Ministry of Health
Royal Government Of Bhutan

COMPREHENSIVE MULTI-YEAR PLAN OF IMMUNIZATION

2009–2013

Prepared by:
Vaccine Preventable Disease Program
Communicable Disease Division
Department of Public Health
Ministry of Health, Bhutan

With Technical Support from WHO

Table of Contents

Executive Summary

The Royal Government of Bhutan is committed to provide best quality health services to its citizens. Public Health Service of the Kingdom, specially the EPI programme has received the government's high priority. Over the last three decades the EPI programme in Bhutan has made great strides towards achieving targets in Millennium Development Goals.

Bhutan's EPI has shown great resilience over the years while serving it's sparsely scattered population over one of the world's difficult terrains. While it has achieved very high immunization coverage and maintained it over the years EPI diseases also has almost disappeared. Bhutan achieved UCI status in 1991. The country is polio free since 1986, only one case of neonatal tetanus reported in 2006 after reporting no cases since 1994.

Bhutan also is a leading country in introducing new vaccines. Hepatitis B monovalent was introduced in 1997 and tetravalent vaccine in 2004. MR vaccine was introduced in 2006 replacing monovalent measles. Hib vaccine will be introduced in 2009 as the pentavalent form.

The Royal Bhutan Government continues to be the major funding source of the EPI program contributing to more than 65% of the total cost of the EPI programme. DANIDA, JICA were major external donors and GAVI is becoming a major contributor for new vaccines. WHO and UNICEF are long term partners of Bhutan's EPI program.

Bhutan's national planning follows 5 year cycles. The last 9th Five Year Plan covered 2002-2006 and was extended by one year. The current 10th Five Year Plan is for 2008-2012. In line with these plans comprehensive Multi Year Plans were developed. The present cMYP is for 2009 to 2013.

The present cMYP is an important management tool for the EPI programme. While setting medium term goals, objectives and strategies for EPI programme it also sets financial sustainability plans for 2009 -2013.

Bhutan's EPI programme and the Ministry of Health while confident that the programme will gain financial self sustainability with the maturing of Bhutan Health Trust fund, looks forward to work in synchrony with its development partners. While appreciating the long term partners in Health, WHO and UNICEF, Bhutan will be closely working with GAVI especially in Health Systems Strengthening and introducing new vaccines.

.

List of Acronyms

The following acronyms are used in this document

AEFI	Adverse event following immunization
AFP	Acute Flaccid Paralysis
BHTF	Bhutan Health Trust Fund
BHU	Basic Health Unit
BHW	Basic Health Worker
c-MYP	comprehensive Multi Year Plan
DHSO	District Health Supervisor Officer
DT	Diphtheria and tetanus
DTP-HepB	Diphtheria Tetanus Pertussis Hepatitis B
EPI	Expanded Program on Immunization
EVSM	Effective vaccine store management
FSP	Financial Sustainability Plan
GDP	Gross Domestic Product
GIVS	Global Immunization vision and strategy
GNM	General Nurse Midwifery
HA	Health Assistant
ICC	Inter-sectroal coordination committee
JDWNRH	Jigme Dorji Wanchuk Referral Hospital
MDG	Millennium Development Goal
MNT	Maternal and Neonatal Tetanus
MR	Measles and Rubella
OPV	Oral Polio Vaccine
ORC	Outreach Clinics
PCM	Partner Coordination Mechanism
PHC	Primary Health Care
SEARO	South East Asia Regional Office
TT	Tetanus Toxoid
VHW	Village Health Workers
VPD	Vaccine Preventable Disease
VPDP	Vaccine Preventable Disease Program
VVM	Vaccine vial monitor
WHO	World Health Organization

List of Tables

List of figures

1. Introduction

1.1 Country Profile

Bhutan is a small landlocked South East Asian country located in the Eastern Himalayas, covering an area of 38,394 square kilometres. More than 72.5% of the area is covered by the forest. The southern border touches with four Indian states of Sikkim in the far west, West Bengal, Assam, and Arunachal Pradesh in the far East. In the north, the mighty and majestic Himalayas form the natural border with the Tibetan Province of China.

