

**The Government of  
The Socialist Republic of Viet Nam**

**Financial Sustainability Plan  
for Immunization Services**

Submitted to the Global Alliance for Vaccines and Immunization (GAVI)  
and the Global Fund for Children's Vaccines (The Fund)

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This document is supplemented by Annexes and detailed spreadsheets (provided as attachments in electronic format).

## Acronyms and Abbreviations

ADB	Asian Development Bank
AEFI	Adverse events following immunization
AusAID	Australian Agency for International Development
BCG	Bacille Calmette-Guerin (anti-TB vaccine)
CBAW	Child bearing age women
CHC	Commune health centre
CPRGS	Comprehensive Poverty Reduction and Growth Strategy
DHC	District health centre
DHS	Demographic and health survey
DTP	Diphtheria, tetanus, pertussis (vaccine)
EPI	Expanded Programme on Immunization
EU	European Union
FSP	Financial Sustainability Plan
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
GNP	Gross National Product
HCMC	Ho Chi Minh City
Hib	Haemophilus influenzae type b
ICC	Inter-Agency Coordinating Committee (for EPI)

IEC	Information, education and communication
IMCI	Integrated management of childhood illness
IMF	International Monetary Fund
IVAC	National Institute of Vaccines and Biological Substances (a vaccine manufacturer)
JE	Japanese encephalitis
JICA	Japan International Cooperation Agency
MCH	Maternal and child health
MDVP	Multi-dose vial policy (formerly the open-vial policy)
MNTE	Maternal and neonatal tetanus elimination
MoF	Ministry of Finance
MoH	Ministry of Health
MYP	Multi-year Plan (for immunization)
NGO	Non-governmental organisation
NIP	National Immunization Programme
NT	Neonatal tetanus
ODA	Official development assistance
OPV	Oral polio vaccine
PATH/CVP	Children's Vaccine Program at PATH (Program for Appropriate Technology in Health)
PHC	Primary health care
SIA	Supplemental immunization activities
SOE	State-owned enterprise
TB	Tuberculosis
TT	Tetanus toxoid
UNICEF	United Nations Children's Fund
VF	Vaccine Fund
VHW	Village health worker
VND	Viet Nam Dong (currency unit)
VNDHS-II	Viet Nam Demographic and Health Survey
VNHR	Viet Nam Health Report (2002)
VVM	Vaccine vial monitor
WHO	World Health Organization

## Executive Summary

## **Immunization services in Viet Nam and key programme objectives**

The Expanded Programme on Immunization has been very successful in controlling vaccine-preventable diseases in Viet Nam. In particular, polio has been completely eradicated, neonatal tetanus has almost been eliminated at the district level and the incidence of other diseases has declined. This success has largely come from the consistently strong support of the Government of Viet Nam, from other ministries and social organizations as well as local authorities and the dedication of the health workers. The programme has also benefited from the support of many donor countries and organisations, as well as from the domestic production of relatively low-cost vaccines.

The key objectives in the multi-year plan for immunization services include maintaining high coverage levels (over 90%), strengthening various aspects of the programme (eg, training and delivery of services to remote areas), introducing a second dose of measles vaccine and expanding coverage of Japanese encephalitis immunization. Although core aspects of the programme are working reasonably well, there are also opportunities to improve the efficiency of the programme relating to the cold chain, logistics and timeliness of the first dose of hepatitis B vaccine.

## **Assessment of the key health sector challenges and opportunities**

The macroeconomic growth prospects for Viet Nam appear to be favourable. The economy has grown rapidly in the past decade (by 6% per year) and forecasts for future growth are promising. Such growth should continue to benefit the public health sector. Furthermore, Viet Nam has a relatively low level of debt compared to other developing countries. Remaining challenges are the persisting poverty among much of the population and also the desire to avoid inequities (ie, to ensure that economic development benefits the poor).

Specific Government health targets for the period 2001 to 2010 have been approved by the Prime Minister. Of these, the targets that are relevant to immunization include the lowering of infant mortality, lowering under-5 mortality, and the raising of life expectancy.

The health sector has been undergoing major changes since the 1980s. There has been the rapid growth of private medical practice and of user fees for treatment services. The role of Provincial Governments has increased and these governments can now reallocate the national health budget according to local needs. User fees and revenue from health insurance have improved the resourcing of the health sector at the Provincial level. Also there has been increased Central Government support for personnel costs at the commune health centre level. Social health insurance currently covers an estimated 25% of the population but it appears to have little relevance to the support of preventive services such as immunization.

Preventive programmes such as EPI are still “vertically orientated” but there are signs of increasing integration with other parts of the health system (such as the provision of the first dose of hepatitis B vaccine in many and BCG in some hospitals).

Viet Nam is not particularly dependent on official development assistance with it being only 4.4% of GDP. However, the official development assistance (ODA) resources going to the health sector have generally been increasing in recent years (up to around US\$ 80 million). Even so, the share of development assistance in total public health spending has declined as the Government's own resourcing of health has increased at an even faster rate.

The Central Government budget for EPI has been increasing annually and has helped fund recent successes (polio eradication, neonatal tetanus control and successful measles control campaigns in 2002 and 2003). Nevertheless, there is still concern by health officials that the EPI budget is currently not adequate to allow for all the objectives in the multi-year plan to be realised. Also there is general concern that public health worker remuneration levels are too low.

### **Current programme costs and sources of financing**

The analysis of the cost of immunization services undertaken for this financial sustainability plan (FSP) suggests that the total cost is way beyond the official EPI budget (Table A1). This is because the official EPI budget does not cover salaries and many costs relating to shared transportation and buildings. Vaccines are the most important budget item.

Although the Government of Viet Nam is by far the major funder of immunization services, donors are also substantial contributors (Table A2). In 2003 the cost per DTP3 immunized child was around US\$ 17.6, which is similar to that for many other developing countries (Table A3).

**Table A1: Major cost components of immunization services in Viet Nam for the year 2003**

Cost Category	US\$	%
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<b>Cost Category</b>	<b>US\$</b>	<b>%</b>
Personnel salaries / allowances (not displayed due to lack of consent of Ministry of Labour)		
Vaccines	6,517,702	39%
Campaigns (including vaccines/supplies)	2,885,902	17%
Cold chain equipment	2,000,251	12%
Injection supplies	1,969,864	12%
Buildings	1,707,073	10%
Transportation	691,368	4%
Vehicles	412,412	2%
Other (maintenance & communication etc)	310,751	2%
Monitoring and disease surveillance	224,549	1%
Training (short term)	138,826	1%
<b>Total</b>	<b>16,858,698</b>	<b>100.0%</b>

**Table A2: Funding sources for immunization in Viet Nam - 2000 & 2003**

<b>Funding source</b>	<b>2,000</b>		<b>2,003</b>	
	<b>US\$</b>	<b>%</b>	<b>US\$</b>	<b>%</b>
Gov. of Viet Nam and local authorities	7,173,394	81	10,200,097	61
GAVI	0	0	3,957,198	23
Gov. of Luxembourg	0	0	1,549,560	9
UNICEF	336,119	4	526,343	3
JICA	841,289	9	350,000	2
WHO	275,900	3	174,500	1
PATH/CVP	0	0	101,000	1
AusAID	250,000	3	0	0
<b>Total</b>	<b>8,876,702</b>	<b>100</b>	<b>16,858,698</b>	<b>100</b>

**Table A3: Immunization costs in a wider context - 2003**

Cost category	Result
Routine immunization costs per capita (using just routine recurrent costs)	\$0.1
Total immunization cost per capita	\$0.3
Cost per DTP3 immunized child	\$17.6
Government spending on immunization as % of Government health budget	5.6%
Total spending on immunization as % of Government health budget	7.4%

## Cost projections and the future gap in resources for immunization

In Section 4 cost projections were undertaken using a spreadsheet tool and various assumptions about programme costs. The projection analysis (for 2004-2013) assumed a baseline where there was a continuation of the current immunization services as per the year 2003. The most important category was that for vaccines (including new vaccines such as hepatitis B as well as Japanese encephalitis (JE), cholera and typhoid).

An alternative “Scenario B” included the introduction of second dose of measles (in 2005) and the phase in of increased coverage of JE vaccine. For measles control this resulted in a total cost of US\$ 750,000 per year in 2005 and for JE the cost rose to over US\$ 3 million per year from 2008 onwards.

The key results of the gap analysis indicate that there is relatively little “secure” funding for immunization services and there is no “secure” funding at all after 2006. A majority of the “secure” funding comes from GAVI until 2006, and from the National EPI budget for 2004. By far the most important source of “probable” funding is the Government of Viet Nam since this analysis was based on a continuation of the historical trend for increasing funding (using an annual increase of 10%). The next major source of “probable” funding was UNICEF, followed by JICA and then WHO.

The size of the funding gap expands most sharply at the end of the support from GAVI (ie, after year 2006). Indeed, the cost category for “new and other” vaccines constitutes the largest proportion of the funding gap in 2007. The overall size of the “gap” also increases over time as the contribution from other partners is no longer defined as “probable” and with on-going population growth. Although this analysis is suggestive of some “real” risk to the financing of immunization services, part of the risk is simply due to the long length of the forward time commitment covered by the analysis. Nevertheless, the projected funding “gap” does suggest that there is a definite need to mobilize more funding for immunization services and to realise any efficiency gains that lower costs. This is particularly so if the objectives in Scenario B (second dose measles and expanding JE coverage) are to be realised.

**Table A4: Summary of estimated secure / probable funding for immunization services and the estimated funding gap (US\$)**

<b>Secure + Probable Funding</b>	<b>2004</b>	<b>2005</b>	<b>2006*</b>	<b>2007</b>	<b>2008</b>
Government (all levels)	\$ 6,500,150	\$ 7,150,165	\$ 7,865,182	\$ 8,651,700	\$ 9,516,870
GAVI-VF	\$ 3,659,831	\$ 3,512,250	\$ 2,563,108	\$ -	\$ -
JICA	\$ 350,000	\$ 350,000	\$ 350,000	\$ 233,000	\$ 121,000
Government of Luxembourg	\$ 1,515,300	\$ 5,400	\$ -	\$ -	\$ -
UNICEF	\$ 526,343	\$ 526,343	\$ 526,343	\$ 526,343	\$ 526,343
WHO	\$ 192,100	\$ 173,800	\$ 173,800	\$ 173,800	\$ 173,800
PATH/CVP	\$ 133,400	\$ 133,400	\$ 133,400	\$ -	\$ -
<b>Total</b>	<b>\$12,877,124</b>	<b>\$ 11,851,358</b>	<b>\$ 11,611,833</b>	<b>\$ 9,584,843</b>	<b>\$ 10,338,013</b>
<b>Funding Gap</b>	<b>\$ 2,294,122</b>	<b>\$ 3,139,437</b>	<b>\$ 3,220,136</b>	<b>\$ 4,965,789</b>	<b>\$ 4,535,780</b>

<b>Secure + Probable Funding</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Government (all levels)	\$10,468,557	\$11,515,413	\$12,666,954	\$13,933,649	\$15,327,014
GAVI-VF	\$ -	\$ -	\$ -	\$ -	\$ -
JICA	\$ -	\$ -	\$ -	\$ -	\$ -
Government of Luxembourg	\$ -	\$ -	\$ -	\$ -	\$ -
UNICEF	\$ 526,343	\$ 349,000	\$ 174,500	\$ -	\$ -
WHO	\$ 173,800	\$ -	\$ -	\$ -	\$ -
PATH/CVP	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	<b>\$ 11,168,700</b>	<b>\$ 11,864,413</b>	<b>\$ 12,841,454</b>	<b>\$ 13,933,649</b>	<b>\$ 15,327,014</b>
<b>Funding Gap</b>	<b>\$ 3,952,544</b>	<b>\$ 3,551,262</b>	<b>\$ 2,874,914</b>	<b>\$ 2,089,812</b>	<b>\$ 1,010,086</b>

**Notes:** \* End of Vaccine Fund commitment (ie, the last year that support is provided).

## **Strategic priorities and actions for financial sustainability**

There is such a strong political commitment to the EPI programme in Viet Nam that there is no “threat” to the basic funding of this preventive service. The only concern is that there may be delays in the provision of the additional funding from Central Government that is required to meet all the objectives in the multi-year plan. This situation could arise from a reduction in national economic growth or increased demands from other parts of the health sector (eg, to address HIV/AIDS, other chronic diseases, re-emerging disease threats such as SARS, or for the expanding demands of the treatment sector in general).

The options for dealing with these funding risks are: (i) Reviewing objectives and possibly reducing the speed in which improvements are introduced; (ii) Accelerating the potential improvements in programme efficiency; (iii) Considering various additional development loans (eg, from the World Bank or ADB) that would allow programme improvements to occur.

Table A5 below summarises the major strategies to achieve financial sustainability. More details are in Table 5.1 in Section 5.

**Table A5: Key components of the strategic plan to enhance financial sustainability of the national immunization programme and to improve its efficiency**

<b>Strategies</b>	<b>Indicator(s) / time frame</b>
<b>1) Domestic resourcing for immunization services</b>	
1.1) Enhancing Government Funding for EPI	Overall immunization programme budget increases by at least 10% in real terms per year. However, the precise level of required future increases will depend on the extent to which donor assistance is increased and the extent to which all the objectives in the multi-year plan are pursued.
1.2) Budget shifting at the national and province levels	The proportion of health sector expenditure on EPI out of total expenditure (central and provincial levels) increases to the point where all components of the multi-year plan are fully funded by 2010.
<b>2) External resourcing for immunization</b>	
2.1) Additional resourcing from GAVI/ Vaccine Fund	Ministry of Health prepares the appropriate documentation (by 2005).
2.2) Project grants from bilateral or multilateral agencies	Discussions are held and plans are finalised (if appropriate) during 2005.
2.3) The grant portion of development loans	Discussions are held and plans are finalised (if appropriate) during 2005.
<b>3) Improving programme efficiency</b>	
3.1) Cold chain management	<ul style="list-style-type: none"> <li>• Effective utilization of vaccine vial monitors (VVM) for all vaccines by 2005.</li> <li>• Cold-chain equipment inventory is established by 2005.</li> <li>• Expand availability of refrigeration and introduce multi-dose vial policy to enhance program efficiency by 2005.</li> </ul>
3.2) Communication and information technologies	<ul style="list-style-type: none"> <li>• Surveys indicate that at least 95% of EPI managers at the district level have both computer and email access by the end of 2008.</li> </ul>

## Introductory comments

The Expanded Programme on Immunization has been very successful in Viet Nam in protecting the health of children. This success has largely come from the strong support and investment from the Government; the contribution of other ministries and social sectors as well as the hard work of the health workers, and the effective support of many donor countries and organisations.

The development and ongoing consideration of this Financial Sustainability Plan (FSP) in the 10 coming years will help the key ministries (MoH, MoF, MoPI) in Viet Nam to ensure the adequate and timely provision of resources to meet immunization programme objectives. This FSP will also assist donors in being able to plan for multi-year commitments to improve health in Viet Nam and achieve regional objectives (such as measles elimination). More broadly, it is recognised that the FSP process for immunization will provide a model for FSP development for other national health programmes in Viet Nam (eg, in ensuring resourcing from the Global Fund to fight AIDS, Tuberculosis and Malaria).

It will include the information of the ICC Meeting (if possible) Feedback on this FSP is welcomed at any time and should be forwarded to Dr Nguyen Van Cuong, National EPI, Ministry of Health EPI (email: [vancuong@fpt.vn](mailto:vancuong@fpt.vn)).

## 1. Country and Health Sector Context

This section describes how current conditions and likely changes in the economy and health sector in Viet Nam impact on the resourcing and functioning of national health programmes such as immunization services.

### 1.1. Macroeconomic issues

Viet Nam is a developing country with a population of 80 million people. An estimated 25% of people live in urban areas – which is low compared to many other South East Asian countries. Also an estimated 11% of the population live in mountainous or otherwise remote regions.

Since 1986 with the launch of *doi moi* (renovation/reform), Viet Nam has undergone rapid social and economic transformations. Major reforms include the removal of restrictions on private sector activities in commerce and industry, a return to household-based farming in agriculture, and the rationalisation of the state-owned enterprises. There has also been a strengthening of the rule of law and the implementation of an open door policy with other countries. Since *doi moi* began, there has been rapid economic growth with real GDP per capita growth averaging over 6% annually for a decade. Indeed, Viet Nam has become the world's second largest rice exporter.

Viet Nam did not experience the dramatic negative effect of the economic crisis in 1998 (compared to many other South East Asian countries). Also the SARS crisis in 2003 does not appear to have had a major economic impact since the economy is not particularly

dependent on tourism flows. The World Bank and ADB consider that Viet Nam “is again growing quite strongly” (World Bank/ADB 2002<sup>1</sup>).

Major issues still facing Viet Nam include the poverty and equity issues as detailed below.

**Persisting poverty:** Poverty in Viet Nam has been reduced from an estimated 70% in the mid-1980s to 37% in 2001 (using the World Bank’s internationally comparable poverty line). However, Viet Nam is still a relatively poor country with a GNP per capita of US\$ 419 per year in 2001. Nearly half the population lack access to safe water and 33% of children were underweight in 1999. In 2001 the “human development index” for Viet Nam was 0.69 which compares to a high in the region of 0.93 (Japan) and a low of 0.49 (Laos) (WHO 2003<sup>2</sup>). To help address the poverty issue, a Comprehensive Poverty Reduction and Growth Strategy (CPRGS) has recently been developed (SRV 2002<sup>3</sup>). This presents a vision of a transition towards a market economy with socialist orientation.

**Equity:** The increase in growing economic disparity between urban and rural populations in the last decade. Also, ethnic minorities in mountainous and remote areas may have only benefited marginally from the development process. The Government recognises that equity is an important issue to address in the context of on-going economic development. The Viet Nam Development Report of 2001 states that “the fruit of growth shall be shared broadly across all segments of the population and also to avoid the inequities, social exclusion and environmental degradation that has often accompanied other country’s rapid economic growth” (cited in: VNHR 2002<sup>4</sup>).

