they leave it up to CHCs to collect vaccines from the district level (collection system). It is possible that the policy to give budgets to CHC based on amount per FIC is distorting allocations to districts. This could account for the waning surveillance activities conducted by District Health Workers (DHWs). The EPI review team was told that no funds were provided at the district level to cover for the transport/fuel costs of surveillance activities. This is in contrast to other programmes where 50,000 VND per day are provided for surveillance in the Nutrition programme and 25,000 VND per day for the Malaria programme.

There seems to be a lack of strategic direction provided to districts or communes on elements in the planning process, only very general goals. The district and commune plans are not detailed activity plans and do not have budgets.

Key Recommendations Immunization Management

Human Resources

- Develop and implement a comprehensive human resource strategy to strengthen EPI manpower and skills, and to increase staff retention by avoiding high turnover. This strategy should include personnel management, training and supportive supervision to facilitate in-service training and problem-oriented feedback. To introduce supportive supervision, national and regional staff would need to be trained on both the content and method of supportive supervision, to transfer needed skills and practice to lower levels of the system.
- A clear assessment of surveillance staff requirements is needed at provincial and district levels. Likewise, the roles and functions of existing surveillance staff at these levels needs to be strengthened and clarified.
- Given the importance of VHWs, communes should recruit VHWs for those villages where VHWs do not exist..
- Continue to offer periodic refresher trainings in EPI to keep health staff motivated and updated on best practices. Training should include provincial/district hospital staff and more CHWs.
- Conduct specific training activities to strengthen surveillance and data management, analysis and reporting practices for district and CHC staff
- Enforce a policy for regular supervisory visits.

Planning and Financing

- Improve collaborative process of annual EPI planning and budgeting between the province/district and district/communes.
- Provide guidance and/or training to districts and communes on key components of micro-planning, including detailed scheduling of EPI activities.
- All levels of the system should develop funded annual plans, including funding for transport, and other operational costs.
- Preventive Medicine Centers (PMC) should routinely lobby with Provincial Health Services (PHS) on the importance of EPI and of allocating national funds which arrive earmarked for EPI.
- The PMC should encourage the PHS to advocate to People's Committee on increasing annual budget contributions to cover for operational expenses.
- Explore ways to use financial resources more efficiently. For instance, reconsider the frequency of vaccine distribution down the supply chain given the capacity of the cold chain. In some instances, monthly distributions could be changed to quarterly or twice a year in order to save transportation costs.

6f. Immunization Safety and Adverse Events Following Immunization

Background

In the EPI review conducted in 1998, most of the EPI inoculations were done using reusable syringes and needles. Where normal disposable syringes were introduced, waste management was still poor. Auto-disable (AD) syringes and safety boxes were introduced to the EPI at all levels since January 2003. GAVI provided the funds in lieu to procure AD syringes and safety boxes from a local state-owned manufacturer (Mediplast) during its first phase support. In the last EPI review in 2003, all EPI inoculations but BCG doses were given by AD syringes. The early version of the AD syringes had some technical problem of difficulty pushing the plunger into the barrel bottom, but it was resolved soon after the last review.

EPI waste has been destroyed in a number of ways, including open burning and burial, burial without burning, un-protected pits and incineration. During and after the annual meeting of the Safe Injection Global Network (SIGN) held in Hanoi in 2005, stakeholders met and discussed how EPI and other medical waste can be treated in a consistent manner. They also discussed potential application of environmentally friendly waste disposal solutions such as autoclaving to abide better with the Stockholm Convention to reduce persistent organic pollutants (POPs). However, there has not been any concrete policy decision made on these issues since then.

Figure 14 Injection Safety Ninh Binh Province



Needle remover and safety box



CHC incinerator

In Vietnam, the surveillance system for adverse events following immunization (AEFI) commenced with a pilot trial in Phu Tho Province in Red River Delta area in 2002. Eventually, the system was expanded nationwide and it is one of the most notable advancements the Vietnamese EPI has achieved in the past five years.