Central Bhutan consists of rather broader valleys of Paro, Thimphu, Punakha, Wangdue and Trashigang. The northern region comprises of the main Himalayan range and has a sparse population, with many difficult to reach areas. The southern belt has a hot and humid climate. The central inner Himalayas have a cool temperate climate, while the higher and northern region has a severe alpine climate.

Figure 1: Map of Bhutan

Bhutan is the least populated country in the South East Asian Region. The population and housing census of Bhutan in 2005 enumerated Bhutan's total population 672,425, with a population growth rate of 1.3. Urban population was 30.9% and the sex ration was 111 males per 100 females. The crude birth rate and crude death rate is 20 per 1,000 population, and 7 per 1,000 populations respectively. The infant mortality is 40.1 per 1,000 live births, and the under 5 mortality rate is 61.5 per 1,000 live births.

Administratively, the country is divided into 20 Dzongkhags (districts) and these are further divided into 202 geogs (blocks). Each Dzongkhag is headed by a Dzongda (governor) appointed by the central government. The Dzongda is the overall in-charge of over all socio-economic development activities in the Dzongkhag.

1.2 National Health Policy

The concept of health in Bhutan must be seen in the context of the overall development strategy that, defines development as the preservation of spiritual and emotional, as well as economic well being. Therefore, the health sector policy objectives reflect the national ones: equity, social justice, sustainability and efficiency, in the context of preservation of national culture. The long term objective of the health services is to "facilitate, through a dynamic professional health care, the attainment of a standard of healthy living by the people of Bhutan to lead a socially, mentally and economically, enhanced quality of life of the people in the spirit of social justice and equity". The focus of health sector is to improve the quality of services and bring new technologies and advanced health facilities including new vaccines to the country. Basic health care service and essential drugs are provided free of charge to all Bhutanese citizens and foreign nationals working or visiting Bhutan.

1.3 Health care system in Bhutan

Bhutan adopted Primary Health Care (PHC) approach to the health delivery system in year 1979. Currently, health care is provided through a network of 29 hospitals, 176 Basic Health Units (BHUs), and 485 outreach clinics (ORCs) spread over 201 gewogs (blocks). These facilities are manned by doctors, nurses, paramedics and technicians. At the community level, village health workers assist regular health staff in reaching out healthcare to the communities, particularly in the far flung areas of the country. The low density of population and poor communication, especially in the northern region, is an important reason for lower productivity in terms of coverage and relatively higher system wastage.

In 2006, Bhutan had 145 doctors (including expatriates), with a doctor per 10,000 population ratio of 2.3; the nurse per 10,000 population ratio was 8.3. A total of 2,738 health personnel of different categories serve in different hospitals. These consist of:

Doctors	140
Traditional Doctors (Drungtshos)	32

District Health Supervisory Officer (DHSO)	24
General Nurse Midwife (GNM) and Health Assistant (HA)	385
Technicians	378
Others	1779

In Bhutan Primary Health Care is provided through several public health programmes each focusing on their respective areas. EPI programme and surveillance of vaccine preventable diseases comes under the vaccine preventable disease control programme.

1.4 Current Situation of Health Sector

The Royal Government initiated decentralization policy in 1981, and since then health has been in the forefront in implementation of the decentralization policy. Today the health service is fully decentralized to the dzongkhags and all primary health care programs are integrated into dzongkhag health care delivery system. Through this far-reaching health service delivery reforms, today, over 90% of the population are accessible to health services. The challenge now is to cover the remaining population groups, and the Ministry of Health is fully committed to reaching out to the un-reached population.