**Economic prospects:** Fortunately the economic prospects for Viet Nam appear to be fairly favourable. Exports are increasing and there has been a rapid expansion of exports to the United States over recent years. The country is also attracting substantial overseas investment. Infrastructure improvements (in roads, telephone systems and Internet access) are also likely to contribute to on-going economic development. Also the level of debt servicing is not particularly high compared to other developing countries (at 6.5% of exports in 2001) (UNDP 2003<sup>5</sup>, p292). The World Bank considers that Viet Nam’s debt service capacity is sustainable over the medium to long term and that this probably makes it ineligible for debt relief under the HIPC initiative (World Bank/ADB 2003, page iv). It also notes that most of Viet Nam’s debt is on concessional terms and carries very low interest rates. The perception of Viet Nam by risk-rating agencies is also reported to be consistent with this medium-term sustainability. Other signs of confidence in Viet Nam’s economic progress are (i) the recent signing of the second Poverty Reduction Support

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<sup>1</sup> World Bank/ADB. Vietnam: Delivering on its Promise (Development Report 2003). Hanoi: World Bank/ADB, 2003.

<sup>2</sup> WHO. The work of WHO in the Western Pacific Region (1 July 2002 – 30 June 2003). Manila: World Health Organization, 2003.

<sup>3</sup> SRV (Socialist Republic of Viet Nam). The Comprehensive Poverty Reduction and Growth Strategy (CPRGS). Ha Noi, Viet Nam, May 2002.

<sup>4</sup> Chien TTT (ed). Viet Nam Health Report 2002. Ministry of Health Viet Nam: Medical Publishing House, 2002.

<sup>5</sup> UNDP (United Nations Development Programme). Human Development Report 2003. New York: Oxford University Press, 2003.

Credit with the World Bank (World Bank 2003a<sup>6</sup>); and (ii) a Government-Donor mid-year review in 2003 where the CPRGS implementation was considered to be on track.

Threats to on-going economic development include the spread of communicable diseases (eg, the re-emergence of SARS from South China) and the increasing prevalence of chronic diseases such as HIV/AIDS that can have large economic impacts. The country is also relatively vulnerable to flooding which can impact on agricultural productivity. Indeed, the frequency and severity of flooding may increase as a problem in the future as a consequence of global climate change (VNHR 2002, p163).

Adverse economic impacts can also arise as a result of fluctuating commodity prices and policies by importers of Vietnamese agricultural products (eg, US tariffs imposed on catfish exports from Viet Nam – which could extend in the future to shrimp exports). But in the long-term any reduction in trade-protectionism in agriculture would probably favour Viet Nam given that is a major rice exporter and is close to major rice markets in Asia. Also if Viet Nam gains access to the World Trade Organization then this may help protect it from agricultural tariff policies of other countries.

**Implications for public health:** The overall favourable economic prospects for Viet Nam are likely to benefit population health in the following ways:

- By allowing both Central and Provincial Governments to better fund the health services (through an increased tax revenue base).
- By improving the capacity for people to pay for health services themselves and to pay user fees for selective treatment services that can be used to subsidise preventive services (such as immunization).
- By supporting infrastructure improvements such as roads and telecommunications (which may benefit health sector efficiency and performance – especially in remote areas).

Also as Vietnamese businesses continue to become more efficient and competitive, this might be expected to lower the price of products relevant to health (eg, the cost of vaccines and other health sector supplies).

## 1.2. Government goals and expenditure on health

The Government of Viet Nam is committed to improving the health status of its people – which is why the country's health statistics are relatively good for a low-income country (ie, comparable to middle-income countries such as Brazil, Algeria and Turkey). Specific Government health targets for the period 2001 to 2010 have been approved by the Prime Minister (Decision No. 35/2001/QD-TTg, 19/3/2001). Of these, the targets that are relevant to immunization include the lowering of infant mortality, lowering under-5 mortality, and the raising of life expectancy. Immunization is a particularly cost-effective means to reduce infant mortality and it also contributes to raising life expectancy. This is through its impact on reducing infant mortality but also on reducing adult mortality (eg, hepatitis B immunization reduces the risk of fatal liver disease in adults).

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<sup>6</sup> World Bank. State Bank of Vietnam and World Bank sign second Poverty Reduction Support Credit (PRSC2) for \$100 million. [World Bank press release, 15 August 2003] Internet: [http://www.worldbank.org.vn/news/press30\\_01.htm](http://www.worldbank.org.vn/news/press30_01.htm)

Expenditure on health in Viet Nam is largely at the private level with Government only accounting for a quarter of the expenditure (Table 1.1). The Government expenditure on health has been estimated to represent around 6% of the national budget (Table 1.2 below). The expenditure on health has been increasing in recent years but appears to have *decreased* as a proportion of GDP.

From a development perspective, the proportion of Government funding spent on health has been described as being too low (VNHR 2002). The annual Government spending on health of \$5 per capita is less than the \$12 recommended in the World Development Report 1993 (World Bank 1993<sup>7</sup>). The argument for more spending arises from the international evidence for the importance of population health status for a country's economic and social development. Furthermore, health sector funding also needs to keep up with a relatively high population growth rate in Viet Nam (at 1.35% in 2001- with a crude birth rate of 19.67 per 1000 population in 2001).

National public health programmes (which includes EPI) comprised 8.8% of Government health expenditure in 2001). In 2002 it was estimated that expenditure on EPI comprised an estimated 2.2% of total Government expenditure on health. These figures may also be considered to be sub-optimal given the relative cost-effectiveness of preventive programmes compared to treatment services. More specific details on the EPI budget are in Section 1.5.

As with other civil servants, health workers in Viet Nam are paid relatively low salaries. In 1998 the average monthly salary (including allowances but excluding bonuses) was estimated to be only US\$ 28.87 (World Bank et al 2001<sup>8</sup>, p127). Basic salary constitutes an estimated 80-90% of total compensation for health workers. However, the limited salaries can get difficulty in implementing the assigned work especially for preventive health workers.

***Future prospects:*** Overall the prospects for increased Government expenditure on health in Viet Nam would appear promising on the grounds that:

- The macroeconomic prospects for the country are favourable (see the previous section).
- The Government has stated its strong commitment to meeting its health targets.
- There is a growing evidence of the value of investing in health as a means to enhance national social and economic development.
- There is growing appreciation in Viet Nam of the need to improve the remuneration of health workers.

## **Table 1.1: Health financing data for Viet Nam**

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<sup>7</sup> World Bank. World Development Report 1993: Investing in Health. Oxford: Oxford University Press, 1993.

<sup>8</sup> World Bank, Sida, AusAID, Royal Netherlands Embassy, Ministry of Health, Vietnam. Vietnam Growing Healthy: A review of Vietnam's health sector, 2001. Hanoi: 2001.

<b>Indicator</b>	<b>Data</b>
Per capita GDP in \$US (2001)	419
<b><i>Total health expenditure</i></b>	
Per capita total expenditure on health at average exchange rate (US\$), 2000	\$21
<b><i>Public health expenditure</i></b>	
General Government recurrent expenditure on health as % of total expenditure on health (ie, public & private), 2000*	25.8%
Per capita Government expenditure on health at average exchange rate (US\$), 2000	\$5
<b><i>Sources of public health expenditure</i></b>	
Social security expenditure on health as % of general Government expenditure on health, 2000	1.5%
External resources for health as % of general Government expenditure on health, 2000 (ie, grants and loans)	12.3%
<b><i>Private health expenditure</i></b>	
Out-of-pocket expenditure on health as % of total expenditure on health, 2000	68.7%

Sources: WHO website, WHO 2003<sup>9</sup> and VNHR 2002.

\* The general government recurrent expenditure does not include any capital investment.

**Table 1.2: Recent trends in Government health sector expenditure\***

	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
Health expenditure (VND billion)	2387	2761	3033	3064	3117	3457	4192
Health expenditure as % of total current Gov. expenditure**	6.0%	6.2%	6.1%	5.9%	5.9%	5.2%	5.6%
Gov. health expenditure as % of GDP	1.0	1.0	1.0	0.8	0.8	0.8	0.9

**Notes:** \* From World Bank/ADB (2003, p63).

\*\* Excluding interest.

### 1.3. Changes in the health sector

<sup>9</sup> WHO. The work of WHO in the Western Pacific Region (1 July 2002 – 30 June 2003). Manila: World Health Organization, 2003.

There have been many changes to the health sector in Viet Nam in the past two decades with the major ones summarised below.

***Overall structural reform:*** As part of doi moi process, the Government of Viet Nam introduced various reforms including permitting user fees for health services, legalisation of private medical practice and deregulation of the pharmaceutical market. An outcome of these reforms was a rapid increase in the number of private health providers. This private sector has helped to meet the health needs of the population. However, the regulation and monitoring of the private sector has not yet been fully developed. Many public sector workers also work part time in the private sector and this may impact on their morale and productivity for their public sector work. Nevertheless, one study has suggested a marked increase in public health worker productivity in the 1990s (though much of this was a recovery from a decline in the late 1980s) (World Bank et al 2001). The trend towards private sector work may well continue unless further improvements in public sector remuneration levels take place.

***Introduction of user fees:*** The introduction of user fees for treatment services has improved the revenue flows at the provincial Government level. This has made it possible for some of these Governments to assist with funding national health programmes within their province (eg, they contribute funding to cover incentive payments and to support campaigns). User fees have also improved the funding at the commune health centre (CHC) level.

***Decentralisation - role of Provincial Governments:*** Since financial year 2000, Provincial Governments have had the powers to reallocate the national health budget according to their local needs. This means that they can for example shift additional resources to areas such as EPI (though to date Provincial Governments have generally not added substantially to supporting national programme funding). Due to different revenue-raising capacity (through users fees and health insurance), spending on public health services has become relatively greater in the better-off provinces. Indeed, overall health spending per capita in the richest seven provinces is nearly three times that in the poorest quintile of provinces (World Bank/ADB 2003, p60). This is of concern in terms of equitable spending on health. More recently, there has been more emphasis on decentralisation with a further decree in 2002 (Decree 10/2002/NS-CP). This grants more financial autonomy to hospitals and other health sector organisations in terms of levying fees.

***Changing financing of CHCs:*** These centres once depended for their financing on People's committees but this became insufficient in the 1990s. To address this, the Government took over the payment of the health workers at commune level (in 1995/96). Also a decision to pay (from the Government budget) allowances for all village health workers was made in the year 2000. More recently there have been additional allowances paid to CHC workers in remote mountainous areas (with plans to extend this to workers in delta areas in the future). These moves have all helped to ensure that CHCs continue to play an ongoing role in providing health services.

***Role of preventive health programmes:*** These programmes continue to be successfully delivered through "vertical" programmatic approaches. But in some cases the programmes appear to be less "vertically orientated" than in the past. For example, the immunization programme now involves the activities of staff in the hospital sector (ie,

providing the first dose of hepatitis B vaccine and sometimes the BCG vaccine). Also the IMCI initiative (integrated management of childhood illness) includes the provision of missed immunizations to sick children in contact with the hospital sector.

***Introduction of social health insurance:*** In 1992 the Government created a social health insurance scheme that now covers an estimated 25% of the population. Such insurance coverage is likely to increase as the Government of Viet Nam has a goal of achieving universal insurance coverage by 2010. An example of a pilot “commune health insurance scheme” is one in Soc Son (which is one of the poorest districts of Ha Noi). This scheme may be expanded to Hoa Binh, Ninh Binh and Quang Binh provinces (WHO 2003<sup>10</sup>, p151). Yet social health insurance is not particularly well developed in Viet Nam at present and may have little relevance to supporting immunization services (as discussed further in Section 5.1). In particular, social health insurance has not benefited the poor (since only 18% of the population in the poorest quintile of the population are enrolled). This situation may not be helped as Decree No. 10 will probably mean that the role of market forces expands and the poor are faced with new and higher user fees (Decree 10/2002/NS-CP).

***Introduction of state-owned enterprises (SOEs):*** Reforms have permitted these enterprises to be established and to be subject to market forces. Further reforms of SOEs have also been proposed in 2003 (eg, with the Ministry of Finance working on new accounting standards). This is relevant to the health sector since Viet Nam’s vaccine producers are now SOEs. Such a transition may stimulate quality improvements in the vaccines produced so as to open up export opportunities (and indeed one manufacturer recently started to export JE and cholera vaccines).

#### 1.4. Development assistance in Viet Nam and the health sector

Relative to many other developing countries Viet Nam is not particularly dependent on ODA. In 2001 ODA was only 4.4% of GDP (UNDP 2003, p292). In the early 1990s support came mainly from the United Nations and a few major bilateral donors (including long term donors such as Australia, Finland and Sweden -which had provided assistance since the 1970s). A particular increase in donor support occurred after 1993 when pledges averaged around US\$ 2 billion per year to reach a cumulative total of US\$ 17.5 billion between 1993 and 2000. To date, 80% of the total pledges have been translated into signed up programmes. A majority of these development funds have gone into infrastructure projects (56% in 1999) and particularly to energy and transport systems such as highways. Support for infrastructure to supply safe water and sanitation facilities has been limited. Major donors are Japan, ADB, World Bank, France, Denmark, the UN-agencies (UNICEF and WHO) and the international NGO community.

### **Trends in development assistance**

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<sup>10</sup> WHO. The work of WHO in the Western Pacific Region (1 July 2002 – 30 June 2003). Manila: World Health Organization, 2003.

- ODA has been increasing since 1993 except for a decline in 2001 (UNDP 2003<sup>11</sup>, p11).
- There has been a rise in capital investment programmes (up to 62% of total development assistance in 2000) and in technical assistance (at 21%).
- There has been an increase in the share of development loans (from 10% in 1993 to 72% in 2000).
- An increased share of development assistance is now spent at provincial level (now around 66%). Nevertheless, development assistance per capita remains low in regions where a large proportion of the poorest live (ie, Mekong Delta, North Central Coast, South Central Coast and the Central Highlands).

## **The future of overall development assistance**

The UNDP considers that a further rise in ODA for 2003 is likely to occur (UNDP 2003, p11). Also, the Government projects in its socio-economic plan for the next five years that development assistance will remain largely the same as in the previous period (at around 17% of the total investment required). Of note is that some donors have recently made major new announcements in ODA levels (ie, the EU and the USA at Monterrey in March 2002). However, the impact this will have on ODA levels to countries such as Viet Nam is not yet clear.

The experience and capacity of the Government to deal with the flow of development assistance has been improving. Improved coordination will also be facilitated through the Government's Socio-economic Development Strategy 2001-2010, the CPRGS and sectoral strategies and plans.

Unlike some other developing countries, Viet Nam has not succumbed to aid dependence and has been able to maintain firm control over its own development agenda. This approach is likely to continue even though accountability required by external donors is increasing (and particularly with the increase in the share of loans).

## **Development assistance to the health sector**

Human resource development is estimated to have received US\$ 183 million in 2001 (down from US\$ 230 million in 2000) (UNDP 2003, p19). For the health sub-sector the ODA disbursements were US\$ 80 million in 2001. Most of the assistance in the health area is in the form of technical cooperation on a grant basis. Over 60% of the commitment is to vertical disease control programmes, primary health care, and reproductive health and family planning. The remainder is divided between hospitals and sector policy and planning. The total development assistance accounts for around 10% of public spending on health. There is a strong focus of this assistance on a minority of provinces (ie, 15 provinces comprising only 31% of the population of Viet Nam received 80% of the total development assistance over the period 1991-1998).

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<sup>11</sup> UNDP (United Nations Development Programme). Viet Nam Development Cooperation Report. Ha Noi, Viet Nam, 2003. [www.undp.org.vn]

The major donors in the health area at the end of 2000 included the World Bank, the ADB, Japan, the UN agencies, Sweden, Australia, Germany and the European Community.

## **Trends in development assistance to the health sector**

- The annual flow of resources going to the health sector more than doubled during the 1990s (ie, from 229 billion VND in 1991 to 471 billion VND in 1998 (World Bank et al 2001p145)). This is part of an international trend for increasing involvement in health by multilateral and bilateral agencies and private sector organisations. However in 2001 the ODA disbursements to health were reduced (down from US\$ 90 million in 2000 to US\$ 80 million in 2001). Immunization and other disease control programmes experienced a decline of more than fifty per cent between these two years (UNDP 2003, p19).
- The share of development assistance in total public health spending actually *declined* between 1991 and 1998 since the Government's own resources (from user fees and health insurance) increased at an even faster rate. For example it was 14.0% in 1991 and 11.5% in 1998 (World Bank et al 2001, p145).
- Some donors have reduced their support (at least in the immunization services area) following the achievement of the goal of regional polio elimination (eg, funding by AusAID).
- There may be an increased appreciation by donors of the importance of the greater cost-effectiveness of investing in preventive programmes as opposed to treatment services. Also with the success of regional polio elimination, some donors may now be more willing to invest in other region-wide disease control initiatives (eg, measles elimination). The advent of SARS in 2003 has also particularly highlighted the importance of investing in effective communicable disease surveillance and control systems (that work at both a country and regional level).

Given these trends and issues it is quite possible that external health sector support for Viet Nam will increase in the future. Nevertheless, this development assistance may be increasingly channelled directly to health projects within countries and to NGOs. This is because of the preference of many donors for projects that can demonstrate measurable results in a relatively short time rather than programmes aimed at long-term capacity building (WHO 2003<sup>12</sup> p201).

In terms of improving the coordination of development assistance, the MoH in Viet Nam has established a new department with this purpose. This department has proven to be successful and it has organised an International Support Group that meets regularly to consider health sector issues.

Details relating to specific donors and commitments for future support are detailed in Section 2.3 below.

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<sup>12</sup> WHO. The work of WHO in the Western Pacific Region (1 July 2002 – 30 June 2003). Manila: World Health Organization, 2003.

## 1.5. Immunization budgeting process and financial management

**Central level:** At the central level, it is the MoH that is responsible for making “strategies, policies and plans” in areas such as preventive programmes (VNHR 2002, p174). So the proportion of the health budget going to EPI is determined primarily by the information that the MoH provides to the relevant financial and planning ministries (MoF and MoPI). However, the specific total budget for health that is approved by the MoF is “typically far lower than the share requested by the MoH” (VNHR 2002, p208).

The EPI budget is one component of the budgets for national health programmes (which also cover malaria, HIV/AIDS, tuberculosis, and nutrition etc). The EPI budget has increased from 10.7 billion VND in 1993, to 56 billion in 1997, and to 98 billion in 2003 (see Table 1.2 and World Bank et al 2001, p176). The proposed budget for 2004 is 100 billion VND, which is a relatively small increase compared to that of previous years (Table 1.2). The budget for EPI is usually finalised late in the preceding year (though in 2003, 70% of the EPI budget were determined in September).

The national EPI budget is used for funding key components of the EPI programme including purchasing vaccines, all injection supplies, IEC activities, disease surveillance and campaigns. Only a limited amount of funds are routinely made available for the purchase of cold chain equipment. . Funding is also provided to the regional and province levels and this is generally the major source of EPI-related funds for provinces (with the exceptions being wealthier provinces such as Ha Noi and HCMC). However, the national EPI budget does not cover salaries or the bulk of allowances or other shared costs at provincial and district levels eg, for transportation and buildings).

