

**MID TERM IMMUNIZATION  
STRATEGIC PLAN  
DPR OF KOREA  
(2007-2011)**

Ministry of Public Health  
July 2006

# Contents

<b>PREFACE .....</b>	<b>3</b>
<b>ACRONYMS AND ABBREVIATIONS.....</b>	<b>4</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>6</b>
<b>1. INTRODUCTION.....</b>	<b>17</b>
1.1 PURPOSE OF THIS DOCUMENT .....	17
<b>2. SITUATIONAL ANALYSIS.....</b>	<b>18</b>
2.1 INTERNATIONAL HEALTH CONTEXT .....	18
2.2 COUNTRY CONTEXT .....	20
2.3 HEALTH SYSTEM OPPORTUNITIES AND CONSTRAINTS .....	22
2.4 IMMUNIZATION IN DPR KOREA .....	26
2.5 CURRENT VACCINE PREVENTABLE DISEASE BURDEN .....	27
2.6 CURRENT EPI SCHEDULE .....	28
2.7 CURRENT COVERAGE RATES AND TRENDS .....	29
2.8 MANAGEMENT STRUCTURE AND SERVICE DELIVERY .....	30
2.9 CURRENT FINANCING AND AUDIT MECHANISMS .....	31
2.10 COSTING AND FINANCING OF THE MULTI YEAR PLAN.....	31
2.11 IMMUNIZATION SYSTEM CONSTRAINTS.....	41
2.12 SUMMARY OF ACHIEVEMENTS AND OBSTACLES.....	46
<b>3. EPI MID TERM PLAN 2007 - 2011 .....</b>	<b>48</b>
3.1 GLOBAL GOAL.....	48
3.2 DPRK-SPECIFIC GOALS .....	48
3.3 DPRK'S EPI MISSION .....	48
3.4 GUIDING PRINCIPLES OF IMMUNIZATION PROGRAM .....	49
3.3 TARGET GROUP .....	49
<b>4. MID-TERM GOALS, OBJECTIVES, MILESTONES AND STRATEGIES.....</b>	<b>51</b>
Goal 1 <i>Immunization Services</i> .....	49
Goal 2 <i>Accelerated Disease Control</i> .....	60
Goal 3 <i>Financing</i> .....	67
Goal 4 <i>Communication</i> .....	69
Goal 5 <i>New Vaccines</i> .....	72
Goal 6 <i>Data management</i> .....	77
Goal 7 <i>Integration of EPI and Health Systems</i> .....	84
<b>ANNEX 1 MANAGING THE NATIONAL IMMUNIZATION PLAN</b>	
<b>ANNEX 2 SUMMARY OF EPI GOALS, OBJECTIVES AND MILESTONES</b>	
<b>ANNEX 3 DETAILED FINANCIAL SUSTAINABILITY STRATEGIES</b>	
<b>ANNEX 4 INFRASTRUCTURE OF COORDINATION</b>	
<b><u>ANNEX 5 BASIC INDICATORS</u></b>	

## **LIST OF FIGURES AND TABLES**

Table 1 Objective, Indicators, Target and Strategies  
Table 2 Human Resources for Immunization DPRK  
Table 3 Coverage DPT3 by province  
Table 4 Current Costing and Indicators - 2005  
Table 5 Breakdown of Future Costs by cMYP component - 2007-2011  
Table 6: Future Financing and Gaps - 2007-2011  
Table 7: Future Financing and Gaps - 2007-2011  
Table 8 Composition of the Funding Gap - 2007-2011

Figure1 Strategic areas of Global Immunization Vision Statement  
Figure 2 GDP per capita (\$US 1992-2003)  
Figure 3 Public Health Policies DPRK  
Figure 4 Structure of Ministry of Health  
Figure 5 Summary of Health System Issues  
Figure 6 National EPI antigen coverage rate  
Figure 7 Gross Domestic Product (GDP) in \$US million; 1992 – 2003  
Figure 8 % national budget allocation to health (source MoPH)  
Figure 9 Current and Future Costing - 2007-2011  
Figure 10 Analysis of Future Costs by cMYP component - 2007-2011  
Figure 11: Current and Future Financing - 2007-2011  
Figure 12 Summary of Baseline Indicators

## **PREFACE**

Introduction of EPI has shown appreciable results during the last two decades. The success story of eradicating smallpox and recent success in polio eradication efforts have been very encouraging. However, we shall have to cover a long distance in completely eradicating vaccine-preventable diseases from the country.

In order to give the desired thrust to the EPI, the government of DPR Korea is committed to making available the necessary resources for improving the managerial capacity of the personnel involved and logistical supports coupled with appropriate research initiatives. The Multi Year Strategic Plan (MYP) document is intended to guide those who implement the Programme to provide vaccination to every child in the country. It also spells out the strategies for providing efficient and sustainable immunization services to the community. This document is also aims at informing immunization managers and implementing agencies about the need for monitoring and strengthening the processes at all levels, thereby focusing attention on achievable goals.

## **ACRONYMS AND ABBREVIATIONS**

AD	Auto-destructive syringe
AEFI	Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
BCG	Bacille Calmette-Guerin; vaccine against tuberculosis
CBR	Crude birth rate
CRS	Congenital Rubella Syndrome
DPT	Diphtheria-Tetanus-Pertussis combination vaccine
DPTHepB	Diphtheria-Tetanus-Pertussis-Hepatitis B combination vaccine
EPI	Expanded Programme in Immunization
GAVI	Global Alliance for Vaccines and Immunization
GIVS	Global Immunization Vision and Strategy
HAEI	Hygienic & Anti-Epidemic Institute
Hep B	Hepatitis B
Hib	<i>Haemophilus Influenzae</i> type B
ICC	Inter-agency Coordinating Committee
IEC	Information, Education and Communication
IMR	Infant Mortality Rate
IPC	Interpersonal Communication
IPV	Inactivated Polio Vaccine
JE	Japanese encephalitis
MDVP	Multi-Dose Vaccine vial Policy
MLM	Mid-Level Manager
MMR	Measles, Mumps and Rubella vaccine
MoPH	Ministry of Public Health
MR	Measles and Rubella vaccine
MV	Measles vaccine
MYP	Multi-Year Plan
NCL	National Control Laboratory
NGO	Non-Governmental Organization
NNT	Neonatal Tetanus
NRA	National Regulatory Authority
OPV	Oral Polio Vaccine
ORS	Oral Rehydration Solution
RIMS	Routine Immunization Monitoring System
SIA	Supplementary Immunization Activities
SOP	Standard Operating Procedures

TT	Tetanus Toxoid vaccine
UNICEF	United Nations Children's Fund
VPD	Vaccine Preventable Disease
VVM	Vaccine Vial Monitor
WHO SEARO	South-East Asia Regional Office of the World Health Organization

# **EXECUTIVE SUMMARY**

## **1. Introduction**

The immunization programme of DPR Korea is implemented through the routine health system and the target age group is vaccinated with all vaccines according to the compulsory free medical care system. Based on this system, all the population living in the country benefits from free of charge immunization services.

The national EPI team has prepared second five year plan of EPI (2007-2011) based on the “Public Health Law of DPR Korea” adapted in the 6<sup>th</sup> Supreme People’s Assembly in 1980. This plan provides the framework on which activities should be planned to achieve the objectives of DPRK’s goal of immunization within the coming five years, as well as the providing guidance for the introduction of new vaccines.

The success of EPI is crucial for the prevention of mothers and children from vaccine preventable diseases as well as for the expansion of other public health interventions.

## **2. Situational analysis**

**2.1 EPI impact:** Since 2003, there has been significant decrease of infant mortality rate (IMR) and burden of vaccine preventable diseases in DPRK. Following the extensive polio eradication efforts in the past years, no wild polio case has been identified since 1996. Therefore, “National Immunization Days” for OPV immunization ceased in 2003.

**2.2 EPI output:** Immunization coverage rates for all antigens have increased all over the country since 1990s. However, there had been significant differences in DPT3 coverage rate among all antigens in 2000. The reported coverage of DPT3 was 80%, while the result of 2nd Multi Indicators Cluster Survey (MICS) was 62.1%. In particular, the coverage rate was lower in the remote areas far from the capital. This is due to the weakness in the timeliness of transportation of vaccines, monitoring and supervisory activities as well as weak IEC activities.

**2.3 Administration and Finance:** Under the unified guidance of the Ministry of Public Health (MoPH), DPRK, the EPI team organized in the MoPH provides administrative guidance on EPI through central, provincial and county level Hygienic & Anti-Epidemic Institutes (HAEI), while the EPI finance is also managed by MoPH through Health Bureaus in the provincial and county /city level People’s Committee.

At present, procurement of vaccines, injection safety supplies and cold chain equipment etc. is supported by UNICEF and GAVI. Salaries for EPI staff and other finance are managed by the

national level using the national budget.

**2.4 Programme constraints:** As shown in the data of MISC in 2004 monitoring and weak supervisory practice remains problematic. Few cases of AEFIs have been reported after DPT vaccination. Higher coverage rate could be achieved if there were strengthened IEC activities targeted for mothers as well as activated supervisory practice. Another problem is the insufficiency of fund for transportation of vaccines and maintenance of cold chain.

**2.5 System constraints:** A range of health system constraints have been identified. These include limited transport in rural areas, interrupted electricity supply for operation of the cold chain, and limitations in integration of surveillance and planning systems. Service delivery is integrated well, but opportunities exist in the next 5 years for better co ordination of EPI with MCH, IMCI and CMW at Provincial and Central level, and with some aspects of service delivery at the Ri level.

### **3. EPI Mid-term plan**

Although EPI is nationwide, special attention will be paid to the remote areas far from the capital and to increase the DPT3 coverage as soon as possible.

**3.1 EPI mission:** To provide high quality immunization service to all target population in order to prevent mortality, morbidity and disability from diseases those are preventable through the optimum use of vaccines currently available.

#### **3.2 Guiding principles:**

- 3.2.1 To provide best quality of immunization service to all target children and women according to the national immunization schedule.
- 3.2.2. To provide equity in the vaccine distribution, cold chain management and supervisory practice in order to maintain equally high immunization coverage all over the country.
- 3.2.3 To ensure standard operating procedures in the procurement, storage and distribution of vaccines including vaccination in order to secure the quality and safety of vaccination
- 3.2.4 To make better use of routine health system established in the country, to encourage the household doctors to fulfill their responsibilities and to ensure the financial sustainability
- 3.2.5 To strengthen, maintain and manage the existing state of EPI on vaccination, distribution and storage of vaccines, injection safety etc.

### **4. Objectives, Goals, Indicators and strategy of mid-term plan**

**4.1 Strengthening Coordination and capacity:** Plans include the expansion of technical capacity of central level to organize national EPI team which is able to cooperate with other sectors. Strategies will be applied to link EPI with IMCI and MCH programs nationally and also at the service delivery point.

**4.2 Mobility support for field workers:** This includes the method to increase the capacity not only for the peripheral level health workers to perform outreach sessions but also for increasing the mobility of supervisors to undertake supportive supervisory visits to the field. Activities to maintain the distribution mechanism of vaccines in each level will also be explored.

**4.3 Monitoring system on routine immunization:** This system will be introduced in a phased manner, which will contribute to the strengthening of capacity in the national level to use the analyzed data related with immunization, conveyed in a timely manner from county to province and subsequently to central level.

**4.4 Training:** National, provincial, county and Ri level in-service training will be organized in a phased manner taking into considerations the actual situation. Training institutes will be designated and their capacities and capabilities will be reviewed and strengthened.

**4.5 Strengthening microplanning:** Provinces and counties will be assisted to prepare the microplan to increase the immunization coverage, including management of cold chain and vaccine & supplies. Efforts will also be made to link immunization micro-plans to other child health services.

#### **4.6 Injection safety:**

Sustained supply of Auto-destructive (AD) syringes, safety boxes and needle cutters which was introduced throughout the country from 2003. Standard guidelines in their use will be supplied, highlighting appropriate disposal.

#### **4.7 Financial Sustainability**

Financial sustainability will be promoted through vaccine wastage reduction (implementation of multi dose vial policy), increasing national government financial contribution to immunization sericesces, mobilizing international resources, reducing wastage rates, and increased domestic vaccine production.

### **5. Managing the national immunization plan**

Management of the programme will be through the national level immunization cell, which will be expanded to include specific officers for procurement, surveillance/monitoring and evaluation, IEC activities, operational aspects, financial and administrations, introduction of new vaccines and immunization safety issues. The Government will organize activities of

formulating policy, establishing national priorities, estimating national needs and leading inter-agency coordination.

Provinces will play the role of mid level body in the implementation of the 5 year plan. A mid-term evaluation is planned for 2007.

A summary of the overall plan follows.

# MID TERM IMMUNIZATION PLAN SUMMARY

2007 - 2011

## Country Background

Total population	23,777,000
% of Total Population Under 1	1.75%
Population Growth	1.20%
Birth cohort	416,000
Pregnant Women as % of Pop.	25.1
Infant Mortality Rate	21

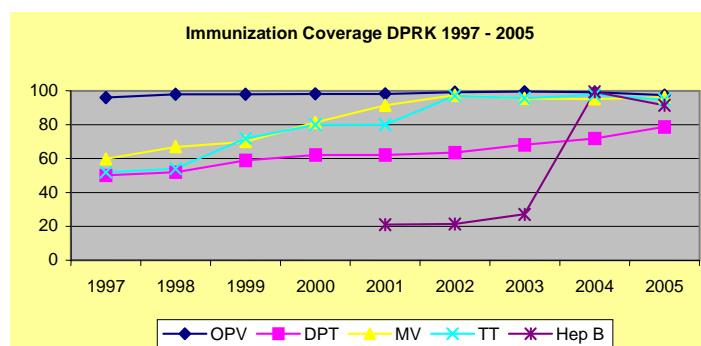
### MDG Goal

To reduce child mortality by 2/3rds between 1990 and 2015

**DPRK NIP Mission:** To provide high-quality immunization services to all communities in order to prevent mortality, morbidity and disability from diseases that are preventable through the optimum use of currently available vaccines and vaccines that become available.

## Situation Analysis

### Immunization Coverage 1997 - 2005



### Baseline Indicators 2005

- 20% counties with DPT3 coverage > 80%
- 100% of counties with over 90% TT2+ coverage for pregnant women
- 85% of counties with measles coverage of at least 90% per year
- 100% of counties identified with 90% functioning cold chain equipment
- 0% counties reporting any vaccine stock
- 90% of monthly AFP surveillance reports received by counties that are complete
- 95% of counties reporting AEFI on a monthly basis to the provincial level

## Immunization System

**Communication** - Families in provinces where the immunization coverage is low are often unaware or unconvinced of the need for immunization. More information is required on knowledge, attitude and practice to guide updating of the communication strategy.

**Surveillance** – The AFP surveillance system is strong. This provides the basis for developing integrated vaccine preventable disease surveillance (including measles and tetanus)

**Services Delivery** – Existing service delivery strategies are effective. Most service (85%) is provided at the fixed site by the section doctor. But the low rate of DPT3 is a concern, and is due to lack of health education and lack of response to AEFI. In some provinces the coverage is low, and there is no timely response to drop out.

**Logistics** – There is weak monitoring of the break down of cold equipment. Investment will be required to expand a solar powered chain system.

**Program Management**– Data is often lacking in terms of and completeness. Micro-planning skills need to be developed, improved data management in order to identify high risk areas take corrective action.

**New Vaccines**- The burden of disease for some vaccine preventable diseases is not well known. More information is required to country decision making about new and underutilized vaccines (JE, Hib, Rotavirus).

## Health System Issues

DPRK has a strong **health system** - there is 1 section doctor to manage primary care services for 100 to 130 households across the country (a total of approx. 50,000 doctors)

**Health infrastructure** is limited particularly in relation to transport services, and reliable electricity supply. Principal weaknesses are lack of transport capital and financing of operational costs. This effects service delivery as well as the operation of the waste management system

There are integrated micro-plans at county level for household doctors. However, skills in **health planning** & use of **health information** at county level can be improved.

Another problem is the **insufficiency of finance** for transportation of vaccines and maintenance of the cold chain.

There are opportunities at Provincial and Central levels for closer **program co ordination** of immunization with CMW, MCH and IMCI and delivery

## MYP Goals DPRK 2007 - 2011

1. Counties will provide equitable, efficient and safe **immunization services** to all infants and pregnant women
2. Contribute to global **polio eradication , measles mortality reduction** and **neonatal tetanus elimination**
3. Sufficient and sustainable **funding** with established adequate, accountable and efficient fund flow
4. There is sustained **demand** and reduced social barriers to access immunization services
5. Accelerate introduction of licensed **new and under used vaccines** against diseases with significant mortality and morbidity in DPRK
6. To monitor and use accurate, complete and **timely data** on vaccine-preventable diseases, AEFIs, antigen coverage and dropout rates by counties.
7. To strengthen integration of EPI with the **health system** in terms of planning, surveillance, program co ordination and service delivery.

## Program Milestones

- 2007:** Certification of Polio Eradication by SEARO  
**2007:** Burden of Disease Studies HIB, JE  
**2007:** Communication strategy updated following KAP study  
**2007:** Guidelines disseminated on Hep B Birth dose.  
**2008:** Integrated Planning & VPD surveillance guidelines  
**2008:** JE is integrated into regular surveillance  
**2009:** Country Decision on new vaccine (HIB, MMR)  
**2009:** 10 Provinces have established active measles surv.  
**2010:** 100% provinces have >90% TT2 coverage  
**2010:** 100% of provinces have at least 95% measles cov.  
**2011:** Certification of Elimination of Neo Natal Tetanus  
**2011:** Certification of Elimination of Measles  
**2011:** 100% of counties achieve 98% coverage with Vit. A  
**2011:** 100% of counties have motorcycle transport  
**2011:** 100% of counties have solar cold chain systems

## Schedule

Primary vaccination	At birth	6 weeks	10 weeks	14 weeks	9 months	6 years
BCG						
OPV						
DPT-Hep B						
Hep B Birth						
Measles						
JE (Risk area)	3 doses @ 12 mths. 1 dose every year until age 15					
Vitamin A	6-59 months					
TT1	As early as possible during pregnancy					
TT2	1 month after 1 <sup>st</sup> dose					
TT Booster	If not previously vaccinated within 3 yrs					
Mumps	1 dose @ 8 months					
Pertussis	3 doses @ 3rd,4th & 5th years					

## Targets

Program Targets	2007	2008	2009	2010	2011
% Counties with > 95% Measles coverage	100%	100%	100%	100%	100%
% Counties with 98% coverage Vitamin A	100%	100%	100%	100%	100%
% Counties with TT2 coverage > 90%	90%	90%	90%	100%	100%
% Counties > 80% DPT-Hep B3	70%	90%	100%	100%	100%
% AFP cases with adequate stool samples	90%	90%	90%	90%	90%
% Functioning cold chain equipment	90%	90%	90%	90%	90%
Wastage DPT Hep B	30%	30%	30%	30%	30%
BCG DPT Drop Out Rate	12%	9%	7%	5%	5%

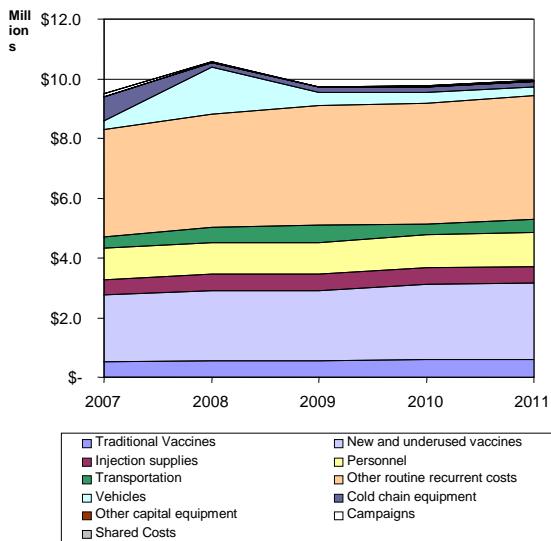
## Costing of the Multi Year Plan

### Key Finance Indicators

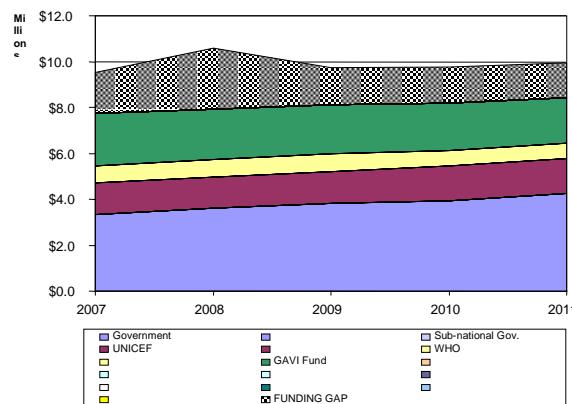
Baseline Indicators		2005
Total Immunization Expenditures		\$4,087,773
Campaigns		\$541,458
Routine Immunization only		\$3,546,316
per capita		\$0.15
per DTP3 child		\$11.1
% Vaccines and supplies		50.1%
% National funding		49.3%
% Total health expenditures		0.53%
% Gov. health expenditures		0.58%
% GDP		0.03%
Total Shared Costs		\$2,863,469
% Shared health systems cost		41%
TOTAL		\$6,951,242

### Resource and Finance Requirements

#### Projection of Future Resource Requirements



### Future Secure + Probable Financing and Gaps



**Table 1. Objectives, Indicators, Target and Strategies**

Goal	Objectives	Key indicators	Target	Strategies
1.Counties will provide equitable, efficient and <i>safe immunization services</i> to all infants and pregnant women	1.1 To ensure that regular quality immunization sessions are planned and held	% of counties that achieve $\geq 80\%$ DPT-HepB vaccine coverage and M-BCG dropout rate of $\leq 10\%$	95%	Strengthened coordination, national operational guidelines, strengthening supervision practice, prioritizing poorly performing counties and under served populations, strengthened microplanning, reducing drop-out and missed opportunities, fixed-day, fixed-site service
	1.2 To ensure that adequate trained staff are empowered to provide EPI vaccines immunization	% of vaccinators receiving refresh training in past 3 years	100%	Strengthen coordination, review and adjust staffing levels, strengthen institutional training at national and provincial levels as well as refresher training, decrease frequency of staff rotation
	1.3 To keep an annually upgraded inventory of cold chain according to the levels of the network, allowing for new equipment,substitution, replacement, spare parts, fuel etc. in order to maintain a functional status of 90%	% of counties with 90% of identified cold chain equipment functioning	>90%	Strengthening coordination, regular assess and monitoring cold chain status, appropriate procurement and inventory keeping and regularized appropriate repaire and maintenance system
	1.4 To ensure an efficient vaccine and injection equipment management and logistics system to forecast and deliver adequate supplies of vaccines in a timely manner	% of counties with no stockout of measles vaccines	100%	Strengthening coordination activities to reduce vaccine wastage implement open vial vaccine policy strengthening of NRA
	1.5 To ensure the implementation of safe injection practice and safe disposal	% of counties supplied with and using AD syringes, needle cutters	100%	Sustain of AD syringes, needle cutters for all immunization sessions

Goal	Objectives	Key indicators	Target	Strategies
	1.6 To ensure adequate transportation system for delivering vaccines, service delivery and supervision	% counties with functionning motorcycles by 2010.	100%	To rehabilitate the transportation logistics according to the rehabilitation plan.
2. Contribute to global <b>polio eradication, measles mortality reduction and neonatal tetanus elimination</b>	2.1 To achieve polio eradication certification by 2007	Number of wild polio cases	No wild polio cases	Strengthening routine immunization delivery system (goal 1, objective 1.1) quality AFP surveillance
	2.2 To eliminate neonatal tetanus	% of counties with over 90% TT2+ coverage for pregnant women	100%	Strengthening routine immunization delivery system (goal 1, objective 1.1) quality surveillance and data analysis, safe delivery practice, SIAs in outbreak region
	2.3 To maintain the status of measles eradication	% of counties with measles coverage of at least 90% per year	100%	Situational analysis, strengthen routine immunization delivery system (goal1, objective 1.1), strengthening surveillance, management of case with rash and laboratory capacity, and consider applying global strategies
	2.4 To achieve and maintain a level of 98% coverage with vitamin A supplementation to children under five	% of counties with 98% coverage of vitamin A supplements each year for children 6-59 months	100%	Strengthen routine immunization delivery system (goal1, objective 1.1), adequate training for EPI staff, organizing SIAs for the areas with <70% seropositive rate following the immunization
3. Sufficient and <b>sustainable funding</b> with established adequate, accountable and efficient fund flow	3.1 To ensure adequate financial resources for the EPI at national and provincial level for EPI to achieve its goals and objectives	% of counties able to show tracked budget versus expended resources % counties implementing multi dose vial policy Wastage rate combined vaccine	100% 100% 30%	National Financial Sustainability Plan (FSP), capacity building for immunization health economics, various research options, Increase national government financial contribution to immunization services, Reducing wastage rates, Increased domestic vaccine production

	3.2 To ensure political commitment for adequate annual funding at all levels			Ensure the FSP, Strengthen cooperation with international organizations
4. Sustained demand and <i>reduced social barriers to access</i> immunization services	4.1 To ensure widespread support by all families and communities so that all eligible children and pregnant women are immunized	% of infants with vaccination cards in the immunization session	100%	Reach the underserved to increase demand by influencing behavior with print and other mass media strategies and activating wider community and county network, update national communication strategy based on KAP
	4.2 To ensure political administrative support of responsible agencies for immunization as the key public good			Advocacy efforts, cost-effectiveness studies
5. Accelerate <i>introduction of licensed new and under used vaccines</i> against diseases with significant mortality and morbidity in DPRK	5.1 To ensure that institutional mechanisms are in place to adequately obtain, review and utilize information for deciding on the introduction of new and under used vaccines	Availability of clear policy guidelines for new vaccines introduction		Strengthen coordination, burden of disease studies, surveillance systems, cost effectiveness analysis
	5.2 To review the effectiveness of introduction of MMR or MR vaccine in the immunization programme of DPRK	Progress of MMR studies		Research, advocacy and planning
	5.3 To review the need for introduction of the Japanese encephalitis (JE) vaccine in selected provinces	Availability of diseases burden data		Strengthen coordination, establish surveillance system

	5.4 To maintain the introduction of Hep B vaccine	% coverage DPT Hep B 3	100%	Maintenance of high coverage rate, strengthen surveillance and training, accelerating the introduction of DPT-Hep B vaccine, promote birth dose administration < 24 hours after birth
6. Monitor and use accurate, complete and <i>timely data on vaccine-preventable diseases, AEFIs, antigen coverage and dropout rates by counties</i>	6.1 To institutionalize surveillance for vaccine-preventable diseases and early detection of any outbreaks	% of monthly VPD surveillance reports received from counties, which are complete and timely	>90%	Phased introduction of RIMS, increased accuracy and use of data at local levels, and community involvement, strengthened laboratory capacity at all levels
	6.2 To strengthen vaccine quality and injection safety by developing a monitoring system for reporting and responding to AEFIs by 2009	% of counties reporting AEFI status to the province on monthly basis	100%	Provide training in AEFI SOPs and standardize reporting methods along with establishing response mechanisms
	6.3 To establish an effective, efficient, complete and timely immunization recording and local area monitoring system by 2009	% of complete and timely monitoring reports received from counties	100%	Increased use of monitoring tools at local level, supportive supervisory practices, prioritization of Ris and counties and phased introduction of RIMS
7. Strengthen the <i>integration of EPI with the overall health system</i>	7.1 Develop an integrated disease surveillance systems	% counties reporting in a timely & complete manner on 3 main vaccine preventable diseases (Polio, measles and tetanus)	100%	Develop guidelines for integrated surveillance, Streamline the surveillance and reporting form for other VPD's, Organize training course to build capacity for surveillance activities; Build up on the experience aquired during the AFP surveillance; Provide incentives to those that are good at surveillance and specimen transportation; Strenghten laboratories and lab confirmations at central levels for the testing of measles and Tetanus.