Table 1: Key Health Indicators (National Health Survey 2000 & National Census 2005)

Indicator	**1984**	**1994**	**2000**	**2005**
General Fertility Rate	169.60	172.7	142.7	NA
Total Fertility Rate	NA	5.6	4.7	NA
Crude Birth Rate (per 1000 population)	39.1	39.9	34.09	20.0
Crude Death Rate (per1000 population)	13.4	9.0	8.64	7.0
Infant Mortality Rate (per 1000 population)	102.8	70.7	60.5	40.1
U5 MR (per 1000 live births)	162.4	96.9	84.0	61.5
Maternal Mortality Rate (per 1000 live births)	7.7	3.8	2.55	NA
Population Growth Rate	2.6	3.1	2.5	1.3
Contraceptive Prevalence Rate	NA	18.8	30.7	NA
Doctors per 10,000 population	NA	NA	1.7	2.3

Bhutan is showing significant improvements in health indicators as shown in the above table. Reductions in infant mortality rate and under five mortality rates are very positive towards achieving the 4th millennium development goal.

The Expanded Program on Immunization was first launched on 15 November 1979 coinciding with the International Year of Child with the objective of reducing the seven vaccine preventable diseases (TB,

Diphtheria, Pertussis, Tetanus, Polio, Measles & HepB). Tetanus Toxoid (TT) immunization of pregnant mothers was introduced in 1983. And in 1987 the National Plan of Action for the acceleration of EPI was formulated. The strong government commitment and the community mobilization resulted in the achievement of the Universal Child Immunization (UCI) in 1991.

The health sector has made remarkable progress in all areas of health developments over the last four decades since the modern health service was introduced in the country. The Infant Mortality Rate has reduced from 102.8 in 1984 to 40.1 in 2005, and Maternal Mortality Rate has reduced from 7.7 in 1984 to 2.55 in 2005. Population Growth Rate also has seen a marked decrease from 3.1 in 1994 to 1.3 in 2005 (see table 1). The life expectancy at birth has increased remarkably from 47.5 in 1985 to 66.0 in 2003 (Statistical Yearbook of Bhutan 2003). These vital indicators speak well of the rapid socio-economic development in the country. However, the top ten disease morbidity trend and EPI coverage trends over the past five year remained same despite marked improvement in safe water supply provision, sanitation and hygiene and immunization services. This is an obvious challenge to health care delivery system and health professionals, and as such, programs have affected major program revisions and strategies to address these issues.

Table 2: Morbidity trend for top ten diseases 1999-2003

	Diseases	**1999**	**2000**	**2001**	**2002**	**2003**
1.	Cough and cold (ARI)	212,277	217,237	207,347	259,083	270,559
2.	Skin diseases	99,082	102,610	115,276	99,637	105,163
3.	Diarrhoea/dysentery	88,546	92,075	90,228	68,641	90,219
4.	Peptic ulcer syndrome	60,982	65,648	70,797	53,640	57,095
5.	Conjunctivitis	54,421	48,737	49,612	47,906	54,635
6.	Worm infestation	46,168	39,277	34,897	27,697	23,606
7.	Diseases of Teeth & Gum	35,516	39,508	44,548	29,474	28,062
8.	Urinary tract infection	31,406	16,698	18,147	15,763	18,186
9.	Otitis media	22,110	21,824	24,892	23,472	19,354
10.	Nutritional deficiency	21,381	21,426	22,994	4,657	4,404

It is event form above data that over the years despite improving health indicators, infectious conditions dominate in morbidity patterns in the country.

Table 3: Ten leading health problems in the country 2006-2003

Health Problem	**2006**	**2005**	**2004**	**2003**
Common cold	1	1	1	1
Skin infections	2	2	2	2
Diarrhoea	3	6	3	3
Peptic Ulcer Syndrome	4	3	4	4
Acute pharyngitis/Tonsillitis	5	5	5	
Other diseases of skin and subcutaneous tissues	6	7	6	10
Musculoskeletal disorders excluding arthritis	7	4	7	9
Other diseases of digestive system	8	9	10	
Other respiratory and nose diseases	9			8
Conjunctivitis	10	8	8	5
ANC, immunization and other counseling		10	9	6
Dysentery				7

It is of interest to note that common cold has been the leading health problem in the country and diarrhea has been the 3rd leading health problem except in 2005. Both these conditions are primarily affecting children and mostly are preventable conditions.

Skin infections continue to be a major health problem in the country and peptic ulcer syndrome high in the list may be associated with lifestyle in Bhutan. It is also significant to note that none of the non communicable diseases like hypertension, heart disease or cerebro vascular conditions making the top 10 list.