**Table 1.3: Central funding for the National EPI Programme (does not include routine salaries or various shared costs at the provincial and district levels)**

<b>Year</b>	<b>EPI budget (VND – billions)</b>
1999	61.2
2000	65.0
2001	70.0
2002	87.0
2003	98.0
2004 (proposed)	100.0 (US\$ 6.5 million)

**Provincial and district levels:** Viet Nam has 61 provinces and 636 districts. Each district has a district health centre that includes a “hygiene and epidemic prevention” team (that

covers EPI activities). In some provinces the health budget is allocated and directly managed by the Finance Section of the Provincial Government. But in other provinces it is allocated and managed by the Health Section of the Provincial Government.

Provinces generally rely for most (or even all in some cases) of their funding for EPI from the Central Government level. However, some of the wealthier provinces (eg, Ha Noi and HCMC) are able to contribute additional funds to national programmes such as EPI (eg, 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 at the central level on provincial health budgeting.

Some district level authorities have also contributed to EPI funding in terms of incentive payments and campaign support. Nevertheless, the measles campaign in 2002/2003 was funded by the Government and 24.7 billion VND from district level.

**Commune level:** Of the 10,396 communes, an estimated 95% have a health facility of some type, and this is mainly a CHC (VNHR 2002, p176). CHCs provide services in both cities and rural areas. For the latter they serve 8-9 villages on average – but up to 30 villages in some cases (there are an estimated 93,639 villages nationwide). At the level of the CHC the salaries and allowances of the health workforce is from Central Government. Additional allowances are paid to CHC workers in mountainous areas (with an extension to health workers in delta areas being planned for the future).

Immunization resources at the CHC level are provided from the higher levels (eg, vaccines and injection supplies are provided from the national level). CHCs are also partly funded through user fees. Data from CHCs involved in community based monitoring in over 40 districts indicate that these are actually achieving full cost recovery from user fees (for an average charge of US\$ 0.6 per visit) (MoH/UNICEF 2001<sup>13</sup>).

Incentives are paid to EPI workers involved in outreach programmes to enhance immunization coverage in remote areas. However, the amounts are not large (eg, an additional 1000 VND per fully immunized child -which is US\$ 0.07 or under 0.6 cents per injection).

Despite these sources of funds, there is often limited capacity at this level to pay workers for work-related expenses (eg, the fuel they use in their motorcycles) and for such routine expenses as electricity (for those CHCs that have electricity).

**User fees:** At present some local authorities approve small fees for the non-routine immunizations (eg, hepatitis B for older children; JE, typhoid, and cholera vaccine outside high-risk areas; booster immunizations for JE; Hib vaccine; and pneumococcal vaccine). Some hospital outpatients also apply user fees for routine EPI vaccines so as to make these available outside the routine monthly immunization sessions (eg, HCMC Children's Hospital Number 1).

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<sup>13</sup> MoH/UNICEF. Community based monitoring for primary health care in Viet Nam. Ministry of Health and UNICEF, 2001.

## 2. Programme Characteristics, Objectives and Strategies

This section provides basic information about the scale, scope, performance, management and future plans of the national immunization programme. It is based largely on the MYP and other MoH documentation.

### 2.1. Immunization programme characteristics

The EPI was introduced in Viet Nam in 1981 with the co-operation of WHO and UNICEF. After a trial period and gradual expansion since 1985, the EPI was extended to the whole country. As a result the goal of Universal Childhood Immunization (UCI) was achieved in 1989 (87% of infants had been vaccinated with the six basic vaccines (VNHR 2002)). Since 1986, the EPI has been one of the six national priority health programmes in Viet Nam.

In 1997, the immunization programme has been expanded to cover hepatitis B, Japanese encephalitis, cholera and typhoid (in selected high-risk areas). The use of hepatitis B immunization was expanded to all districts in 2002 and 2003.

**Programme structure:** The EPI programme involves a national system consisting of a national and four regional “Institutes of Hygiene and Epidemiology”, 61 provincial “Centres for Preventive Medicine”, 636 “District Brigades of Hygiene and Epidemic Prevention”. At the assignment of the Minister of Health, the system of hygiene and epidemic prevention is responsible for planning, management, implementation, monitoring and evaluation of the EPI at central and provincial, district and commune levels.

At the commune level there are CHCs covering about 95% of 10,396 communes. Working in these commune and district health facilities are nearly 43,000 primary health workers at the commune level and over 60,000 clinical and public health staff at the district level, distributed relatively evenly across the country.

The majority of communes deliver immunizations through regular monthly immunization sessions. Depending on feasibility, all eligible children within the commune are gathered for immunization on the same one or two days. For a minority of communes (around 10%) immunizations are delivered through periodic or campaign immunizations.

Viet Nam conducted supplementary immunization activities for polio control from 1993 to 2002. These were considered to be “highly effective” in controlling polio (MMWR 1995<sup>14</sup>). Supplementary immunization has more recently been used for measles control (in 2002 in the north for 7.7 million children and in 2003 in the south for 8.5 million children). Supplementary immunization has also been used for neonatal tetanus elimination.

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<sup>14</sup> MMWR. Update: Progress towards poliomyelitis eradication – Socialist Republic of Vietnam, 1993-1994. MMWR; 1995;44: 412-5.

**Vaccine schedule:** The immunization schedule in Viet Nam is the standard one recommended by WHO for EPI (Table 2.1). However, in selected high risk districts other vaccines are also used (Japanese encephalitis, typhoid and cholera).

**Table 2.1: Immunization schedule with traditional and new vaccines\*\***

Age	Visit	Traditional antigens	New vaccines
Birth	1	BCG	Hepatitis B
2 months	2	OPV1 DTP1	Hepatitis B
3 months	3	OPV2 DTP2	
4 months	4	OPV3 DTP3	Hepatitis B
9 months	5	Measles	
1-5 years*			

\* Other vaccines used in selected high risk districts include Japanese Encephalitis (1-5 years, 3 doses, in 10 provinces); typhoid fever (3-5 years, 1 dose), and cholera (2-5 years, 2 doses).

\*\* TT is also provided to pregnant women (2 doses) and to child bearing age women (aged 15-35 years) in selected high-risk districts.

**Overall coverage:** Immunization coverage data for Viet Nam is shown in the table below. The year 2002 data shows a lower level of coverage for DTP3 than usual. This was due to vaccine supply problems in that year resulting from a shift in the DTP production facility in Nha Tran and the freezing of imported DTP vaccine during transport to Viet Nam. In comparison, survey data for 1998 indicated that DTP3 coverage was 92% for the child population under one year. The routine reporting system for this same year indicated that DTP3 coverage was 94% (UNICEF/WHO reporting form).

Despite these good coverage figures, the National EPI Review in 1998 (NEPIR 1998<sup>15</sup>) and that in 2003 considered that there may be limitations with the denominator data used for these coverage statistics. This may be because some children (especially those from ethnic minorities) may not be registered with the health authorities. A consequence of this is the possible over-estimation of the coverage rate in routine statistics.

<sup>15</sup> Review of the Expanded Programme on Immunization Viet Nam. Ha Noi: MoH/WHO/UNICEF, October 1998.

**Table 2.2: National immunization coverage data for Viet Nam – 2002**

<b>Immunization</b>	<b>%</b>
BCG	96.7
DTP3 (third dose)	74.8*
OPV3 (third dose)	91.6
Measles	95.7
Hepatitis B (third dose)	65.1
Provision of two doses of tetanus toxoid (TT2+) to pregnant women	89.3

\* Insufficient supply of DPT vaccine

Source: WHO 2003<sup>16</sup>

**Coverage of selected populations:** Full immunization coverage is lower among the poorest children in Viet Nam (60% in the poorest quintile compared to 85% in the richest quintile) (VNHR 2002, p268-9). Immunization rates are also lower in the Northern Uplands and the Central Highlands. Nevertheless, both MoH and VNDHS-II data indicate relatively small inter-provincial variation in immunization coverage rates overall – with rates being generally high in all regions.

A survey of 10 remote areas in 10 districts of 10 provinces in 2001 reported overall DTP3 coverage of 62.0% (GSO 2002<sup>17</sup>). Among the surveyed population, DTP3 coverage was 46% in the poorest quintile and 86% in the richest. Coverage was particularly low amongst certain ethnic groups (eg, 28% for DTP3 for the Hmong). In addition, this survey based on immunization card, it showed that 40% of surveyed children/ mothers keeping their immunization cards.

During disasters such as severe flooding the programme is able to pay EPI staff additional allowances to ensure that immunization activities continue. However, during the severe floods in southern Viet Nam in the year 2000, there was also donor support (eg, additional allowances paid by UNICEF).

The EPI review in 1998 reported that social mobilisation was “very successful” in Viet Nam and that widespread use of IEC materials was observed (EPI Review 1998, p51<sup>18</sup>).

**Timeliness of immunizations:** A survey in 2002 reported that the delivery of the first dose of hepatitis B immunization in the first three days of life was generally good (ie, in

<sup>16</sup> WHO. The work of WHO in the Western Pacific Region (1 July 2002 – 30 June 2003). Manila: World Health Organization, 2003.

<sup>17</sup> General Statistical Office. Analysis results of the baseline surveys on the situation of children and women in ten districts. Ha Noi: Statistics Publishing House, 2002.

<sup>18</sup> Review of the Expanded Programme on Immunization Viet Nam. Ha Noi: MoH/WHO/UNICEF, October 1998.

the 70% to 100% range for the 11 provinces surveyed) (WHO 2002<sup>19</sup> p12). This success may be partly due to the additional involvement of maternity department staff and family planning staff in delivery the first dose of hepatitis B vaccine.

A possible concern however, is that some children in villages with small populations may not get their immunizations at the correct times. This is because the health workers may be waiting until several children are present before opening 20 dose vials (eg, for DTP and BCG). This might suggest that these staff may be trying too hard to reduce vaccine wastage and that extra training is needed to address this issue.

**Vaccine wastage:** Vaccine wastage is traditionally low in Viet Nam with wastage factors used in vaccine ordering calculations being 2.8 for BCG, 1.05 for hepatitis B and 1.5 for all other antigens. A survey in 2002 found a wastage factor of 1.12 for hepatitis B use at the commune level and 1.01 at the district level (WHO 2002<sup>20</sup> p11). The primary reason for these relatively low wastage rates is that EPI vaccines are administered predominantly through routine immunization sessions in CHCs. The planning for these sessions assists in minimising vaccine wastage and there is also careful supervision of vaccine use and wastage during supplementary immunization for polio, neonatal tetanus and measles.

After the EPI programme review in 1998, more careful planning of distribution systems of vaccines is considered to have further reduced wastage. Nevertheless, wastage can still arise as a result of problems with cold chain maintenance and poor logistics. The multi-dose vial policy has not been strongly promoted in Viet Nam owing to safety concerns and the need for widespread training to accompany this policy. Nevertheless, there is a need to change the multi-dose vials (for locally produced vaccines, especially BCG and DPT vaccines).

**Cold chain:** In general the cold chain is considered to be functioning well in Viet Nam. Nevertheless, a survey in 2002 found that the daily monitoring of the temperature of cold chain equipment could be improved upon at the province and district levels (WHO 2002, p12). Another cold chain survey also found that the system was working but that the equipment was often old and that there was scope for improvements in management and monitoring (Nelson and Chang Blanc 2002<sup>21</sup>). Also, the MoH has recently encouraged 13 provinces in North Viet Nam to make improvements in the cold chain.

It is generally recognised that a large proportion of the cold chain equipment in use in Viet Nam is fairly old and that it is difficult to obtain parts of some models of refrigerators and freezers. Some EPI staff consider that a replacement rate of cold chain equipment of 20% per year is justified – at least for several years (after which a replacement rate of 10% might be more appropriate). A possible priority area is considered to be the replacement of some regional cold stores.

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<sup>19</sup> WHO. Introduction of hepatitis B vaccine in Viet Nam: Background, current status and recommendations. Ha Noi: World Health Organization, Viet Nam, 2002.

<sup>20</sup> WHO. Introduction of hepatitis B vaccine in Viet Nam: Background, current status and recommendations. Ha Noi: World Health Organization, Viet Nam, 2002.

<sup>21</sup> Nelson C, Chang Blanc D. Vietnam Technology Mainstreaming Assessment (Report for PATH/CVP). June 9-18, 2002.

For the purchase of new cold chain equipment, Viet Nam has been fairly reliant on donors (particularly JICA). Recently the Government of Luxembourg has assisted with providing refrigerators for widespread distribution at commune levels. This may improve the quality of cold chain storage at the peripheral level and also reduce vaccine wastage. VVMs are used on imported hepatitis B vaccine and imported measles vaccine.

PATH considers that there would be some qualitative benefits of using Uniject for hepatitis B vaccine outside the cold chain in Viet Nam when this technology is available in the country.

***Injection equipment and safety:*** Recent improvements in injection safety include the introduction of auto-disable syringes for all injections) which is likely to have had a range of benefits (ie, safety and perhaps even on improving coverage (Drain et al 2003<sup>22</sup>)). Safety boxes have also been introduced and these plus AD syringes are now produced in Viet Nam. Both products are now considered to be of appropriate quality.

Incinerators for waste disposal have also been purchased. A “National Policy for Injection Safety and Safe Disposal of Injection Equipment” has been prepared along with an annual workplan for 2002-3. Nevertheless, the general shortage of incinerators for appropriate waste disposal is still a matter of concern. A survey in 2002 also reported a shortage of safety boxes in some locations (WHO 2002,<sup>23</sup> p12) - but since then safety box production in Viet Nam has increased.

A survey in 2002 found a low wastage factor of only 1.12 for needles and syringes at the commune level (WHO 2002, p12).

***Staff training:*** The training of staff has recently occurred in relation to the introduction of new vaccines (such as recombinant hepatitis B vaccine), new equipment (eg, AD syringes) and new surveillance activities (eg, adverse events following immunization (AEFI) training to national, regional and provincial EPI managers). Nevertheless, a consultant who was involved in training relating to hepatitis B immunization in 2002 reported that there were a number of areas in which the quality of the training courses could be improved upon (cited in: WHO 2002, p9). Also the MYP recognises the need for a greater investment in the training of EPI staff in all aspects of their work. In particular, the large turnover of EPI staff at all levels means that a large and continuous investment in training is required.

There may also be scope for training for more microplanning at the District and CHC level so as to improve the efficiency of outreach activities to remote communities. This training has been occurring in districts where community based monitoring has been introduced (MoH/UNICEF 2001<sup>24</sup>). In general however, most CHCs do not have annual plans (eg, that specify the amount of vaccine required to take on various outreach activities).

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<sup>22</sup> Drain PK, Ralaivao JS, Rakotonandrasana A, Carnell MA. Introducing auto-disable syringes to the national immunization programme in Madagascar. Bull WHO 2003;81:553-560.

<sup>23</sup> WHO. Introduction of hepatitis B vaccine in Viet Nam: Background, current status and recommendations. Ha Noi: World Health Organization, Viet Nam, 2002.

<sup>24</sup> MoH/UNICEF. Community based monitoring for primary health care in Viet Nam. Ministry of Health and UNICEF, 2001.

**Logistics:** The EPI logistics are considered to work fairly well in Viet Nam. For example, a survey in 2002 reported that there were high rates of inventory-keeping for vaccines at all levels of the system (WHO 2002, p12). This success may be partly due to the strong commitment of the health workforce and to how immunization activities are organised (ie, being focused on 1-2 days per month). Nevertheless, there is probably still scope for improving planning in vaccine ordering (especially for provinces and districts involved in campaigns).

**Monitoring and surveillance:** Data on vaccine-preventable diseases is routinely collected and analysed. There is also an integrated active surveillance system covering neonatal tetanus, measles and acute flaccid paralysis (AFP). A specific surveillance system using linked databases for adverse events following immunization is being piloted in one area of Viet Nam (Ali et al 2003<sup>25</sup>).

A review of the EPI programme in Viet Nam was conducted in 1998 (NEPIR 1998<sup>26</sup>) and another review is scheduled for November 2003. Viet Nam will also undertake a comprehensive review to validate elimination of maternal and neonatal tetanus in early 2004.

In conjunction with UNICEF, the MoH has introduced “community based monitoring” in over 40 districts (MoH/UNICEF 2001<sup>27</sup>). This has been successful in monitoring immunization coverage and cold chain monitoring (eg, data on EPI thermometers and temperature recording).

On-going issues with the programme and the involvement of donors are considered at meetings of the ICC. Invitees and participants of recent ICC meetings have included:

- National members – the MoH (National EPI), MoPI, MoF and the Committee for Protection and Care of Children.
- UN agency members – WHO, UNICEF, UNFPA and UNAIDS.
- Other international members (not all of whom are currently active in supporting immunization) – ADB, AusAID, British Embassy, Canadian Embassy, EU, French Embassy, Italian Embassy, JICA, Japanese Embassy, Luxembourg Embassy, Netherlands Embassy, PATH/CVP, Swedish Embassy, US Embassy, US Centers for Disease Control and Prevention, World Bank.

**Indicators of successful disease control resulting from EPI:** A particularly key success for immunization in Viet Nam was the eradication of polio in the country (with no cases after January 1997) (WHO 2002<sup>28</sup>). This success arose from high levels of routine coverage combined with supplemental immunization activities. Also, this achievement occurred without any disruption to routine immunization activities. In fact there were improvements in BCG, DTP3 and measles coverage when supplementary OPV

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<sup>25</sup> Ali M, Canh do G, Clemens JD, et al. The vaccine data link in Nha Trang, Vietnam: a progress report on the implementation of a database to detect adverse events related to vaccinations. Vaccine 2003;21:1681-6.

<sup>26</sup> Review of the Expanded Programme on Immunization Viet Nam. Ha Noi: MoH/WHO/UNICEF, October 1998.

<sup>27</sup> MoH/UNICEF. Community based monitoring for primary health care in Viet Nam. Ministry of Health and UNICEF, 2001.

<sup>28</sup> WHO. Polio eradication: Western Pacific Region. Manila: World Health Organization, 2002.

immunization was introduced in Viet Nam (Aylward et al 1997<sup>29</sup>). Other key successes include (VNHR 2002, p41):

- The elimination of maternal and neonatal tetanus at the district level (with this likely to be confirmed in a forthcoming review in early 2004).
- The reduction in the number of cases and deaths from measles in the past 15 years. But despite the success of measles immunization in Viet Nam (McFarland et al 2003<sup>30</sup>) a second routine dose will probably be introduced in 2005 to assist with regional elimination.
- The reduction in cases of diphtheria and pertussis.