To ensure an access to a relevant standing committee or group of experts for the assessment of AEFI cases, two committees were formed. First is the AEFI Steering Committee chaired by a Vice-Minister of Health and the second is the Expert Committee chaired by the Director General of Vietnam Administration of Preventive Medicine (VAPM), MOH and consists of experts from Drug Administration of Viet Nam (DAV) and Department of Therapy of MOH, NIHE, Pasteur Institutes and national hospitals. The MOH Decision #3510/QĐ-BYT stipulates the formation of these committees.

Main Findings

Immunization safety

There has been regular training on the immunization safety and AEFI surveillance in all reviewed facilities in 6 provinces during the last two years. AD syringes were used for all injections except for BCG. Supply of AD syringes and safety boxes was sufficient and there was no stock outs at any level.

In most CHCs visited, no injection waste including sharps was found around the compound. In Lao Cai Province, however, such wastes were visible around some CHCs. In Ninh Binh Province, CHC were supplied with an electric needle removal device. It was more common for CHCs to dispose of safety boxes before they were full after each EPI session, but some kept them until they were full.

Similar to the findings of the last review, CHCs applied different final disposal methods of safety boxes filled with used AD syringes. Some CHCs had their own incinerator, some applied open burning with subsequent burying and the others burnt and buried them in deep, concrete protected pits. In one of the districts in Ninh Binh, all boxes were collected and burnt in an incinerator at the district health center.

In Ninh Binh, two out of four CHCs visited experienced EPI-related needle stick injuries in the past year. Similar incidences were also reported in Khanh Hoa.

Waste management

There was no written policy or recommendation observed at commune level on proper waste disposal.

There is a new regulation from the MOH to keep auto-disable syringes and empty vials for two weeks before destruction. The purpose of this policy is to ensure traceability once any AEFI case occurred. They intend to investigate the remaining vials and slings. This policy, however, does not seem to be quite useful given limited chance of identifying the antigen related to that particular AEFI case.

Some risky waste management practices were still observed. In Lao Cai, communes discarded infectious waste in public areas. In Khanh Hoa, Lam Dong and Ben Tre, burning was conducted either openly or in shallow pits, posing the risk of exposing the general public to infectious sharp waste. In Ben Tre, one CHC was using an inadequate incinerator.

Adverse Events Following Immunization (AEFI)

The AEFI system is functional for detecting and investigating AEFI cases and assessing causality. The reporting rate, however, is still low and implementation variable across different regions of the country.

All facilities had a system to report AEFI. All sites had the standard register book for recording such cases. AEFI guidelines and the drug kit for responding to the AEFI were present at CHCs visited. Serious AEFIs were reported to appropriate levels and properly investigated.

Vaccinators, including midwives and nurses at hospitals, expressed concerns about AEFI, especially after Hepatitis B birth dose. This concern was explicitly mentioned at least in five out of six provinces reviewed. The concern was not only prevalent amongst the health workers but also amongst mothers in some places. However, in other places, population remained receptive to the birth dose.

In Ben Tre, health staff advocated that the National Program needed to be more active in communicating to the population of the positive aspects of immunization and the low risk of AEFIs.

In Ninh Binh, minor AEFI cases had not been recorded properly on the AEFI logbook kept at CHC. In Lam Dong also, only one commune was recording descriptions of AEFIs reported from parents in the AEFI register. In Dac Nong, there was one serious AEFI case following a hepB birth-dose in January 2009, but the case has not been reported.

In Ninh Binh, CHWs expressed the need for AEFI training further down the system to VHWs.

There is no functional AEFI committee established at province level as requested by the MOH Circular #23, which risks delays in rapid response and guidance to districts and communes should an AEFI occur.

For fear of AEFIs, four of 12 districts in Lam Dong were separating the immunizations of DTP from Hepatitis B, using alternate strategies. Some districts are alternating Hepatitis B day from DTP day, within the same month. Other districts are only giving Hepatitis B one month, and DTP the next. Both strategies are delaying the timeliness of immunizations given.

Key Recommendations Immunization Safety and AEFI

Injection safety

- Although hazards of unsafe injections to clients were minimized by the introduction of AD syringes and safety boxes, prevention of needle stick injuries amongst vaccinators as an occupational hazard needs to be more explicitly addressed in the existing safe injection training.