2. Situational analysis of immunization programme in Bhutan

2.1 Historical perspective

The Royal Government of Bhutan acknowledges that the Expanded Program on Immunization has significantly contributed towards improving the health status of children in Bhutan. The EPI service started on November 15, 1979, with an objective of reducing 6 vaccine preventable diseases, namely, tuberculosis, diphtheria, pertussis, tetanus, polio and measles.

- Tetanus toxoid for pregnant women was introduced in 1983.
- The last clinically compatible polio case was reported in 1986 and since then Bhutan maintained "zero" polio status.
- Bhutan's successful implementation of the EPI program resulted in achieving Universal Child Immunization (UCI) in 1991.
- One case of Neonatal tetanus reported in 2006 after 12 years of last case in 1994.
- Hepatitis B was introduced in 1997 as monovalent and replaced with DTP-HepB (tetravalent) in 2004.
- Over the past five years from 1999 to 2003, there has been no case of Diptheria and Pertusis (see table 12). Measles cases (clinical diagnosis) reported in 1999, 2000 and 2001 could have been rubella because measles cases when subjected to laboratory diagnosis for measles and rubella in 2003 and 2004 confirmed rubella. The test was negative for measles.
- The measles-rubella (MR) vaccine was introduced in early 2006, replacing monovalent measles.

EPI is fully integrated in the general health system. The services are provided throughout the country from the fixed centers at hospitals/ BHUs and outreach clinics. The primary health care workers, namely the Health Assistant (HA), Auxiliary Nurse Midwife (ANM) and Basic Health Worker (BHW) are responsible for providing immunization services to the children and pregnant women.

2.2 Progress of control of vaccine preventable diseases

Polio

The last clinically compatible poliomyelitis case in Bhutan was reported in 1986 in Tsirang. Since this last polio case, Bhutan joined the international polio eradication program in 1995 and has remained polio free. Bhutan has sustained a high level of OPV3 coverage and strong AFP surveillance. The joint national-international AFP surveillance review in 2005 suggested that there was no evidence of wild polio circulation in Bhutan and its AFP surveillance system was strong enough to detect any emerging case if occurred. In 2005, 6 AFP cases were reported though none of them were proven to be polio.

Surveillance for other diseases beside AFP is not yet functioning at a satisfactory level. Currently surveillance for measles and neonatal tetanus is integrated into the AFP surveillance, hoping to use the strong AFP surveillance as a base. However, the program is still facing problems with incomplete reports and inadequate investigation.

Maternal and Neonatal Tetanus (MNT)

As for MNT, although there is no case reported since February 2006 when 1 case was reported, Bhutan is still believed to be at risk. TT2+ coverage from the 2002 immunization coverage survey was only 46.1%. Although this was believed to be due to recording problems, there is so far no evidence to support it. Additionally, the proportion of unattended delivery at home was high at 51% in 2005.

Measles

The nation-wide measles coverage reported was 93% in 2005, with two districts of coverage less than 80%. However, with the nation wide MR campaign conducted recently in year 2005, outbreak of measles as well as rubella is unlikely. In 2005 there were 69 measles cases without death; of these 26 were among children under 5 years of age.

In 2005, there were no reported cases of diphtheria and pertussis. The following table shows EPI diseases reported 1999-2006

Table 4: EPI disease cases reported over 1999 – 2006

Year	Polio	Measles	Diphtheria	Pertussis	Neonatal Tetanus	Rubella
1999	0	350	0	0	0	0
2000	0	460	0	0	0	0
2001	0	682	0	0	0	0
2002	0	0	0	0	0	0
2003	0	0	0	0	0	350
2004	0	0	0	0	0	NA
2005	0	69	0	0	0	NA
2006	0	0	0	0	1	NA