The benefits of using hepatitis B vaccine in Viet Nam have not yet been documented but benefits have been found in every country where this immunization has been studied (ie, in terms of reduced hepatitis B virus carriage rates and long-term reduction in liver cancer rates).

Despite the overall success of the programme, there is still some burden from vaccine-preventable diseases as shown in the table below. Of note is that the occurrence of diphtheria outbreaks may be suggestive of areas with sub-optimal immunization coverage.

**Table 2.3: Reported vaccine-preventable diseases – 2002 (MoH 2002<sup>31</sup>)**

<b>Vaccine-preventable disease</b>	<b>Number of cases reported</b>	<b>Cases per 100,000 population</b>
Typhoid	7,090	8.89
Measles	6,720	8.43
Viral encephalitis (including Japanese encephalitis)	1,634	2.05
Pertussis	598	0.75
Cholera	317	0.40
Neonatal tetanus	106	0.13
Diphtheria	66	0.08
Polio	0	0

<sup>29</sup> Aylward RB, Bilous J, Tangermann RH, et al. Strengthening routine immunization services in the Western Pacific through the eradication of poliomyelitis. *J Infect Dis* 1997;175(Suppl 1):S268-71.

<sup>30</sup> McFarland JW, Mansoor OD, Yang B. Accelerated measles control in the Western Pacific Region. *J Infect Disease* 2003; 187(Suppl 1):S246-51.

<sup>31</sup> MoH. Health statistics yearbook 2002. Ha Noi: Health Statistics and Information Division, Ministry of Health, 2002.

## 2.2. Programme Objectives and Strategies

The key objectives and strategies for the National EPI have been detailed in the Multi-Year Immunization Plan for (2001-2005) previously provided to GAVI. These are repeated below:

### **General strategies:**

- *Strengthening social mobilization of EPI, investment for the EPI, ensuring to meet the demands of vaccines, logistics and budgets for the EPI.*
- *Improvement of training on EPI management for EPI staff and health workers as well as ensuring safe injection practices and skill of using vaccines and organizing immunization service etc.*
- *Increasing support for mountainous, remote, difficult and affected by typhoon areas in implementation of EPI; collaboration with medical military, border guard and between the preventive and curative systems in implementation of EPI.*
- *Strengthening of disease surveillance as well as monitoring and management activities and reporting systems at all levels.*
- *Strengthening of communication on mass media; especially communication in ethnic minority and in remote, mountainous and difficult areas.*
- *Gaining the support from Governments of other countries and International Agencies for EPI, particularly GAVI, use of proper and effective international support through the ICC.*

### **Specific strategies:**

- *Improvement of the quality and effectiveness of routine immunization services in order to ensure that over 90% of children under one year of age receive 7 kinds of EPI vaccines, and over 80% of pregnant women and over 90% of women of child bearing age receive tetanus vaccine. Vaccinating over 80% of children in epidemic areas for Japanese encephalitis, typhoid and cholera.*
- *Implementation of mass immunization campaigns:*
  - *The second dose of mass measles vaccination campaigns for children under 10 years old, equivalent to 20 million children in the whole country. [Achieved in 2002 and 2003].*
  - *The second dose of measles vaccination campaigns for children under 5 years old in the whole country 3 years after the first campaign, equivalent to 10 million children.*
- *Conducting a campaign of supplementary polio vaccination in areas that are considered high-risk for imported cases of wild poliovirus.*
- *Improvement of EPI diseases surveillance, especially surveillance on polio, neonatal tetanus and establishment of measles active search for elimination of measles in the future.*
- *Strengthening of safe injection practices through implementation of the National Plan of Action and Policy.*
- *Expansion of production and improvement of quality of production of local vaccines to meet the demands of the EPI.*

**Additional objectives:** Since the formulation of this MYP, the funding from GAVI has allowed for hepatitis B immunization to be expanded to all districts. This has highlighted the importance of ensuring that the first dose of hepatitis B vaccine is given near to birth. Also the MoH has been successful in obtaining ministerial support for the following: the introduction of a routine second dose of measles vaccine (detailed in Circular No. 19), nation-wide use of JE vaccine, an increase of the coverage of cholera vaccine (in Central Viet Nam and possibly for ages up to 15 years), and an increase in coverage of typhoid vaccine use.

The introduction of Hib vaccine is considered desirable by EPI staff in the long term given that there is some evidence of a health burden from this disease (based on data for Ha Noi – IVI 2001<sup>32</sup>). However, this vaccine is a lower priority than expanding the use of JE vaccine, cholera vaccine and typhoid vaccine.

There is some evidence for the circulation rubella in Viet Nam based on laboratory diagnosis work as part of measles surveillance activities. However, immunization against this disease is currently not planned given the other priorities (such as measles control).

**Requirements to implement these objectives:** There is strong support by the Government and the health sector for the MYP and the objectives relating to improvements in the control of measles, JE, cholera and typhoid. Therefore the major requirements to implement these objectives are:

- The funds for the additional vaccines (measles, JE, cholera, typhoid).
- The funds for additional injection equipment and IEC activities (particularly for new activities such as the second dose of measles).
- The capacity of the Vietnamese vaccine manufacturers to increase production (ie, for JE, cholera and typhoid in the short-term and measles in the long-term).

### 2.3. Main programme partners

This section details the involvement of key partners in supporting immunization services in Viet Nam. The list does not detail all of the partners who provide support for primary health care in general (but not immunization in particular). It does not also fully detail those organizations and countries that have channelled their support through UNICEF and WHO (eg, Canada, Italy, Netherlands, Sweden, Rotary International, United Kingdom and the United States – via the Centers for Disease Control and Prevention).

**Asian Development Bank (ADB):** The bank is not directly involved in supporting immunization services. However, it provides strong support for rural health capacity building which is likely to benefit the delivery of preventive health services such as immunization.

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<sup>32</sup> IVI (International Vaccine Institute). Population-based studies of invasive bacterial diseases in East Asian children, Summary Interim Project Report (October 2001). Seoul: IVI, 2001.

**Australian Government (AusAID):** This Government was a major supporter of polio elimination in Viet Nam in the 1990s. In the year 2000 it contributed to strengthening immunization, the elimination of neonatal tetanus, and the control of hepatitis B (UNDP 2002<sup>33</sup>, p230). However, AusAID is currently not directly supporting any immunization activities. Support has also been given to health care infrastructure development and training for primary health care which may indirectly benefit immunization activities.

**Canadian Government (CIDA):** Support has been provided for the training of primary health care workers (but there has been no recent specific support for immunization activities).

**Equipment manufacturers in Viet Nam:** There are four manufacturers of needles and syringes in Viet Nam that sell supplies to the national EPI programme. The manufacturers have worked constructively with health officials to make on-going improvements in the quality of these products (eg, the auto-disable syringes and the safety boxes produced in Viet Nam). Although refrigeration equipment is manufactured in Viet Nam, none of this is yet WHO-approved for cold chain use.

**European Union:** The EU has recently provided funding to UNICEF to allow it to purchase DTP vaccine for Viet Nam (to address the DTP vaccine shortage that occurred in 2002). However, the EU is currently not directly supporting any other immunization activities. Nevertheless, it has invested in district level primary health care initiatives with reducing infant mortality as an objective (and such activities provide a supportive environment for immunization activities).

**GAVI:** Viet Nam successfully applied to the “new and under-used vaccines sub-account” of GAVI for hepatitis B vaccine and safe injection equipment. These products began to arrive in late 2001 and the vaccine began to be dispensed in January 2002 (in those 44 provinces not covered by locally produced hepatitis B vaccine). Data collected in 2002 suggested that the more widespread introduction of hepatitis B vaccine has been successful (WHO 2002<sup>34</sup>). The total amount of vaccine applied for was 20,080,154 doses, with a third of these being as single doses (for 2002-2006).

Viet Nam also successfully applied for injection safety support in September 2002 and has obtained funding to buy locally-produced safe injection supplies. As the Government is providing funds for half the safe injection supplies, the remainder of the funding is being used for other injection safety activities, with a major focus on training. A total of 12,253,261 AD syringes and an appropriate number of safety boxes were requested.

In year 2003, hepatitis B vaccine was provided (valued at \$984,397) but no disbursements of injection equipment occurred (in the year to end of September). Approved supplies from the Fund for hepatitis B vaccine, injecting equipment and injection safety materials amounted to: US\$ 3.96 million for 2003, US\$ 3.66 million for 2004, US\$ 3.51 million for 2005 and US\$ 2.56 million for 2006.

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<sup>33</sup> UNDP (United Nations Development Programme). Viet Nam development cooperation report. Ha Noi: UNDP, 2002.

<sup>34</sup> WHO. Introduction of hepatitis B vaccine in Viet Nam: Background, current status and recommendations. Ha Noi: World Health Organization, Viet Nam, 2002.

**JICA / Government of Japan:** Over the last decade JICA has been a key supporter of EPI in Viet Nam (valued at over US\$1 million per year for some years). The Government of Japan has strongly supported for polio eradication in Vietnam in 2000. It has provided particularly strong funding for polio vaccine but also for measles vaccine, DTP vaccine, vehicles, cold chain equipment and injection safety equipment (safety boxes and incinerators). In year 2000 the contribution involved DTP vaccine (1.6 million doses); measles vaccine (valued at US\$ 400,000 and supplied through the multi-bi scheme); and support for measles vaccine production in Viet Nam.

During the period 2001- 2002, the Government of Japan has supported Vietnam 22 million doses of measles vaccine, about 22 million AD syringes, about 1 million mixing syringes, about 250 safety boxes and 15 incinerators estimated nearly 9 million USD for implementing measles campaign in Vietnam for nearly 20 million children aged from 9 months to under 10 years.

In year 2003 the contribution involved measles vaccine and cold chain equipment (1 million doses and 100 sets of ice-lined refrigerators- valued at US\$ 350,000). Such funding for measles control is not yet committed for 2004 but it is considered fairly likely by JICA staff – given the long-term commitment of JICA to measles control in Viet Nam. Also JICA has a strong interest in seeing health gain from its support and so this would favour some ongoing support by JICA for measles control (the success of which can be readily measured through disease surveillance).

In 2003 JICA has supported the training of two laboratory staff from Poliovac (Viet Nam) to go to the Kitazato Biomedical Institute in Japan (this is for 3 months each and is roughly estimated to cost around to 6 million yen). Grant aid also commenced in 2003 for funding the construction of facilities for measles vaccine production in Ha Noi (for a total of 2.141 billion yen – with the first amount being 70 million yen from June 2003 to March 2004). The funding is through to March 2006. The planned production capacity is for 7.5 million doses of measles vaccine a year.<sup>35</sup>

Although JICA has had a strong commitment to EPI it was suggested by JICA staff that funding for measles vaccine and other EPI activities could possibly decline over time given that the need in Viet Nam is less than some other South East Asian countries (eg, Laos and Cambodia). However, any such reduction would probably be a phased over a matter of some years.

In addition to JICA, the Embassy of Japan does provide additional grant aid to Viet Nam but none of this relates to immunization activities.

The Japanese Government is currently the second largest donor nation in the world (after the US). Development assistance from Japan has been shifting over time towards the health and social sector and also towards Asia (eg, relative to Africa and South America). The continuation of this shift could be favourable in terms of the amount of assistance directed towards the health sector in Viet Nam. Also if the suggestive upturn in the Japanese economy (in mid 2003) is sustained, then this might well favour increased development assistance in the long term. Nevertheless, JICA funding still has a strong orientation towards treatment services and secondary care facilities and so any increase in

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<sup>35</sup> VNS. Japan helps Viet Nam to produce measles vaccine. *Viet Nam News* 25 June, 2003: p3.

the total level of assistance may not necessarily always benefit preventive services such as immunization services.

**Luxembourg Development Agency:** This Government agency has for many years provided cold chain equipment to Viet Nam. Most recently it has supplied cold chain equipment for the years 2002 to 2004 (at 1.4 to 2.7 million Euros per year). This has involved Electrolux refrigerators being supplied to CHCs in remote areas (eg, mountainous areas in the Northern Region in 2003). Support for training in use of this equipment has also been provided and funding has been allocated for spare parts. Future funding commitments for equipment include the year 2004 (1.4 million Euros) and 2005 (5000 Euros) (equivalent to a total of US\$ 1,520,700).

**PATH/CVP:** This organisation has been particularly active in Viet Nam in the last two years supporting hepatitis B vaccine expansion, new immunization technologies, training of EPI staff, and providing IEC materials. Its future focus is likely to be in the following areas:

- New vaccines (especially hepatitis B).
- Advocacy, communication and training (with a possible initiative for 2004 being a regional training initiative for senior EPI managers).
- New immunization technologies (eg, relating to: the cold chain, sharps disposal, VVMs, Uniject etc). For example a demonstration project in the waste disposal area is currently underway.
- EPI management.

PATH will also continue to provide support for pilot studies, feasibility assessments, demonstration projects and policy development in specific areas. An estimated US\$ 133,000 of expenditure is already planned for 2004 for EPI related activities: (1) \$1500 for a pilot lot of hepatitis B vaccine in Uniject (if permitted by the Viet Nam NRA); (2) \$12,900 for personnel; (3) \$80,000 for training; (4) \$30,000 for IEC/social mobilisation; and (5) \$9000 for shared personnel costs). Furthermore, although CVP does not yet have additional funds secured for 2004 it is considered likely that funding bids will be successful.

**Republic of Korea:** This Government has recently provided a soft loan to Viet Nam to support local production of vaccines (including new vaccines and increased production of existing vaccines). These vaccines are recombinant hepatitis B vaccine, cholera vaccine, typhoid vaccine, rabies vaccine, and JE vaccine.

**UNICEF:** This UN agency has had a long involvement in providing support in the areas of cold chain equipment, vaccines (especially DTP, TT and measles), and training of staff (eg, on topics such as EPI planning and cold chain maintenance). It has often helped adapt technical and IEC materials for the Viet Nam situation and it has provided some advocacy and financial support for the development of local vaccine manufacture.

EPI plus is one of the five global priorities for UNICEF and so support for EPI in Viet Nam will continue. UNICEF also has a strong commitment to measles control in Viet Nam and the region. The two major areas of immunization support for the future are considered to be: (i) providing vaccines (particularly DTP, measles and to a smaller

extent TT); and (ii) capacity building through EPI staff training. Particular financing issues of note include:

- In recent years UNICEF in Viet Nam has had a reduction in its regular funding sources – probably because of the successful reduction in child morbidity and mortality in the country. So it now has to raise more revenue from other sources. Overall support for EPI in Viet Nam has declined from around US\$ 2 million US\$ per year to now around 1 million.
- The UNICEF budget for 2004 is not yet determined (as of September 2003 – though it is usually finalised in October of the preceding year). Nevertheless, funding support is considered very likely to occur for EPI (eg, in such areas as maternal and neonatal tetanus control in high-risk districts).
- UNICEF can not buy TT vaccine from Vietnamese manufacturers since GMP requirements have not yet been met.

UNICEF staff consider that they work well with other agencies such as WHO and that the ICC mechanism works well in Viet Nam.

**USAID:** This US Government agency supports a child survival programme for Vietnamese ethnic minority populations in two districts (North Central Highlands Region, for US\$ 2.06 million for 2003 and US\$ 1.2 million proposed for 2004) (USAID 2003<sup>36</sup>). Immunization is just one part of an overall programme that covers access to health services, health service quality, safe motherhood and nutrition.

**Vaccine producers in Viet Nam:** The state-owned enterprises that produce vaccines in Viet Nam include: IVAC (DTP, TT, BCG); VabioTech (vaccines against hepatitis B, JE, cholera and rabies); Poliovac (OPV) and the Pasteur Institute in HCMC (BCG). VabioTech has recently started exporting JE vaccine to India. These producers have supported immunization in Viet Nam by producing low cost vaccines. Also these vaccines are not subjected to the high freight costs of imported vaccines. This domestic vaccine production has also been helpful during the current global shortage of such vaccines as DTP and TT.

Vietnamese vaccine producers have also constructively engaged with health officials in making the vaccine formulations appropriate to Vietnamese needs (eg, on issues such as vial size). With international support (JICA and the Republic of Korea) some of these manufacturers are expanding their production capacity. This will allow Viet Nam to become self-sufficient in typhoid vaccine and hepatitis B vaccine (since domestic product currently only covers an estimated 15% of the child population for hepatitis B vaccine). A National Regulatory Authority was established in 1999 as part of the process of facilitating Vietnamese vaccines reaching international standards of manufacturing practice.

**WHO:** The involvement of WHO in Viet Nam has been on-going since 1968. Particular areas of focus for WHO in Viet Nam have included supporting training of staff, surveillance (eg, relating to AFP, AEFI, measles and other vaccine-preventable diseases), supporting monitoring (eg, EPI reviews) and provision of technical advice (eg, on

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<sup>36</sup> USAID. Data sheet for “Assistance to Vulnerable Groups” Program. Internet: [http://www.usaid.gov/policy/budget/cbj2004/asia\\_near\\_east/vietnam.pdf](http://www.usaid.gov/policy/budget/cbj2004/asia_near_east/vietnam.pdf)

vaccines and injection safety). A major focus in the 1990s was supporting the elimination of polio in Viet Nam.

In 2002 the WHO team consisted of around 30 people and the 2002-2003 budget is around US\$ 8 million, including an estimated US\$ 3.5 million in extra-budgetary funds. This extra-budgetary component has been increasing recently due to successful mobilisation of resources.

“Combating communicable diseases” is currently one of WHO’s three programmatic areas. Within this area, support for immunization is a major component. Support will continue to be given jointly with UNICEF to the National EPI programme. This support aims to strengthen the routine programme, to introduce hepatitis B immunization, to enhance injection safety and to strengthen the quality assurance in vaccine production. WHO has noted that “although the burden of communicable diseases in Viet Nam has been decreasing, there is still an unfinished agenda” (WHO 2003<sup>37</sup>). It has also reported that it has been very strong in the area of communicable disease control in the past biennia and “will continue for the next biennia”. WHO has also specifically stated that it plans to work to improve child health through support to National EPI in relation to measles and hepatitis B control in Viet Nam. However, specific budget commitments for the year 2004 and beyond have yet to be clarified.

In terms of monitoring vaccine quality, WHO has recently provided support for a National Regulatory Authority assessment in Viet Nam. This will assist in Vietnamese produced vaccines meeting WHO standards for quality.