	7.2 Development of integrated planning systems	% counties that describe a package of services to be delivered in an integrated micro-plan  EPI Plan is integrated into health sector plan	100%	Develop guidelines on programme planning processes, Central and provincial level experts on planning should visit counties to build capacity in integrated planning; (3) Joint review between the planners and implementors on the developed plans; Estimate the cost effectiveness and affordability of developed plans and integrated into the overall sectoral plan.
	7.3 Strengthen national coordination mechanisms between EPI and the national health system and relevant Ministries	% counties that describe a package of services to be delivered in an integrated micro-plan	100%	Ensure the good coordination and linkages between the departments of the MOPH; Link EPI with IMCI and MCH programs; Strengthen the collaboration with civil society as well as other Ministries, Stimulate the collaboration and linkages with the volunteers, merge the Vitamin A and Deworming campaigns into EPI Strengthen coordination between CMW and HAEI for better handling of vaccine and devices

# **1. INTRODUCTION**

DPR Korea is one of the counties with most guaranteed, qualified immunization service in terms of qualities of vaccines used, number of beneficiaries, and number of immunization sessions organized geographical spread and diversity of areas covered.

Immunization is one of the most cost-effective interventions for disease prevention. Traditionally, the major thrust of immunization services has been reduction of infant and child mortality. However, vaccines like hepatitis B are administered in infancy and can give life long protection against liver cancer and other complications of hepatitis B infection in adults. Immunization delivery is also a vehicle for health promotion and other health services addressing morbidity of public health significance in all age groups. Immunization is thus not simply an item of national expenditure but truly one of national investment.

## **1.1 PURPOSE OF THIS DOCUMENT**

This Multi Year Plan (MYP) is essential for three main reasons.

- A. Provide a framework on which to plan activities to achieve the five specific objectives of immunization policy of DPRK:
  - 1. Increasing the accessibility/availability/coverage of immunization services.
  - 2. Ensuring the quality and reliability of immunization services
  - 3. Increasing the demand for immunization service
  - 4. Monitoring diseases incidence and programme performance
  - 5. Mobilizing resources to sustain and improve immunization services
- B. Avail opportunities to introduce emerging newer vaccines
- C. The success of the EPI must be used as an opportunity to expand, where feasible, other public health interventions such as promotion of Maternal & Child health care, breastfeeding, oral rehydration solution (ORS), and vitamin A prophylaxis etc.

The document sets out the mid-term (2007-2011) goals, related objectives, indicators, strategies and associated costs. This is a distinct strategic plan on which to base activities through a planned timeline (fiscal years 2007-2011).

## **1.2 PROCESS**

In September 2000, the Ministry of Public Health, DPR Korea constituted an Inter-agency Coordinating Committee (ICC) on Immunization to prepare a strategic framework for immunization. It has four sub-committees and Annex 1 contains their constitution.

1. Administrative sub-committee
2. Technical sub-committee
3. IEC sub-committee
4. Financial sub-committee

National Immunization Programme (NIP) of MoPH DPRK with support of ICC developed the 1<sup>st</sup> EPI multi-year plan (2001-2006) in 2001. This plan was drafted by the NIP, Ministry of Public Health DPRK. Amendments were made during a 5 day meeting in Pyongyang in July 2006, and the revised draft program plan and costings were presented for comment at an ICC meeting on the 10<sup>th</sup> July 2006.

The strategic plan has been made through close cooperative and iterative process involving Government authorities, technical agencies, professional organizations, development partners and implementing agencies, which provide the goals, objectives, indicators, strategies and costs.

## **2. SITUATIONAL ANALYSIS**

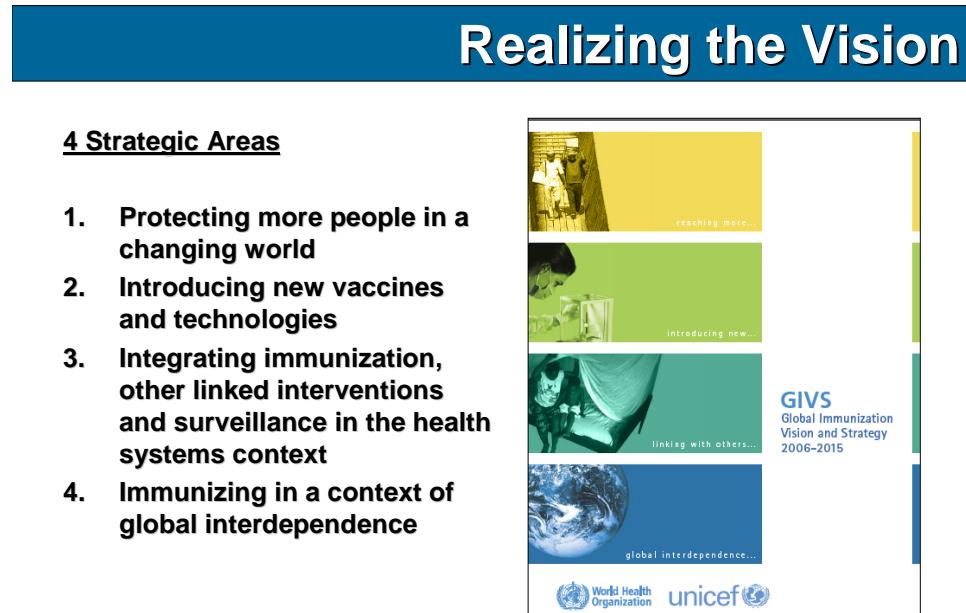
### **2.1 INTERNATIONAL HEALTH CONTEXT**

***Global Immunization Vision and Strategy:*** In 2005, WHO and UNICEF developed global immunization vision and strategies (GIVS) for the period 2005 to 2015. The asof this approach is as follows:

- **By 2010:**
  - **90% coverage nationally and 80% in all districts**
  - **90% reduction of global mortality due to measles(compared to 2000)**
- **By 2015:**
  - **Maintain Coverage achievement (80%-90%)**
  - **2/3 reduction of global childhood mortality and morbidity due to VPDs (compared to 2000)**
  - **New vaccines to reach same coverage within 5 years**
  - **Access to vaccines of assured quality**
  - **Capacity for case-based surveillance**
  - **Planning integrated in sector-wide planning and costed**

The four strategic areas of GIVS are outlined in the figure below.

**Figure1 Strategic areas of Global Immunization Vision Statement**



The DPRK MYP has been developed taking into account the vision and strategies described in this strategy, as well as the vision and strategy as outlined in DPRK public health policy (see below).

**International Commitments:** DPRK's longstanding pledge to universal and free health care has been reaffirmed through the adoption of a number of international instruments and the international goals and targets of major conferences over the past decade. As a State Party to the International Covenant on Economic, Social and Cultural Rights (ICESCR), the DPRK recognizes the right of everyone to the enjoyment of the highest attainable standard of physical and mental health. The recent accession to the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW) in early 2001 affirms the government's legally binding commitment towards guaranteeing women's reproductive rights as well as recognizing that women's equal social and biological status underpin good health. The DPRK's notable commitment to reproductive health rights is further demonstrated by its adoption and partial implementation of the platform of action of the International Conference on Population and Development (ICPD) in 1994.

**Table 2 International Health Commitments DPRK**

<b>DPRK International Commitments in Health and Nutrition</b>	
<b>International Covenant on Economic, Social and Cultural Rights (ICESCR)</b>	1981 1990
<b>Convention on the Rights of the Child (CRC)</b>	1990
<b>World Summit for Children</b>	1992
<b>International Conference on Nutrition</b>	1994
<b>International Conference on Population and Development (ICPD)</b>	1995
<b>World Summit for Social Development</b>	1996
<b>World Food Summit</b>	2000
<b>Millenium Summit (Millenium Development Goals)</b>	2001
<b>Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)</b>	2002
<b>UNGASS for Children (World Fit for Children)</b>	

## **2.2 COUNTRY CONTEXT**

The Democratic Peoples' Republic of Korea (DPRK) lies in the North Eastern part of Asia, covering 122,762 square kilometers and has land borders with China and Russia to the North with a demilitarized zone to the south. DPRK has a homogenous population who speak one national language. In 2006, approximately 419,000 new infants will be born from an estimated total population of 23,310,000 (with annual growth rate of 2.1%). About 60% of these infants will live in urban areas.

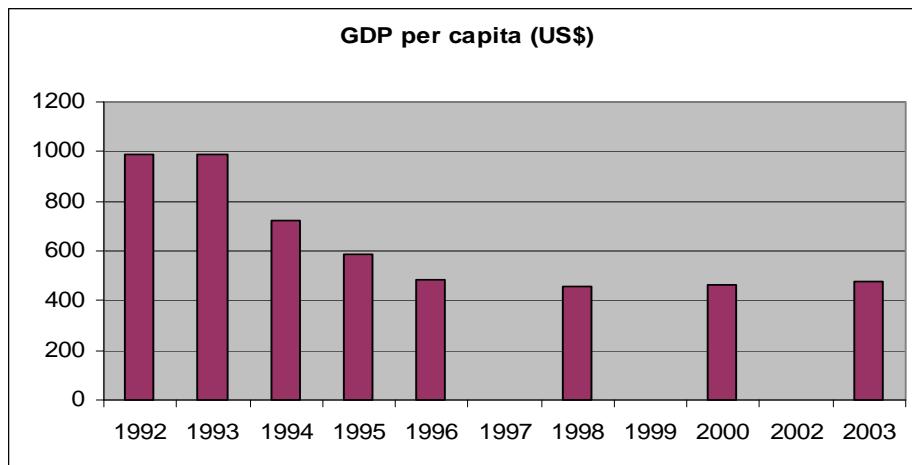
The country is administratively divided into 10 Provinces and 206 cities or counties. Cities are further administratively split into dong and counties into Ri. Since the early 1990s, DPR Korea's economic and trading relations have been confined largely to neighbouring countries and a few traditional economic partners. DPRK is committed to the philosophy of Juche<sup>1</sup>, and as such DPRK has largely relied on its own strengths and resources for its development.

1990s: The 1990s were an extremely difficult time for DPRK. The disruption of economic and trade links with its old economic and trading partners, and the lack of an effective substitute led to a fall in economic growth. The worsening situation was also attributed to a

<sup>1</sup> Juche philosophy expounds that man is master of everything and decides everything in our country. Such a human centred state policy firmly guarantees successful implementation of preventive, community based initiatives and implementation of our country's health network

series of natural calamities which seriously disrupted the agricultural and energy sectors. These all led to a contraction in the size of the DPRK economy.

**Figure 2 GDP per capita (\$US 1992-2003)<sup>2</sup>**



**Since 2000:** The economic constraints and natural calamities of the 1990s led to a decrease in the quality of the economic infrastructure. Agricultural production is still around half what it was in the 1980s and the reduced capacity to obtain commercial imports has led to continuing food insecurity in many parts of the country. The national budget for the year 2001 is stated to be US\$ 9.9 billion, but no official figures are available since then.

External trade continued to decline until 2002. Estimated totals of import and exports for the year 2000 was US\$ 2.4 billion, of which three quarters is accounted for by imports. The trade gap continues to be partly met through the provision of official assistance from traditional trading partners in the region. Exports, as a proportion of GDP, continue to be around 4 or 5% of GDP. After about a decade of economic decline then stagnation, there is evidence of a reverse of this trend and the economy has *probably* grown by 2 to 3% annually since 2002.

Since 2002, the Government has signaled a shift in the direction of the economy. The Government of DPRK has expressed an interest in expanding trading links and modernizing its economy. DPRK is already rebuilding its economy through technological modernization and improving infrastructure. There has been a major increase in wage levels since 2002, to offset rises in prices. Exchange rate revisions have been undertaken. Generally, DPRK is moving towards a monetized economy, allowing prices to play a more extensive role in allocation of resources. This new domestic economic adjustment is increasing flexibility of economic management and operations. DPRK is also moving to more extensive engagements with partners beyond the region. In development cooperation, it is engaged in a process of establishing a

<sup>2</sup> Sources: Ministry of Finance, Central Bureau of Statistic, Department of planning and SoE Report DPRK Government, State of the Environment, DPRK, 1 November 2001

comprehensive set of relationships aimed at stimulating predictable forms of development assistance.

## **2.3 HEALTH SYSTEM OPPORTUNITIES AND CONSTRAINTS**

### **National Policy**

Universal and free health care is guaranteed in the country's Constitution of 1960 and the Public Health Law of 1980. The Public Health Law particularly emphasises commitment to a health care system that is equally preventative and curative and gives special priority to the needs of women and children. The Government's policy objective in the 1950s and 1960s was to rapidly expand health services for the majority of the population and this was achieved in the 1970s. The main policy objective then shifted to reducing inequities in health care provision and services for farmers and remote rural areas were developed. Remarkably, universal access to health care was achieved by the 1980s. With the planned expansion of the health services completed, the 1980 law on public health marked a further shift in policy towards developing the quality of the health care system and emphasising prevention. The main policy objective of improving quality remains the same to this day. The Ministry of Public Health is directly in charge of implementation of the Public Health Policy including vaccine production and immunization services.

### **Figure 3 Public Health Policy**

#### **Public Health Policy:**

The State bears the full responsibility for the life and health of people and guarantees it by law:

1. To implement the universal free medical care for people
2. To give priority for preventive medicine
3. To establish well regulated health system from central to Ri level and to establish predominant section doctor system

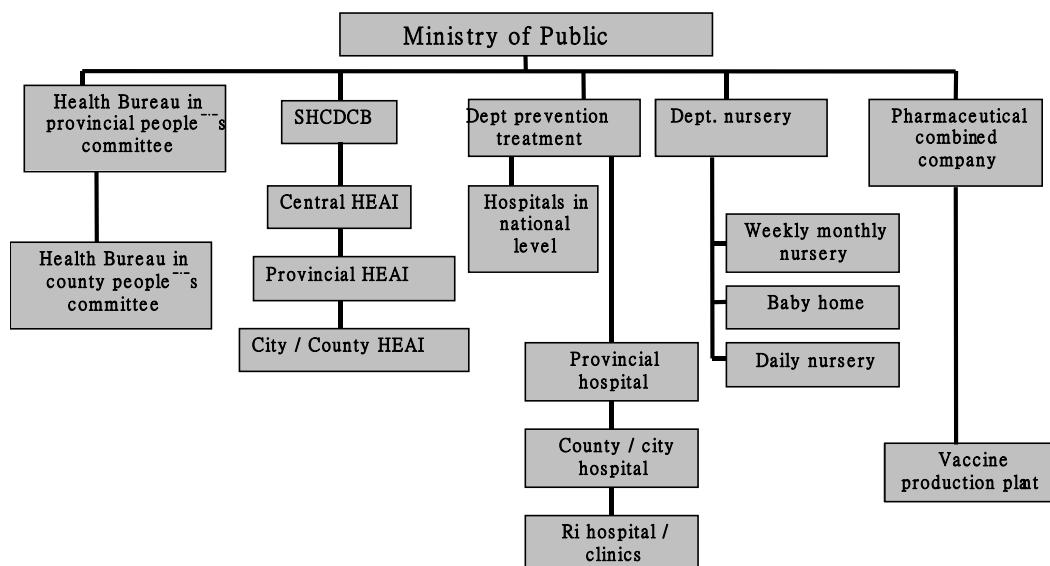
#### **Public Health strategy**

1. To improve constantly the cultured ways in production and life to eradicate the resource of infectious diseases totally
2. To constantly decrease the incidence and morbidity of the population
3. To strengthen the health education activities to improve the common sense on health so that the populations can take an active part in preventive activities
4. To increase the numbers of health workers as well as elevate their standard and to provide sufficient materials support so that improvements can be made in the quality of health services

### **Structure of Health System**

There is a central Ministry of Public Health which reports to the cabinet of the DPRK. The MOPH is responsible for treatment and prevention all over the world. Sub nationally there are Provincial Health Bureaus, County Health Bureaus and Ri.

**Figure 4 Structure of Public Health in DPRK**



The section doctor system provides integrated first line preventive and curative services for 100 to 150 households. There are approximately 50,000 section doctors in DPRK, all of whom are medically trained. There is therefore a high ratio of doctors per population (568 per 100,000).<sup>3</sup> DPR Korea has an extensive infrastructure of approximately 130 hospitals at central and provincial levels, 433 hospitals at county level, 1118 primary health care centres in rural areas (Ri), 5890 primary health centres in urban areas (Dong). There is one hygienic and anti epidemic institute (HAEI) at central level. There is one HAEI in each of the 10 provinces and one HAEI for each of the 206 cities and counties. The facilities are run by over 70,000 trained staff. There is a very high delivery rate of infants by trained medical staff (96.7%) and most births take place in ri hospitals and clinics, followed by county hospitals. In order to ensure the timely distribution of vaccines and syringes, there is close cooperation between Central Hygienic & Anti- Epidemic Institute (HAEI) and Central Medical Ware house (CMW).

## Health Systems

In relation to **health planning**, the planning cycle has moved from a 10 year to an annual health sector plan. The health needs are integrated to the budget needs during the first half of

<sup>3</sup> UNICEF Situation of Women and Children in DPRK UNICEF DPRK 2003

the previous year. These are sent to the national planning board that reviews the budget needs and makes a decision by December of the previous year. There is currently no 5 or 10 sector plan. There are integrated micro-plans at county level for household doctors. However, skills in planning at county level can be improved. There is weak implementation due to lack of funds. There is a major issue of flow of funds on a timely basis. The need was identified to improve national and central level coordination of the different programs. In order to reach this objective, it is proposed that specific guidelines are developed for integrated micro-planning at county level. Although service delivery level integration is effective and is a major strength of the health system, it is still the case that EPI program at National and provincial level can be more involved in Maternal and Child health strategy development and the IMCI strategy implementation. At the service delivery level, there are opportunities for strengthening integration of Vitamin A and deworming and malaria bed net distribution with EPI. In future, government will establish the system of delivering vaccines, injectors and other cold chain equipment through CMW with the assistance of UN agencies.

### Figure 5 Summary of Health System Issues

#### Summary of Health System Issues Effecting Immunization Performance

DPRK has a strong **health system** - there is 1 section doctor to manage primary care services for 100 to 130 households across the country (a total of approx. 50,000 doctors)

**Health infrastructure** is limited in provinces, particularly in relation to transport services, and reliable electricity supply. Principal weaknesses are lack of transport capital and financing of operational costs. This effects service delivery as well as the operation of the waste management system

There are integrated micro-plans at county level for household doctors. However, **skills in health planning & use of health information** at county level can be improved.

Another problem is the insufficiency of **finance for transportation** of vaccines and maintenance of the cold chain.

There are opportunities at Provincial and Central levels for closer program **co ordination of immunization with MCH and IMCI** (including more coordination with CMW and AES to ensure adequate bundling of vaccines and supplies at implementation levels), and at the service delivery point in terms of integration of other interventions with EPI.

In terms of **health financing**, it is the national responsibility to fund the needs for the mid term plan. The MOF makes final decisions about finance. Health sector financing is based on GDP - there is always a portion reserved for the health sector and the EPI PROGRAM. Other resources might be required depending on the economic situation. 30-35% of overall needs for EPI should be funded by DPRK government. As part of mobilizing additional resources, DPRK expects to re-launch the local production of vaccines. This may be made possible by bilateral assistance, in particular to fund training and transfer of equipment for the vaccine production factory. The MOPH proposes to increase the proportion of vaccines provided by government.

There is no long term financial planning, so it is not possible to predict the future in terms of government or donor commitment, but the current perspective is optimistic. At the operational level, there is often weak implementation due to lack of funds for transport and maintenance of the cold chain.

In terms of ***human resources***, health workers are graduates of medical universities, and there is a medical university in each province. There are efficient and regular hands on training of health workers (with translated manuals including "immunization in practice"). The population is highly literate, and provides opportunities for reaching extra children. At the Ri level, the section doctor system ensures high level of contact between the population and the system, and there is therefore a high level of fixed facility immunization of children (76%). However, there is lack of human resources in terms of surveillance systems, so both the Mid Term Plan program planning and costing identifies opportunities for developing human resources in terms of measles and tetanus surveillance (integrated VPD surveillance) at both Provincial and county level.

**Table 2 Human Resources for Immunization DPRK**

Level	Position	Estimated Total No.	% Time on EPI
Central	Public Health Staff	35	100%
Province	Public Health Staff	130	100%
County	Public Health Staff	1310	100%
Ri	Section Doctors	49,056	20%
Ri % Outreach			23%

In terms of ***surveillance***, managers identify that the AFP system has been effectively developed over recent years, and is seen as a basis for strengthening a wider vaccine preventable disease surveillance system. Guidelines are clear, staff have been trained and there is operational finance for this

system. In contrast, the guidelines and operational systems for measles and neo natal tetanus are not as strong. There is insufficient global or regional direction on integration of surveillance systems. The need was identified to harmonize data reporting systems at the peripheral level and to strengthen active and case based surveillance. This being the case, it was recommended in the Mid Term planning forum that guidelines on integrated surveillance be developed, and a program of training and monitoring/reporting system changes be implemented. DPRK will apply for certification of polio eradication in 2007. The development of integrated VPD surveillance system is seen as a first step towards integration into a wider communicable disease surveillance system and for moving towards international certification of measles and neo natal tetanus elimination.