2.3 Organization of EPI Programme

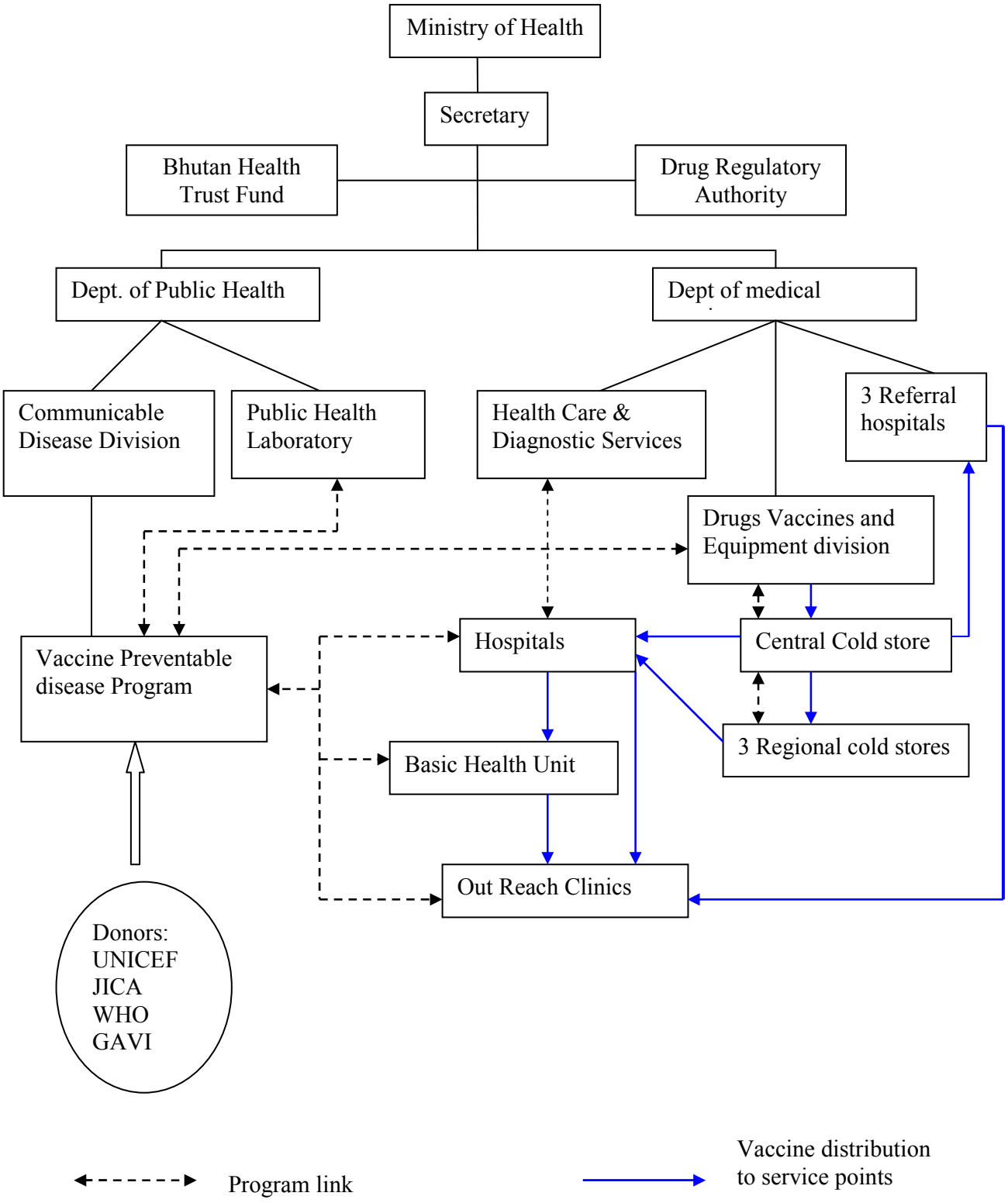

Figure 2: Organization of EPI programme in Bhutan

2.4. EPI Schedule

The current EPI schedule in Bhutan is given in following table:

Table 5: Current EPI Schedule

Antigen	***Age of Administration***
BCG / OPV0	At birth
OPV1 / DTP-HepB1	6 weeks
OPV2 / DTP-HepB2	10 weeks
OPV3 / DTP-HepB3	14 weeks
MR1	After 9 months
DT / MR2	24 months