**World Bank:** The Bank has provided input to the GAVI Regional Working Group and may provide support for the forthcoming EPI Review in Viet Nam. Also, its strong support in other areas of health is likely to provide indirect benefits to the delivery of preventive health services such as immunization. For example Bank-supported projects have supported the provision of primary health care in poorer provinces. It has also supported the equipping of communes in remote areas with health staff.

### 3. Pre-Vaccine Fund and Vaccine Fund Year Financing

This section provides an analysis of basic information about the total cost of the national immunization programme in Viet Nam. It compares major cost categories during a year before Vaccine Fund resources (year 2000) and for the second year of the provision of Vaccine Fund resources (the “Vaccine Fund year” – ie, 2003).

**Detailed cost analyses:** The detailed cost analyses are shown in Table 3.1 for year 2000 and Table 3.2 for year 2003 in electronic Annex I Tables for Section 3. Specific components of these costs are provided in these Excel spreadsheets (the “cost projection tool”).

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<sup>37</sup> WHO. WHO country cooperation strategy 2003-2006: Viet Nam (internal document). Ha Noi: World Health Organization, 2003.

**Major cost drivers:** Table 3.3 in electronic Annex I Tables for Section 3 details the major cost components of immunization services. For both years the largest cost category was personnel costs (salaries and allowances), followed by the cost of vaccines. For 2003 the next most important categories were: the cost of campaigns, then the cost of cold chain equipment, and then the cost of injection supplies. Even though personnel costs were the major cost category it is of note that salaries and allowances of health workers are generally considered to be relatively low in Viet Nam; more over EPI staff from regional to overcome level have to carry out other health services.

The biggest absolute increase in cost between the two years was for vaccines (Table 3.3). This is attributable to the expansion in the use of hepatitis B vaccine and the need for imported DTP vaccine in 2003 (owing to a temporary reduction in production by the domestic producer with the relocation of a facility). Another factor was the increases in the cost of domestic vaccines made by state-owned enterprises in Viet Nam. However, Viet Nam was still making substantial savings from the use of domestic vaccines at an estimated \$US 1.02 million per year (relative to purchasing all vaccines from UNICEF). Most of this saving is due to the relatively low cost of OPV, followed by hepatitis B and DTP. Some of the saving is also from avoiding freight costs associated with importation. For further details see the second table in the “vaccines” part of the spreadsheet for costings in 2003.

One factor in why the vaccine cost category is relatively large is because Viet Nam also uses JE vaccine, cholera vaccine and typhoid vaccine in selected high-risk areas (at a total additional cost of around US\$ 2.1 million in 2003).

The next biggest absolute increase in cost (after the vaccine category) was for cold chain equipment. This increase was substantially due to donor inputs in 2003. The cost of injection supplies also increased with the shift to using AD syringes and safety boxes. This was even with the cost savings attributable to Viet Nam’s own production of AD syringes and safety boxes (which are less expensive than internationally-available products). Vietnam spent 79.3% of total costs for the above mentioned essential equipment.

**Major funders:** Table 3.4 in electronic Annex I Tables for section 3 details the major funders of immunization services in Viet Nam. Of particular note is the importance of the Government of Viet Nam as the major funder – with the Government increasing expenditure in absolute terms over this time period. However, the role of donors also increased proportionately over this time period with increased support from GAVI, the Government of Luxembourg, UNICEF, and PATH/CVP. There was a decrease in the level of support provided by JICA, WHO, and AusAID (however this analysis did not include all the inputs from JICA, Republic of Korea, UNICEF and WHO into supporting domestic vaccine production in Viet Nam).

**Cost per immunized child:** Table 3.5 in electronic Annex I Table for section 3 details the T increase in the cost per immunized child between the two years. It also suggests that there was a small decrease in the level of Government spending on immunization as a proportion of the total Government health budget. The cost per immunized child for 2003 is possibly a bit lower than that for some other developing countries. This may be due to Viet Nam’s relatively low personnel costs, the savings attributable to domestic vaccine production, and the use of relatively old cold chain equipment in much of the country.

This analysis provides a cost to the health sector per child immunized. However the true cost to the Government of Viet Nam as a whole is possibly somewhat higher, given that this analysis does not consider the following factors:

- Government expenditure on the basic training of health workers who provide immunizations (ie, training to become a nurse, assistant doctor or doctor).
- The initial Government inputs associated with support for vaccine manufacture in Viet Nam (and the ongoing inputs that are linked with the support from various countries and organisations relating to expanding production capacity).
- The provision of discounted television and radio advertising for immunization-related advertising by state-owned broadcasters.
- Uncountable salary and allowances of health workers.
- Uncountable expenditure for volunteers working in EPI services.

Furthermore, the true cost of immunization is likely to be higher still (to Viet Nam society as a whole) when considering non-Government inputs such as:

- The provision by many health workers at the CHC level of their own transport for work purposes (for which they may not always fully compensated in terms of vehicle depreciation and running costs). Also a small percentage of these workers use their home as a basic health facility (ie, if no CHC is present).
- Village volunteers who provide their time to bring children to immunization posts (though this analysis did include the expenditure on small gifts for these volunteers).
- Village residents who provide accommodation and food for EPI workers involved in outreach (eg, to mountainous areas).

Some donor inputs which have been used to enhance primary care infrastructure and activities (with likely beneficial flow-on effects to immunization).

## 4. Future Resource Requirements and Programme Financing / Gap Analysis

This section projects future costs (based on assumptions about the inputs required) and estimates and analyses the gap between future resource requirements and available financing.

### **Projections of resourcing requirements**

The projection analysis (Scenario A: basic scenario for 2004-2013) assumed a baseline where there was a continuation of the current immunization services as per the year 2003 (ie, no measles second dose and no expansion of JE immunization). However, it was assumed that there was some initial intensive upgrading of cold chain equipment (at a 20% replacement rate) that after three years was reduced (ie, to a 10% replacement rate). Also supplementary immunization activities to eliminate maternal and neonatal tetanus were assumed to run for only another three years (given the good progress to date with control of tetanus in Viet Nam). The detailed results are shown in Table 4.1 below and specific methodological details are in Annex 2. The relevant Excel spreadsheets in electronic form have also been provided with this document (the “financing projection and gap analysis tool”).

The most notable feature of Table 4.1 is the dominance of operational costs and new vaccines (which in this analysis covers hepatitis B as well as JE and typhoid) categories. The cost projection for vaccines and injection supplies is also shown in Table 4.2. Of note is that the analysis for this table also did not assume any change in the use of measles or expansion of JE immunization coverage. This means that the cost increase is entirely due to the natural increase in the denominator population (since vaccine costs were not subjected to an annual inflation rate adjustment). Of note is the importance of hepatitis B vaccine in determining the overall cost (ie, 38% of the total cost). The next most important vaccine in terms of cost was Japanese encephalitis, closely followed by DTP and cholera vaccines.

An alternative “Scenario B” included the introduction of second dose of measles (in 2005), the phase in of increased coverage of JE vaccine (from 24% in 2004 and beginning to increase in 2005 up to 95% coverage by 2009) and introduction of Hemophilus influenzae type b (Hib) vaccine (from 7% in 2005 and maintain 9% from 2006 onward). For measles control this resulted in a total cost of US\$ 771,064 per year in 2007 and for JE the cost rose to over US\$ 3 million per year from 2009 onwards. The detailed results are shown in Table 4.3 below (and a separate spreadsheet has been provided in electronic format). To cover the additional costs of “Scenario B” the national EPI funding would have to be increased by around 50% for the year 2005 and by around 80% for year 2009 (relative to Scenario A).

## **Financing Gap Analysis**

The assumptions used in the analysis are detailed below:

**Government of Viet Nam:** The budget for EPI for 2004 has been announced and so this was treated as “secure” funding. However, this budget does not cover health worker salaries and various shared costs. Government funding in subsequent years (assuming an increase of 10% per annum) was also considered to be “probable”. This is still a conservative figure given the historical pattern of funding increases over the past decade and also the rapid economic growth that is still underway in Viet Nam (with the associated likely expansion of sources of revenue for the Government).

**GAVI:** The approved funding for the period 2004-2006 was included as “secure”.

**JICA:** The funding at the 2003 level (measles vaccine and cold chain equipment) was considered “probable” over a three year period. This was on the basis of comments from JICA and the strong historical support from JICA over a long period in terms of measles control and cold chain improvements. A phase out over two years was assumed to occur in the 2007-2008 period.

**Government of Luxembourg:** The funding relating to cold chain equipment for 2004-2005 was treated as “secure” since this is based on a signed agreement with the Government of Viet Nam.

**UNICEF:** Given the long term support provided by UNICEF in the past to immunization services in Viet Nam, a continuation of this funding (at the 2003 level) was considered “probable” for the five years 2004-2009 – followed by a two year phase out.

**WHO:** From WHO financial documentation it was possible to identify some secure funding for specific projects in 2004 and 2005. Also, given the long term support provided by WHO in the past to immunization services in Viet Nam a continuation of this funding (at the 2003 level) was considered “probable” for the five years 2004-2009.

**PATH/CVP:** The planned provisional budget for 2004 was treated as “probable” with a similar pattern also being “probable” for the subsequent two years.

## **Results of the financing and gap analysis**

The key results of the analysis are detailed in Tables 4.4 and 4.5 below (with more detailed results in the relevant electronic spreadsheet). Of note is that there is relatively little “secure” funding for immunization services and there is no “secure” funding at all after 2006. A majority of the “secure” funding comes from GAVI and then from the National EPI budget for 2004. The Government of Luxembourg is also providing secure funding for 2004-2005.

By far the most important source of “probable” funding is the Government of Viet Nam since this analysis was based on a continuation of the historical trend for increasing

funding (using an annual increase of 10%). The next major source of “probable” funding was UNICEF, followed by JICA and then WHO.

The size of the funding gap expands most sharply at the beginning of the year 2005, if only the secure funds are taken into account, and then again after the support from GAVI ends in 2007. Indeed, the cost category for “new and other” vaccines contributes 44% of the funding gap in 2007 (see Table 4.5).

The overall size of the “gap” also increases over time as the contribution from other partners is no longer defined as “probable” and with on-going population growth. If however, there is a growth in Government financing of immunization services at 10% per annum – the “gap” narrows over time and nearly disappears by 2013. But to close the gap completely (and assuming no additional donor inputs) the programme will need substantial additional funding (see Table 4.4).

Although this analysis is suggestive of some “real” risk to financing, part of the risk shown in Table 4.4 is simply due to the long length of the forward time commitment covered by the analysis. It is a basic fact that neither donors nor Governments can commit to funding so far out into the future. It is also rational not to entirely pre-commit the health budget in this way as it allows for some flexibility in being able to divert health funding to emerging crises (e.g. outbreaks of SARS). Nevertheless, as time progresses the “gap” is likely to be filled by the following:

- The Government of Viet Nam’s likely support for increasing the health budget – especially given the likely future growth of the economy and therefore the tax base with which to fund basic health services such as immunization.
- Donors may commit their support further in advance when they line up their long-term objectives with those of Viet Nam (e.g. in such areas as regional measles elimination). Donors may also become more appreciative of the cost-effectiveness immunization and therefore increase their support accordingly.
- There may be improvements in reducing costs that reduce the size of the “gap”. For example when domestic production of measles vaccines begins or if low cost Vietnamese refrigeration equipment becomes acceptable for widespread use in the cold chain.

Nevertheless, the projected funding “gap” does suggest that there is a definite need to mobilize more funding for immunization services and to realise any efficiency gains that lower costs. This is particularly so if the objectives in Scenario B (second dose measles ,expanding JE coverage and introduction of Hib) are to be realised. These issues are considered further in the Section 5.

**Table 4.1 Summary Cost Projection Table (Scenario A: Basic scenario)\*: US\$**

Item No	Cost category	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL
		US\$										
<b>1</b>	<b>Vaccines</b>	<b>\$ 6,081,503</b>	<b>\$6,098,706</b>	<b>\$ 6,115,446</b>	<b>\$ 6,131,710</b>	<b>\$ 6,205,290</b>	<b>\$ 6,279,754</b>	<b>\$ 6,355,111</b>	<b>\$ 6,431,372</b>	<b>\$ 6,508,549</b>	<b>\$ 6,586,651</b>	<b>\$ 70,943,233</b>
1.1	-Traditional 6 antigens	\$ 1,761,140	\$ 1,782,274	\$ 1,803,661	\$ 1,825,305	\$ 1,847,209	\$ 1,869,375	\$ 1,891,808	\$ 1,914,510	\$ 1,937,484	\$ 1,960,734	\$ 18,593,500
1.2	- New and underused	\$ 3,659,075	\$ 3,702,984	\$ 3,747,420	\$ 3,792,389	\$ 3,837,898	\$ 3,883,953	\$ 3,930,560	\$ 3,977,727	\$ 4,025,459	\$ 4,073,765	\$ 38,631,231
1.3	-SIA vaccine costs	\$ 661,287	\$ 613,447	\$ 564,365	\$ 514,015	\$ 520,184	\$ 526,426	\$ 532,743	\$ 539,136	\$ 545,606	\$ 552,153	\$ 5,569,361
<b>2</b>	<b>Injection supplies</b>	<b>\$ 1,627,075</b>	<b>\$ 1,558,370</b>	<b>\$ 1,487,781</b>	<b>\$ 1,415,274</b>	<b>\$ 1,432,258</b>	<b>\$ 1,449,445</b>	<b>\$ 1,466,838</b>	<b>\$ 1,484,440</b>	<b>\$ 1,502,253</b>	<b>\$ 1,520,280</b>	<b>\$ 14,944,015</b>
<b>3</b>	<b>Cold chain equipment</b>	<b>\$ 232,777</b>	<b>\$ 198,938</b>	<b>\$ 202,916</b>	<b>\$ 101,420</b>	<b>\$ 144,300</b>	<b>\$ 105,518</b>	<b>\$ 107,628</b>	<b>\$ 109,781</b>	<b>\$ 111,976</b>	<b>\$ 114,216</b>	<b>\$ 1,429,469</b>
<b>4</b>	<b>Operational costs*</b>	<b>\$ 6,519,156</b>	<b>\$ 6,409,831</b>	<b>\$ 6,286,375</b>	<b>\$ 6,147,989</b>	<b>\$ 6,322,622</b>	<b>\$ 6,501,818</b>	<b>\$ 6,685,694</b>	<b>\$ 6,874,362</b>	<b>\$ 7,067,942</b>	<b>\$ 7,266,557</b>	<b>\$ 66,082,346</b>
<b>5</b>	<b>Other capital costs**</b>	<b>\$ 710,736</b>	<b>\$ 724,951</b>	<b>\$ 739,450</b>	<b>\$ 754,239</b>	<b>\$ 769,324</b>	<b>\$ 784,710</b>	<b>\$ 800,404</b>	<b>\$ 816,412</b>	<b>\$ 832,741</b>	<b>\$ 849,395</b>	<b>\$ 7,782,361</b>
<b>TOTAL</b>		<b>\$15,171,246</b>	<b>\$14,990,795</b>	<b>\$14,831,969</b>	<b>\$14,550,632</b>	<b>\$14,873,793</b>	<b>\$15,121,244</b>	<b>\$15,415,675</b>	<b>\$15,716,367</b>	<b>\$16,023,461</b>	<b>\$16,337,100</b>	<b>\$ 153,032,282</b>

**Note:** The table does not include shared personnel costs since they are allocated directly from the National Treasury and it requires the clearance of Ministry of Labour to list figures.

\* Operational costs include personnel, transportation (full and shared), maintenance and overhead, short & long-term training, IEC/communication, monitoring and surveillance, MNT campaigns and other recurrent costs.

\*\* Other capital costs include vehicle and computer costs.

**Table 4.2 Projected costs of vaccines and injection equipment: US\$**

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	TOTAL	%
<i>Traditional 6 antigens</i>												
BCG	294,530	298,065	301,642	305,261	308,924	312,631	316,383	320,180	324,022	327,910	<b>3,109,549</b>	5.4%
DTP	592,556	599,667	606,863	614,145	621,515	628,973	636,521	644,159	651,889	659,712	<b>6,255,998</b>	10.9%
TT -Pregnant Women	157,107	158,992	160,900	162,830	164,784	166,762	168,763	170,788	172,838	174,912	<b>1,658,675</b>	2.9%
Measles (1 dose)	410,870	415,800	420,790	425,840	430,950	436,121	441,354	446,651	452,011	457,435	<b>4,337,821</b>	7.6%
OPV	306,077	309,750	313,467	317,229	321,036	324,888	328,787	332,732	336,725	340,766	<b>3,231,457</b>	5.6%
<b>Subtotal</b>	<b>1,761,140</b>	<b>1,782,274</b>	<b>1,803,661</b>	<b>1,825,305</b>	<b>1,847,209</b>	<b>1,869,375</b>	<b>1,891,808</b>	<b>1,914,510</b>	<b>1,937,484</b>	<b>1,960,734</b>	<b>18,593,500</b>	
<i>New vaccines / other</i>												
Hepatitis B	2,055,837	2,080,507	2,105,473	2,130,739	2,156,307	2,182,183	2,208,369	2,234,870	2,261,688	2,288,828	<b>21,704,801</b>	37.9%
cholera	497,145	503,110	509,148	515,258	521,441	527,698	534,030	540,439	546,924	553,487	<b>5,248,679</b>	9.2%
Japanese encephalitis*	640,833	648,523	656,305	664,181	672,151	680,217	688,380	696,640	705,000	713,460	<b>6,765,691</b>	11.8%
Typhoid*	465,261	470,844	476,494	482,212	487,999	493,854	499,781	505,778	511,847	517,990	<b>4,912,060</b>	8.6%
<b>Subtotal</b>	<b>3,659,075</b>	<b>3,702,984</b>	<b>3,747,420</b>	<b>3,792,389</b>	<b>3,837,898</b>	<b>3,883,953</b>	<b>3,930,560</b>	<b>3,977,727</b>	<b>4,025,459</b>	<b>4,073,765</b>	<b>38,631,231</b>	
<b>TOTAL</b>	<b>5,420,216</b>	<b>5,485,258</b>	<b>5,551,081</b>	<b>5,617,694</b>	<b>5,685,107</b>	<b>5,753,328</b>	<b>5,822,368</b>	<b>5,892,236</b>	<b>5,962,943</b>	<b>6,034,499</b>	<b>57,224,731</b>	<b>100%</b>

Notes: \* Based on the assumption of no change in coverage from the level in 2003.