In relation to *logistics*, weaknesses were identified in cold chain systems and *transport systems*. Principal weaknesses of transport are lack of transport capital and financing of operational costs. This effects service delivery as well as the operation of the waste management system, as the ri level needs to transport safety boxes to the county level. This also applies to the *cold chain system*. Although there is a well organized structure for delivery of vaccines to the peripheral level, these limitations in logistics and transport raise concern about efficacy of vaccines. It is proposed in the new plan that investments be made in capital equipment and to improvements in operational funds for the transport system. Motorcycles are required for county level, and 2 or 3 bicycles for each Ri. Cold trucks are required at central level, and cold cars at Provincial level. These requirements are costed in this mid term plan.

The major *infrastructure* limitation in peripheral areas (aside from transport) is the limitations in consistent electricity supply to county and Ri facilities. Inconsistent power supply at county level and below is raising concerns about maintaining the cold chain. A recent review by WHO and the EPI PROGRAM has recommended a transition to solar powered cold chain systems. This has resulted in the EPI PROGRAM plan to shift to solar powered refrigeration systems at county level.

In terms of the *service delivery system*, we have already described that services are well integrated. However, there are still opportunities for further integration of other interventions (eg malaria bednets) with EPI services. There also opportunities for integration of deworming and vitamin A with campaigns, and for providing a wider range of services on the twice yearly child health days.

## **2.4 IMMUNIZATION IN DPR KOREA**

A vaccine production unit was set up in 1946. As the need and demand for vaccination was more than the capacity of this units, additional units has been built and their capacities was also expanded which resulted in production of ten different vaccines including those against tuberculosis, poliomyelitis, tetanus, diphtheria, pertussis, measles and Japanese encephalitis. However, due to certain factors including natural disasters, these vaccine production was stopped or ceased in some cases since 1995.

According to the “Public Health Law” adapted in the 6<sup>th</sup> Supreme People’s Assembly in 1980, the country organized immunization activities.

To strengthen the National Immunization Programme, the government requested for the

support of the international health agencies (UNICEF, WHO). Since then UNICEF and WHO are providing support especially in the form of vaccines, cold chain equipment, transport, technical assistance and local human resource capacity building. GAVI commenced support to DPRK in 2003 through new vaccine introduction and support for injection safety and immunization services strengthening. Despite of difficulties the government continued its support to EPI largely in the form of trained Human resource made available even in the remoted parts of the country to ensure that all the target population get benefit from this programme.

## **2.5 CURRENT VACCINE PREVENTABLE DISEASE BURDEN**

The impact of the EPI is measured in terms of the vaccine preventable disease burden. Between 2000 and 2005 the infant mortality rate in DPRK has fallen steadily from 21.8 to 18.6 deaths per 1000 live births. (Source of data: CBS 2005)

Since 1999 there has been recorded significant reduction of the number of 6 vaccine preventable diseases. There were no recorded measles or tetanus cases in the last decade.

Despite the improvement indicated above, the stated goals were not fully achieved. Thus, there is an urgent need to address deficiencies in the immunization system and emphasize the need for system strengthening and vigilant monitoring and surveillance.

DPR Korea had conducted “National Immunization Days” for OPV since 1997 along with routine immunization. As a result no wild polio cases have been reported since 1996. Between 2002 and 2005 number of pertussis, mumps and rubella cases have been reduced from 1087, 2710 and 520 to 493, 187 and 127 respectively.

Polio eradication programme has contributed to the surveillance system throughout the network of AFP surveillance and the rapid response system was also established.

There is no regular report of data on disease burden of Hepatitis B. About 400,000 new born are in DPR Korea per year, among which 30,000 (7.5%) are born from mothers of HBAg positive.

No regular report is made for disease burden caused by *Haemophilus influenzae* Type B. It is only known as the general cause pediatric pneumonia and meningitis. Japanese Encephalitis vaccination programs have been operating since the 1980s, but there is lack of adequate surveillance systems that describe the impact of this program on disease burden.

Generally, although there has been marked improvement in immunization coverage and a decline in reportable vaccine preventable diseases, there is still concern that health information and surveillance systems are not sufficiently reliable, analytic and timely. This being the case, this plan will describe objectives and activities that will identify strategies for strengthening health information and surveillance systems, in order to (1) more accurately measure the impact of the program on disease burden and (2) provide the opportunity to take corrective action.

## **2.6 CURRENT EPI SCHEDULE**

Primary vaccination	At birth	6 weeks	10 weeks	14 weeks	9 months	6 years	Additional information on vaccination schedule
BCG							
OPV							
DPT - Hep							
Hep B Birth							
Measles							
JE (Risk area)	3 doses @ 12 mths. 1 dose every age						
Vitamin A	6- 59						
TT	As early as possible during						
TT	1 month after <sup>st</sup> dose						
TT Booster	If not previously vaccinated within						
Mumps	1 dose @ 8						
Pertussis	3 doses @ 3rd,4th & 5th						

adolescents should receive 3 doses on demand. There should be an interval of one month between dose 1 and dose 2 and 2 months interval between doses 2 and 3. The birth dose should be given with 24 hours of birth or as soon as possible within 7 days.

There is currently a very high rate of institutional delivery and delivery by trained medical staff (96.7%) in DPRK.<sup>4</sup> This provides the opportunity to implement the global recommendation of WHO to promote administration of a birth dose within 24 hours of birth.<sup>5</sup> This will require advocacy programs, revision of guidelines and schedule information. Information systems may need to be adapted to record timeliness of delivery of birth dose.

It is also proposed that measles and tetanus schedules be reviewed during the period of this plan, in order to support international certification of disease elimination goals by 2011.

<sup>4</sup> UNICEF Analysis of Situation of Women and Children in DPRK UNICEF DPRK 2003.

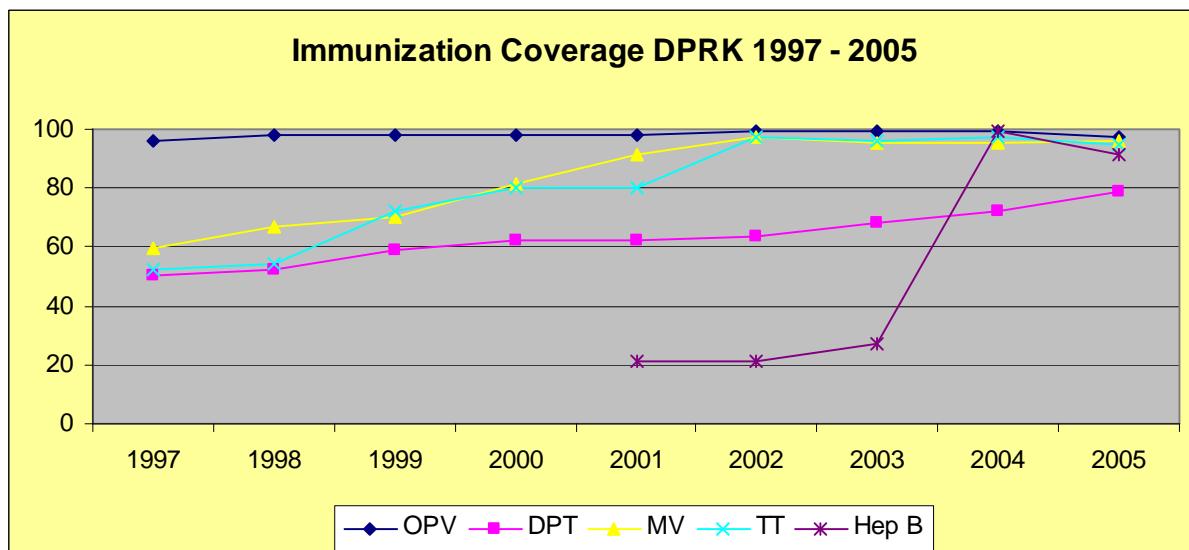
<sup>5</sup> WHO Position Paper on Hepatitis B Birth Dose WHO Geneva 2005

## 2.7 CURRENT COVERAGE RATES AND TRENDS

The output of the EPI is measured in terms of antigen coverage and drop-out rates.

- (1) Antigen coverage rates are a measure of “access” to immunization services
- (2) Drop-out rates indicate service utilization and are useful to consider when prioritizing improvements for “acceptability” of services.

**Figure 6 National EPI antigen coverage rate**



Above chart shows the increasing trend up to 2003 and slight decline in 2004 and 2005. The sharply increasing trend for hepatitis B describes the phased introduction of this vaccine. Measles coverage is higher than DPT3 because there is a long tradition of administration of this vaccine and it is in high demand by the population.

Further improvements in coverage will require strengthening of supervisory practice and reduction of drop out rate as well as the improvement of reporting system. In addition to this, DPT3 coverage rate shows the importance of IEC activities among the population, correct understanding of AEFIs and rapid response to AEFIs.

**Table 3 Coverage by province**

Provinc	DPT3	Drop
Pyongyan	82.1	2.2
S.Pyonga	80.9	2.6
N.Pyonga	79.1	4.3
Jagan	78.6	4.9
N.Hwanga	77.6	5.6
Ryangan	77.4	5.9
N.Hamgyo	77.4	4.7
S.Hwangh	77.2	5.5
Kangwo	77.2	5.6
S.Hamgyo	77.2	5.0

**Where are the unimmunized?** Those unimmunized were the missed opportunity children or those whose mothers refused to receive following doses due to AEFIs with 1<sup>st</sup>/2<sup>nd</sup> dose of DPT, or those living in the remoted parts of the country. There is variation across provinces and counties of the percentage of

children reached with vaccines. This plan proposes to strengthen data management and analysis at the county level, to ensure that these variations are detected and that there is prompt follow up action.

## **2.8 MANAGEMENT STRUCTURE AND SERVICE DELIVERY**

### **2.8.1 Service Delivery**

Immunization services are provided through more than 12,000 immunization posts, 7008 PHC units, 433 county level hospitals, 130 central and provincial level hospitals and specialized hospitals, and Hygienic and Anti-Epidemic Institutes. Certain level of drop-out rate highlights the urgent needs for the improvement in the management of service delivery to

- (1) Enhance the availability of supplies
- (2) Increase the quality and quality of staff
- (3) Increase the demand for service

### **2.8.2 Responsibilities**

The government is responsible for the dispatching and supply of vaccines, injections and cold chain equipment to the provinces, training of personnel, supply of stationery, training materials and salary for specific staff.

Province, county/cities are responsible for service delivery through health facilities and village outreach sessions. Although roles and responsibilities are defined, there exist practical difficulties in the correlation of EPI staff due to their high turnover.. Therefore, it is quite essential to train them regularly.

### **2.8.3 Management system**

**National level:** The central management of EPI rests with 4 assistants under one programme manager. The National EPI programme manager is in the State Hygiene and Communicable Disease Control Board, MoPH.

**Peripheral level:** Implementation of EPI is the joint responsibility of the national, provincial and county level. The relationship between the national and provincial EPI department and between provincial and county level EPI officers is critical for efficient and effective service delivery. Overall coordination and fund and communication flows have been identified as key problematic areas. This is particularly the case in relation to.

### **2.8.4 Logistics system**

National level provides vaccines injection supplies to provincial on quarterly basis, while

province to county on monthly basis and county to Ri on weekly basis.

## **2.9 CURRENT FINANCING AND AUDIT MECHANISMS**

All operation aspects of EPI are funded by the government of DPRK. The funds are released to the province for disbursal to the counties/cities for various activities such as logistics, cold chain maintenance, injection safety, and payment of immunization related staff. The vaccines required are being centrally procured and distributed to the provinces. Provinces compile the statement of expenditures based upon the expenditure statement submitted by the counties and furnish utilization certification to government.

### ***2.9.1 Current audit mechanism***

**Scope of statutory audit:** The auditor of government is vested with the power and authority to conduct an audit of the expenditure incurred from the consolidated funds of the country. The corresponding mechanism at the provincial level is relevant officer.

The scope of audit is to ascertain whether the money shown in the accounts as having been disbursed were legally available for and applicable to the service or purpose for which they have been applied or charged and whether expenditure conforms to the authority which governs it. The auditors can request financial report from any agencies in the country and also carry out a detailed audit by randomly selecting the period/scheme under various ministries and departments. The consolidated reports on audit of the selected agencies will then be submitted to the government. The provincial level auditor, similarly submits a consolidated report of all schemes, together with the report of the detailed audit in respect of the selected scheme, to the concerned provincial level legislatures.

The account is also audited by auditors of the country.

## **2.10 COSTING AND FINANCING OF THE MULTI YEAR PLAN**

### **2.10. 1 Economic Background<sup>6</sup>**

#### ***Recent state of the Economy***

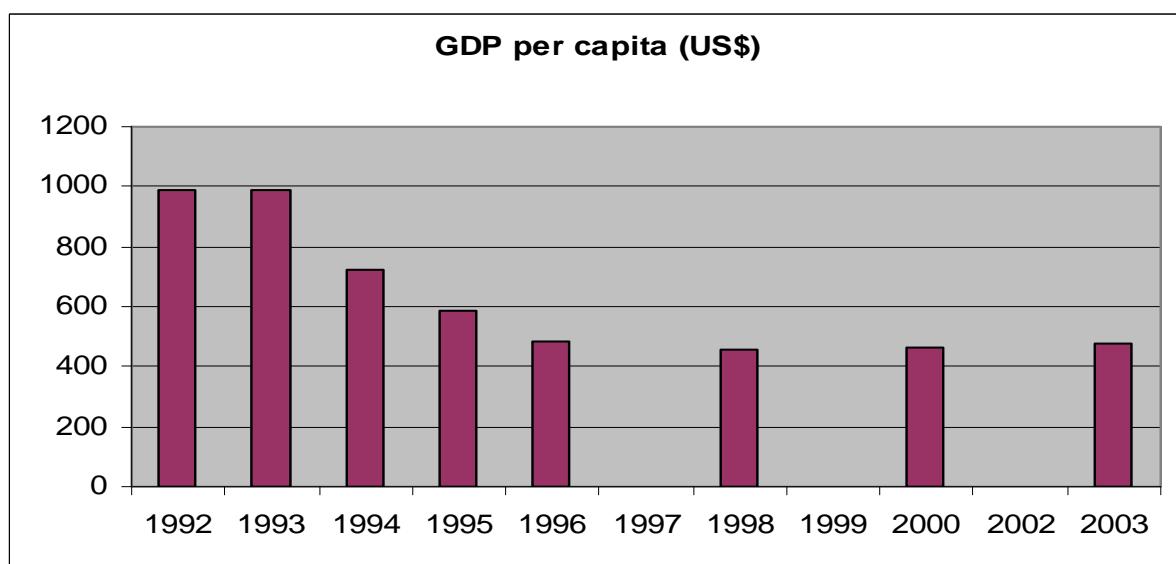
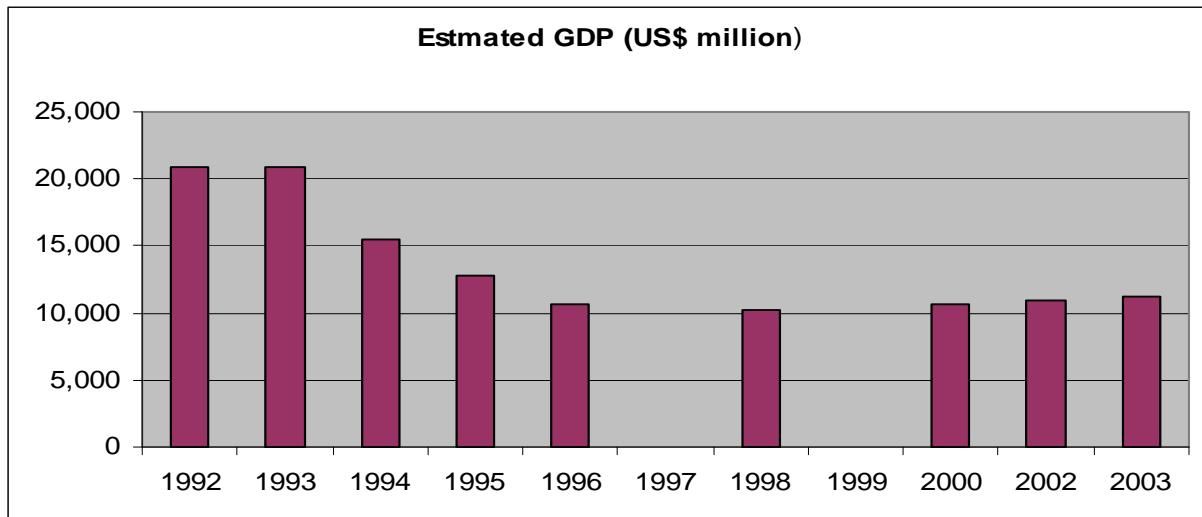
**1990s:** The 1990s were an extremely difficult time for DPRK. The disruption of economic

---

<sup>6</sup> Sources of Information on economics: MoPH Financial Sustainability Plan 2004

and trade links with its old economic and trading partners, and the lack of an effective substitute led to a fall in economic growth. The worsening situation was also attributed to a series of natural calamities which seriously disrupted the agricultural and energy sectors. These all led to a contraction in the size of the DPRK economy.

**Figure 7 Gross Domestic Product (GDP) in \$US million; 1992 – 2003<sup>7</sup>**



**Since 2000:** The economic constraints and natural calamities of the 1990s led to a decrease in the quality of the economic infrastructure. Agricultural production is still around half what it was in the 1980s and the reduced capacity to obtain commercial imports has led to continuing food insecurity in many parts of the country. The national budget for the year 2001 is stated to be US\$ 9.9 billion, but no official figures are available since then.

<sup>7</sup> Sources: Ministry of Finance, Central Bureau of Statistics (CBS), Department of planning and SoE Report DPRK Government, State of the Environment, DPRK, 1 November 2001

External trade continued to decline until 2002. Estimated totals of import and exports for the year 2000 was US\$ 2.4 billion, of which three quarters is accounted for by imports. The trade gap continues to be partly met through the provision of official assistance from traditional trading partners in the region. Exports, as a proportion of GDP, continue to be around 4 or 5% of GDP. After about a decade of economic decline then stagnation, there is evidence of a reverse of this trend and the economy has *probably* grown by 2 to 3% annually since 2002.

Since 2002, the Government has signaled a shift in the direction of the economy. The Government of DPRK has expressed an interest in expanding trading links and modernizing its economy. DPRK is already rebuilding its economy through technological modernization and improving infrastructure. There has been a major increase in wage levels since 2002, to offset rises in prices. Exchange rate revisions have been undertaken. Generally, DPRK is moving towards a monetized economy, allowing prices to play a more extensive role in allocation of resources. This new domestic economic adjustment is increasing flexibility of economic management and operations. DPRK is also moving to more extensive engagements with partners beyond the region. In development cooperation, it is engaged in a process of establishing a comprehensive set of relationships aimed at stimulating predictable forms of development assistance.

The current GDP per capita is estimated to be US\$ 566, which translates into a total national GDP of US\$ 13.5 billion

**\$US Exchange rates:** Up until 2001, the fixed exchange rate was 2.1 Won to \$US 1. In 2006 prices increased and the Government decided to fix the Won / \$ exchange rate to 138. The Won \$US exchange rate has remained officially relatively constant.

### ***Key economic challenges and future directions***

Major decisions are imperative to regain the momentum of economic growth and development, and to improve social conditions. Internal economic policy is changing for greater flexibility and transparency and economic infrastructure is being modernized. The DPRK government is continuing to take important steps to mark out new directions to revitalize economic growth and create the resources required to accelerate human development. This focuses on increased level of export orientation in DPRK economy and reaching out to development partners.

### ***Domestic and external resources available***

Increased trade is essential to obtain more domestic resources for allocation to the health sector. Although not currently a source, multilateral international financial institutions (IFI) could be an important channel of investment in DPRK. These institutions could help stimulate

other forms of private foreign investment. Similarly, DPRK has the potential to expand its development cooperative arrangements with the bilateral donor community.

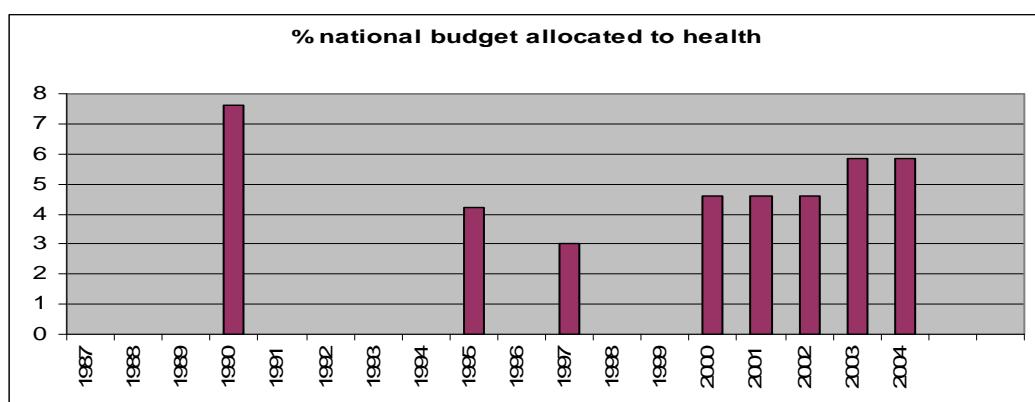
Currently, 90% external assistance received by DPRK is humanitarian. Sustainable development assistance is of a very modest scale. DPRK is currently a recipient of International Fund for Agricultural Development (IFAD) and OPEC loans as well food security assistance from the EU. Given the current global political climate and attitude by external donors towards DPRK, possibilities of external funding remain fragile and unpredictable.

### ***Impact of economy on health sector***

By most human development indicators – access to health, water and sanitation, educational achievements and mortality rates – DPRK reached remarkable standards by the end of the 1980s. Women and children and other vulnerable groups had a degree of protection seen in few other developing countries.

However, during the 1990s there was a rapid decline in these high standards. Food insecurity led to malnutrition in some parts of the country, particularly amongst women and children. Standards of health care in rural areas have suffered – in some areas there are cases of shortages of medical and hospital supplies. During the economic hardship period, the Government had limited source to maintain the support to the health sector and requested the assistance of UNICEF and the WHO in 1996 for the assistance in its health programmes.

**Figure 8: % national budget allocation to health (source MoPH)<sup>8</sup>**



In view of increasing financial constraints, investment in the health sector declined to a minimum in 2002 (figure 8). Some aspects of the health system require review to ensure cost-effective and affordable systems are in place. DPRK is highly committed to the

<sup>8</sup> Sources: Ministry of finance, Central Bureau of Statistic, Department of planning and SoE Report DPRK Government, State of the Environment, DPRK, 1 November 2001

maintenance of the high standards in human development. In recent years there has been some increase in investment in the health sector (figure 8). Currently, it is estimated that the DPRK Government is spending about \$US30 per capita on health services.

Resource scarcities have led to difficulties in operating and maintaining the level and quality of services which prevailed up to 1990. Improving resource allocation to the health sector is largely dependent on economic growth.

## **2.10.2 Analysis of the current and projected future costs for the program**

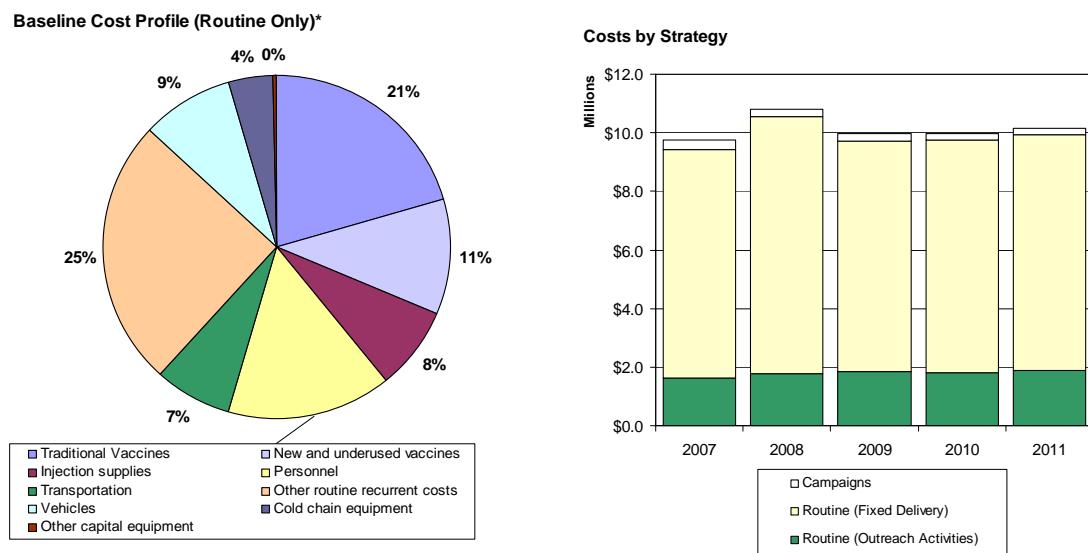
In 2005, the total expenditures on immunization totalled \$4.3 million. In the baseline year, over 85% of spending on immunization was for routine delivery systems, the remainder for supplemental immunization activities in risk areas (pertussis and measles campaigns). Translated into indicators, the cost of routine immunization represented \$0.16 per capita or almost \$12 per DPT fully vaccinated child in 2005.