2.5 Immunization Coverage

Bhutan launched the universal childhood immunization (UCI) in year 1991. Since then, the nation has been successful in sustaining coverage of above 80% for all EPI antigens. The latest immunization coverage survey conducted in 2002, showed coverage at national level as follows:

Table 6: Immunization coverage survey data - 2002

Antigen	***Coverage by card only***	***Coverage by card & history***
BCG	94.9%	99.5%
DTP3	93.5%	98.6%
OPV3	94.9%	98.6%
HepB3	91.6%	96.3%
Measles	91.0%	96.3%
TT2	46.1%	86.3%

The VPDP is planning for the next EPI survey to be carried out in 2008 and a subsequent one 2-3 years following introduction of the Hib vaccine.

Table 7: Number of infants vaccinated 1999-2006

Year	BCG	Polio^3	DPT^3	Measles	Hep.B^3
1999	12,493	12,303	12,228	10,757	11,864
2000	12,197	12,429	12,330	10,721	12,088
2001	13,958	13,818	14,061	13,317	13,682
2002	13,746	13,711	13,389	12,805	13,889
2003	13,720	13,571	13,363	12,434	12,976
2004	14,162	13,822	13,720	13,264	13,720
2005	14,084	13,746	13,728	13,435	13,728
2006	13,484	13,531	13,400	12,777	13,400

Table 8: Immunization coverage (%) from 2003 to 2006

Antigens	2003	2004	2005	2006
BCG	93	92	97	92
OPV3	96	95	95	96
DTP3	95	92	95	95
MCV	88	89	93	90

Due to uncertain or unavailable denominator data the immunization accurate coverage data are not available for years prior to 2004. National immunization coverage data has improves significantly over the last few years and the country plans to maintain these high converge levels at national level and plans to focus in achieving similar high levels in each district too.

2.6 Vaccine wastage

Bhutan reports one of the highest vaccine wastage rates in the world. It is as much a serious concern to the Health Ministry as it is for the external donors. The fact can only be comprehended by experiencing the situation in Bhutan's context. The current wastage rate for BCG at 80% is the highest while DPT at 41% is the lowest among the antigens (see table 10S).

The program is trying various strategies to reduce the waste rate, but the nature of the difficult geographic terrain and sparse & scattered communities poses a limiting factor. In an effort to reduce the vaccine wastage, the country introduced vaccine vial monitors on all vaccines, open-vial-policy for liquid vaccines at the fixed clinics and auto-disable syringes in 2003. The national policy of providing immunization services through out reach sessions for remote villages has improved the access to services and coverage at the cost of increased vaccine wastage.

An assessment report of cold chain and vaccine wastage carried out in 2007, indicated that the poor stock control and cold chain monitoring contributed to huge wastage from both opened vials and un-opened vials. Other main contributing factors were larger vial size and the smaller session size.

Table 9: Vaccine Wastage Rates- Year 2006

Vaccine	Wastage Rate (%)	Wastage Factor
BCG	80	5
Measles	72	4
OPV	45	2
DPT-HepB	41	2
TT	67	3

.

The vaccine wastage is an important parameter for assessing program efficiency. Wastage of DTP-HepB vaccine can be considered as the yardstick to assess this parameter. It has been estimated as 60% as against an expected target of 30%. Low density of population and large inaccessible geographical areas prevent efficient utilization of multi-dose vaccine vials. DTP-HepB was procured in 10 dose vials and it is difficult to mobilize many children together for an immunization session at an outreach site. Since 2006, Bhutan changed DTP-HepB from 10 dose vials to 2 dose vials. This would have certainly reduced the vaccine wastage but it has not been estimated. Although it is believed that there are no vaccine wastages on account of system problems, like expiry in stores or non-use of frozen vaccines, in absence of any monitoring, this conclusion cannot be firmly made. From 2007, the program has initiated the monthly vaccine wastage reporting from all the health facilities.

Vaccine stock-outs are rare. At present, there are 6 EPI technicians posted in three regional cold stores with the sole responsibility of vaccine supply and cold chain management.