**Table 4.3 Projected costs for scenario (second dose measles and expanding JE coverage and introduction of Hib into the EPI)\*: US\$**

	2004	2005**	2006***	2007	2008	2009****	2010	2011	2012	2013	TOTAL	%
Measles- second dose	-	-	360,910	771,064	780,316	789,680	799,156	808,746	818,451	828,273	<b>5,956,596</b>	0.7%
Hib	-	5,861,830	8,089,325	8,186,397	8,284,633	8,384,049	8,484,658	8,586,474	8,689,511	8,793,785	<b>73,360,661</b>	71.1%
Japanese encephalitis	729,170	1,174,522	1,630,458	2,097,167	2,574,843	3,063,681	3,100,445	3,137,650	3,175,302	3,213,406	<b>23,896,645</b>	23.2%
<b>TOTAL</b>	<b>729,170</b>	<b>7,036,352</b>	<b>10,080,693</b>	<b>11,054,628</b>	<b>11,639,793</b>	<b>12,237,410</b>	<b>12,384,259</b>	<b>12,532,870</b>	<b>12,683,264</b>	<b>12,835,464</b>	<b>103,213,902</b>	<b>100%</b>

Note: \* Covers the cost of vaccine and injection supplies but not other delivery costs.

\*\*Introduction of the second dose of measles vaccine (with 45% coverage).

\*\*\* Universal coverage (95%) of measles second dose.

\*\*\*\*End of expansion of JE coverage (and assuming it reaches 95% of the target population).

**Table 4.4 Summary of estimated secure/ probable funding and the estimated funding gap:US\$**

<b>Secure Funding</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006**</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Government (all levels)	\$ -	\$ 6,500,150	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
GAVI-VF	\$ -	\$ 3,659,831	\$ 3,512,250	\$ 2,563,108	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
JICA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Government of Luxembourg	\$ -	\$ 1,515,300	\$ 5,400	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
UNICEF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
WHO	\$ -	\$ 64,000	\$ 53,800	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
PATH/CVP	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	<b>\$ -</b>	<b>\$ 11,739,281</b>	<b>\$ 3,571,450</b>	<b>\$ 2,563,108</b>	<b>\$ -</b>						
<b>Funding Gap</b>	<b>\$</b>	<b>\$ 3,431,965</b>	<b>\$ 11,419,345</b>	<b>\$ 12,268,861</b>	<b>\$ 14,550,632</b>	<b>\$ 14,873,793</b>	<b>\$ 15,121,244</b>	<b>\$ 15,415,675</b>	<b>\$ 15,716,367</b>	<b>\$ 16,023,461</b>	<b>\$ 16,337,100</b>
<b>Secure + Probable Funding</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006**</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Government (all levels)***	\$ -	\$ 6,500,150	\$ 7,150,165	\$ 7,865,182	\$ 8,651,700	\$ 9,516,870	\$ 10,468,557	\$ 11,515,413	\$ 12,666,954	\$ 13,933,649	\$ 15,327,014
GAVI-VF	\$ -	\$ 3,659,831	\$ 3,512,250	\$ 2,563,108	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
JICA	\$ -	\$ 350,000	\$ 350,000	\$ 350,000	\$ 233,000	\$ 121,000	\$ -	\$ -	\$ -	\$ -	\$ -
Government of Luxembourg	\$ -	\$ 1,515,300	\$ 5,400	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
UNICEF	\$ -	\$ 526,343	\$ 526,343	\$ 526,343	\$ 526,343	\$ 526,343	\$ 526,343	\$ 349,000	\$ 174,500	\$ -	\$ -
WHO	\$ -	\$ 192,100	\$ 173,800	\$ 173,800	\$ 173,800	\$ 173,800	\$ 173,800	\$ -	\$ -	\$ -	\$ -
PATH/CVP	\$ -	\$ 133,400	\$ 133,400	\$ 133,400	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>	<b>\$ -</b>	<b>\$ 12,877,124</b>	<b>\$ 11,851,358</b>	<b>\$ 11,611,833</b>	<b>\$ 9,584,843</b>	<b>\$ 10,338,013</b>	<b>\$ 11,168,700</b>	<b>\$ 11,864,413</b>	<b>\$ 12,841,454</b>	<b>\$ 13,933,649</b>	<b>\$ 15,327,014</b>
<b>Funding Gap</b>	<b>\$ -</b>	<b>\$ 2,294,122</b>	<b>\$ 3,139,437</b>	<b>\$ 3,220,136</b>	<b>\$ 4,965,789</b>	<b>\$ 4,535,780</b>	<b>\$ 3,952,544</b>	<b>\$ 3,551,262</b>	<b>\$ 2,874,914</b>	<b>\$ 2,089,812</b>	<b>\$ 1,010,086</b>

**Note:** \* The table does not include Vietnamese Government funding for shared personnel costs since they are allocated directly from the National Treasury and it requires the clearance of Ministry of Labour to list figures.

\*\* End of Vaccine Fund commitment (ie, the last year that support is provided).

\*\*\* Reflecting 10% annual proportional increase of MOH budget for EPI based on the interim agreement during the FSP discussion.

**Table 4.5 Vaccine and projected costs and contribution to the funding gap**

	2004	2005	2006*	2007	2008	2009	2010	2011	2012	2013
<i>Proportion of projected costs</i>										
Traditional vaccines	7.3%	7.4%	7.5%	7.6%	7.5%	7.5%	7.4%	7.4%	7.3%	7.3%
New vaccines (Hepatitis B, JE, Cholera)	15.2%	15.4%	15.6%	15.8%	15.7%	15.6%	15.5%	15.3%	15.2%	15.1%
All vaccines	22.5%	26.0%	26.3%	26.7%	26.5%	26.3%	26.1%	25.9%	25.8%	25.6%
<i>Vaccines and the funding gap</i>										
Cost of new vaccines as a proportion of the funding gap (secure+ probable)	0.0%	0.0%	0.0%	44.1%	43.7%	43.5%	43.1%	42.8%	42.5%	42.2%

**Note:** \* End of Vaccine Fund commitment (ie, the last year that support is provided).

## 5. Sustainable Financing Strategy, Actions and Indicators

This section examines the challenges and opportunities for programme resourcing. It then presents the strategy for moving toward financial sustainability in the resourcing of the national immunization programme.

### 5.1. Opportunities for programme resourcing

#### **Opportunities for enhanced immunization programme resourcing (within Viet Nam)**

*1) Enhancing Government funding of EPI (central level):* A substantial increase in Government resourcing of National EPI could be justified on the grounds that the programme could achieve significantly more to improve health if it was better resourced. This is especially likely to be so in terms of measles control but also for expanding JE coverage. Ways that this could be achieved include:

- Stronger advocacy by health workers to the Government (including highlighting the cost-effectiveness of immunization relative to most other areas of health sector spending). On-going close cooperation between the MoH and the other two key ministries (MoF and MoPI) is critical.
- Stronger advocacy by donor organisations to the Government (including highlighting the cost-effectiveness of immunization and the benefits of regional control of communicable diseases – such as measles).
- Recommendations from the MoH and donors to Government that it considers earmarking revenues from health-promoting taxes (eg, tobacco tax and alcohol tax) for National Health Programmes (including EPI). Organisations such as WHO specifically recommend such tied taxes (WHO 2002<sup>38</sup>, p152). The Government of Viet Nam has passed a resolution stating that tobacco is a type of “harmful good” (VNHR 2002, p146) and the level of tobacco tax is to be raised by 10% in January 2004. The idea of taxing medicines that are not on the essential drugs list has also been suggested in the Viet Nam context (Ladinsky et al 2000<sup>39</sup>).

*3) Budget shifting at the national and province levels:* The Central Government and Provincial Governments could increase the proportion of their health budgets spent on prevention as opposed to treatment services. This could be promoted through stronger advocacy by health workers involved in immunization and by donors. Such advocacy could include highlighting the cost-effectiveness of immunization relative to most other areas of health sector spending.

It is also possible that the relatively wealthy provinces in Viet Nam (such as HCMC and Ha Noi) could pay a large proportion of the salaries of their own health workers. This

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<sup>38</sup> WHO. The work of WHO in the Western Pacific Region (1 July 2002 – 30 June 2003). Manila: World Health Organization, 2003.

<sup>39</sup> Ladinsky JL, Nguyen HT, Volk ND. Changes in the health care system of Vietnam in response to the emerging market economy. *J Public Health Policy*. 2000;21:82-98.

would allow Central Government to divert additional financial resources to poorer provinces. Improvements in the accountability of how Provincial Governments spend their health budgets could also help facilitate a stronger focus on preventive services.

**4) *Cross-subsidisation at the province level?:*** Provinces could also increase user fees for their treatment services and use some of the extra revenue for preventive services (such as immunization). However, this would require careful consideration as high user fees for health services may be exacerbating poverty for some sectors of the population (VNHR 2002). The VNHR states that reducing user fees is one way of reducing the “medical poverty trap” and that it is desirable that these user fees are replaced with pre-payment schemes (VNHR 2002, p83).

**5) *User fees for non-routine immunizations?:*** At present some local authorities approve small fees for the non-routine immunizations (eg, hepatitis B for older children; JE, typhoid, and cholera vaccine outside high-risk areas; booster immunizations for JE; Hib vaccine; and pneumococcal vaccine). Some hospital outpatients also apply user fees for routine EPI vaccines so as to make these available outside the routine monthly immunization sessions (eg, HCMC Hospital Number 1).

To raise additional revenue, the health sector could systematically introduce user fees for these non-routine immunizations and charge higher fees. These non-routine immunizations could be promoted in MoH advertising and the profits from sales of these vaccines could then be used to cross-subsidise routine EPI activities. However, there are problems with such user fees in that they involve administration costs and they might delay new initiatives (eg, the introduction of free JE vaccine and free Hib vaccine for all children). Also some immunizations should only be provided in national programmes where a high level of coverage can be assured. For example the limited use of vaccines containing antigens against rubella can actually do more overall harm than good to public health (by shifting the average age of infection in the population to older age groups and hence increasing the risk of rubella infection in pregnant women).

**5) *Support via health insurance schemes?:*** Existing Government policy is that insurance schemes should not cover immunization – since free immunization is provided through a national programme (Decree 10/2002/NS-CP). This would seem to be appropriate as insurance is more suited to risk management associated with unexpected treatment costs and has potentially adverse effects in terms of equity and efficiency (Akal and Harvey 2001<sup>40</sup>). Also insurance schemes are not particularly well developed in Viet Nam (ie, currently only 15% of the population is covered and the schemes in existence may not be functioning particularly effectively (especially in terms of reaching the poor)

If however, Government funding for the EPI programme became constrained in the long-term, then one possibility is to include immunization coverage in the current student health insurance scheme (eg, possibly for second dose measles and JE immunization). Also rural health schemes could potentially cover JE immunization if the Government was unable to fund universal coverage of JE immunization of children within the next decade.

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<sup>40</sup> Akal A, Harvey R. The role of health insurance and community financing in funding immunization in developing countries. Background paper for the GAVI Financing Task Force, 2001.

## **Opportunities for enhanced programme resourcing (external resources)**

**1) GAVI funding extension (hepatitis B vaccine):** A one year extension of GAVI funding for this vaccine could be requested (ie, to cover the year 2007) by a written request to the GAVI Board. The justification for this would be that the provision of this vaccine to Viet Nam in 2002 was somewhat delayed and also Viet Nam has been covering around 15% of the child population with its own vaccine. This extension would also provide some extra time to allow locally produced vaccine to reach full production capacity.

**2) Obtaining GAVI funding (JE vaccine):** GAVI does not currently categorise JE vaccine as an “under-used” vaccine. However, a request could be made to the GAVI Board on the grounds that African countries get funding for yellow fever vaccine and so it is reasonable and equitable that low-income Asian countries get funding for JE vaccine. Also there is reasonable evidence that JE vaccine is being under-utilised in the Viet Nam setting and that it is a cost-effective intervention. For example there is evidence from a study in Shanghai (China) that use of JE vaccine was cost saving to the health sector (Ding et al 2003<sup>41</sup>). Also a study in Thailand found this vaccine was cost saving where the annual incidence of JE was over 3 per 100,000 population (Siraprapasiri et al 1997<sup>42</sup>).

**3) Obtaining GAVI funding (Hib):** Further consideration could be given to making an application to GAVI for funding the introduction of low-dose Hib vaccine (given suggestive available evidence for the efficacy of this vaccine at one-tenth the normal dose (Nicol et al 2002<sup>43</sup>)). This application could include funding for a pilot study to assess vaccine efficacy and effectiveness when given in combination with locally produced DTP vaccine (eg, in a pilot site with appropriate laboratory facilities such as Ha Noi).

**4) Additional project grants from other bilateral or multilateral agencies:** A potentially promising area for project grants is funding for a second dose of measles vaccine. A number of donors have provided strong support for measles control in the past (eg, JICA) and measles elimination has now become a region-wide objective that could feasibly be achieved. Both UNICEF and WHO will continue to be strongly supportive of enhancements in measles control. Donors may also be particularly interested in exploring the following:

- The expansion of JE immunization (given its cost-effectiveness).
- Assisting in funding for hepatitis B vaccine after GAVI funding finishes after 2006 (if Vietnamese manufacturers are not quite ready to produce hepatitis B vaccine at this time).
- Enhancing training of EPI workers (since this has such widespread benefits for primary health care).

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<sup>41</sup> Ding D, Kilgore PE, Clemens JD, et al. Cost-effectiveness of routine immunization to control Japanese encephalitis in Shanghai, China. *Bull World Health Organ* 2003;81:334-42.

<sup>42</sup> Siraprapasiri T, Sawaddiwudhipong W, Rojanasuphot S. Cost benefit analysis of Japanese encephalitis vaccination program in Thailand. *Southeast Asian J Trop Med Public Health* 1997;28:143-8.

<sup>43</sup> Nicol M, Huebner R, Mothupi R, et al. Haemophilus influenzae type b conjugate vaccine diluted tenfold in diphtheria-tetanus whole cell pertussis vaccine: a randomized trial. *Pediatr Infect Dis J* 2002;21:138-41.

- The funding of a pilot programme to investigate the use of low-dose Hib vaccine in Viet Nam (if this is not covered by GAVI funding – as discussed above).

Some people who commented on the draft of this FSP considered that a greater proportion of the relatively large donor resources going into HIV/AIDS prevention in Viet Nam might be better spent on EPI.

**5) *Applying for the grant portion of development loans:*** Given the cost-effectiveness of immunization in improving public health, there is a strong case for development loans to be used to support improving immunization services. This issue could be informed through further discussions with major loan providers such as the World Bank and the Asian Development Bank. These organisations could be particularly interested in supporting JE immunization expansion given the adverse long-term impacts of this disease on human productivity (ie, JE can cause long-term brain damage).

## **Specific opportunities for programme efficiency gains (that could lower costs)**

Efficiency gains can be used to save financial resources that can then be used to enhance immunization services in other ways.

**1) *Enhanced staff training to reduce vaccine wastage:*** Training can be used to improve logistics management and the performance of the cold chain (ie, particularly to prevent poor vaccine ordering leading to expired vaccine having to be discarded). It can also be used to promote the MDVP which can reduce vaccine wastage (as detailed below).

**2) *Cold chain improvements:*** Improvements in the cold chain will reduce the risk of damaged vaccine having to be discarded (with a particularly priority being the cold stores at the regional level). Improved stock management of cold chain equipment can also allow for more efficient bulk ordering of new equipment (which lowers purchase costs per unit). Improved stock management can also allow for greater standardisation of cold chain equipment, which allows for more cost-effective maintenance (ie, avoiding the problem of rare models of refrigeration equipment being discarded due to lack of spare parts). To facilitate these developments, Viet Nam could develop a “cold chain policy” document which included an analysis of the optimal refrigeration and freezing capacity at each level of the health system (from which optimal equipment models, quantities and replacement rates could be determined).

There may also be some benefit of a policy of only buying cold chain equipment from one or two manufacturers (to simplify maintenance issues). Consideration could also be given to testing and accrediting Vietnamese-produced refrigeration equipment for use in the cold chain (this would save on freight costs, improve access to spare parts and potentially provide other benefits to the Vietnamese economy).

For areas prone to power-outages, the appropriate use of different energy systems (gas power, backup generators) can protect against cold chain disruption and vaccine wastage. Increasing the number of CHCs with refrigerators may also save on vaccine costs and vaccine delivery costs (ie, by allowing vaccine to be stored overnight for two-day

immunization sessions). But this may increase overall costs and even lead to more vaccine wastage if the CHC staff do not receive appropriate training in both cold chain maintenance and vaccine ordering.

**3) *Improved access and use of communication and information technologies:*** Improvements in access to telephones and email throughout immunization services may assist in coordination of both routine and campaign activities. This may reduce the wastage of supplies (from vaccine to IEC materials). Improved access to computers may also lower the costs of training (eg, distributing a CD may replace the need for travel to some out-of-town training courses). Video CDs are used for training in China and these do not need a computer (merely a small CD player and a television).

### **Possible opportunities for programme efficiency gains (that require further consideration before inclusion in the Strategic Plan – Section 5.3)**

**1) *Administration of BCG vaccine:*** There could possibly be some advantage in shifting the bulk of BCG immunization to hospital nurses in maternity wards (as opposed to mainly EPI workers in CHCs as occurs currently). It could then be given at the same time as the first dose of hepatitis B vaccine (as is the case in many other developing countries). This change would shift the cost of providing BCG from the EPI part of the health service to the hospital sector (and hence save resources in the EPI budget).

**2) *Changing BCG vaccine formulation:*** Cost savings might occur if BCG vaccine was available in a single dose, 5-dose or 10-dose ampoules (rather than the current 20 dose one which costs US\$ 1.41). Indeed, work has been done in Viet Nam on a 10-dose ampoule – but this is not yet on sale. Also of note is that Japan could potentially assist with the technology transfer associated with producing a single dose BCG ampoule as this is currently produced in Japan (Japan BCG Co Ltd). However, any increase in the number of different types of vaccine formulations increases costs in terms of vaccine storage and stock management.

**3) *Combining the delivery of first dose measles with JE immunization:*** In areas where JE immunization is used, the number of immunization sessions could be reduced by combining the administration of these two vaccinations. Technical assistance from WHO could be used to consider the advantages and disadvantages of this approach in more detail. A preliminary analysis of measles morbidity data suggests that delaying first dose measles immunization (from 9 months to age 12 months) in Viet Nam would probably have beneficial impacts on measles elimination. But this issue requires more study.