**Table 4 Current Costing and Indicators - 2005**

Baseline Indicators	2005
Total Immunization Expenditures	\$4,353,773
Campaigns	\$541,458
Routine Immunization only	\$3,812,316
Per capita	\$0.16
Per DTP3 child	\$11.9
% vaccines and supplies	46.6%
% national funding	45.9%
% total health expenditures	0.57%
% government health expenditures	0.62%
% GDP	0.03%
Total Shared Costs	\$2,863,469
% Shared health systems cost	40%
<b>TOTAL</b>	<b>\$7,217,242</b>

Total expenditures on routine immunization corresponded to some 4% of overall expenditures on health in DPRK (about \$28 per capita on health) and where national funding is short of 50% of total immunization financing. Government funding mainly covers for the locally produced vaccines, the staff salaries and maintenance & overhead costs of the programme (buildings, cold chain and transportation).

**Figure 9 Current and Future Costing - 2007-2011**



It is important to note however, that DPRK immunization services have a high proportion of costs that are shared across the health sector and without specific funding for immunization. These costs that are not specifically borne by the programme represent some 40% of overall costs. If these are included, total expenditures on immunization would be \$7.2 million (compared to \$3.8 million if shared costs are not included).

In 2005, the cost profile for DPRK shows that the major cost driver of routine immunization lies with vaccines and injection supplies (40%) and other recurrent expenses (25%) such as training, social mobilization, surveillance activities and IEC. Noteworthy is that the cost of introducing DTP-HepB vaccine represents only 11% of overall cost of the routine programme and that human resources represent no less than 15% despite a large workforce for the programme (1,475 health workers employed 100% for the programme and 49,056 health workers that are spending a proportion their time at the Ri-Dong level on immunization service delivery). With salaries ranging between 2,300 to 4,000 Won per month, the cost of personnel in DPRK are low.

The future resource requirements for the EPI programme in DPRK was based on the needs to

both sustain the current gains in immunization and the required needs to undertake activities in the next 5 years as outlined in this mid term plan. Particular focus was given to strengthening social mobilization, communication and advocacy activities; strengthen surveillance beyond AFP; strengthening the cold chain and needs for transportation which is one of the weakest links in the programme; and the needs for adequate programme management (for improved monitoring, micro-planning and information to guide decision making about future new vaccine introduction).

The resource requirements are expected to rise in order to reach the objectives of the programme. At least a doubling of the costs is noted when comparing the baseline expenditure (2005) on routine immunization with future resource requirements. Overall resource requirement between 2007-2011 will hover between \$9 to \$ 10 million with a notable peak in 2008 which reflects higher than average investments in cold chain and transportation equipment.

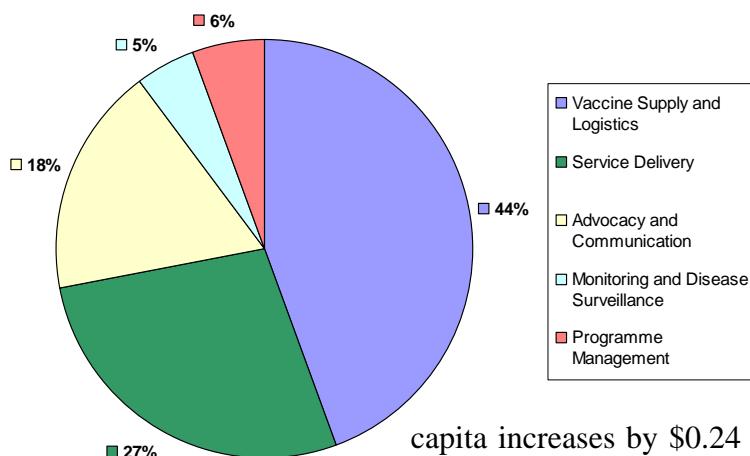
**Table 5 Breakdown of Future Costs by cMYP component - 2007-2011**

cMYP Components	2007	2008	2009	2010	2011	2007-2011
	US\$	US\$	US\$	US\$	US\$	US\$
Vaccine Supply and Logistics	\$4,524,461	\$5,272,420	\$4,137,452	\$4,311,763	\$4,258,084	\$22,504,180
Service Delivery	\$2,598,053	\$2,758,169	\$2,920,050	\$2,716,847	\$2,862,872	\$13,855,992
Advocacy and Communication	\$1,664,640	\$1,747,872	\$1,825,278	\$1,867,195	\$1,910,060	\$9,015,045
Monitoring and Disease Surveillance	\$416,160	\$465,059	\$514,686	\$522,815	\$546,520	\$2,465,239
Programme Management	\$535,230	\$545,934	\$556,853	\$567,990	\$579,350	\$2,785,357
<b>Grand Total</b>	<b>\$9,738,544</b>	<b>\$10,789,454</b>	<b>\$9,954,319</b>	<b>\$9,986,611</b>	<b>\$10,156,886</b>	<b>\$50,625,813</b>

The majority of the costs are for vaccines and logistics (ex: cold chain) and service delivery. Both components account for some 70% of the costs. While in relative terms, monitoring and disease surveillance and programme management only represent some 12% of the costs, in dollars terms this is a significant increase from current expenditures on these components.

**Figure 10 Analysis of Future Costs by cMYP component - 2007-2011**

**Breakdown of Costs by cMYP Components (2007-2011)**



Over the entire 2007-2011 period, approximately \$50 million will be required. Several points are worth noting - This is approximately \$10 million a year or \$0.4 per capita and \$27 per DTP fully vaccinated child. The cost per capita increases by \$0.24 from the baseline and more than \$15

per DTP fully vaccinated child. Outreach is not an important delivery strategy in DPRK. Instead, most children receive their vaccinations through fixed site strategy – the cheapest and most efficient. Through improved advocacy and communication, DPRK hopes to reduce the need for outreach so that immunization is a completely demand driven service.

### **2.10.3 Projected financing from all sources for the same time period**

In DPRK, the main funding sources for routine immunization are limited to the national government (38%), GAVI (18%), UNICEF (24%) and WHO (20%). Over the period it is expected that GAVI will be a major funding source to the national immunization programme.

Future funding was projected over the period and by including both monies that are secured and those that could be available (probable). Of the funds that are considered secure, national financing is expected to increase in the future from \$3.4 to over \$4.2 million. This is approximately a 30% increase in national funding over the 5 year period.

**Table 6: Future Financing and Gaps - 2007-2011**

Governement Funding	2007	2008	2009	2010	2011	2007-2011
	US\$	US\$	US\$	US\$	US\$	US\$
<b>Routine Immunization</b>	<b>\$ 3,420,000</b>	<b>\$ 3,720,000</b>	<b>\$ 3,830,000</b>	<b>\$ 3,940,000</b>	<b>\$ 4,240,000</b>	<b>\$ 19,149,999</b>
<b>Recurrent Costs</b>	<b>\$ 3,420,000</b>	<b>\$ 3,720,000</b>	<b>\$ 3,830,000</b>	<b>\$ 3,940,000</b>	<b>\$ 4,240,000</b>	<b>\$ 19,149,999</b>
Traditional vaccines	\$ 346,321	\$ 358,187	\$ 358,270	\$ 376,455	\$ 380,973	\$ 1,820,205
New and underused vaccines	\$ -	\$ 236,548	\$ 336,690	\$ 571,972	\$ 674,829	\$ 1,820,039
Injection supplies	\$ 118,095	\$ 121,084	\$ 121,112	\$ 126,231	\$ 127,746	\$ 614,267
Personnel	\$ 1,036,648	\$ 1,057,381	\$ 1,078,529	\$ 1,100,100	\$ 1,122,102	\$ 5,394,760
Transportation	\$ 207,765	\$ 281,826	\$ 327,788	\$ 205,261	\$ 241,697	\$ 1,264,337
Maintenance and overhead	\$ 635,787	\$ 668,104	\$ 600,464	\$ 542,552	\$ 574,935	\$ 3,021,843
Training	\$ 75,650	\$ 75,650	\$ 75,650	\$ 75,650	\$ 75,650	\$ 378,250
IEC/social mobilization	\$ 550,000	\$ 550,000	\$ 560,000	\$ 570,000	\$ 570,000	\$ 2,800,000
Disease surveillance	\$ 110,000	\$ 110,000	\$ 110,000	\$ 110,000	\$ 110,000	\$ 550,000
Programme management	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 150,000
Other routine recurrent costs	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 300,000	\$ 1,100,000
<b>Capital Costs</b>	<b>\$ -</b>					
Vehicles	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Cold Chain	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other equipment	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Campaigns</b>	<b>\$ 109,734</b>	<b>\$ 31,220</b>	<b>\$ 31,497</b>	<b>\$ 31,780</b>	<b>\$ 32,069</b>	<b>\$ 236,299</b>
<b>Shared Health Systems Costs</b>	<b>\$ 3,520,498</b>	<b>\$ 3,590,908</b>	<b>\$ 3,662,726</b>	<b>\$ 3,735,981</b>	<b>\$ 3,810,700</b>	<b>\$ 18,320,814</b>

(not included in immunization specific financing from the government)

Funding from the GAVI Fund to cover for the new vaccines has been projected up to 2008 and DPRK expects to begin co-financing for the DTP-HepB vaccines beginning in the same year.

Some GAVI probable funding was included as potentially DPRK can benefit from some award payments on ISS funding and Phase II new vaccine and HSS awards.

Funding from WHO and UNICEF has been estimated at about the same levels as for previous

years. Up to 2008 the funding was considered as secured, and probable beyond that.

Probable funding from WHO and UNICEF has been projected assuming that the same levels of funding provided today, will continue in the future.

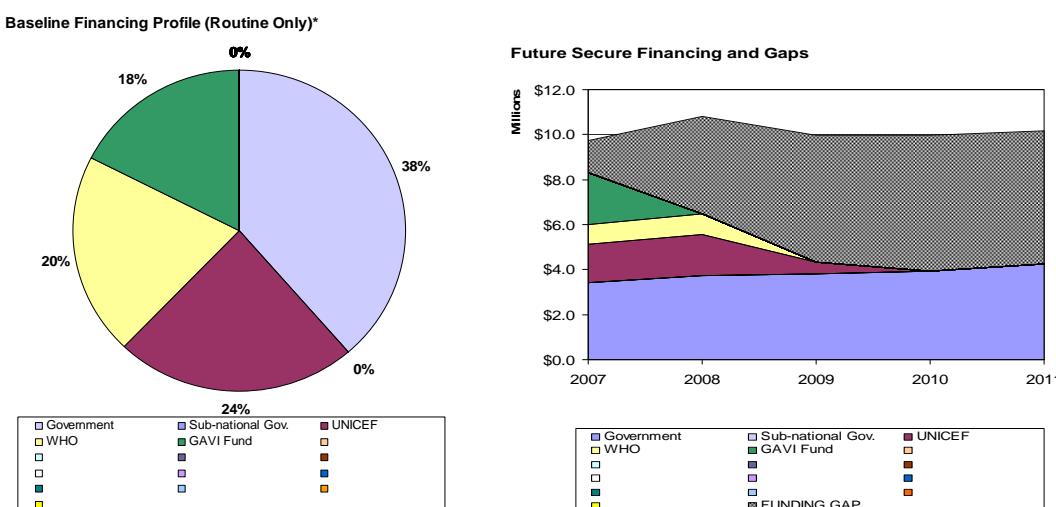
**Table 7: Future Financing and Gaps - 2007-2011**

Resource Requirements, Financing and Gaps*	2007	2008	2009	2010	2011	2007 - 2011
<b>Total Resource Requirements</b>	<b>\$9,738,544</b>	<b>\$10,789,454</b>	<b>\$9,954,319</b>	<b>\$9,986,611</b>	<b>\$10,156,886</b>	<b>\$50,625,813</b>
<b>Total Resource Requirements (Routine only)</b>	<b>\$9,440,724</b>	<b>\$10,567,844</b>	<b>\$9,730,082</b>	<b>\$9,759,693</b>	<b>\$9,927,234</b>	<b>\$49,425,576</b>
per capita	\$0.388	\$0.429	\$0.390	\$0.387	\$0.389	\$0.396
per DTP targeted child	\$28.286	\$29.900	\$27.495	\$25.712	\$25.817	\$27.380
% Vaccines and supplies	35%	33%	35%	37%	37%	35%
<b>Total Secured Financing</b>	<b>\$8,315,717</b>	<b>\$6,495,337</b>	<b>\$4,337,479</b>	<b>\$3,940,000</b>	<b>\$4,240,000</b>	<b>\$27,328,532</b>
Government	\$3,420,000	\$3,720,000	\$3,830,000	\$3,940,000	\$4,240,000	\$19,149,999
Sub-national Gov.						
UNICEF	\$1,687,324	\$1,859,043	\$507,479			\$4,053,845
WHO	\$879,620	\$916,294				\$1,795,914
GAVI Fund	\$2,328,773					\$2,328,773
<b>Funding Gap (with secured funds only)</b>	<b>\$1,422,827</b>	<b>\$4,294,117</b>	<b>\$5,616,840</b>	<b>\$6,046,611</b>	<b>\$5,916,886</b>	<b>\$23,297,281</b>
% of Total Needs	15%	40%	56%	61%	58%	46%
<b>Total Probable Financing</b>	<b>\$250,000</b>	<b>\$2,467,183</b>	<b>\$4,511,287</b>	<b>\$4,996,179</b>	<b>\$4,778,672</b>	<b>\$17,003,321</b>
Government						
Sub-national Gov.						
UNICEF			\$1,190,161	\$1,785,693	\$1,821,791	\$4,797,645
WHO			\$953,514	\$909,611	\$977,390	\$2,840,515
GAVI Fund	\$250,000	\$2,467,183	\$2,367,611	\$2,300,875	\$1,979,492	\$9,365,161
<b>Funding Gap (with secured &amp; probable funds)</b>	<b>\$1,172,827</b>	<b>\$1,826,935</b>	<b>\$1,105,553</b>	<b>\$1,050,432</b>	<b>\$1,138,214</b>	<b>\$6,293,960</b>
% of Total Needs	12%	17%	11%	11%	11%	12%

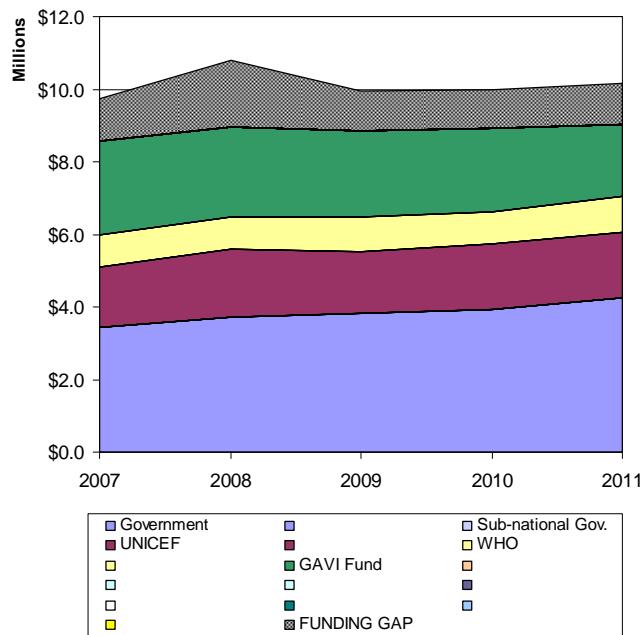
Despite the availability of funding for immunization, some funding gaps emerge, and if not filled, could compromise reaching the objectives of the programme between 2007-2011.

If only secure funding is considered, some 46% of resources requirement over the entire period are unmet (about \$23 million for 2007-2011). At least a \$4 million shortfall exists every year of the period. If probable funds are included, most of the needs are meet over the 5 year period - only 12% or some \$1.25 million annually are unmet.

**Figure 11: Current and Future Financing - 2007-2011**



#### Future Secure + Probable Financing and Gaps



The majority of the funding gaps are for activities (social mobilization, advocacy and communication, training and surveillance) as well as for logistics (vehicles and cold chain equipment). Beginning in 2008, there are important funding gaps for vaccines unless DPRK can benefit from Phase II awards from GAVI.

**Table 8 Composition of the Funding Gap - 2007-2011**

Composition of the funding gap	2007	2008	2009	2010	2011	2007 - 2011
Vaccines and injection equipment	\$2,217,183	\$2,117,611	\$2,584,981	\$2,521,582	\$9,441,357	
Personnel						
Transport	\$31,309	\$82,907	\$268,953	\$186,216	\$211,171	\$780,556
Activities and other recurrent costs	\$477,097	\$565,596	\$2,431,480	\$2,518,386	\$2,523,830	\$8,516,388
Logistics (Vehicles, cold chain and other equipment)	\$726,335	\$1,238,040	\$606,056	\$561,891	\$462,720	\$3,595,042
Campaigns	\$188,087	\$190,391	\$192,741	\$195,138	\$197,583	\$963,939
<b>Total Funding Gap*</b>	<b>\$1,422,827</b>	<b>\$4,294,117</b>	<b>\$5,616,840</b>	<b>\$6,046,611</b>	<b>\$5,916,886</b>	<b>\$23,297,281</b>

\* Immunization specific resource requirements, financing and gaps. Shared costs are not included.

#### 2.10.4 Priority actions that the government will take to fill any resource gaps

The government's willingness to ensure financial sustainability of immunization was already well established in the previous multi-year plans and the DPRK Financial Sustainability Plan. As outlined in its MYP 2001-2006 (section 10.2.3), the Government is already committed to gradually increasing its contribution both directly and indirectly to the immunization programme. The Government of DPRK will be considering the following strategies to increase financial sustainability of its immunization programme.

- Increase national government financial contribution to immunization services: This is largely dependent on economic growth, which is dependent on DPRK's ability to export goods to those nations willing to establish friendly trading links with DPRK. The Government of DPRK will also review increasing the annual % of GDP allocated

to health and to immunization in particular, so it receives the domestic resources it was receiving before the economic crisis of the 1990s.

- Reducing wastage rates: DPRK has already implemented an action plan to reduce wastage rates and established future targets for wastage rates. The Multi Dose Vial Policy will be available in all sites and staff trained in its use for fixed and outreach sessions.
- Increase external resources available: Much external funding is ‘humanitarian’ in nature, is dependent on consolidated appeals and the external political environment. Current donors are channelling funds through WHO, UNICEF and GAVI. The Government of DPRK intends to use the costing and financing information to inform the International donor community of possible future immunization costs. Through this links with the donor community may be established, with special emphasis on the fact that DPRK is already meeting most of its immunization programme costs.
- Increased domestic vaccine production: DPRK is now reviewing expansion of domestic vaccine production and is actively trying to improve the standards of its production through the capacity building of a National Regulatory Authority.

## **2.11 IMMUNIZATION SYSTEM CONSTRAINTS**

The most common constraints are;

- (i) Coverage not uniform
- (ii) Imperfect implementation
- (iii) Poor surveillance
- (iv) Certain level of drop-outs
- (v) Low coverage rate in some provinces comparing with national level
- (vi) Incorrect reporting
- (vii) Injection safety
- (viii) The need for re-orientation of staff
- (ix) Cold chain replacement plan
- (x) Vacancy of some staff at the field level
- (xi) Surveillance of vaccine-preventable diseases
- (xii) Vaccine and device logistics
- (xiii) Maintenance of equipment

The table below summarizes the main immunization system constraints:

**Table Immunization System Constraints**

<p><b>Communication</b>- families in provinces where the immunization coverage is low are often unaware or unconvinced of the need for immunization. More information is required on knowledge, attitude and practice to guide updating of the communication strategy.</p> <p><b>Surveillance</b> – the AFP surveillance system is strong. This provides the basis for developing integrated vaccine preventable disease surveillance (including measles and tetanus)</p> <p><b>Service delivery</b> – existing service delivery strategies are effective. Most service (85%) is provided at the fixed site by the section doctor. But the low rate of DPT compared to other antigens (like BCG and Measles) is a concern. And is due to lack of health education and lack of response to AEFI. In some provinces the coverage is low and there is no timely response to drop out.</p> <p><b>Logistics</b> – there is weak monitoring of the break down of cold chain equipment. Based on cold chain evaluation, investment will be required and improved data management to a solar powered cold chain system.</p> <p>Vaccines are being handled by HAEIs while the device (syringes &amp; safety boxes) by CMW, if it is not well coordinated either one can be lagging at service delivery point.</p> <p><b>Programme Management</b> – Data is often lacking in terms of accuracy and completeness. Micro-planning skills need to be developed, and improved data management in order to identify high risk areas and take corrective action.</p> <p><b>New vaccines</b> – The burden of diseases for some vaccine preventable disease is not well known. More information is required to support country decision-making about new and underutilized vaccines (HIB, JE, Rotavirus)</p>
--

### **2.11.1 Technical and programme management constraints**

**National level:** the EPI has recently been strengthened by positioning EPI staff and assistants and additional staff to look after vaccine logistics and financial management under direct supervision of EPI programme manager. Still there is a gap in proper data generation and analysis of performance, evaluation, VPD surveillance inventory management (vaccine, cold chain, and injection safety), field supervision and monitoring.

**Provincial Level:** Provinces have a dedicated immunization focal point. The technical advice and resources available to these teams would require augmentation. Planning, management and monitoring of immunization activities at the provincial level are required to be strengthened. Timely data generation both in the area of performance and surveillance, data discrepancies, analysis, feedback for corrective action is few areas that need immediate attention.

**County level:** This plan needs the availability of EPI officers in the county level. The current mid level manager training initiative for county level managers aims to strengthen county level planning, monitoring and supervision. But there remains a shortage of appropriately qualified staff who are able to practically plan and manage immunization services effectively.

A review of county level human resource needs and training requirements is urgently needed. There is need for timely generation of data, their analysis and transmission to the next higher level.

There is therefore a strong emphasis in this plan on development of health planning and data management skills of managers at Provincial and County level.

### ***2.11.2 Service delivery***

#### **Figure 12 Summary of Baseline Indicators**

20% counties with DPT3 coverage > 80%
100% of counties with over 90% TT2+ coverage for pregnant women
85% of counties with measles coverage of at least 90% per year
100% of counties identified with 90% functioning cold chain equipment
0% counties reporting any vaccine stock out
90% of monthly AFP VPD surveillance reports received by counties that are complete
95% of counties reporting AEFI on a monthly basis to the provincial level

There is low vaccine coverage rate in some provinces, and no timely response to the drop-outs, especially the low rate of DPT3 are issues of major concern. This is one of the weaker parts of service delivery and it is due to the insufficient response to the AEFIs of DPT and improper health education activities. Difficulties in accessing the resource for mobility of supervisors are another reason for weaker performance.

There is therefore an emphasis in this planning on strengthening the micro-planning capacities of health staff. This will include:

- Peripheral units should keep the plan with different responsibilities of the staff as well as the time table for all priority health activities.
- In the urban areas health workers in the county hospitals and Dong clinics should register all the targets in their sections and keep the schedule of immunization.
- Strengthening supervision and monitoring of immunization activities

### ***2.11.3 Data quality***

Programme data often are lacking in terms of accuracy, completeness and timeliness. Currently, there are certain differences between reported and evaluated coverage, which make it difficult to use data for action. This also reflects the lack of understanding at the health facility level on the importance of accurate recording and reporting of data for analysis, and identifying for corrective action necessary to improve immunization coverage.

### ***2.11.4 Vaccine procurement and distribution logistics***

**Procurement:** Procurement of vaccines for routine immunization is done centrally through UNICEF and GAVI support. Estimation of beneficiaries and vaccine is based on the projected population, latest CBR and IMR, and the process for estimated requirement for the subsequent year is completed by the month of December each year.

Feedback with regard to the vaccine utilization and supply is also not accurate, complete and timely, resulting in overstocking or undersupply sometimes. There is also a need for strengthening planning and logistics of vaccine distribution at the provincial and county level with efficient feedback mechanisms on utilization and future demand.

**Cold chain:** The cold chain consists of walk in Freezer and walk in cooler at national level. Provincial level has big size ice-lined refrigerators and deep freezers, which has capacity to store 3 month doses of their province. County level is provided with small size ice-lined refrigerators and deep freezers, which has capacity to store one month doses of their counties. Vaccine carriers were supplied to the Ri level. For the outreach sessions, health workers carry the vaccines in the vaccine carriers with 4 ice packs.