Waste management

- A clear written policy on proper waste disposal methods to be applied at commune level should be set up and communicated. The policy should reflect different settings where CHCs are operating in terms of population, population density, remoteness, resource availability, etc. and outline the most suitable disposal solutions for each setting.
- The above policy needs to be accompanied by the development and dissemination of more detailed field guidelines than the existing training material which outlines proper disposal methods.
- EPI waste management at CHCs should be consistent with that of curative services because the amount of the curative waste largely exceeds that generated by EPI. To arrive at a coherent solution, more coordinated discussions will need to be initiated with the Department of Therapy, MOH.

AEFI

- A public relations strategy regarding AEFIs should be established in order to better communicate with the general public on the definition of an AEFI and its expected

frequency. The media needs to be educated on whether their reporting on “so called AEFIs” after causality investigations is responsible and accurate.

- Reflecting on the above strategy, it should be ensured that health staff at all levels is trained on the latest developments and requirements regarding AEFI. They should be able to deliver proper AEFI information to parents before, during and after the vaccination, and respond to any reported AEFI quickly and properly.
- A clear response strategy to protect vaccinators against false claims of AEFI should be set up and communicated to disperse fear amongst the providers.
- Develop terms of reference and establish a Provincial Committee for addressing and responding to AEFIs (provincial hospital, provincial health services and staff from PMC) as per MOH Circular #23.
- Ensure recording of minor AEFI cases at CHCs and report serious AEFIs rapidly to the district. Train District health workers on the importance of rapid follow-up, case investigation and response.
- National guidelines need to be provided to health workers on how funds available for compensation should be used.
- The drug kit to respond to AEFI should be available at all CHCs

7. Conclusion

Since its introduction in 1981, the EPI program in Vietnam has demonstrated outstanding public health impact. Polio has been eradicated, maternal and neo natal tetanus has been eliminated, and school-based immunization programs for protection against measles have been launched.

This 2009 review determined that the EPI program has accomplished many achievements since the last review conducted in 2003. Notably, coverage performance for most antigens remains quite high, cold chain and logistics management has greatly improved, and a concerted effort has been made to train health workers in a range of EPI skills, such as AEFI surveillance and reporting. Nevertheless, overarching challenges remain. As concluded in 2003, collaboration with curative services needs continued attention so that a comprehensive national policy can be developed to address injection waste disposal and vaccination of infants and children at hospitals. The assurance of data quality and development of a standard methods to estimate the target population still pose problems. And the shortage of financial resources and retention of skilled human resources remain important constraints to EPI.

Furthermore, new challenges are emerging for implementation of the program between 2010 and 2015. These include an expansion of Vietnam's immunization schedule, introduction of new vaccines and associated rises in program costs, and ambitious disease elimination and control goals for measles and hepatitis B. The quality of disease surveillance and feedback systems will need to be sustained if these goals are to be achieved. The negative impact of AEFI on hepatitis B Birth Dose coverage since 2007 highlights the critical need to build capacity of rapid AEFI system investigation and response, and to develop more sophisticated communication strategies to inform the public, media and providers on the benefits and side effects of immunization.

These program challenges are taking place in the national context of health system and social change. There is increasingly more international consensus on the value of integrating immunization with other health system interventions, a platform which Vietnam will need to further explore. Socio-economic changes relating to Vietnam's economic growth, trends in privatization and internal migration will also present future hurdles to the program in terms of regulation of private sector immunization, maintaining health workforce motivation and tracking of more mobile populations.

Despite important financial, human resource and geographic constraints, Vietnam's EPI program and health system is well-functioning and well-positioned to meet these coming challenges. The strategy of "immunization days" at CHCs across the country ensures that the population can access a range of services in one visit. The strong networks established between commune health centers and village health workers have been identified by this review to be a critical factor in immunization program success. The implementation of EPI outreach "posts" in more remote locations also demonstrates the potential for EPI to contribute to health system strengthening by assisting services to outreach to harder to reach areas of the country. These established elements within the EPI programme will provide the foundation needed to ensure its continued evolution as one of the country's significant public health achievements.

8. ANNEX - Provincial Reports

The summary provincial reports for the provinces of Lao Cai, Ninh Binh, Khanh Hoa, Dac Nong, Lam Dong and Ben Tre are available under separate cover.