**4) *Obtaining typhoid vaccine at a lower price:*** Viet Nam currently imports some of the typhoid vaccine it uses in its routine programme for high-risk areas (from Aventis Pasteur). Until Vietnamese production can meet the demand for this vaccine, it may be possible for UNICEF to use its procurement system to get typhoid vaccine at a lower price. This issue could be explored further with UNICEF as typhoid vaccine is currently not routinely procured by UNICEF.

**5) MDVP policy:** Promoting the multi-dose vial policy in Viet Nam (formerly described as the open dose vial policy) could produce small savings in the use of the hepatitis B vaccine given at birth (since this often involves the use of a two dose vial). It might also might reduce wastage of DTP vaccine (ie, allowing opened vials to be used the next day for an immunization session that lasts for two days). For DTP this would require an assessment of the level of preservative in the vaccine relative to WHO specifications. But to obtain these savings there would need to be further investment in health worker training regarding this policy. Nevertheless, the MDVP is already currently used in some hospital settings in Viet Nam (eg, those involved in IMCI).

**6) DTP and TT vaccine vial design:** There may be some savings if 10-dose vials for both DTP and TT were also produced by the local manufacturers (as opposed to just 20-dose vials). However, there would be additional costs in terms of cold chain storage capacity and in the complex of vaccine ordering. This issue could be explored further with technical advice from WHO and the relevant vaccine manufacturer (IVAC). Indeed, IVAC has already done some work on developing a 10-dose vial of DTP.

**7) Coordination with donors:** There currently appears to be good coordination and information sharing between the Ministry and donors (and between donors themselves). Nevertheless, on-going investment in information sharing and the functioning of the ICC for EPI will help maximise the benefits of cooperation.

**8) Vaccine vial monitors:** VVMs are currently used on imported hepatitis B vaccine and imported measles vaccine. However, they could be introduced for use with domestically produced vaccines and therefore assist in avoiding the use of any defective vaccine and in identifying weak points in the cold chain.

**9) Investment in family planning:** As population growth is a driver in overall immunization costs (see Section 4) further investment in this area would help to restrain the growth in programme costs over time by lowering the infant population. This area is also already a priority for the Government of Viet Nam.

## **Long-term opportunities for programme efficiency gains**

The following are not covered in the strategic plan (Section 5.3) but are listed to indicate long-term possibilities for improvements in programme efficiency.

**1) Lower cost domestic vaccines:** In the long-term, the state-owned enterprise companies that produce vaccine may reach the standards set by the National Regulatory Authority and be able to meet WHO's criteria for the export of vaccine. This may mean larger production capacity and lower unit costs that benefit the immunization programme in Viet Nam. Some vaccine production (eg, JE vaccine) is quite labour intensive and so Viet Nam (with its low labour costs) is likely to be fairly competitive in this area. Indeed, JE vaccine is already exported from Viet Nam to India. Progress in the area of enhancing local vaccine production is occurring with major assistance from JICA and the Republic of Korea.

2) **Long-term vaccine savings:** In the long-term, improvements in water supply and sanitation will reduce the need for expenditure on cholera and typhoid vaccines in Viet Nam. However, at least in the medium-term, these vaccines are considered very worthwhile ways to prevent these diseases in selected high-risk areas. Also in the long-term it may be possible to stop polio immunization – at some point after global polio eradication has been declared by the WHO.

3) **Sponsorship (business sector):** In the long-term, it may be possible to find sponsors from the business sector that would subsidise the cost of immunization advertisements or other aspects of the programme. This is plausible since immunization is widely considered by the public to be a positive health-promoting activity.

## 5.2. Scope for adjustments to address funding risks

There is such a strong political commitment to the EPI programme in Viet Nam that there is no “threat” to the basic funding of this preventive service. The only concern is that there may be delays in the provision of the additional funding from Central Government that is required to meet the objectives in the MYP. This situation could arise from a reduction in national economic growth or increased demands from other parts of the health sector (eg, to address HIV/AIDS, other chronic diseases, re-emerging disease threats such as SARS, or for the expanding demands of the treatment sector in general).

Another funding risk is that lack of improvements in health worker remuneration will damage the efficiency of the programme and lead to a reduced capacity to reach programme objectives. This situation could again arise if Government revenues are reduced from a decline in national economic growth.

Another possible funding risk is that donor support for immunization services will decline. Reasons for this could include a stronger focus by donors on other health issues (eg, HIV/AIDS, chronic diseases, injury and emerging diseases). It could also reflect low economic growth by major donors such as Japan. Donors may also shift their emphasis to countries that are poorer and growing less rapidly than Viet Nam (eg, those in sub-Saharan Africa).

The options for dealing with these funding risks are:

- Reviewing objectives and possibly reducing the speed in which improvements are introduced (eg, increasing JE immunization coverage over a longer period or reducing the size of any JE immunization catch-up campaign).
- Accelerating the potential improvements in programme efficiency that are detailed above in (Section 5.1).
- Considering various additional development loans (eg, from the World Bank or ADB) that would allow programme improvements to occur. These loans could be repaid once Viet Nam was in a stronger economic position.

### 5.3. Strategic plan and actions

This sub-section gives a summary of the specific strategies that are proposed and actions that are needed enhance financial sustainability of the national immunization programme. These strategies are derived from both the Ministry of Health's MYP (2001-2005) and consideration of the issues raised in Section 5.1 above.

**Table 5.1: Strategic plan to enhance financial sustainability of the national immunization programme and to improve its efficiency (for the top six major actions)**

Strategies	Major actions and organisation/s responsible	Indicator(s) / time frame
<i>1) Domestic resourcing for immunization services</i>		
1.1) Enhancing Government Funding for EPI (central level)	<ul style="list-style-type: none"> <li>FSP completion (coordinated by MoH with input from MoF and MoPI).</li> <li>Closer cooperation and information sharing between MoH and MoF and MoPI on funding issues.</li> <li>On-going work with partners (eg, via the ICC for EPI) to advocate for improving EPI funding at the central level.</li> </ul>	<ul style="list-style-type: none"> <li>FSP finalised in 2003.</li> <li>Overall immunization programme budget increases by at least 20% in real terms for 2005 &amp; 2006. However, the precise level of required future increases will depend on the extent to which donor assistance is increased and the extent to which all the objectives in the multi-year plan are pursued (see Table 4.4 and Table 4.3 for details).</li> </ul>
1.2) Budget shifting at the national and province levels	<ul style="list-style-type: none"> <li>Relevant ministries (MoH, MoF and MoPI) encourage Central Government and Provincial Governments to shift more resources towards prevention activities such as EPI (compared to treatment services).</li> <li>Donors also provide encouragement and public health and economic arguments for this funding shift.</li> </ul>	The proportion of health sector expenditure on EPI out of total expenditure (central and provincial levels) increases to the point where all components of the MYP are fully funded by 2010.
<i>2) External resourcing for immunization</i>		

Strategies	Major actions and organisation/s responsible	Indicator(s) / time frame
2.1) Additional resourcing from GAVI/ Vaccine Fund	<ul style="list-style-type: none"> <li>MoH gives further consideration to making additional requests to the GAVI Board (regarding hepatitis B, JE and Hib – see Section 5.1).</li> <li>Donors (eg, WHO) provide technical support for evaluating the options.</li> </ul>	MoH prepares the appropriate documentation (by 2005).
2.2) Project grants from bilateral or multilateral agencies	MoH undertakes discussions with existing donor organisations (eg, JICA, UNICEF) with regard to support for measles (2 <sup>nd</sup> dose) and extending JE immunization coverage.	Discussions are held and plans are finalised (if appropriate) during 2005.
2.3) The grant portion of development loans	MoH undertakes discussions with providers of development loans (ie, World Bank and ADB) with regard to support for extending JE immunization coverage.	Discussions are held and plans are finalised (if appropriate) during 2005.
<b>3) Improving programme efficiency</b>		
3.1) Enhanced staff training to reduce vaccine wastage	<ul style="list-style-type: none"> <li>MoH provides additional training relating to vaccine stock management and use (during 2004/2005).</li> <li>Donor organisations consider providing technical support and funding support for training.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate training is conducted for EPI managers in 80% of districts (by end of 2005).</li> <li>Wastage rates for hepatitis B vaccine are reduced (national wastage factor &lt; 1.15).</li> </ul>
3.2) Cold chain management	<ul style="list-style-type: none"> <li>MoH improves the standard of cold chain equipment at all levels.</li> <li>MoH develops an up-to-date functional inventory of all cold chain equipment (including the age of the equipment).</li> <li>Donor organisations consider providing funding support.</li> </ul>	<ul style="list-style-type: none"> <li>Surveys using vaccine vial monitors indicate that cold chain failure is &lt;5%.</li> <li>Inventory is established by 2005.</li> </ul>
3.3) Communication and information technologies	<ul style="list-style-type: none"> <li>MoH works to ensure that at least 95% of EPI managers at the district level have both computer and email access by the end of 2008.</li> <li>Donor organisations consider providing funding support for purchasing these technologies and training in their use.</li> </ul>	Surveys indicate that the 95% target is achieved by 2008.

## 6. Stakeholder Comments:

This section details the opinions and additional information provided by programme partners that are relevant to this FSP. Nevertheless, it is noted in the FSP guidelines prepared by GAVI that this plan is owned by the Government of Viet Nam and does not *require* endorsement from donors.

### **Comments from JICA:**

It is expected that the governmental budget plan to be ensured for the sustainability of EPI through this FSP practice. To achieve self-sufficiency of the Vietnamese EPI in the future, donors will continue to play an important role to support it.

### **Comments from PATH/CVP:**

The process of drafting the Viet Nam FSP has been interesting but difficult, requiring a level of detailed and open budget analysis and foresight that is not common in this country. National and development partners will certainly have benefited from the process, and are now left with a clearer picture of where the gaps are, and how the different options will impact on the financing of the Viet Nam EPI in the future. Although the ultimate outcome is self-sufficiency, there remains an important role for donors in supporting the Viet Nam EPI, which provides a model for neighbours in the region to emulate.

### **Comments from UNICEF:**

This is one of the most critical documents needed in order to ensure sustainability for the National EPI in Vietnam after termination of the GAVI support in 2006. A matter of concerns not raised in the document is the future cost for implementing universal precautions in all health facilities in the country. Safe injection practices and safety disposal boxes are not enough and this document will serve as starting point for joint co-ordination work between different donors and government of Vietnam for a successful future of the EPI.

### **Comments from WHO:**

The most important outcome of the financial sustainability planning practice was to share future needs for EPI funding displayed by concrete figures with related government line ministries, i.e. MoH, MoF and MoPI. Accordingly, MoH basically expressed acceptance of proportional increase of its EPI budget from 2005 onward, which is expected to be the most important financing source after GAVI Vaccine Fund's termination in 2006. However, the planning is a rolling process, and the FSP can be revisited in budgeting season of each fiscal year.

## Annex 1 Methodological Notes on Cost Calculations (years 2000 & 2003)

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### Exchange rates

For the year 2000 the average rate used was 14086 VND to 1 US\$ (WHO website<sup>44</sup>). For 2003 the equivalent average rate to the end of August was 15301 VND to 1 US\$. For 2003 the average rate to the end of August was 118.4 Japanese Yen to 1 US\$.

### Vaccine costings

For both 2000 and 2003 the stated cost per vial does not cover the transport of the vaccine from the state-owned enterprise suppliers in Viet Nam to the four regional cold stores (for locally produced vaccine). Therefore UNICEF average freight costs were used for these vaccines (as per the FSP guidelines Annex 1 p33-34). However, since the transport costs are limited to just transport within the country (and not around the world) only 25% of the stated UNICEF freight cost was generally used. The freight cost for JE and cholera vaccine was modelled on that for hepatitis B. However, the stated price per vial cost for imported vaccines (eg, measles and typhoid) is inclusive of freight (ie, to the central store).

JE, cholera and typhoid vaccine are only used in selected high risk areas.

**2003 data:** The stock movement data for 2003 was only available to the end of August – so the quantities have been annualised to give an expected quantity for the year. Full freight costs (using UNICEF averages) were used for the imported vaccines. The national stock data initially included both GAVI supplied and domestically supplied hepatitis B -

<sup>44</sup> WHO - Budget and finance section. Internet: [Http://intranet.wpro.who.int](http://intranet.wpro.who.int)

so this has been separated based on data from GAVI and the expected usage of domestically supplied hepatitis B vaccine.

DTP stock movements were also corrected for imported DTP supplied by a donor (UNICEF). Total DTP use is particularly high for this year because extra immunization was occurring to make up for the shortage of this vaccine in 2002 (hence the DTP stock movements were not annualised).

**2000 data:** For 2000 the donors paid for all the measles vaccine (which was used in measles campaigns in five provinces).

## Injection supplies

In the year 2003 stock management data (to end of August) do not adequately capture the flow of GAVI-provided materials (since some were delivered in late 2002 and others are pending). Hence in the summary table the supplies approved by GAVI for the 2003 year are used.

In the year 2000 safety boxes and AD syringes were not used.

Supplies of cotton wool and alcohol for skin preparation cost an estimate 46,000 VND per 100 children immunized (averaging 2 injections each) ie, 230 VND (US\$0.02) per injection (though this cost is covered at the local level and these supplies are not actually dispensed from the national level).

## Personnel costs

Data on dedicated EPI staff remuneration at the national and regional level were collected from National EPI and from the Northern Region. These data were supplemented by 2003 survey data on health sector wages and allowances (MoH/WHO 2003<sup>45</sup>).

**Numbers of workers:** At provincial levels and lower, estimates of the numbers of personnel had to be made (see the table below). There are an estimated 45,000 health workers at the commune level (VNHR 2002, p186). Of these survey data indicates that 3.3% are doctors (ie, 1485), 15.4% are general assistant doctors (ie, 6930), and 52.3% are nurses (ie, 23,535) (VNHR 2002, p187).

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<sup>45</sup> MoH/WHO. Report on results of survey on salary and social allowances of health staffs (draft document). Ha Noi: Ministry of Health (Department of Manpower and Organization) and World Health Organization, 2003.

**Table A1: Background estimates on the size of the EPI workforce (provincial level and below)**

<b>Level</b>	<b>Position</b>	<b>Estimated total number in country</b> (based on scaling of data from Northern EPI on a per province / district basis)
Provinces	EPI Director	61 (1 x 61)
	EPI Deputy / Secretary	61 (1 x 61)
	Medical officer	183 (3 x 61)
	Drivers	92 (1.5 x 61)
Districts	EPI Director	636 (1 x 636)
	EPI Deputy / Secretary	636 (1 x 636)
	Medical officer	954 (1.5 x 636)
	Drivers	636 (1 x 636)
Commune level	Nurses	23,535 (see discussion in text above)
	Assistant doctors	6930 (see discussion in text above)
	Doctors	1485 (see discussion in text above)
	Volunteers	311,880 (30 per commune x 10,396)

**Outreach & campaigns (SIAs):** For national and regional level workers, the per diem payments were made for time spent at any other level of the system. The per diem (national and regional levels) was an average based on the average of the per diem paid for travel to mountainous areas (40,000 VND) and that for delta areas (20,000 VND).

For 2003 the campaigns (measles & tetanus elimination) were estimated to involve per diem payments on 20 days per year for 2003 (province and district level) and 30 days per year (at higher levels - given the planning requirements) (ie, 1.7 days per month and 2.5 days per month respectively). For 2000 the campaign activity was estimated to be twice the level it was in year 2003 (for polio supplementary immunization activities).

At the commune level, per diems are replaced with incentive payments for fully immunized children. This was estimated to be equivalent to 4000 VND per month (ie, 1000 VND each for an average of 4 fully immunized children per month).

**Volunteers:** This group is not formally paid but receive gifts on national days that were estimated to average 15,000 VND per year (ie, \$US 0.96 per year or 1250 VND per month). This has been included in the analysis in the column of the spreadsheet covering benefits.

**Personnel cost for HBI delivery:** The first dose of hepatitis B vaccine is now given in the hospital setting (for those births occurring in such facilities). It was estimated by EPI staff

that the average amount of health worker time per injection in this setting was 15 minutes (including preparation, delivery, recording, and related vaccine stock management and cold chain management). Also assumed were a coverage rate of 95% for HB1, that 60% of births were in district or provincial health facilities (with the rest being in commune level facilities or at home), and that the number of infants born in 2003 was 1,548,079 (WHO 2002<sup>46</sup>). This equates to a total of 220,600 hours of workers time per year or 0.9% of the working time of the 14,662 midwives in the health system (VNHR 2002, p183).

**Year 2000 data:** Detailed survey data on remuneration levels were not available for this year and so trend data for the 1997 to 2003 period were used to determine monthly wages and allowances (see the table below). The numbers of workers was fairly similar in this year though no workers were involved in delivering the first dose of hepatitis B vaccine in hospital settings.

**Table A2: Trends in health worker salaries 1997 & 2003**

Position	Gross monthly wage (1997)* (VND)	Gross monthly wage (2003)** (VND)	Estimate for 2000 as % of 2003	Average annual increase in salary
Medical officer	425,000	611,680	84.7%	7.3%
Nurses	280,000	487,530	78.7%	12.4%
Assistant doctors	311,000	487,650	81.9%	9.5%
			Average = 81.8%	Average = 9.7%

\* World Bank et al 2001, p141

\*\* As per survey data for 2003 (MoH/WHO 2003<sup>47</sup>).

### Transportation costs

Data were derived from the national level and for lower levels from extrapolating from the data obtained for Northern EPI.

**Hiring vehicles:** The hire vehicle cost (inclusive of fuel) was based on three campaign trips per year at an average 1 million VND per trip (regional and province levels).

**Motorcycles:** The number of motorcycles used by EPI workers at the district level was estimated at an average of 1 per district. The number of motorcycles at the commune level was estimated at an average of 1 per commune for the estimated 70% of communes with adequate roading for use of motorcycles (10,396 x 70% = 7277). Motorcycles at the district and commune levels are actually owned by the health workers and not the health services. But for the purposes of this analysis it is assumed that 100% of running costs

<sup>46</sup> WHO. Demographic Tables for the Western Pacific Region 2000 - 2005. Manila: World Health Organization, 2002.

<sup>47</sup> MoH/WHO. Report on results of survey on salary and social allowances of health staffs (draft document). Ha Noi: Ministry of Health (Department of Manpower and Organization) and World Health Organization, 2003.

(fuel and maintenance) are reimbursed to the health workers using motorcycles (though this may not always be the case).

**Motorboats:** It was estimated that half of the remote communes without road access were in delta areas and that motorboats were used in around half of these ( $10396 \times 70\% \times 50\% \times 50\% = 1819$ ).