The national and provincial level cold chain officers and county level designated officers are responsible for the maintenance and repair of the cold chain. Arrangements for additional equipment were completed designed in 2003, which was followed by the distribution of 50 solar refrigerators to the county level and cold chain review on their use in 2005. Based on the findings of this review, it is proposed in this plan to replace the electrical equipment to non-electrical one in the county level step by step, and the replacement of old stock is one part of this strategic plan. Though the programme envisages hiring of refrigerator mechanics at all county level, in many provinces this has not been done. However, there is weak monitoring of the breakdown rate of cold chain equipment and cold chain failure rate. Maintenance of the cold chain is a major area of concern since the accessories for this equipment requires importation. Maintenance of the cold chain is therefore an important part of this plan.

### ***2.11.5 Injection safety and unsafe waste disposal***

WHO estimates that in the South-East Asia Region unsafe injection contributes to 31% of new cases of HIV, 59% of hepatitis B and 92% of hepatitis C. In DPR Korea about 400,000 infants are delivered each year. Of those, 7.5% are born from mothers of HBAg positive, which is the danger of Hep B infection. The government is committed to address this issue specially.

### ***2.11.6 Low demand for and awareness of immunization service in some areas***

Available data and research, including monitoring reports, coverage evaluation surveys all

underscore a common theme-families in provinces where immunization coverage is low are often unaware or **unconvinced of the need** for routine immunization services. Equally important, low levels of immunization are also an outcome of poor service delivery. A quantitative research study commissioned by UNICEF in 2002 highlighted some common barriers to low demand for immunization services at the household and community level. Lack of knowledge is a key obstacle. Families are not adequately informed about the importance of routine immunization, where and when to access services, and how to respond to side-effects.

**Lack of motivation** is a reinforcing barrier. Vaccine-avoidance behaviour and the quality of service delivery are also likely to shape people's attitudes and decision to immunize their children.

Therefore, **strategic communication** is a crucial component of this plan for building and sustaining family and community demand for immunization services. It will need to operate at the level of households, convincing parents of the need for routine immunization. It will also need to foster a social norm at the community level to ensure wider participation and accountability so that all children in a particular community are fully immunized against VPDs. Improving the communication and negotiation skills of front-line health functionaries is critical to re-establish people's faith in the health system. This can be achieved through:

- (i) Appropriate interpersonal communication training.
- (ii) Supervision and monitoring
- (iii) Special efforts to motivate health workers.

Targeted advocacy is also required to ensure that immunization services continue to remain responsive and well supported. In order to assist the targeting of this advocacy, this plan proposeses to undertake knowledge attitude and practice study and conduct a follow up update of the national communication strategy for immunization.

#### ***2.11.7 Introduction of new vaccines and research***

DPR Korea is currently introducing combined DPT-Hepatitis B vaccine and is considering introduction of MMR, Hib. There is also lack of information of the impact of immunization on the incidence of Japanes encephalitis in at risk areas of the country. There is no information or surveillance on rotavirus disease in the country.

Weak surveillance hinders the availability of accurate information on the disease burden of VPDs. There is therefore an acute need for more disease burden studies to quantify problem so that policy makers can take informed decision about the introduction of new vaccines.

There is a lack of DPRK specific cost analysis of new vaccines and estimated financial benefits of their introduction in the country. There is a lack of studies to assess the need for new vaccine/underutilized vaccine and coordinate appropriate research into disease burden studies and cost-benefit analysis. This plan therefore proposes to support evidence based decision making, through strengthening of surveillance systems and conducting programs of epidemiological and health economics research.

## **2.12 SUMMARY OF ACHIEVEMENTS AND OBSTACLES**

	<b>Achievement</b>	<b>Obstacle</b>
POLIO	<ul style="list-style-type: none"> <li>-No wild polio cases since 1996</li> <li>-effective surveillance system established</li> <li>-excellent polio lab established</li> <li>-Strengthened cold chain infrastructure</li> <li>-Social mobilization</li> </ul>	<ul style="list-style-type: none"> <li>Supplement county level cold chain equipment</li> <li>Lack of finance for transport of vaccines and maintenance of cold chain</li> </ul>
NEONATAL TETANUS	<ul style="list-style-type: none"> <li>-no case reported until now</li> </ul>	<ul style="list-style-type: none"> <li>Surveillance systems are not sufficiently strong</li> </ul>
MEASLES	<ul style="list-style-type: none"> <li>Coverage rate of &gt;95% is maintained all over the country, no case reported since 1986</li> </ul>	<ul style="list-style-type: none"> <li>-Low coverage in certain areas may lead to outbreak</li> <li>-Measles laboratory network not fully established</li> <li>-Active surveillance needs to be strengthened.</li> </ul>
HEPATITIS B	Hep B vaccine is introduced nationwide since 2004	<ul style="list-style-type: none"> <li>-There is a need to promote more timely administration</li> </ul>
INJECTION SAFETY	Incinerators installed in most of counties	<ul style="list-style-type: none"> <li>-Financial implications</li> <li>- Limitations in transport means delay in transport of safety boxes</li> </ul>
ROUTINE IMMUNIZATION	More than 95% coverage rate maintained	<ul style="list-style-type: none"> <li>Disparity between reported and evaluated coverage</li> <li>-There are inequities in coverage between provinces and between counties</li> <li>-Sometimes there is lack of demand for immunization</li> <li>-There is less access in more remote regions of the country</li> </ul>
VITAMIN A	2 doses of vitamin A campaign conducted for 6-59	

	months children with 6 months interval	
--	--	--

### **3. EPI MID TERM PLAN 2007 - 2011**

This mid-term plan seizes on the opportunity to address regional and social inequities in immunization coverage rates and the issues highlighted in 2.7. It aims to increase awareness of all stakeholders about strengthening immunization and management roles at each of three specific levels: Central, Province and County/City. The plan aims to strengthen the immunization infrastructure within the broader RCH programme as well as intersectoral linkages.

#### **3.1 GLOBAL GOAL**

With the annual birth cohort of over 400,000 and under five population of 2 millions, DPRK immunization policy and mid-term plan will contribute significantly to the global fourth *Millennium Development Goal*:

- Reducing under five mortality by 2/3 in 2015
- As measured by:
  - Under five mortality rate
  - Infant mortality rate
  - % of infants immunized against measles

#### **3.2 DPRK-SPECIFIC GOALS**

Under the national population policy, the *National Sociodemographic goals* for 2020 concerning child health are:

- Reduce the infant mortality rate to below 15 per 1000 live birth
- Achieve universal immunization of children against all vaccine-preventable diseases.

#### **3.3 DPRK'S EPI MISSION**

To provide high-quality immunization services to all communities in order to prevent mortality, morbidity and disability from diseases those are preventable through the optimum use of currently available vaccines and vaccines that become available from time to time.

### **3.4 GUIDING PRINCIPLES OF IMMUNIZATION PROGRAM**

The guiding principles of DPRK's EPI to achieve the mission will be:

- (a) Maximal reach:** to overcome barriers at all levels to sustain demand and ensure all pregnant mothers and children are immunized as per the national schedule.
- (b) Equity: To reduce disparities in service by addressing the needs of the unserved.**
- (c) Quality and Safety:** The immunization programme will follow recommended practices in vaccine procurement, storage, distribution and service delivery.
- (d) Sustainability:** Ensuring sufficient financial and human resources for long-term needs for immunization services, through investments by the government and key partners.
- (e) Management excellence:** The EPI, in collaboration with key partner agencies and professional organizations, will optimize the use of resources following result-based principles and evidence-based practices.

### **3.5 TARGET GROUP**

The identification and fixing of immunization targets is essential for proper planning and monitoring of the EPI. Emphasis will always be given to the primary series of immunization. The target groups are highlighted in the national immunization schedule in the national policy document.

#### **(a) Primary immunization**

- All children under one year shall be provided with the primary series of immunizations according to the National Immunization Schedule.
- All pregnant mothers shall be the target for TT vaccination, according to the National Immunization Schedule.
- Japanese encephalitis vaccine is provided to all children in risk areas under the age of 1

#### **(b) Boosters**

- All children of 6 years old should receive booster dose of measles vaccine and Japanese encephalitis vaccine (in risk areas).

#### **(c) Vitamin A**

- All children between 6-59 months should be administered vitamin A 2 doses per year.
- All children between 6-59 months should be administered mebendazole along with vitamin A 2 doses per year.

## **4. MID-TERM GOALS, OBJECTIVES, INDICATORS, MILESTONES AND STRATEGIES**

The mid-term plan envisions six goals, each with its own set of objectives, strategies to reach those objectives and indicators to measure progress.

Key annual milestones are also used for each objective to benchmark the progress by year. Although EPI is nationwide, special attention will be given to strengthening routine immunization in provinces highlighted in the situation analysis. The six goals and their respective objectives and milestones are summarized in section 6.

### **GOAL 1**

**Counties will provide efficient and safe immunization services to all infants and pregnant women.**

#### **OBJECTIVE 1:**

**To ensure that regular quality immunization sessions are planned and held**

#### **INDICATORS:**

Quality of service delivery is related to immunization coverage and drop-out rates, which are reflected in the indicators:

- % of counties with BCG coverage rate of  $\geq 90\%$
- % of counties with BCG-Measles drop-out rate of  $\leq 10\%$
- % of counties with DPT3 coverage rate of  $\geq 80\%$
- % of counties with holding  $\geq 90\%$  of planned session

#### **STRATEGIES:**

Immunization delivery will be part of comprehensive primary health care including fixed health facilities, outreach clinics, baby homes and nurseries. Gains and lesson learnt from polio eradication projects will be built on for strengthening routine immunization.

1. **Coordination:** National-level quarterly meetings of all provincial EPI managers will strengthen feedback from the provinces and provide an update on new technology.

2. **Strengthening supervision:** Although there are a wide variety of contexts in which immunization services are delivered in DPRK, there is a need for standardization of simple to use service delivery guidelines. These will also include basic standardized microplanning tools and monitoring guides for routine immunization.
3. **Strengthening supervision:** supervision of immunization services will be strengthened by the development, field-testing and implementation of a systematic approach to global best practice. A series of supervisory guidelines will be distributed to provinces for adaptation to province context and for use at county and facility levels. The guidelines will be reviewed through the practical use and health facility/counties track the most important parameters and identify remedial activities. Supportive supervision will include not only checklists but also on-job training of staff. Service monitoring visits will include % sessions planned versus held, % drop-outs and vaccine utilization at every level for each antigen.
4. **Prioritization of poorly performing counties:** Provinces will undertake situational analysis/review on a quarterly basis of poorly performing counties in terms of coverage and drop-out rates, identify bottlenecks and take necessary action through strengthened microplanning, prioritized training, and strengthened supervision practice.
5. **Prioritization of underserved populations within provinces:** Extra efforts will be made at the provinces to identify and serve that population who live in areas which are underserved and who are mobile. These efforts will include identification of appropriate outreach sessions coordinated by the county and PHC level doctors in consultation with EPI doctors. Household doctors could be mobilized for the mobile session on the days when no fixed-day service is being provided. The outreach session should be supervised by health bureau officers.
6. **Microplanning:** Microplanning has strengthened the polio eradication process, which can also be used for routine immunization (mapping areas of underserved populations, session planning and county workplan). The EPI will provide updated guidelines for microplanning and assist counties to implement it. Every site providing immunization services will devise and implement annual microplans. Microplans will include aspects of vaccine delivery and transport within the provinces and counties.
7. **Missed opportunities, reducing drop-outs and ensuring booster doses:** Together with enhancing communication between service providers and mothers (as detailed in goal 4) this approach aims to reduce the number of drop-outs and increase the chances of children to receive vaccinations beyond the primary immunization schedule.
  - (a) **Health facilities:** Every contact of health care system with children of vaccination age will be used to enquire about the child's vaccination status. Vaccines will be

administered where applicable, provided the minimum interval between doses is respected. Possible reasons for non-vaccination shall be identified and addressed. Supervisors will coordinate and ensure administration of DPT and TT as per the national schedule.

- (b) **Schools:** School health programmes will be strengthened. Supervisors will visit every school with health workers to assess the immunization status of children and ensure booster vaccination with measles vaccines of children aged 6 years.
- 8. **Registration:** All administrated doses of vaccines will be recorded in the immunization register and the immunization card. Doses given outside the target age will be registered on the immunization card of the child as well as in the separate column in the immunization register. PHC units and nurseries will keep the immunization cards of the children and it should be sent to another unit when the family of the child changes their residence, which will then be registered in the new PHC unit or nursery.
- 9. **Responsibilities:**
  - (1) **County EPI doctors:** They will be pay special attention for ensuring the availability of vaccines at immunization sites, especially those who are difficult to reach. This will help decrease the health workers time spent visiting PHCs to collect vaccines. County EPI doctors will responsible for monitoring and providing supportive supervision for effective implementation of the programme in the county. Together with supervisors of Children's health care they will jointly undertake monthly review of the immunization programme PHC-wise and take necessary actions to improve performance in certain areas.
  - (2) **First-line supervisors:** County level Supervisors and PHC level supervisors will ensure that all planned immunization sessions are actually held and ensure that every child/pregnant women is followed up for full vaccination with quality vaccines and safe injection practice.
- 10. **Fixed-time, fixed-day strategy:** Policy recommended from the government will include fixed day strategy to ensure that communities are aware of the immunization day. This will also help in the development and dissemination of information through the mass media and house to house visits by household doctors.
- 11. **Fixed site strategy:** Policy recommended from the government will include immunization sites being fixed for each habitation, preferably at sub centers of the villages. This will ensure easy accessibility by all communities and help the community to know where to go for vaccination.

## **MILESTONES**

Although these milestones reflect national strategic planning, they will need to be adapted for each province.

**2007:** 70% counties achieve DPT3 coverage of  $\geq 80\%$  and BCG-measles drop-out rate of  $\leq 15\%$

**2008:** 90% counties achieve DPT3 coverage of  $\geq 80\%$  and BCG-measles drop-out rate of  $\leq 12\%$

**2009:** 100% counties achieve DPT3 coverage of  $\geq 80\%$  and BCG-measles drop-out rate of  $\leq 10\%$

**2010:** 100% counties achieve DPT3 coverage of  $\geq 80\%$  and BCG-measles drop-out rate of  $\leq 5\%$

**2011:** 100% counties achieve DPT3 coverage of  $\geq 80\%$  and BCG-measles drop-out rate of  $\leq 5\%$

## **OBJECTIVE 2:**

**To ensure that adequately trained staffs are empowered to provide essential quality immunization services**

### **INDICATORS:**

- % of countries with  $> 80\%$  of health workers
- % of health workers in the PHC level who are trained on EPI in the past 3 years
- % of county level health workers who receive training in the province on EPI in the past 5 years

### **STRATEGIES**

1. **Coordination:** Training is sometimes provided by multiple agencies with little consideration to coordination. It is therefore recommended that each province creates training cell that can screen and approve training activities appropriately. Control of training coordination needs is the responsibilities of national and provincial level.
2. **Increase the number of staff:** A regular review of immunization personnel requirements will be undertaken and financial and human resources will be mobilized to allow the training of new cadres based on the Census of 2004. The possible vacancies due to the aging and shift to other occupation will be expected
3. **Strengthening training:** Immunization training activities are integrated with the RCH programme. Refresher training for all categories of staff will be undertaken every year by each level. All training activities should be followed up through supervision visits. A designated officer in the MoPH will coordinate all training programme. All provinces will also have designated focal point for EPI training by 2006. Guidelines for immunization training will be updated by 2006 to include new policies and activities, incorporating the

operational guidelines.

**(a) National and provincial levels:** A review of roles and staff capacity at national and provincial level is required to improve the implementation capacity. A national immunization training cell will be created under MoPH. This review would produce recommendations for improvement and potential changes in functions. Every province training institute selects trainers with an aptitude for training and provides periodic training to these trainers. Once a year, trainers will receive training from national level trainers and be assessed by the provincial institute's faculty by developing standard training objective formats.

**(b) Training of mid level managers (MLM):** Current MLM training has covered all county level EPI staff. However, this course material needs to be made more concise and practical. Key components also require strengthening:

- (i) Hep B vaccine introduction
- (ii) Ad syringes
- (iii) Analyzing and using monitoring data at local levels for planning
- (iv) Prioritizing areas on the basis of coverage rates and drop-out rates
- (v) Safe injection practices and waste management
- (vi) AEFIs monitoring, reporting and responding
- (vii) Waste reduction
- (viii) Monitoring and supervision
- (ix) Microplanning
- (x) Training in epidemiology
- (xi) Financial management

Provincial level immunization training centers will provide continuing medical education annually for health workers of each area.

**(c) Training of field level staff:** High quality training would continue to be provided to peripheral health workers. The training would be expanded to include the above topics and (i) drop-out tracking and house to house visits; (ii) proper recording, and (iii) effective cold chain maintenance. Formulation of guidelines on injection safety and a comprehensive manual on EPI operational guidelines shall be made available and disseminated to all health facilities. This manual will serve as technical guidelines for immunization service delivery, immunization safety, monitoring for and managing AEFIs, logistics management, surveillance and outbreak response. Special attention will be paid to giving adequate time for training vaccinators to improve injection techniques of vaccine administration, sterilization and use of AD syringes. Basic strategies will include:

- i. On-the-job refresher training for all health workers
- ii. Each province will identify core county training teams for each county. This

- team will move to train health workers appropriately
- iii. Monthly block meetings will provide an opportunity for supervisors to help identify gaps in knowledge and provide some training

"Immunization in Practice" has been translated and adapted for local use in training of field staff.

4. **Decrease frequent staff rotation:** Transfer of staff at all levels decreases the system's capacity to generate institutional memory and decreases staff motivation. Within the human resource review there will be recommendations made regarding the time for each posting and ways of reducing staff turnover. Provincial Health departments should sit together with directors of hospital and EPI staff on regular basis.

### **MILESTONES**

These milestones reflect national strategic planning and each province will need to review their own milestones accordingly.

**2007:** Provincial and county level EPI human resource and managerial capacity is reviewed.  
Mid-level Manager training in all counties is completed.  
Further training needs of field functionaries are identified.  
Adapted field level operational guidelines are finalized and used countywide.

**2008:** Recommendations from the human resources and managerial reverie are implemented.  
A country-wide human resource needs review is completed.  
All PHC level health workers have attended a training course on safe injection practices, waste disposal and AEFI reporting and Hep B + DPT vaccine introduction.

**2009:** Recommendations from the review of human resource needs are implemented.  
**2010:** Re-orientation and training needs of county level EPI staff and field functionaries are assessed and implemented.  
**2011:** Re-orientation and training needs of county level EPI staff and field functionaries are completed.

### **OBJECTIVE 3:**

**To keep an annual upgraded inventory of cold chain according to the levels of the network, allowing for new equipment, substitution, replacement, spare parts, fuel and others in order to maintain a functional status of 90%**

## **INDICATORS:**

- % of counties with immunization cold chain equipment and vehicle inventory
- % of counties identified with 90% functioning cold chain equipment
- % of counties having refrigerator mechanics
- % of counties where refrigerator mechanics at the county level and cold chain handlers at the PHC level are trained

## **MILESTONES**

**2007:** Cold chain review is undertaken at provincial level.

A national cold chain focal point is established (procurement and logistics) at the national level to look after forecasting and utilization and to assist provincial estimates for requirement.

90% of identified cold chain equipment is functioning at any given point of time.

Training materials for cold chain training at all levels will be standardized and finalized.

**2008:** Cold chain review in some major provinces

90% of identified cold chain equipment is functioning at any given point of time.

100% of provincial level cold chain officers and county level cold chain technicians are trained.

**2009:** 90% of identified cold chain equipment is functioning at any given point of time.

100% of provincial level cold chain officers and county level cold chain technicians are trained.

**2010:** 90% of identified cold chain equipment is functioning at any given point of time.

100% of provincial level cold chain officers and county level cold chain technicians are trained.

**2010:** Computerized immunization cold chain and spare parts inventory system available in all provinces and national level.

**2011:** 100% of counties have installed the solar refrigeration

## **STRATEGIES**

1. **Coordination:** Cold chain focal point at the national provincial and county levels will have the ultimate responsibility for procurement, inventory, distribution, and repair and maintenance of appropriate cold chain equipment. All provinces will have a cold chain officer at provincial level and refrigerator mechanics at the county level responsible for preventive maintenance, as well as repair of cold chain equipment. A focal point at every health facility will be designated with responsibility for cold chain maintenance.
2. **Cold chain assessment:** Prioritized provinces will review the cold chain over a period of

five years to

- (a) Identify weakness
- (b) Review provincial cold chain requirement over 5 years with precise plans and budgets for strengthening the cold chain (repair and maintenance plans) and switching to CFC-free equipment.
- (c) Make recommendations for planning and budgeting for strengthening, substitution, replacement, spare parts and fuel, etc. in the cold chain, ensuring adequate maintenance and repair.
- (d) Review cold chain training requirements for staff at all levels.
- (e) Cold chain repair and maintenance plans will be incorporated in all county microplans

3. **Procurement and installation of cold chain equipment:** Procurement, distribution and installation of cold chain equipment will be an effort of the National EPI programme.
4. **Training:** A cold chain training focal point identified nationally by 2005. Cold chain training materials was standardized and adopted in 2005. These will be used for training national, provincial, county and peripheral cold chain staff. The training will include:
  - (a) Repair and maintenance of new CFC-free equipment as well as existing equipment
  - (b) Inventory planning and computer database planning
  - (c) Appropriate vaccine storage
  - (d) Recommendations of cold chain review in 2005
  - (e) Supportive supervision training on cold chain issue
5. **Inventory:** An inventory of all cold chain equipment will be maintained and updated at the central, provincial and county levels. Inventory systems will be used to plan for maintenance and replacement of equipment and to monitor appropriateness of the cold chain system.
6. **Cold chain maintenance and repairs:** Each cold chain technician at the county level will be equipped with a basic tool set, to carry out minor repairs and maintenance. Local staff will be trained for cold chain handling.
7. **Vaccine storage capacity:** Vaccine storage capacity will be assessed and upgraded to meet any expansion of services. The provincial level should have storage capacity for three months. At the county level the storage capacity is for one month. All storage points should have ice pack freezing capacity.

#### **OBJECTIVE 4:**

**To ensure and efficient system for vaccine and injection equipment management and logistics to forecast and deliver adequate supplies of vaccines in a timely manner**

## **INDICATORS:**

- % of counties reporting any vaccine stock-out (>1 month no vaccine available during the year)

### **MILESTONES**

**2007:** 30% of counties being monitored for microplan for vaccine forecasting.

100% of counties with no measles vaccine stock-out.

**2008:** 45% of counties being monitored for microplan for vaccine forecasting.

100% of counties with no measles vaccine stock-out.

**2009:** 60% of counties being monitored for microplan for vaccine forecasting.

100% of counties with no measles vaccine stock-out.

**2010:** 75% of counties being monitored for microplan for vaccine forecasting.

100% of counties with no measles vaccine stock-out.

**2011:** 100% of counties being monitored for microplan for vaccine forecasting.

100% of counties with no measles vaccine stock-out.

## **STRATEGIES**

1. **Coordination:** A designated officer for procurement and supplies at the national level is established. A focal point will be designated at provincial level to coordinate physical asset management functions and to track assets accordingly. Logistics training will be provided for provincial store managers.
2. **Reduction of vaccine wastage:** Micro planning processes should help increase service delivery efficiency. Distribution shall be made as per forecasted need of health facilities to accommodate the changes in need to reduce vaccine wastage. Although vaccine wastage rates will be monitored to identify key areas, strict enforcement of wastage rates should never interfere with the need to vaccinate a child.
3. **Multi-dose vaccine vial policy:** The country will adapt Multi-dose vaccine vial policy (MDVP) for OPV, as outlined by WHO, in order to reduce wastage, and to allow for improved vaccination services by reducing missed opportunities. However, before considering an MDVP for other vaccines, there is a need to consider introduction of freezing indicators on the vials. The EPI will purchase vaccines with vaccine vial monitors (VVMs), wherever applicable.
4. **Vaccine and supply requirements:** Vaccine needs will be assessed nationally, based on the projected mid-year population, CBR and IMR with due validation by provinces. The allocation to the provinces for each of the vaccines would be made after deducting the

stock in hand and supply order in the pipeline. Health staff at health facilities, counties, provinces and national levels will be trained in vaccine need estimations, vaccine stocks and inventory management, handling, VVM interpretation, open vial policy and on how to reduce vaccine damage and wastage. This training will be incorporated in the operational guidelines. Vaccines and vaccination supplies stocks ledgers shall be properly maintained at all levels. Supplies like immunization cards, registers, stationery etc. should be avoided lapses/delays. Regular supply of vaccines from the national level to the provincial level stores will be enhanced through timely ordering and efficient distribution by government. Transport and supply of vaccines will be reflected in local microplanning processes.

5. **Vaccine quality control:** All vaccines used in the county will be in line with the basic quality standards established by the National Regulatory Authority (NRA). The NRA is already in place and will be strengthened as necessary. Standardized National Control Laboratory (NCL) will carry out quality control of vaccines. Monitoring of vaccine quality will be enhanced through visits by the central and provincial Drug Regulatory agencies. Post-distribution quality will be monitored through monitoring of AEFIs.
6. **Bundling policy:** The policy of bundling shall be adapted for all vaccines, AD syringes, and safety boxes to reduce wastage and improve logistics efficiency, wherever applicable.
7. Co ordination: Co ordination will be strengthened between County Medical Warehouses and Ai Epidemic Stations in order to ensure there is consistency between vaccine supply and injection safety supply.

#### **OBJECTIVE 5:**

**To ensure the implementation of safe injection practices and waste disposal, the government has decided to sustain availability of auto-disable (AD) syringes, with satisfactory disposal mechanisms not contravening environmental protection**

#### **INDICATORS:**

- % of counties in which AD syringes and needle cutters are introduced.
- % of health workers who have received training in the use of AD syringes

#### **STRATEGIES**

Introduction of AD syringes and needle cutters from 2006. AD syringes will be introduced for all injections given in the immunization sectors. Needle cutters (to be used after each injection) will also be introduced.

The MoPH will issue guidelines regarding appropriate disposal of plastic AD syringes after liaison with the Ministry of Territory and environmental protection. A single needle, single syringe per single dose policy will be strictly followed.

### **MILESTONES**

**2007-2011:** All counties are supplied with and are using AD syringes and needle cutters

### **OBJECTIVE 6**

**To ensure adequate transportation system for delivering vaccines, service delivery and supervision**

#### **INDICATORS:**

- % of counties with motor cycles

#### **STRATEGIES**

Transportation logistics will be rehabilitated according to the rehabilitation plan. 100% of counties will have a functioning motorcycles by 2010. Cold trucks will be provided at central level and cold cars at provincial level. Finance will be identified for renting of vehicles where necessary.

### **MILESTONES**

**2007:** 60% of counties have motorcycles

**2008:** 2 to 3 bicycles for each Ri.

**2011:** 2 additional cold trucks at central level plus vehicles for supervisory visits Central level.

**2011:** 100% counties have motorcycle.

**2011:** 100% provinces have cold cars.

## **GOAL 2**

**Contribute to global polio eradication, measles mortality reduction and  
neonatal tetanus elimination**

**Immunization campaigns are useful for two main reasons:**

- (a) Highly maintenance of immunization coverage for polio
- (b) Outbreak control

Campaign approaches for other reasons will be encouraged and the ultimate decision on appropriate campaigns will rest with advice from the National EPI team and approval by MoPH.

### **OBJECTIVE 1: To achieve polio eradication certification by 2007**

#### **INDICATORS:**

- Number of wild polio cases in DPR Korea
- Number of AFP cases per 100,000 population under 15 years by regions
- Number of AFP cases per 100,000 population under 15 years (target:>1)
- Number of AFP cases with adequate stool specimen collection (target: >90%)

#### **MILESTONES**

**2007:** Zero wild polio cases status is maintained in DPR Korea

AFP surveillance is maintained to  $\geq 1$  non polio AFP cases per 100,000 population under 15 years

90% of AFP cases sampled with adequate stool samples

**2008:** Certification of polio eradication in SEARO

AFP surveillance is maintained to  $\geq 1$  non polio AFP cases per 100,000 population under 15 years

90% of AFP cases sampled with adequate stool samples

**2009:** Review the OPV immunization policy

**2010:** Decision on the turnover of OPV to IPV (dependent on global polio eradication)

#### **STRATEGIES:**

The polio eradication programme currently implemented by the government through its existing immunization programme essentially consists of three-pronged approaches.

1. **Routine immunization for polio:** All strategies highlighted for goal will be used for strengthening routine immunization.
  2. **Supplementary immunization campaigns:** (Strategies recommended by MoPH). Ownership of the immunization programme at all levels to ensure participation of all government and non-government sectors in the programme.
    - (a) Ensuring microplans for all rural and urban areas to ensure that booths are available and accessible to all sections of the community. A house-to-house search is made in all areas to vaccinate children not vaccinated at booths during each campaign.
    - (b) Ensuring that well-trained and motivated manpower is available to provide service during each campaign.
    - (c) Strategic communication to increase demand and adequate community participation in the programme.
    - (d) Regular province/county analysis of data to review progress and prioritization of corrective action taken by counties.
- 3. AFP virological surveillance:**
- (a) AFP and virological surveillance conducted by government and national polio surveillance programme, WHO-SEARO and polio laboratory network.
  - (b) Establishment of network for reporting cases of AFP
  - (c) Clinical investigation and stool examination of all AFP cases
  - (d) Establishment of a WHO accredited laboratory network for isolation of wild poliovirus from the stools of AFP cases and contacts
  - (e) Management of AFP case data with regular analysis at the provincial and county levels to measure the progress in polio eradication and to guide supplementary immunization activities.
  - (f) Vaccine procurement and supply under the existing EPI through the government.
  - (g) As part of AFP surveillance, activities will be undertaken to accelerate the certification process including implementation of the plan of action for laboratory containment of stocks of wild poliovirus infectious materials and potential wild poliovirus infectious materials.

These efforts will continue till polio is completely eradicated, hopefully by 2007.

## **OBJECTIVE 2:**

### **Not to have neonatal tetanus cases developed**

This objective will be monitored by provinces through reviews of the surveillance data, regular reporting and selective investigation.

## **INDICATORS:**

- % of counties with over 90% TT2+ coverage for pregnant women
- % of provinces validated as NNT eliminated

## **MILESTONES**

**2007:** National focal point for NNT is appointed.

All provinces have an NNT focal point.

100% of provinces have eliminated NNT

90% of provinces have >90% TT2 coverage for pregnant women

**2008:** 100% of counties in each province have >90% TT2 coverage for pregnant women

A national NNT database is created.

**2009:** 100% of provinces have eliminated NNT

90% of provinces have >90% TT2 coverage for pregnant women

**2010:** 100% of provinces have >90% TT2 coverage for pregnant women

**2011:** 100% of provinces have eliminated NNT

100% of provinces have >90% TT2 coverage for pregnant women

## **STRATEGIES**

- 1 **Strengthening service delivery:** Ensure that TT is offered at all antenatal sessions and routine immunization sessions. Provide two doses for the first pregnancy (with immunization card) and further doses according to the national schedule. The overall coordination of NNT elimination will be the responsibility of the national NNT coordinator.
- 2 **Increase reporting and action on cases:** Report NNT cases from every health facility and establish NNT as a reportable disease. NNT will be included with weekly AFP in active surveillance and zero reporting. Case investigations for hospital-based cases and cases in low-risk areas (areas where NNT is no longer considered a problem). Targeted action will be around reported and investigated cases by improving and promoting routine TT immunization for pregnant women and clean deliveries in the community concerned.
- 3 **Data analysis:** Reported data will be analyzed at county and provincial levels for incorporation into ongoing microplanning processes. A national NNT database will be established with regular review of indicators and identifying high-risk counties within the provinces. High risk counties within the provinces will be validated for elimination of NNT by surveys and counties prioritized on the basis of this for targeted corrective action.
- 4 **Safe delivery practices** will be coordinated with the treatment and prevention department of MoPH.

- 5 To collaborate with international agencies in order to review immunization schedules and develop detailed **tetanus elimination plan**.

**OBJECTIVE 3:**  
**To maintain measles case free status by 2010**

**INDICATORS:**

- % of counties with measles coverage of at least 90% per year
- % of counties with <70% seropositive rate after MV vaccination

**MILESTONES**

**2007:** Measles laboratory network assessed

National and provincial measles nodal points identified  
3 major provinces have established active measles surveillance  
Serosurvey on measles antibody in 3 major provinces  
100% of provinces have at least 90% MV coverage  
Maintain measles case free status

**2008:** Measles laboratory network is initiated

3 major provinces have established active measles surveillance  
Serosurvey on measles antibody in 10 major counties  
100% of provinces have at least 90% MV coverage  
Maintain measles case free status

**2009:** 7 provinces have established active measles surveillance

Serosurvey on measles antibody in 20 major counties  
100% of provinces have at least 90% MV coverage  
Maintain measles case free status

**2010:** 10 provinces have established active measles surveillance

Serosurvey on measles antibody in 30 major counties  
100% of provinces have at least 90% MV coverage  
Maintain measles case free status

**2011:** 10 provinces have established active measles surveillance

Serosurvey on measles antibody in all counties  
100% of provinces have at least 95% MV coverage  
Maintain measles case free status

## **STRATEGIES**

The first dose measles vaccine will be delivered to children through strengthening routine immunization. To raise the immunity against measles booster doses will be organized for the children aged 6. Two doses of Vitamin A are administered by conducting Children's health day.

1. **Situation analysis:** Provinces and counties will be prioritized according to performance indicators (especially measles-coverage rate and BCG-measles drop-out rate) according to surveillance and immunization to be able to prioritization for immunization strengthening and corrective action.
2. **Planning:** In the post polio eradication phase the government will consider setting up national expert group to prepare a National measles elimination Plan. This will then be submitted to the government for approval. Measles focal point will be appointed in national and provincial level. Provinces will introduce measles elimination plan in a phased manner, based upon:
  - (a) Epidemiological evidence
  - (b) Programmatic and service delivery situation
  - (c) Laboratory confirmation of cases with rash
3. **First opportunity:** First opportunity for measles immunization will depend on reliable routine immunization at immunization sites (strategies highlighted for goal 1):
  - (a) Routine immunization sessions planned and implemented regularly at every immunization site.
  - (b) Regular analysis of routine immunization and corrective action to ensure a sustained increase in the coverage of measles vaccination.
4. **Surveillance:** Twice-yearly province-by province review of all measles data with county indicators will be available.
  - (a) Measles cases and deaths will be reported with active surveillance for other VPDs supported by the measles laboratory network in a phased manner.
  - (b) Tracking of measles outbreaks will be based on reported cases and surveillance data
  - (c) Prompt investigation of outbreaks will include investigations to understand the epidemiology of measles infection, factors associated with measles outbreaks, identifying populations at risk, immunization services (routine coverage, vaccine efficacy, session plans, supplies, facilities, etc.) in the area of the outbreak. Outbreak investigation reports will suggest ways to avoid outbreaks in future.
  - (d) Laboratory confirmation of measles outbreaks by random testing of 5-10 blood samples for measles IgM.
  - (e) During measles outbreaks, virus isolation will be attempted from a few cases of each

chain of transmission as appropriate.

- (f) Routine immunization will be promoted in communities all age group.
- (g) Modernizing measles laboratory network, including strengthening of technical capacities of lab doctors

5. **Case management:** Case management guidelines will be nationally standardized and promoted. Appropriate case management to accompany outbreak investigation, including provision of 2 doses of vitamin A, antibiotics, ORT and referral if needed.

6. **Global initiative ‘sustainable measles mortality reduction with regional measles elimination’:** Through supplementary immunization activities for measles, countries in American subcontinent have eliminated measles. Currently European, Eastern Mediterranean and South African block countries have adapted the same strategy for achieving measles eradication goals. International agencies like UNICEF and WHO are supporting these activities in the post polio eradication phase. It would be important to consider adapting in future the following strategies for measles eradication in DPRK.

(a) **‘Catch-up’ campaign:** The targets of these campaigns are populations 9 months for 1<sup>st</sup> dose and 6 years for booster doses to protect children who were not vaccinated previously. These will only be considered to provide second opportunity measles vaccination as a one-time strategy under the following circumstances:

- Epidemiological analysis based upon local data will help to determine the population at risk and geographical area. This campaign will be conducted in phased manner and supplementary doses will be given to the population with <70% seropositive rate of measles antibody under the approval of MoPH.
- Adequate logistical, financial and trained human resource to achieve high quality campaign reaching at least 90% coverage of target population.
- High quality planning with sufficient time for careful implementation and supervision.
- Since campaigns are normally implemented through fixed sites, various kinds of IEC campaign will be needed.
- Based on the above measles cases free status will be maintained.

(b) **‘Follow-up campaign’** prevents accumulation of cohorts of susceptible children through the quality surveillance and reporting system.

- Follow-up campaign is significant in the prevention of importation of measles to the country where no measles cases developed.
- The surveillance data should determine the target population. Target will be children born in the eliminated areas, or those traveled to the outbreak areas.
- Other factors remain the same as maintenance campaign.

(c) **Keep up:** strengthening and sustaining high routine immunization coverage.

#### **OBJECTIVE 4:**

**To achieve and maintain a 98% level of coverage with two doses of vitamin A supplementation to children under 5 years old**

#### **INDICATORS:**

% of counties that achieve 98% coverage with two doses of vitamin A supplements each year for children under 5 years old

#### **MILESTONES**

**2007:** A national plan for vitamin A supplementation is updated and implemented.

A national and provincial vitamin A focal point are established

**2008:** 100% of counties achieve 98% coverage with vitamin A

**2009:** 100% of counties achieve 98% coverage with vitamin A

All target children will receive two doses of vitamin A yearly during “Children’s Health Day”

All measles outbreaks provide vitamin A to measles cases.

**2010:** 100% of counties achieve 98% coverage with vitamin A

**2011:** 100% of counties achieve 98% coverage with vitamin A for children aged 6-59 months

#### **STRATEGIES**

1. **Training:** Vaccinators and other health staff are trained at the time of EPI training, MLM training and supportive supervision monitoring visits to correctly administer vitamin A according to the national schedule at fixed and outreach immunization sessions. Training in the stock management of vitamin A will be given at the time of other PEI training. Staff will be able to forecast the needs for routine immunization, measles outbreaks and therapeutic use.
2. **Health Education:** Vitamin A will be included in the strategic communication activities to increase awareness of the need and create demands for vitamin A.
3. **Therapeutic dose:** Correct therapeutic doses of vitamin A to measles cases will be administered during measles outbreaks to reduce mortality and disability caused by measles disease.

## **GOAL 3**

**Availability of sufficient and sustainable funding with established adequate, accountable and efficient fund flow**

### **OBJECTIVE 1:**

**To ensure adequate and reliable financial resources at the national, provincial and county levels for the EPI to achieve its goals and objectives**

Currently, the government is responsible for procurement and distribution of all vaccines, cold chain equipment and injection safety equipment used under EPI. The existing health infrastructure and human resources provide immunization services to the beneficiaries.

#### **INDICATORS:**

- Track budget versus expended resources
- National annual budget shows provision for purchase of vaccines for routine immunization
- National annual budget having adequate provision for cold chain equipment and its maintenance
- National annual budget having adequate provision for improving service delivery at provincial/county/Ri levels
- National annual budget showing % funding from domestic budget versus external resources
- Wastage Rate DPT Hep B
- % allocation of Government resources to national program (baseline 49%)
- International resources adequately mobilized for new vaccines and health systems strengthening

#### **MILESTONES**

**2007:** A national core immunization financing team is established and functioning

All provinces have a focal point for immunization financing issues.

National budget shows provision for purchase of vaccines for routine immunization, injection supplies.

#### **STRATEGIES**

1. **National financial sustainability plan:** Various costing estimates have been made for

different components of the immunization programme. A core team for immunization financing will be established within the immunization department. Using tools that are already available, this team will analyze current and projected immunization costs. These will be compared to projected finances available and funding gaps will be highlighted. Methods of rasing additional revenues will be analysed and communicated to appropriate levels.

2. **Capacity building for immunization health economics:** The core team will include increased linkage with institutes that may have future interests in training and research in immunization financing issues.
3. **Cost-effectiveness studies of introduction of new vaccines and technologies:** Commissioning of studies exploring cost-effectiveness issues surrounding immunization will help policy-makers take more informed decision. The initial focus will be on new vaccine and immunization initiatives.
4. **Vaccine wastage reduction** (implementation of multi dose vial policy) (see objective 4 Goal 1)
5. **Increasing national government financial contribution** to immunization services (see costing and financing for detail)
6. Mobilizing international resources through GAVI and other international partners (WHO, UNICEF) (see costing and financing for detail).
7. **Increased domestic vaccine production.**

## OBJECTIVE 2

**To ensure political commitment for adequate annual funding at all levels**

### INDICATORS:

To have a reliable system to generate periodical financial reports

### STRATEGIES

**Political lobbying:** Monitoring reports, action plans and research information will be presented concisely and in a targeted fashion to inform opinions within the MoPH about the need for sustained support for immunization.

**Partnership building:** Partnership with immunization partners will be strengthened (including WHO, UNICEF and GAVI). The ICC remains an ideal forum not only for technical support to the immunization department, but also acts as a lobbying body for resource mobilization.

**GOAL 4**  
**Sustained demand for and reduced social barriers to access of  
immunization service**

Strong community participation with immunization services not only improves equity and access to immunization services but also increases the demand for quality services.

**OBJECTIVE 1:**

**To ensure widespread support by all families and communities and to ensure that all eligible children and pregnant women are immunized**

**INDICATORS:**

- % of primary caregivers of infants who know (correctly or within two weeks of the date) when the next immunization is due, the number of visits needed for complete childhood immunization of infants under the age of 1 year, where to take their child and the need for immunization.
- % of infants with vaccination cards in the immunization session.
- % of service providers who communicate to caregivers regarding the next immunization session.

**MILESTONES**

- 2007:** A national focal point and provincial focal point for strategic communication are established  
A national communications strategic plan is drafted and implemented (involving consensus for accelerating routine immunization, with particular focus on low-coverage provinces)
- 2007:** Knowledge Attitude Practice Study on immunization conducted and national communication strategy updated
- 2008:** At least 20% of counties in the country have integrated communication work plans (minimum component IEC training, mobilization of local leaders, effective branding of IEC materials)
- 2009:** 40% of counties in the country have integrated communication plans
- 2010:** 60% of counties in the country have integrated communication plans  
Mid-term review, assessing impact in terms of key knowledge, attitude and practice indicators
- 2011:** 80% of counties in the country have integrated communication plans  
Accelerated communications activities targeting drop-outs and the introduction of new vaccines
- 2011:** 100% of counties in the country have integrated communication plans

## **STRATEGIES**

Communication activities will take two-pronged approaches:

- (a) **To reach the underserved or hard to reach populations** with targeted interventions and convince those who have never participated before, or who are not participating consistently because of a lack of knowledge, doubts and misconceptions, or frustration with the quality of health services.
- (b) **To increase the demand** for services of those who have historically participated in routine immunization but whose interest might be decreasing due to insufficient institutional support for routine immunization.

These two approaches will use two main strategies:

**Influence behaviour at household level:** Print media and other mass media are effective strategies for raising awareness and influencing behaviours. Inter-personal communication (IPC) with families and communities is also critical in bringing about the desired change in attitude and behaviour of service users.

- (a) IPC through health workers, local immobilizers, and influential persons: IEC materials for providers as well as clients (e.g. on frequently ask questions)
- (b) Continued media interventions addressing user's doubts and misconceptions
- (c) Supervisors and health workers will be trained to improve IPC skills at EPI training and supervisory monitoring visits to promote behaviour changes
- (d) During home visits by health workers parents will be encouraged to immunize their children. The supervisor will monitor these visits.
- (e) IPC with pregnant mothers during TT immunization contacts shall be the focus of the communication for enhancing coverage and reducing the drop-out rate
- (f) Local IEC/social mobilization methods will be adapted and developed for demand generation (not just mass media; press/radio and television)
- (g) The health workers will be partnered for effective demand generation and information
- (h) Clinics will also be used as immunization sites and fixed immunization days displayed with the name of vaccinator.
- (i) Immunization schedule information will be the part of all IEC/social mobilization exercises.
- (j) Involvement of link workers.

**Activation of wider community and county network:** Social mobilization activities to activate wider network and groups.

- (a) Immunization sessions plans will be communicated to the beneficiary population, the RI

- level EPI doctors to display information on the site and days of outreach sessions in the village at prominent places.
- (b) The education sector will be mobilized to use their wider reach to mobilize families and communities.
  - (c) County level EPI doctors and directors of PHC units will ensure implementation of communication activities for routine immunization
  - (d) Community leaders, NGOs and volunteers will become actively involved with immunization
  - (e) Routine immunization microplanning with communities and increasing a participatory approach will benefit the program greatly, enhancing sustainability.

## **OBJECTIVE 2**

### **To ensure high level political and administrative support for immunization as the key public good**

Targeting key decision-makers to sustain policy, and administrative and financial support to the programme will help create a more enhancing environment for strengthening and revitalizing routine immunization services.

## **STRATEGIES**

- 1. **Advocacy efforts:** These shall be directed through an active ICC to sustain the interest of partners in the immunization programme, the efforts will include the enrolment of national and provincial level politicians, media and civil society groups to publicly support the acceleration of routine immunization service.
- 2. **Cost-effectiveness issues:** The highly cost-effective nature of immunization services will be emphasized to key policy-makers with thoroughly well-researched information.
- 3. **Identification and mobilization:** Social organizations will be involved.
- 4. **Global perspective:** Opportunities will be seized to inform the international community about DPRK's progress in accelerating routine immunization.
- 5. **Increase confidence in vaccine safety:** The government will be regularly informed about the safety of its immunization programme so that the government may be able to inspire confidence in vaccines.

## **GOAL 5**

### **Accelerated introduction of licensed new and underused vaccines against diseases with significant mortality and morbidity in DPR Korea**

The choice of newer vaccines to be included in the EPI will be determined and periodically reviewed by MoPH, taking guidance from the technical subcommittee on immunization. Basic clinical and operational studies will be encouraged to provide information for the technical subcommittee on immunization. These studies will provide evidence for decisions on the timing and selection of new vaccine introduction and provide guidelines for the use of these new vaccines. Such analysis will include the major mortality causing diseases of children in the country, namely acute diarrhoeal diseases, acute respiratory disease, and meningo-encephalitis in anticipation of HIB, rotavirus and pneumococcal vaccines becoming available. Diseases burden and health economic analyses will help assess the cost-benefit ratios of new vaccine introduction. Specific recommendations of the technical sub committee on the introduction of new vaccines have been taken into considerations to develop this goal.

#### **Principles to guide the addition of new vaccines**

1. The vaccines should be **safe and effective**.
2. The **diseases burden** should be judged to be sufficient to warrant introduction of the vaccine onto the national programme.
3. **Cost** of the vaccine should be judged reasonable and suitable for absorption into budget provision even if the introduction is funded.
4. **Financial sustainability** should be built into the plan of new vaccine introduction

## **OBJECTIVE 1:**

### **To ensure that institutional mechanisms are in place to adequately obtain, review and utilize information for deciding on the introduction of new and underused vaccines**

There are currently four main bodies concerted with the introduction of new vaccines in DPRK:

- (i) National technical sub committee on immunization
- (ii) National biological review committee
- (iii) Drug quality inspection institute
- (iv) National Regulatory Agency

The introduction of new vaccines involved reviewing all licensed vaccine in different global

regions and identifying those that would be relevant to DPRK in the context of country's diseases profile. There are vaccines that are recommended to be produced and used locally. Accurate information on which to base the decision of introducing new vaccines to the EPI requires periodic review by all agencies concerned. This process requires strong coordination and collaboration.

A formal mechanism of coordination and collaboration between these four agencies is therefore urgently required to establish closer links, pool resources more efficiently, plan research more effectively and share results of studies more freely. This will help the government make better informed decisions for resource allocation when deciding on new vaccine introduction.

Currently, there is no information available on disease burden attributable to HIB or rotavirus in DPRK. JE live vaccine is administered in at risk areas of the country (45% of the population). However, there are no adequate surveillance systems for assessing impact of the immunization program.

## **INDICATORS:**

- Number of studies completed on prioritized vaccines
- Availability of clear policy guidelines for new vaccine introduction

### **MILESTONES**

**2007:** A national focal point for new vaccine introduction within the MoPH is established

The technical sub committee will meet every six months

A technical group for new vaccine review is established with functional links with the government and research institutes.