**Travel distances:** It was estimated that 4WDs and cars are utilised for around 3 hours of a typical working day and the average travel speed was estimated at 40 km per hour (ie, averaging 31,200 km per year ( $3 \text{ hours} \times 5 \text{ days} \times 52 \text{ weeks} \times 40 \text{ km} = 31,200 \text{ km}$ )). Motorcycle use was estimated at around 1 hour per day for work-related service delivery (10,400 km). Motorboat use was estimated at around 2 hours per day for work-related use at 10 km per hour speed (5200 km). Refrigeration truck use was estimated at around 3 hours per working day at an average speed of 30 km per hour (23,400 km).

**Fuel consumption:** A mid-range value for L/km for the 4WDs made in Viet Nam was used (based on data from manufacturer and fuel consumption web sites (eg, <http://www.greenhouse.gov.au/fuelguide/>). The value for a motorcycle was for the Viet Nam produced “Honda innova scooter”. Other figures are the default values in the “projection tool” spreadsheet.

**Year 2000 data:** It was estimated that the number of motorcycles and cars at district and commune levels was around 10% less than in 2003.

## Vehicles – capital

Data on vehicle numbers were derived from the national level and for lower levels from extrapolating from the data obtained for Northern EPI (see also the section on transportation costs). The cost of refrigeration trucks is covered in the cold chain cost analysis.

**Motorcycles:** These vehicles are not usually owned by the health service but by the employees themselves and hence they are not included in the cost analysis. However, the cost of motorcycle maintenance is covered in the transportation cost section.

**4WDs:** For 2003, the 4WD price is based on that of the Daihatsu Terios which has the lowest price for a 4WD in Viet Nam identified (at \$US 15,300). In 2000, prices were generally higher and so the mid-range price for the Vietnamese-made Toyota's Zace was used (\$US 20,000 to 22,000). This is also at the lower end of the range (eg, compared with the Ford Escape which is made in Vietnam and has a price of around \$US 38,000).

**Cars:** The average value for an imported car in Viet Nam in the year 2002 was used (\$10,400). (This is more than the price of the cheapest small car on the market in 2003 - the Daewoo Matiz S (at \$US 8990 - made in Viet Nam).

**Motorboats:** The new price was estimated at 20 million VND per boat (\$US \$1300).

## Cold chain

The table below provides background comments on the data used. The relatively low number of useful life years of products for 2003 (5 years is used in the spreadsheet) is considered justified on the grounds of the relatively old age of the equipment. This information is based on examining data for past deliveries of cold chain equipment (mainly provided by JICA) and recent field data on the age of equipment (Nelson and Chang Blanc 2002<sup>48</sup>).

It was assumed that 95% of cold chain capacity is used for EPI vaccines with the remainder being used for other vaccines (eg, rabies vaccine, Hib vaccine, pneumovax) and other materials (eg, HIV kits). (The exception is for use of vaccine carriers at the commune level - at 100%).

For year 2000 there were 3 less cool stores and the number of refrigerators at the commune level was lower. Also the higher useful life years (8 years) was considered appropriate since the equipment was generally newer at this time (due to donor support in the 1990s for new equipment JICA).

**Table A3: Data used for calculating the cost of the cold chain in Viet Nam**

	Current estimate of total number	Unit price for each item US\$	# Comments
<b>National &amp; Regional level (4 regions)</b>			
Cold stores - refrigerators & freezers**	14	4400*	The price for Chinese product was used as it was lower than the price quoted by NEPI which was 300 million VND (US \$19,607)  Including this item in the cold chain section was considered more appropriate than the vehicle section (but running costs are dealt with in the transportation section).
Refrigeration vehicles	4	37000*	
<b>Province level (n=61)</b>			
Refrigerator	122	386	2 per province
Chest freezer	122	833	2 per province
Ice pack freezer	61	284	1 per province
Cold box (>5L)	244	90	4 per province
Vaccine carriers	122	10	2 per province
<b>District level (n=636)</b>			
Refrigerator	636	386	1 per district
Ice pack freezer	636	284	1 per district
Vaccine carriers	1272	10	2 per district
Cold box	1272	13	2 per district

<sup>48</sup> Nelson C, Chang Blanc D. Vietnam Technology Mainstreaming Assessment (Report for PATH/CVP). June 9-18, 2002.

<b>Commune level (n=10,396)</b>			
Vaccine carriers	20,792	10	2 per commune
			It was estimated that 5% of communes have these (ie, mainly those in Ha Noi and HCMC). The 1000 refrigerators recently supplied by the Government of Luxembourg during 2003 are counted as a separate input (ie, in Table 3.2).
Refrigerators	520	386	
<b>All levels</b>			
Ice packs	66558	0.24	Current estimate = 3 per vaccine carrier = 3 x 122+1272+20792)

**Notes:**

\* Prices for Chinese products (quoted to JICA).

# This analysis uses relatively low cost items from the WHO product information documentation (WHO 2000<sup>49</sup>) - unless otherwise indicated. This was considered to be more accurate because some of the cold chain equipment in Viet Nam is relatively low cost - ie, it has been sourced from China or from domestic manufacturers.

\*\* Nelson C, Chang Blanc D. Vietnam Technology Mainstreaming Assessment (Report for PATH/CVP). June 9-18, 2002.

### Buildings space costs - capital cost

The costs of new buildings is highly variable depending on the part of the country (ie, far more expensive in large cities with high land prices). Out of an estimated range of 300 million to 1 billion VND for building a district level facility (which includes a preventive medicine centre) the mid-range value of 650 million was used in the calculations. Provincial general hospitals were estimated to cost 10 times this amount. For a commune health centre the mid-range value was 25 million VND (range 100-150 million VND).

The cost of buildings at other levels was based on rental per square metre of floor area (extrapolating from Ha Noi prices).

The number of buildings was obtained from the VNHR (2002 p178). The proportion of staff involved in hospitals involved in the delivery hepatitis B 1st dose was based on the proportion of all health workers in Viet Nam who were midwives (ie, 6.4%) (VNHR 2002, p183). The estimated proportion of their time spent delivering immunisations (0.09%) is detailed in the section on personnel costs.

**Year 2000:** The rental prices and cost of new buildings were estimated to be 20% less than for 2003. Also no hepatitis B delivery occurred in hospital settings in the 2000 year.

### Other recurrent costs

Maintenance and overhead costs are detailed on a separate spreadsheet from the “other recurrent costs” spreadsheet. For these “other recurrent costs” the data all came from financial statements at the national and provincial levels.

<sup>49</sup> WHO. Product information sheets. Geneva: Department of Vaccines and Biologicals, World Health Organization, 2000.

## Additional capital costs

The number of computers at various levels was extrapolated from Northern Region data. The cost of computers was based on the lowest price of Vietnamese-made products (at US\$ 450 for CMS & Elite brands). The numbers of computers used at the various levels was estimated to be 20% less in the year 2000 and the price of each computer to be 30% more expensive.

## Additional campaign costs

***The 2003 measles catch-up campaign:*** In addition to expenditure on vaccines and injection equipment, this campaign cost the Government of Viet Nam another 19.89 billion VND (for additional payments to staff, for transport, for IEC and training). These costs have been included collectively under operational costs for ‘measles campaign’ after excluding the staff payments (as calculated in the personnel cost spreadsheet) (ie, US\$ 1,221,404).

***Polio SIDs 2000:*** The vaccine cost for the campaign was estimated from the additional OPV used relative to DTP. Other detailed operational level costs for these SIDs were not available and were based on an extrapolation of the operational cost for the measles campaign (of US\$ 0.14 per child immunized for transport, IEC and related training). This was multiplied by the number of extra doses of OPV provided in the year 2000 (relative to DTP utilisation levels for that year and assuming a wastage factor of 1.5 (ie, 2,217,073 extra doses)). The total was therefore US\$ 310,390.

## Notes on Expenditure by Donors - year 2003 & year 2000

***Australian Government (AusAID):*** In the year 2000 AusAID gave US\$ 1,877,000 for strengthening immunization (to strengthen EPI, to eliminate neonatal tetanus, and to control hepatitis B) and for controlling malaria (UNDP 2002<sup>50</sup>, p230). AusAID have not been able to provide a detailed breakdown of this amount but the Project Officer at the time (Dr Hipgrave) has indicated that the total for immunization was US\$ 250,000 (with this going to training (15%), vehicles (15%), per diems for outreach/HB birth dosing, (10%), monitoring and surveillance (15%), shared personnel costs (10%), IEC (10%), equipment (5%), and other (20%)).

***GAVI:*** By the end of September 2003 GAVI had disbursed hepatitis B vaccine valued at US\$ 984,397. However, since the end of 2002 no further disbursements of injection and safety equipment are reported (up to September 2003). Since further disbursements may occur during the rest of 2003, it was considered appropriate to use the figures for the approved supply from the fund for 2003. These were: US\$ 2,481,922 (hepatitis B vaccine

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<sup>50</sup> UNDP (United Nations Development Programme). Viet Nam development cooperation report. Ha Noi: UNDP, 2002.

with freight); injection material US\$ 294,280; and injection safety material (US\$ 1,180,996).

**Government of Luxembourg:** The funding for 2003 was only for cold chain equipment (valued at US\$ 1,549,560 - converted from 1,396,000 Euros). There was no funding identified for the year 2000.

**JICA:** For the purposes of this analysis the JICA inputs for additional DTP vaccine are included in the 2000 calendar year as this equates with the movement of vaccine in the stock management records (though JICA records this input for FY 1999 (which actually ends at the end of March 2000)). The expenditure data to support measles vaccine production capacity in Viet Nam is not included in the cost analysis (since this is not a core part of the EPI programme).

**PATH/CVP:** The funding was only for 2003 and nil occurred in the year 2000.

**Republic of Korea:** The soft loan provided to increase vaccine production capacity in Viet Nam was not included in the cost analysis (since this is not a core part of the EPI programme).

**UNICEF:** The expenditure data to increase vaccine production capacity in Viet Nam was not included in the cost analysis (since this is not a core part of the EPI programme) (this amounted to an additional US\$ 567,000 in 2003 and US\$ 77,420 in 2000).

**WHO:** The expenditure relating to improving quality control of Vietnamese vaccines (via the NRA - \$69,000 in 2003) was not included in the cost analysis (since this is not a core part of the EPI programme).

## Annex 2: Methodological Notes on Cost Projections

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## Denominator populations

The population figures used in this analysis differ slightly from those previously supplied to GAVI. This is because the spreadsheet calculations from the last census (in 1999) have been adjusted (by slightly changing the birth rate) to produce the best estimate of the 2004 population (as per WHO demographic tables - WHO 2002<sup>51</sup>).

## Vaccine cost projections

For the number of pregnant women – this was based on the age range 15 to 35 years (14,192,092 women or 17.46% of the total population).

**Coverage targets:** JE vaccine and typhoid vaccine are included at the currently estimated coverage levels of 24% and 54% of the child population respectively based on stock distributed and using a wastage factor of 1.2. Cholera vaccine (used in some high-risk areas) was included at the currently estimated coverage level of 24% of the child population based on stock distributed and using a wastage factor of 1.5 (same as OPV)..

**Vaccine wastage:** Vaccine wastage is traditionally low in Viet Nam with wastage factors used in vaccine ordering calculations being 1.2 for all vaccines except for BCG (2.8), DTP (1.5) and OPV (1.5). These wastage factors were used to calculate wastage rates (%) for the projections. Of note is that a survey in 2002 found an even lower wastage factor of 1.12 for hepatitis B use at the commune level and 1.01 at the district level (WHO 2002<sup>52</sup> p11). The primary reason for these relatively low wastage rates is that EPI vaccines are administered predominantly through routine immunization sessions in commune health centres.

<sup>51</sup> WHO. Demographic Tables for the Western Pacific Region 2000 - 2005. Manila: World Health Organization, 2002.

<sup>52</sup> WHO. Introduction of hepatitis B vaccine in Viet Nam: Background, current status and recommendations. Ha Noi: World Health Organization, Viet Nam, 2002.

**Drop out rates:** These are not precisely known but are thought to be fairly low given the high coverage rates. Hence the figure 5% is used.

**Vaccine prices:** These have been adjusted to reflect domestic prices (which are generally lower than UNICEF prices – except for hepatitis B vaccine since most of this vaccine will continue to be imported until domestic production of the recombinant version begins at some point in the future. For domestic vaccines, the freight cost is considered to be only 25% of UNICEF prices – since the travel distances are much shorter.

**Prices for supplies:** Since AD syringes and safety boxes are now produced in Viet Nam the freight costs have been reduced (to 25% of UNICEF prices). Also the price of Vietnamese safety boxes is much less (US\$ 0.42 per unit).

## Personnel, outreach

At the district and commune level the personnel costs were shared costs. In the baseline analysis the workforce levels were kept at the 2003 size.

Outreach was defined as being inclusive of per diems paid for travel to a lower level of the health system (excluding travel for campaigns and for monitoring and surveillance purposes). At the commune level the per diem was replaced by the equivalent incentive payment (as calculated in Annex 1).

## Vehicles & transportation

The purchasing rate for the projection was based on maintaining the fleet size for 4WDs, cars, motorcycles and motorboats as per the 2003 level. As motorcycles are not usually owned by the health service but by the employees themselves – they were given a zero value in the vehicle cost analysis. However the running costs have been included in the transportation analysis (since these costs can be reimbursed to the health workers).

Transportation costs at the province level and below are covered in the “shared transportation” section. The cost of vehicle hire is not included in the projection analysis (since the spreadsheet design did not allow for this) – but this is a relatively small component of transportation costs.

## Training – short-term

The number of workshops and participants per workshop was based on the data for training for the measles campaign in 2003 (ie, an average of 81 workshops per province and an average of 32 participants per workshop). The 3 day average per session was based on the Northern Region’s experience for appropriate workshop length. The other daily cost per participant (covering food, equipment hire, facilities hire etc) was roughly estimated at US\$ 1 per person per day. The per diem was based on that provided by the Viet Nam Government (20,000 VND per day) – which is less than that provided by donor

agencies (eg, for UNICEF the per diem is 150,000 VND / day and for WHO it is 110,000 VND / day).

The travel cost to each workshop for provincial and district staff was assumed to total 2 hours of car travel in total per participant (2 hours x 40 km/h at US\$ 0.04 per km = US\$ 3.2). Didactic materials cost per session was based on a cost of US\$ 2 per participant.

## IEC & Social mobilisation

The personnel costs and per diem costs have already been captured in the “personnel section”. The costs were based on the expenditure levels for 2003 (for the national, regional and provincial levels). A 4% annual increase in the expenditure on television advertising was assumed in the baseline model. This equates to a 2% overall annual increase in expenditure for this IEC/social mobilisation category.

## Monitoring and Surveillance

The per diem costs for this activity are implicit in the cost analysis for travel on outreach and to other levels of the health system. Similarly, transport costs are already covered in the transportation cost analysis. Nevertheless, the numbers for staff visits have been documented in this spreadsheet to allow for possible future analyses.

## Cold chain equipment

The replacement level was assumed to be 20% for the first 3 years and 10% for each after that (starting from year 2003 stock levels). Of note is that the spreadsheet doesn't allow for adjustment of shared costs (eg, laboratory kits, non-routine vaccines which may consume around 5% of space in the cold chain in Viet Nam).

## Long-term training

This was based on the long-term training costs for year 2003 (from the Government of Viet Nam and from donors) with a 2% annual adjustment for inflation.

## Additional capital

In the baseline model the number of computers was based on the maintaining the stock estimated for 2003.

## Supplemental immunization activities / campaigns

**Polio SIAs:** The baseline model did not assume any new SIAs – given the high routine coverage and international progress towards global eradication.

**Measles SIAs:** The baseline model did not assume any new SIAs – since it is planned to introduce second dose measles in 2005 (see Scenario B).

**MNTE SIAs:** The baseline model included SIAs for child bearing age women (CBAW) in selected high-risk areas at the same level as for 2003 but declining after 2004 (and ending after 2006). (This current level is equivalent to coverage of 12% of the CBAW population). The additional operational costs (per diems, transport, incentive payments and IEC) were estimated at US\$ 0.50 per woman.

## Scenario B

This scenario covers the introduction of second dose of measles in 2006 ,the phase in of increased coverage of JE vaccine (from 24% in 2004 and beginning to increase in 2005 – up to 95% coverage by 2009) and introduction of Hib in 2005

## Annex 3: Opportunities for Improving Costing Data in this FSP

The EPI Review to take place in November 2003 provides an opportunity for collecting additional financial data with which to improve the cost calculations in this FSP. A prioritised list of areas for consideration for specific data collection are detailed below.

**Improving workforce cost estimations:** Personnel costs are a major part of total programme costs. To better clarify these, EPI Managers (province and district levels)

could be asked about the average number of staff working at each level on immunization (province, district, commune) and the proportion of time these workers spend on immunization on average (ie, for doctors, assistant doctors, nurses, and drivers).

***Provincial funding:*** A small number of wealthier provinces may provide occasional additional funding to EPI activities at the province and district levels (eg, assisting with immunization campaigns). This funding could be better quantified for 2003 by asking EPI managers at the province level for each province included in the survey and for Ho Chi Minh City (HCMC). Any additional allowances paid to EPI workers from the Provincial Government could be identified and quantified (VND per month).

***User fees for immunizations:*** At each health facility visited data could be collected on these fees – ie, if they are used, the amounts, who they are applied to, the annual revenue collected from these fees for 2003 (to date), and what this revenue is used for. Data could also be collected on the fees applied to non-routine vaccines (Hib, pneumococcal vaccine and JE vaccine outside the areas where it is currently used). At least one hospital in HCMC is known to apply user fees to EPI vaccines.

***Cold chain equipment:*** To better determine the appropriate replacement rate for cold chain equipment in Viet Nam it would be useful to collect data on the age of the refrigerators and freezers in all the health facilities visited by the survey team. Other data would be the model and brand of this equipment (as this is relevant for calculating capacity and maintenance costs). Also the percentage of cold chain volumes occupied by non-routine vaccines and other equipment (eg, HIV test kits) could be further clarified.

***Vaccine wastage:*** In the facilities visited, the presence of expired vaccine in refrigerators and freezers could be determined since this is relevant to cost savings.

***MDVP:*** The multi-dose vial policy has the potential to save costs. The extent it is being used in the hospital sector for hepatitis B vaccine (used for the first dose) could be ascertained in any hospitals included in the survey.

***Open question to staff:*** EPI Managers at province and district levels could be asked an open question of how the immunization programme could be made more efficient and save costs.