National immunization policy is in place and available

**2008:** Research needs are reviewed for rotavirus, *Haemophilus influenza* type B (Hib), pneumococcus, Japanese encephalitis. Hib study result available

**2009:** Research will be conducted on Mumps and Rubella

**2010:** Results of the study on rotavirus will be available

## **STRATEGIES**

**Improve coordination:** A new vaccine focal point within the MoPH will be established to improve links with the MoPH. A technical group for new vaccine review will be established with members from all four agencies. This technical group will have the mandate to advise

the government on:

- (a) Designing and drafting the National Immunization Policy for the government
- (b) Defining policies on vaccine use against varicella, Japanese encephalitis, both in and outside EPI.
- (c) Coordination of studies on diseases burden, vaccine efficacy trials and health economic issues of new vaccine introduction (with special focus on the Hib vaccine)
- (d) Together with partner agencies such as WHO and Global Alliance for Vaccines and Immunization (GAVI), review the rates of introduction of new vaccines in other parts of the world, since 1990, including identifying a suitable model that may be adapted for the country's context.
- (e) Advising on advertisements for new vaccines approved by government
- (f) Together with academic institutes review new immunization technologies and research as appropriate to the county's context.

## **OBJECTIVE 2:**

### **To review the needs for MMR or MR vaccine in the county's immunization programme**

The need for introduction of measles, mumps and rubella-containing vaccine (MMR) or a measles and rubella-containing vaccine (MR) will be reviewed. Mumps is not a significant cause of mortality or morbidity and the MR vaccine is cheaper, so it may be worth reviewing the introduction of the MR vaccine.

#### **INDICATORS:**

- Progress of studies
- Coverage of routine immunization to above 85%

#### **MILESTONES**

**2007:** Mumps and rubella diseases burden studies are completed

**2008:** cost-effectiveness study of MMR introduction completed

**2009:** If epidemiological and costing analysis suggests the need and suitability, MMR is introduced in the national immunization schedule

#### **STRATEGIES**

1. **Research:** Consolidation of existing data and research into congenital rubella syndrome (CRS) and mumps. Commissioning of studies to assess the disease burden of CRS and

mumps in the country.

2. **Advocacy:** Publication and dissemination of research results to policy-makers, donors and partner agencies.
3. **Planning:** Financial and logistics consequences are considered part of research scenarios.

### **OBJECTIVE 3:**

**To review the needs introduction of Japanese encephalitis (JE) vaccine  
in selected provinces**

#### **INDICATORS:**

- Availability of disease burden data
- Availability of a safe and effective JE vaccine

#### **MILESTONES**

- 2007:** Geographic mapping of counties prone to JE and those that are risk-free is completed  
JE diseases burden studies are completed within selected provinces  
Cost effectiveness study of JE introduction is completed
- 2008:** JE vaccine is introduced into provinces considered prone to this disease
- 2009:** JE is integrated into the regular surveillance mechanisms

#### **STRATEGIES**

1. **Geographical delineation:** JE-endemic/prone counties and risk-free counties will be plotted through active research and data surveillance. Results will be presented to policy-makers and recommendations made on where JE vaccine should be introduced.
2. **Introduction of quality JE vaccine:** Sources of quality vaccine will be reviewed until it becomes available.
3. **Surveillance:** Diseases surveillance for JE will be integrated into the regular surveillance mechanisms.

### **OBJECTIVE 4**

**To implement phased introduction of Hepatitis B vaccine**

Since 20<sup>th</sup> May 2003, Hep B vaccine was introduced in some selected provinces. In July 2003, survey on the Hp B introduction conducted. The government prepared guideline on the

nationwide introduction of Hep vaccine. Therefore, since 2004 Hep B vaccine is included in the national immunization schedule. The introduction of combined DPT-Hepatitis B vaccine is completed by the end of 2006.

## **INDICATORS:**

- Number of counties and cities covered with Hep B vaccines

### **MILESTONES**

**2006:** A Hep B vaccine immunization focal point is established in the MoPH

All counties will be covered with Hep B vaccine

**2006:** From 1<sup>st</sup> July, Hep B+DPT vaccine introduction is expected.

**2007:** Guidelines for timely administration to all infants of a birth dose of hepatitis B vaccine (less than 24 hours after birth or as soon as possible within 7 days) are disseminated

**2007:** All counties will be covered with Hep B + DPT combination vaccine.

## **STRATEGIES**

1. **Phased Expansion:** Hep B + DPT vaccine expansion is expected. All infants will be vaccinated with Hep B vaccine within 24 hours after birth or as soon as possible within 7 days of birth. This will be considered in future.
2. **Administration of doses** will follow the national immunization schedule, which includes a birth dose for all births. Subsequent doses will be given at 6 weeks and 14 weeks. In case of tetravalent vaccine is introduced it will be given in 6<sup>th</sup>, 10<sup>th</sup> and 14<sup>th</sup> weeks.
3. **Training:** Health workers will be trained in Hep B vaccine administration as part of regular training. Mid-level managers will be trained during MLM training.
4. **Surveillance:** Annual analysis of blood banks for hep B prevalence will be introduced in the regular VPD surveillance mechanism.
5. **Record keeping:** All Institutions or health workers offering Hep B vaccine will ensure institution-retained record keeping.
6. **Tetravalent vaccine:** when DPT-Hep B combination vaccine is available and affordable, the combination vaccine will replace the monovalent vaccines. Affordability was analysed during the scenario-building of the financial sustainability plan and with coordinated research into the cost-effectiveness of tetravalent vaccine introduction.

## **GOAL 6**

**To monitor and use accurate, complete and timely data on vaccine-preventable diseases, AEFIs, and antigen coverage and drop-out rates by counties**

The **impact** of the EPI is measured in terms of disease burden by accurate surveillance mechanisms. These are essential not only for reviewing the impact of the EPI, but also for responding to VPD outbreaks.

The **safety** of the EPI may be monitored through the adverse events following immunization (AEFIs) surveillance system. AEFI surveillance is crucial for ensuring rapid response to low quality and potentially dangerous immunization service.

The **efficiency** of the EPI is measured by monitoring coverage rates and drop-out rates by counties. This is crucial for prioritizing geographical areas and populations for strengthening immunization and targeting resources appropriately.

### **OBJECTIVE 1:**

**To institutionalize surveillance for vaccine- preventable diseases and early detection of any outbreak**

VPDs that will be monitored through this system include those that are currently in the EPI schedule, or those that will be reviewed for new vaccine introduction during this Plan. These include polio, diphtheria, pertussis, neonatal tetanus (NNT), measles, rubella and Hep B. The surveillance initiative should build on the strengths of the current AFP surveillance network, yet not dilute its effectiveness. These strengths can be used for other VPDs and include:

- Complete and timely reporting
- Case investigation
- Detailed data analysis to monitor progress and target action
- Immediate reporting of VPDs and monthly aggregate reporting between laboratory and epidemiology unit.

### **INDICATORS:**

- Number of VPD cases reported
- Number of cases/outbreaks investigated by laboratory
- Number of outbreaks reported and investigated within 48 hours
- % of monthly VPD surveillance reports received by counties that are complete
- % of VPD reports received by counties that are received monthly on time
- % of provinces able to report monthly on VPDs electronically.

## **MILESTONES**

**2007:** A national focal point for monitoring VPDs, AEFI surveillance and antigen coverage rates is established

All provinces have focal point for VPD surveillance and monitoring which has access to and is able to use the database for planning immunization activities.

**2008:** 30% of provinces able to electronically report monthly on VPDs to the National level

**2009:** 50% of provinces able to electronically report monthly on VPDs to the National level

**2010:** 70% of provinces able to electronically report monthly on VPDs to the National level

**2011:** 100% of provinces able to electronically report monthly on VPDs to the National level

## **STRATEGIES**

Disease reporting is currently done monthly by a variety of mechanisms that make it difficult to analyse or use the information locally. It is often difficult to obtain accurate information from the counties to provinces and at the national level. This results in delays in detecting VPDs and in responding with improved immunization efforts. Early detection of clustering is essential for applying interventions for prevention and control. The country is in the process of developing a disease surveillance system in which disease information is used for immediate local intervention.

Ultimately, VPD surveillance should become a part of (be integrated with) the national disease surveillance system; however, immediate strengthening of VPD surveillance at all levels is required. The counties will be the surveillance unit for action and reporting to the provinces.

Each health facility is responsible for reporting VPDs immediately by phone, telegram, card or email to county level officer in hygienic & Anti epidemic stations. Eventually, the diseases surveillance system will require a county level epidemiology officer. At present, the county is responsible for conducting outbreak investigations, implementing preventive measures and preparing a monthly consolidated report for the province. VPDs will gradually be integrated in to a comprehensive disease surveillance system.

The main features of VPD reporting will include the following:

- Case-based reporting from the health facility to the county
- Monthly aggregate reporting to the province
- Province to report monthly aggregate data to the central level

In case of outbreaks, immediate investigation (within 48 hours) will be conducted by the respective counties using the existing infrastructure. If investigation confirms an outbreak, immediate intervention will be initiated by county health bureau or county level surveillance officer assisted by county EPI doctor. Every confirmed outbreak and investigation will be reported immediately from the county to province and the province is responsible for informing the central level. Diseases clusters are also to be detected and investigated as early signals of potential outbreak.

A monthly disease summary will be prepared by the county surveillance officer and information officer and reported to the province and all surveillance units.

1. **Phased introduction of RIMS:** A routine immunization monitoring system (RIMS) has been developed. This system incorporates elements of VPD cases, mapping, database and analysis. All reporting from the county level and above will be done electronically with key standardized tools that can be easily analysed at the county level.
2. **Increase accuracy and use of data at local levels:** The county level will be the unit for surveillance and outbreak control. The County EPI officer will be responsible for surveillance activities; assisted by either a county level epidemiologist, statistician for action at the local level. Together with supportive supervision, monthly feedback from center to province, province to county and county to health facility levels should increase motivation for reporting accurately. Supportive supervision visits by supervisors using a standardized tool will help minimize over-reporting, identify area-specific problems and find local solutions.
3. **Community involvement:** Community reporting of VPDs will also be encouraged and specific strategies will be reviewed. Mechanisms for coverage data collection, compilation and flow from session sites/sub-centers to the county and then to the province on uniform patterns will be highlighted. VPD surveillance mechanism will attempt to integrate as much as possible without losing the required responsiveness for outbreak response or diluting the focus on AFP surveillance.
4. **Laboratory confirmation and strengthened linkage with surveillance:** Laboratory diagnostic support will be provided through a network of currently available institutions and by establishing additional facilities. This will ensure prompt feedback to field investigators as well as to counties, provinces and national level authorities.

## OBJECTIVE 2

**To strengthen vaccine quality and injection safety by developing a monitoring system for reporting and responding to AEFIs by 2010**

Vaccine manufacturers produce vaccines with the highest safety and quality standards available with current technology. However, no biological product has yet been developed which is 100% safe and 100% effective. Consequently, some very rare vaccine related adverse events may occur, especially when a large number of people are vaccinated. Programme managers and vaccinators need to know what they can expect as ‘common’ (mild, subsiding without treatment and leaving no long-term consequences) and ‘rare’ (anaphylaxis, febrile seizure, encephalopathy, etc.).

Programmatic errors are the cause for most commonly reported adverse events. These occur as a result of inappropriate storage, handling, preparation and administration of vaccines. It is extremely important that these AEFI are reported and investigated as they require a rapid response and corrective measures to prevent additional cases. A programme errors often occur if a vaccinator does not follow the standard immunization policies and practices established and taught during training.

AEFI, particularly when they are not properly managed, represent a genuine threat to the immunization programme and, in some cases, to the health of patients. To protect the public and the success of the immunization services, it is therefore critical that AEFI are detected, reported and investigated, and programmatic errors promptly corrected to prevent further risk of harm. Because of the inevitable nature of AEFI, communication plans must be in place to prevent a loss of confidence in vaccines or the vaccination services.

## **INDICATORS:**

- National guidelines on AEFI updated and widely distributed
- AEFI investigation team established in each county and AEFI review committee established in each province
- % of counties reporting AEFI on a monthly basis to the provincial level (allowing zero reporting)
- % of severe AEFI reported within 24 hours
- % of severe AEFFI cases investigated within 48 hours (expected 100%)

## **STRATEGIES**

The strategy is to capitalize on the existing system and experience of province that have succeeded in establishing AEFI surveillance system to strengthen the system in provinces where AEFI surveillance is not functional. In 2004-2005 a series of workshops must be conducted. Provincial EPI managers, surveillance doctors and some vaccinators will be invited for a workshop to:

- Review and update information tasks and responsibilities of key players in the AEFI system

- Share experiences on existing AEFI activities in selected model provinces
- Discuss current barriers to reporting and identify measures to overcome constraints to reduce AEFI
- Review and finalize the proposed core list of AEFI to be reported, procedures to conduct case investigations and to report to the provincial and national level
- Agree on a standardized procedure for laboratory investigation (when a vaccine test is needed, which test is needed under what circumstances, etc.)
- Review (and strengthen) procedures for causality assessment

The experience and technical expertise in surveillance system gained by the well-performing provinces will be an asset to finalize guidelines and reporting forms, to identify solutions to reporting and assist provinces with no AEFI surveillance system. The second set of workshops will be conducted with the participation of less-performing provinces. The main objective will be to initiate a reporting system for these provinces using the experience and material finalized during the first series of workshops with well-performing provinces.

During the workshop with well-performing provinces it is expected that a pool of EPI, surveillance and reporting managers will be identified to serve as facilitators and technical resources for provinces that have low or medium coverage and no AEFI system.

It would be cost-effective to organize echo training so that central level trains provincial level, province to county and county to peripheral levels.

## **MILESTONES**

- 2007:** All provinces have instituted an AEFI investigation team and causality committees  
A national AEFI focal point is appointed within the national immunization department  
All counties are able to report the AEFI status on a monthly basis to the provincial level with immediate reporting in case of AEFI case developed  
All provinces have drafted and are implementing and AEFI response plan
- 2008:** All counties are able to report the AEFI status on a monthly basis to the provincial level with immediate reporting in case of AEFI case developed  
All provinces have drafted and are implementing and AEFI response plan
- 2009:** All counties are able to report the AEFI status on a monthly basis to the provincial level with immediate reporting in case of AEFI case developed  
All provinces have drafted and are implementing and AEFI response plan
- 2010:** All counties are able to report the AEFI status on a monthly basis to the provincial level with immediate reporting in case of AEFI case developed  
All provinces have drafted and are implementing and AEFI response plan
- 2011:** All counties are able to report the AEFI status on a monthly basis to the provincial level with immediate reporting in case of AEFI case developed  
All provinces have drafted and are implementing and AEFI response plan

## **OBJECTIVE 3**

**To establish an effective, efficient, complete and timely immunization recording and local area monitoring system by 2010**

### **INDICATORS:**

- % of counties with less than 10% discrepancy between evaluated and reported DPT3 coverage
- % of monitoring reports received by counties that are complete
- % of monitoring reports received by counties that are received on time
- % of counties reporting an adequate number of monitoring forms available for health facilities

## **MILESTONES**

- 2007:** 25% of counties with less than 10% discrepancy between evaluated and reported DPT3 coverage  
60% of monitoring reports received by counties are complete
- 2008:** 80% of monitoring reports received by counties are complete
- 2009:** 50% of counties with less than 10% discrepancy between evaluated and reported DPT3 coverage  
100% of monitoring reports received by counties are complete
- 2010:** 80% of counties with less than 10% discrepancy between evaluated and reported DPT3 coverage
- 2011:** 100% of counties with less than 10% discrepancy between evaluated and reported DPT3 coverage

## **STRATEGIES**

**1. Strengthen the monitoring system at local level:** Through training and appropriate logistics supply mechanisms:

- (a) All health units will have access to and correctly use tally sheets, monitoring charts, immunization registers, immunization cards and a ‘tickler box’ for follow up defaulters.
- (b) Each health facility health worker will maintain an immunization register showing resident children’s names (irrespective of place of birth), the actual vaccination against each child/mother and report only the actually vaccinated number from the tally sheet.
- (c) Health workers should be encouraged to maintain and use village/ward-wise family registers.
- (d) The health workers should also make efforts to access the revenue department birth registers wherever necessary so that the accuracy of the denominator can be maintained.
- (e) Periodic surveys should be undertaken by the health system to identify unregistered/-in-migrated children. (The frequency of such survey may vary as per the local situation, ranging from once in three months to once every year.)
- (f) All possible efforts should be made to cross notify the concerned health facility/worker on immunization of children missed opportunities.
- (g) Immunization records kept in clinics or nurseries will be made available to each child/mother to ensure that all vaccinations can be recorded, irrespective of the source. These will be provided on every birth registration and standardized nationally, printed.
- (h) An additional column should be included in the vaccination records to trace where the child was vaccinated.
- (i) All efforts should be made to make the reported data available to supervisors and monitors at all

levels.

(j) Legislation is recommended to bring urban health into MoPH and province will play a role as the mid level.

## **2. Decentralization of monitoring to strengthen local use of information for use:**

(a) Decentralized programme monitoring will be centered round the county units. The information on monitoring indicators should be fed back by the county EPI officer during monthly meetings. The county epidemiologist/statistician or data analyst and immunization officer will monitor data, the reported coverage, vaccine supply, vaccine utilization, sessions planned versus held on a monthly basis. When progress discrepancies are noted in counties, survey may be conducted to evaluate coverage.

(b) Supply and utilization of vaccines will be monitored at the PHC/health facility level and reviewed by county EPI officer both during his/her monitoring and during the monthly meeting.

(c) County level officers will monitor through supportive visits records maintained by health workers-both denominator and beneficiaries. The county officer must certify the validity of the monitoring data, which will be liable for extrinsic evaluation.

(d) When gross discrepancies are detected, the county EPI officer will discuss with concerned supervisors to identify reasons for these and take corrective action.

## **3. Use of data at different levels:** Based on data from counties, these will be aggregated at the province and national level for policy and programme reviews. Data will be used to prioritize health facilities by analysing information into:

Priority 1: areas with <80% DPT3 coverage and >10% DPT1-DPT3 drop-out rate

Priority 2: areas with <80% DPT3 coverage and <10% DPT1-DPT3 drop-out rate

Priority 3: areas with >80% DPT3 coverage and <10% DPT1-DPT3 drop-out rate

## **4. Use of survey:** Multiple external coverage evaluations by various agencies add to the confusion and will not be encouraged. Coverage surveys will be conducted wherever VPD is reported in clusters or with unexpected frequency. If coverage is inadequate, action will be taken to improve the coverage rapidly. The county survey data will be disseminated widely for transparency and better performance. Coverage evaluation surveys will be induced as part of the independent evaluation of the programme. An independent evaluation mechanism should be instituted at every province and at the national level for the same, the coverage survey data findings will be shared with the province/counties at the earliest for corrective action and better performance.

## **5. Routine immunization monitoring system (RIMS):** General monitoring activities will be through identification of various officials who will act as monitors. The provinces will be monitored by the national level, counties by provincial level, and sessions by county level. Appropriate formats covering relevant indicators applicable to the respective level being

monitored will be available along with a mechanism for compilation of the monitoring data and data analysis, and identification of action points based on monitoring feedback. The use of independent monitors for assisting the lower level staff may be considered.

## **GOAL 7**

**To strengthen integration of EPI with the overall health system.**

### **OBJECTIVE 1:**

**Develop an integrated disease surveillance systems**

#### **INDICATORS:**

- Number of VPD cases reported
- % of monthly VPD surveillance reports received by counties that are complete
- % of counties are utilizing integrated VPD report systems

#### **MILESTONES**

**2007:** Guidelines developed for integrated Vaccine preventable disease surveillance

**2007:** The reporting forms for vaccine preventable diseases are streamlined.

**2008:** 100% counties are utilizing integrated VPD report systems

#### **STRATEGIES**

Guidelines will be developed for integrated surveillance. This will include streamlining the surveillance and reporting form for other VPD's. A training course will be organized to build capacity for surveillance activities. Incentives will be provided to those that are good at surveillance and specimen transportation. Laboratories will be strengthened and including central levels for the testing of measles and TT.

### **OBJECTIVE 2:**

**Development of integrated planning systems**

#### **INDICATORS:**

- % counties with integrated micro-plans

## **MILESTONES**

**2007:** Guidelines on integrated micro-plans for county level are developed and disseminated

**2007:** The Mid Term Plan of EPI is integrated with the next health sector plan.

**2008:** Training programs are designed and conducted on integrated micro-planning for county level

## **STRATEGIES**

Guidelines on programme planning processes will be developed. Central and provincial level experts on planning should visit counties to build capacity in integrated planning. A joint review between the planners and implementors will be undertaken on the developed plans. Cost effectiveness and affordability of developed plans will be assessed and integrated into the overall sectoral plan.

## **OBJECTIVE 3**

### **Strengthening national coordination mechanisms between EPI and the national health system and relevant Ministries**

#### **INDICATORS:**

- % counties with micro-plans identifying package of services provided through routine services and campaigns

## **MILESTONES**

**2007:** Vitamin A and De worming is merged into EPI activity.

**2008:** Review and recommendations completed on strategies for integration of EPI with MCH/IMCI at central and provincial level.

**2010:** 100% of counties identify package of services to be delivered in integrated micro-plans

## **STRATEGIES**

Good coordination and linkages between the departments of the MOPH will be encouraged.

In particular, a review will be undertaken on how the EPI program can link with IMCI and MCH programs at central and provincial level. Collaboration will be strengthened with civil society as well as other Ministries. Collaboration and linkages with the volunteers will also be stimulated. Efforts will be made to improve co ordination of vaccine and logistics supplies between County medical Warehouses and anti-epidemic stations. At the service delivery point, efforts will be made to merge the Vitamin A and Deworming campaigns into EPI. Other opportunities will be sought for collaboration, such as merging of bed net distribution with EPI programs.

# **ANNEX 1 MANAGING THE NATIONAL IMMUNIZATION PLAN**

To improve this five-year, seven-goal, twentythree –objective plan will require great strengthening of the management system at all levels; national, provincial, county level institutes and Ri clinics. There will be greater transparency and more effective communication.

## **National institute**

The EPI shall be a separate division with EPI programme manager for immunization as the overall technical and management focal point for immunization in DPRK. Under the EPI manager will be a sufficient number of EPI doctors who will act as national technical and management focal points for their respective duties. The areas that would need individual attention are:

- procurement, cold chain and logistics
- surveillance, monitoring and evaluation
- new vaccines (Tetraivalent vaccine of Hep B+DPT, MMR, JE)
- training in immunization and human resource allocation
- strategic communication
- accelerated disease control (polio, tetanus and measles)
- safety issues (safe injection and waste disposal, and AEFI surveillance, monitoring and response)
- financial administration and legal matters within EPI

The role of government will be policy formulation and ensuring the quality of services through monitoring, supervision, training logistics and supply of vaccines, coordination of the programme and providing technical and financial resources, involvement in work delegation and team building, establishing priorities, forecasting needs, carrying out strategic planning and inter-agency coordination.

Planning, monitoring and evaluation for immunization activities will be carried out by the immunization section of State Hygiene and Communicable diseases control board. In this respect, collaboration and cooperation will be sought from other ministries, departments, agencies and non-governmental organizations (NGOs). Every effort will be made to immunize every eligible child.

## **Provincial institute**

These are basically implementing agencies. Maintenance of assets will be the joint responsibility of the implementing agencies (provincial and county level people's committees) and the government. Maintenance of staff and assets will be the responsibilities for each level peoples committee. In case new vaccines introduced, this will be received from the national level and its needs and requirements should be correctly calculated and submitted to the national level.

## **County level institute**

County level should organize and implement the activities to estimate the denominators and needs of the vaccine for the new vaccines as well as the advocacy for the population.

## **Monitoring**

The highlighted indicators will be measured at the field level and milestones will be monitored by the central level. The EPI will constantly be monitored through health sector mechanism, the formal and informal surveillance and immunization monitoring systems.

The national level EPI shall monitor province's performance and the province EPI shall monitor the county's performance. The county level EPI officer shall analyse facility reports monthly and perform assessments of performance including timeliness, accuracy and completeness of reports. The indicators to be monitored are highlighted under each goal.

### **Evaluation**

A mid-term review and final evaluation will be executed by an independent body or group of agencies, designed by the MoPH. Recommendations from the mid-term review will be fed into strategies and methods for implementing the remainder of the plan.

The final evaluation will act as a catalyst for devising the next immunization plan.

## SUMMARY OF EPI GOALS, OBJECTIVES AND MILESTONES

### GOAL 1. Counties will provide equitable, efficient and safe immunization services to all infants and pregnant women

<b>OBJECTIVE</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>1. To ensure that regular, quality immunization sessions are planned and held</b>	70% of counties achieve DPT3 coverage of $\geq 80\%$ and BCG-measles drop-out rate of $\leq 15\%$	90% of counties achieve DPT3 coverage of $\geq 80\%$ and BCG-measles drop-out rate of $\leq 12\%$	100% of counties achieve DPT3 coverage of $\geq 80\%$ and BCG-measles drop-out rate of $\leq 10\%$	100% of counties achieve DPT3 coverage of $\geq 80\%$ and BCG-measles drop-out rate of $\leq 5\%$	100% of counties achieve DPT3 coverage of $\geq 80\%$ and BCG-measles drop-out rate of $\leq 5\%$
<b>2. To ensure that adequate trained staff are empowered to provide essential quality immunization service</b>	Provincial and county level immunization human resources and managerial capacity is reviewed. Mid-level manager training in all counties is completed. Further training need of field functionaries is identified Adapted field-level operational guidelines are finalized and used countywide.	Recommendations form the human resources and managerial review is implemented. A countywide human resource needs review is completed. All health workers have attended a training course on safe injection practice, waste disposal and AEFI reporting and Hep B vaccine introduction.	Recommendations form human resource needs review is implemented.	Re-orientation and training needs of county EPI staff and field functionaries assessed and implemented.	Re-orientation and training of county EI doctors and field functionaries completed.
<b>3. To keep and annually upgraded inventory of the cold chain according to the levels of the network, allowing for new equipment, substitution, replacement, spare parts, fuel and others in order to maintain a functional status of 90%</b>	Cold chain review is undertaken in provinces A national focal point is appointed to look after forecasting and utilization and to assist provincial estimates for requirement. 90% of identified cold chain equipment is functioning at any given point of time. Training material for cold chain training at all levels will be standardized and finalized. Training material for cold chain training (including system and equipment training) is provided.	Cold chain review is undertaken in some provinces. 85% of identified cold chain equipment is functioning at any given point of time. 100% of provincial cold chain officers and county level refrigerator mechanics will be trained	90% of identified cold chain equipment is functioning at any given point of time. 100% of provincial cold chain officers and county level refrigerator mechanics will be trained	90% of identified cold chain equipment is functioning at any given point of time. 100% of provincial cold chain officers and county level refrigerator mechanics will be trained	Computerized immunization cold chain and spare parts inventory system available in all provinces and at national level
<b>4. To ensure an efficient vaccine and injection equipment management and logistics system to forecast and deliver adequate sullies of vaccines in a timely manner</b>	30% of counties being monitored for microplannig for vaccine forecasting and procurement  100% of counties with no measles vaccine stock-out	45% of counties being monitored for microplannig for vaccine forecasting and procurement  100% of counties with no measles vaccine stock-out	60% of counties being monitored for microplannig for vaccine forecasting and procurement  100% of counties with no measles vaccine stock-out	75% of counties being monitored for microplannig for vaccine forecasting and procurement  100% of counties with no measles vaccine stock-out	100% of counties being monitored for microplannig for vaccine forecasting and procurement  100% of counties with no measles vaccine stock-out

<b>5. To ensure the implementation of safe injection practices and waste disposal</b>	All counties will receive and use AD syringe and needle cutter	All counties will receive and use AD syringe and needle cutter	All counties will receive and use AD syringe and needle cutter	All counties will receive and use AD syringe and needle cutter	All counties will receive and use AD syringe and needle cutter
<b>GOAL 2. Contribute to global polio eradication, measles mortality reduction and neonatal tetanus elimination</b>					
<b>OBJECTIVES</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>1. To achieve polio eradication certification by 2007</b>	Maintain no wild polio status in DPRK  AFP surveillance is maintained to $\geq 1$ non-polio AFP case per 00,000 population under 15 years  90% of AFP cases sampled with an adequate stool sample	Certification of polio eradication in SEARO  AFP surveillance is maintained to $\geq 1$ non-polio AFP case per 00,000 population under 15 years  90% of AFP cases sampled with an adequate stool sample	Review to policy on OPV immunization	Decision on use of OPV versus IPV dependent on global certification of polio eradication	
<b>2. To not to develop NNT cases</b>	National focal point for NNT is created.  All Provinces will have NNT focal points.  100% of provinces have eliminated NNT.  90% of counties have >90% TT2 coverage for pregnant women.	100% of counties have >90% TT2 coverage for pregnant women.  A national NNT database is created	100% of provinces have eliminated NNT.  100% of counties in each province have >90% TT2 coverage for pregnant women.	100% of counties in each province have >90% TT2 coverage for pregnant women.	100% of provinces have eliminated NNT.  100% of counties in each province have >90% TT2 coverage for pregnant women.
<b>3. To maintain the strategy of no measles cases by 2010</b>	Measles laboratory network assessed.  National and provincial measles nodal points appointed.  3 major provinces have measles surveillance system established.  3 provinces will have implemented measles antibody sero survey.  All province will maintain >90% measles vaccine coverage.  No measles case developed	Measles laboratory network is initiated  3 major provinces have measles surveillance system established.  10 counties will have implemented measles antibody sero survey.  All province will maintain >90% measles vaccine coverage.  No measles case developed	7 provinces have measles surveillance system established.  20 counties will have implemented measles antibody sero survey.  All province will maintain >90% measles vaccine coverage.  No measles case developed	10 provinces have measles surveillance system established.  30 counties will have implemented measles antibody sero survey.  All province will maintain >90% measles vaccine coverage.  No measles case developed	3 major provinces have measles surveillance system established.  All counties will have implemented measles antibody sero survey.  All province will maintain >90% measles vaccine coverage.  No measles case developed
<b>4. To achieve and maintain a level of 98% coverage with two doses of vitamin A supplementation to children under five years</b>	National and provincial Vitamin A focal point has established.  Update national plan on Vitamin A administration	All counties will sustain 98% of vitamin A coverage rate	All counties have 98% vitamin A coverage rate.  Vitamin A administration to all eligible children of 'children's health day'  Vitamin A to all measles cases in the outbreak areas	All counties will have 98% of vitamin A coverage rate	All counties will have 98% of two dose vitamin A coverage rate for children aged 6-59 months

<b>GAOL 3. Availability of sufficient and sustainable funding with established adequate, accountable and efficient fund flow</b>					
<b>OBJECTIVE</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>1. To ensure adequate financial resources for the EPI at national and provincial levels for the EPI to achieve goals and objectives</b>	National core immunization financing team is established and functioning All provinces have a focal point for immunization financing issues. The national budget shows provision for purchase of vaccines for routine immunization and injection safety.	International resources mobilized for health systems strengthening	Vaccine wastage DPT Hep B 3 maintained at 30%  International resources mobilized for new vaccine introduction		
<b>2. To ensure political commitment for adequate annual funding at all levels</b>					
<b>GOAL 4. Sustained demand and a reduction in social barriers to access immunization services</b>					
<b>OBJECTIVE</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>1. To ensure widespread support by all families and communities so that all eligible children and pregnant women are immunized</b>	At least 20 % of counties in 10 provinces have integrated communication work plans (minimum component IEC training, mobilization of local leaders, effective branding of IEC materials)	At least 4 % of counties in 10 provinces have integrated communication work plans	At least 6 % of counties in 10 provinces have integrated communication work plans.  Mid-term review, assessing impact in terms of key knowledge, attitude and practice indicators.	At least 20 % of counties in 10 provinces have integrated communication work plans.  Accelerated communication activities targeting drop-outs and the introduction of new vaccines	At least 20 % of counties in 10 provinces have integrated communication work plans
<b>2. to ensure high-level political and administrative support for immunization as the key public good</b>					

<b>GOAL 5. Accelerated introduction of licensed new and underused vaccines against diseases with significant mortality and morbidity in the county</b>					
<b>OBJECTIVE</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>1. To ensure that institutional mechanisms are in place to adequately obtain, review and use information for deciding on the introduction of new and underused vaccines</b>	A national focal point for new vaccine introduction is appointed in the MoPH  The technical sub-committee on EPI meets regularly and establish functional link with the government and institute.  National immunization policy is in place and available	Review the research needs on the rotavirus, <i>Hemophilus influenza b</i> , Japanese encephalitis	Research conducted on mumps and rubella	Research results on rotavirus is available	Research results on <i>Hemophilus influenza b</i> is available
<b>2. To review the need for MMR or MR vaccine in the country's immunization programme</b>	Mumps and rubella disease burden studies are completed	Study on the cost-effectiveness on the introduction of MMR vaccine is completed	If epidemiological and costing analyses suggest need and suitability, MMR is introduced to the national immunization schedule		
<b>3. To review the need for introduction of Japanese encephalitis vaccine in selected provinces</b>	Geographic mapping of counties prone to JE and those risk-free is completed.  JE diseases burden studies are completed within selected provinces. Cost-effectiveness study on JE introduction is completed	Introduce JE vaccine in some epidemic prone provinces	JE is introduced in regular surveillance mechanism		
<b>4. To implement a phased introduction of Hep B vaccine</b>	MoPH have Hep B vaccine introduction focal point.  DPT+Hep B vaccine is given nationwide.	Tetraovalent vaccine (DPT+Hep B) will be provided all over the country	Tetraovalent vaccine is introduced in all areas  All infants will be given with Hep B vaccine within 24 hours of birth or as soon as possible within 7 days of birth	Tetraovalent vaccine is introduced in all areas  All infants will be given with Hep B vaccine within 24 hours of birth or as soon as possible within 7 days of birth	Tetraovalent vaccine is introduced in all areas  All infants will be given with Hep B vaccine within 24 hours of birth or as soon as possible within 7 days of birth

<b>GOAL 6. Monitor and use accurate, complete and timely data on vaccine-preventable diseases, AEFIs, and antigen coverage and drop-out rates by counties</b>					
<b>OBJECTIVE</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>1. To institutionalize surveillance for vaccine preventable diseases and early detection of any outbreaks</b>	A national focal point for VPD, AEFI surveillance and antigen coverage monitoring is established. A provincial focal point for VPD, AEFI surveillance and antigen coverage monitoring is established.	30% provinces are able to electronically report monthly on VPDs to the national level. All provinces have focal point for VPD, AEFI surveillance and antigen coverage monitoring and be able to use database for planning immunization activities	50% provinces are able to electronically report monthly on VPDs to the national level. All provinces have focal point for VPD, AEFI surveillance and antigen coverage monitoring and be able to use database for planning immunization activities	70% provinces are able to electronically report monthly on VPDs to the national level.	100% provinces are able to electronically report monthly on VPDs to the national level.
<b>2. To strengthen vaccine quality and injection safety by developing a monitoring system for reporting and responding to AEFI by 2010</b>	All provinces have instituted and AEFI investigation team and causality committees. National EPI cell will have focal point of AEFI response All counties report monthly on AEFI to province together with immediate report All counties will prepare and implement action plan for AEFFI response	All counties report monthly on AEFI to province together with immediate report All counties will prepare and implement action plan for AEFFI response	All counties report monthly on AEFI to province together with immediate report All counties will prepare and implement action plan for AEFFI response	All counties report monthly on AEFI to province together with immediate report All counties will prepare and implement action plan for AEFFI response	All counties report monthly on AEFI to province together with immediate report All counties will prepare and implement action plan for AEFFI response
<b>3. To establish an effective, efficient, complete and timely immunization recording and local area monitoring system by 2010</b>	25% counties with less than 10% discrepancy between evaluated and reported DPT3 coverage rate. 60% of reports received from counties are complete	80% of reports received from counties are complete	50% counties with less than 10% discrepancy between evaluated and reported DPT3 coverage rate. 100% of reports received from counties are complete	80% counties with less than 10% discrepancy between evaluated and reported DPT3 coverage rate. 100% of reports received from counties are complete	100% counties with less than 10% discrepancy between evaluated and reported DPT3 coverage rate.

## GOAL 7. Strengthen integration of EPI with the overall health system.

<b>OBJECTIVE</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>1. To develop an integrated disease surveillance systems</b>	Guidelines developed for integrated Vaccine preventable disease surveillance	The reporting forms for vaccine preventable diseases are streamlined.	100% of counties are utilizing integrated VPD report systems	100 % counties reporting in a timely & complete manner on 3 main vaccine preventable diseases (Polio, measles and tetanus)	
<b>2. To develop integrated planning systems</b>	Guidelines on integrated micro-plans for county level are developed and disseminated  The Mid Term Plan of EPI is integrated with the next health sector plan.	Training programs are designed and conducted on integrated micro-planning for county level		100% of counties identify package of services to be delivered in integrated micro-plans	
<b>3. To strengthen national coordination mechanisms between EPI and and the national health system and relevant Ministries</b>	Vitamin A and De worming is merged into EPI activity.	Review and recommendations completed on strategies for integration of EPI with MCH/IMCI at central and provincial level.  Review and recommendations completed for closer integartion of EPI with service delivery.		100% of counties identify package of services to be delivered in integrated micro-plans	

## ANNEX 3 DETAILED FINANCIAL SUSTAINABILITY STRATEGIES

Strategies	Major actions and organisation/s responsible	Indicator(s) / time frame
<b>1) Domestic resourcing for immunization services</b>		
<b>1.1 Increasing domestic resources available for immunization</b>	<ul style="list-style-type: none"> <li>• FSP completion (coordinated by MOPH with input from WHO and UNICEF).</li> <li>• Closer cooperation and information sharing between MOPH and MOF 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>• Overall immunization programme budget increases by at least 1 % in real terms for 2005 - 2007. However, the precise level of required future increases will depend on the economics situation of the country (how improving will be achieved, i.e. trade link with other countries ) and the extent to which donor assistance is increased and the extent to which all the objectives in the multi-year plan are pursued.</li> </ul>
<b>1.2 Increasing domestic vaccine production and improving the quality of vaccines</b>	<ul style="list-style-type: none"> <li>• MOPH reviews expansion of domestic vaccine production and is actively trying to improve the standards of its production</li> <li>• Developing the capacity of National Regulatory Authority</li> <li>• Strengthening roles and responsibilities of the national hygienic control board.</li> <li>• Enforcement of regulations at provincial levels</li> </ul>	<ul style="list-style-type: none"> <li>• Renewing the supply for the safety and immunogenicity test kit and facilities at least 20 % at all provincial level by 2006</li> <li>• Training of the trainers at least 15 % (2 trainers for each provinces) by 2006</li> <li>• Production standard improving by 2006</li> <li>• 30 % Reduction in vaccine side effect rate by 2006 at central and all provincial levels</li> </ul>
<b>1.3 Increasing local capacity to analyze costing and financing issues</b>	<ul style="list-style-type: none"> <li>• Closer collaboration between MOPH and GAVI, WHO, UNICEF</li> <li>• Department of Finance, MOPH will identify the need for training relating to immunization economics and financing</li> </ul>	<ul style="list-style-type: none"> <li>• Trained personal at provincial level at least 30% in order to improve capacity of data collecting especially for immunization financing data by 2007</li> <li>• Manual translated in Korean language in 2006</li> </ul>
<b>1.4 Community cost sharing</b>	Community mobilization and education through community networks and supports	Publications and printings for community relating to the descriptions of vaccination at least once every year through out the country (three for each Ris= at least 21,024 copies a year)
<b>2) Increasing programme efficiency</b>		
<b>2.1 Enhanced staff training to reduce vaccine wastage</b>	<ul style="list-style-type: none"> <li>• MOPH ensures all immunization sites have a copy of the Multi Dose Vial Policy</li> <li>• MOPH provides additional training relating to vaccine stock management and use (during 2005/2006).</li> <li>• WHO and UNICEF consider providing technical and funding support for training.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduction in vaccine wastage rates for BCG, DTP, Measles hepatitis B and TT vaccine (national wastage rate is 30% and for TT is 20 %) by end of 2006.</li> </ul>

<b>2.2 Staffing levels</b>	MOPH reviews and identifies personnel requirement	MoPH prepares the appropriate documentation (by 2006).
<b>2.3 cold chain management</b>	<ul style="list-style-type: none"> <li>• MOPH improves the standard of cold chain equipments at all levels.</li> <li>• MOPH revises the existing functional inventory of all cold chain equipment (including the age of the equipment).</li> <li>• UNICEF, WHO, GAVI consider providing funding support.</li> </ul>	<ul style="list-style-type: none"> <li>• Surveys done by MOPH using vaccine vial monitors indicate that cold chain failure is less than 10% by 2006.</li> <li>• Inventory is revised and renewed by 2006.</li> </ul>
<b>2.4 Communication and information technologies</b>	<ul style="list-style-type: none"> <li>• MOPH works to ensure that all of EPI managers at the provincial level have access computer.</li> <li>• GAVI considers providing funding support for purchasing these technologies and training in their use.</li> </ul>	Surveys indicate that the 100% target is achieved by 2007.
<b>2.3 Mode of service delivery</b>	Each county review its delivery strategy	Every infant is visited at least 5 times during its first year of life by 2006
<b>3) Increase external resources available</b>		
<b>3.1 Additional resourcing from GAVI/ Vaccine Fund</b>	<ul style="list-style-type: none"> <li>• MOPH gives further consideration to apply for phase II to the GAVI Board in 2007.</li> <li>• Donors (eg, WHO, UNICEF) provide technical support for evaluating the options.</li> </ul>	MOPH prepares the appropriate documentation (by 2006).
<b>3.2 Donors channeling funds through WHO and UNICEF</b>	WHO and UNICEF discussions with existing donor organisations (eg, UK DFID) with regard to support for immunization coverage.	Discussions are held and plans are finalised (if appropriate) during 2006.

## **ANNEX 4 INFRASTRUCTURE OF COORDINATION MECHANISM OF IMMUNIZATION, DPRK**

### **1. Administrative sub-committee**

<b>Position</b>	<b>Name</b>	<b>Title/agency</b>
<b>Chairman</b>	Hong Sun Gwang	Vice director, State Hygiene Communicable Disease Board, MoPH
<b>Member</b>	Jong Bong Ju	Vice-Director, Dept. External Affairs, MoPH
<b>Member</b>	Han Yong Sik	EPI Porgramme manager, State Hygiene Communicable Disease Board, MOPH
<b>Member</b>	Sok Yong Guk	Officer, Dept. External Affairs, MoPH

### **2. Technical sub-committee**

<b>Position</b>	<b>Name</b>	<b>Title/agency</b>
<b>Chairman</b>	Kim Myong Dok	Director, Science & Education Dept., MoPH
<b>Member</b>	Pak Kun Sik	Director, Vaccine production dept., Joint company of Pharmaceutical production, MoPH
<b>Member</b>	Kim Song Ha	Director, scientific leading dept. Academy of Medical Science
<b>Member</b>	Kim Won Taek	Vice-director in charge of science, Pyongyang Medical University

### **3. IEC sub-committee**

<b>Position</b>	<b>Name</b>	<b>Title/agency</b>
<b>Chairman</b>	Pak San Ho	Officer, State Hygiene Communicable Disease Board, MoPH
<b>Member</b>	Kim Yong Ae	Vice director, Women's Union
<b>Member</b>	Kang Chol	Senior officer, Ministry of Education
<b>Member</b>	Kim Kwang Hun	Head, Health Education Institute

### **4. Financial sub-committee**

<b>Position</b>	<b>Name</b>	<b>Title/agency</b>
<b>Chairman</b>	Kim Pok Sil	Director, financial Dep., MoPH
<b>Member</b>	Won Kwang Su	Vice director, Ministry of Finance
<b>Member</b>	Jo Nam Jin	Senior officer, State Planning commission
<b>Member</b>	Jo Won Ryong	Officer, Health Planning Dep., MoPH

## ANNEX 5: BASIC INDICATORS

<b><i>Contextual indicators</i></b>				
<i>Indicator</i>	<i>Unit</i>	<i>Year</i>	<i>Value</i>	<i>Source</i>
Land area	sq.km.		122,762	SoE Report
Population Total		1995	21,819,040	Govt.
Male		1995	10,634,215	Govt.
Female		1995	11,184,825	Govt.
Total		2000	22,963,422	Govt.
Male		2000	11,201,146	Govt.
Female		2000	11,762,276	Govt.
Total		2003	23,310,000	Govt
Male		2003	11,305,350	Govt
Female		2003	12,004,560	Govt
Population: of which:      Urban	million	1994	23.5	UNDP-1
	million	1994	14.3 (61%)	UNDP-1
Rural	million	1994	9.2 (39%)	UNDP-1
Capital city – Pyongyang	million	1994	2.7	ASCW
Population density	per sq km	1994	191	UNDP-1
Annual population growth rate	% per annum	1998	0.9	
Total fertility rate		1990	2.4	UNFPA
		2000	2.1	UNFPA
Life expectancy at birth (Male / Female)	Years	1995	67.6, 75.2	Govt.
		2000	63.0, 70.3	Govt.
GDP	US \$ million	2004	64.4, 67.1	Govt.
		1992	20,875	SoE Report 2001
		1993	20,935	CBS
		1994	15,421	SoE Report 2001
		1995	12,802	CBS
		1996	10,588	SoE Report 2001
		1998	10,273	CBS
		2000	10,608	CBS
		2004	11,164	Estimated
GDP per capita	US \$	1992	990	SoE Report 2001
		1993	991	CBS
		1994	722	SoE Report 2001
		1995	587	CBS
		1996	482	SoE Report 2001
		1998	457	CBS
		2000	463	CBS
		2004	479	CBS
Share of GDP by sector: Industry	%	1996	45.1	SoE Report 2001
	%	1996	14.7	SoE Report 2001
Agriculture	%	1996	4.8	SoE Report 2001
Construction	%	1996	35.4	SoE Report 2001
Others				
Exports	US \$ million	1993	1270	CBS
		1998	859	CBS
		2000	877	CBS
Imports	US \$ million	1993	1474	CBS
		1998	917	CBS
		2000	933	CBS

## **Key Health indicators for DPR Korea**

Under-five mortality	27 / 1,000 39.3 / 1,000 48.2 / 1,000	1993 1996 1999	Govt. Govt. Govt.	
	55 / 1,000	2004	Govt	
Infant mortality	23 / 1,000 14.1 / 1,000 21.8 / 1,000 21 / 1000	1991 1993 2000 2004	ASCW p.7 Govt. Govt. Govt.	
Proportion of one-year olds with a vaccination card at home	94.3 % 98.8 %	1998 2000	MICS-1998 MICS-2000	
Immunization (one-year olds with card):	BCG 96.3 %	1998 2000	MICS-1998 MICS-2000	
	DPT (third dose)	37.4 % 87.0 %	1998 2000	MICS-1998 MICS-2000
	OPV (third dose) 86.5 %	76.5 % 2000	1998 MICS-2000	MICS-1998
	measles	34.4 % 71.2 %	1998 2000	MICS-1998 MICS-2000

<i>Indicator</i>	<i>Value</i>	<i>Year</i>	<i>Source</i>
Health workers	121,188	2002	MoPH
Health worker/population ratio	1 : 200	2002	MoPH
Doctors per 100,000 population	297	2002	MoPH
Hospital beds per 100,000 population	1,383	2002	MoPH
Percent of national budget allocated to health	8.4 %	1985	MoPH
	7.6 % 4.2 % 6.0 % 5.9 %	1990 1995 2000 2001	MoPH MoPH MoPH MoPH
	4.6 5.86 2.5%	2002 2003 2004	MoPH MoPH MoPH
Hospitals: National, specialist and county	777	2002	MoPH
Provincial paediatric	12	2002	MoPH
Provincial maternity	12	2002	MoPH
Ri (rural) and Dong (urban)	908	2002	MoPH
Ri clinics	5,341	2002	MoPH
Nurseries	27,000	2002	MoPH
Baby homes	13	2002	MoPH

### **SOURCES OF DATA** **Key indicators**

EFA	Ministry of Education, <i>Education for All National Report 2000</i> , May 2000
ASCW	UNICEF, <i>An Analysis of the Situation of Children and Women in the Democratic People's Republic of Korea 2000</i> , Dec 1999
GFATM 2002	Ministry of Public Health, <i>Proposal to The Global Fund to fight AIDS, Tuberculosis and Malaria</i> , 2002
MICS-1998	UNICEF, <i>The Multiple Indicator Cluster Survey in the Democratic People's Republic of Korea, 1998</i> (MICS-1998 was conducted by the Central Bureau of Statistics, in collaboration with UNICEF)
Nutrition-98	UNICEF, <i>Report on the Nutrition Survey</i> , UNICEF, Pyongyang (Nutrition-98 was conducted by the Central Bureau of Statistics, in collaboration with UNICEF, WFP and the EU)
MICS-2000	<i>National Report on the Implementation of the Decision of the World Summit for Children</i> , DPRK, Jan 2001 (MICS-2000 was conducted by the Central Bureau of Statistics)
UNDP-1	UNDP, 1993/94 <i>Development Cooperation Report for the DPR Korea</i> , undated.
SoE Report	DPRK Government, <i>State of the Environment, DPR Korea</i> , 1 November 2001