Monitoring of vaccine wastage

With introduction of newer vaccines, Bhutan plans to closely monitor vaccine wastage. The newer vaccines are becoming available at much higher prices than traditional vaccines. Immunization programs will no longer enjoy the luxury of paying little for buying vaccines. Financial analysis shows that introduction of Hib vaccine alone increases the immunization budget by almost four times, not including personnel costs. It is, therefore, critical to keep the vaccine wastage to minimum feasible levels. Bhutan will need to take specific measures to reduce vaccine wastage and monitor this aspect constantly. EPI will start this with Pentavalent vaccine, using this as a surrogate for all EPI vaccines. Specific measures will include:

1. Use single dose Pentavalent vaccine
2. Introduce monitoring formats, to be filled and submitted by all vaccine storage points to respective districts
3. Review vaccine utilization every month in each district
4. Take specific measures in case higher wastage is recorded in a district
5. Training of EPI technicians and cold chain handlers to prevent any wastage on account of freezing or heat exposure

Table 10: Vaccine wastage rates and targets to be achieved

Vaccine	**Current wastage**	**Target**						
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
BCG	80	65	60	60	60	60	60	60
OPV	45	40	40	40	40	40	40	40
MR	NA	60	50	50	40	40	40	40
TT	67	60	50	45	40	40	40	40
DT	60	60	50	50	50	40	40	40
DTP-HepB	60	40	40					
Pentavalent				20	15	10	10	10

The target is to reduce the current vaccine wastage of pentavalent vaccine from 60% for DTP-HepB to 20% in introduction year, 2009 and by further 5% by each subsequent two years. It should be noted that the northern districts have geographical factors that hinder access to services.

It is also reiterated that it would be unrealistic to achieve vaccine wastage less than 50% for conventional vaccines since they are dispensed in 5, 10 or 20 dose vials. Technically, open vial policy is applicable for liquid pentavalent formulation and this should help in reducing the wastage in the fixed clinics.

2.7 Adverse Events Following Immunization (AEFI)

AEFI surveillance system with standard formats is in place. Routine reporting is poor and reflected by the number of AEFI reported over the last few years. In 2005 there were 2 AEFI reported in 2006 there were 11 AEFI reported with six hospitalizations and in 2007 there were only 2 AEFI reports both from hospitalized patients.

It appears more severe forms of AEFI that needs hospitalization or medical attention are being reported. Although, In-service training programmes for health staff on AEFI surveillance, reporting and investigation is being conducted on regular basis, the AEFI surveillance system still needs to be strengthened.

2.8 Cold chain issues

An assessment of the cold chain system was carried out by a consultant in year 2007. The cold chain system was studied at four levels :central stores, regional stores, district hospitals and basic health units). During the assessment period, no freezing of vaccines or the cold chain failure was observed. However, there were still lots of problems that required appropriate intervention. These include;

- Supply for new or replenishment CC equipment
- Cold chain preventive/replacement maintenance plan

- Training the vaccine handlers in cold chain equipment maintenance (CCEM) & vaccine logistics (VL)
- There is weak supervision of health workers

Freezing of vaccines is becoming a major concern with the newer vaccines. Hepatitis B is the most freeze sensitive vaccine currently in the schedule and currently there is no very accurate method to monitor the vaccine cold chain for freezing. It is proposed to introduce freeze monitoring to the cold chain management during the next few years.

2.9 Injection Safety

Introduction of ADs has almost eliminated complications due to unsafe injections such as injection abscesses. However, biomedical waste generated by used ADs has created new problems because of non-compliance. This exposes the health workers and community, especially children, to higher incidence of needle sticks, and potential transmission of Hepatitis B and C. EPI program in collaboration with infection control and health waste management program is in the process of standardizing the protocols and providing refresher training to the health workers.

2.10 Vaccine Regulation

Bhutan Drug Regulation Authority (DRA) was established by Royal Government in June 2004 with the mission of ensuring safety, quality and efficacy of medicinal products in protection of consumer's health. Drugs Technical Advisory Committee provides advice to the board on all technical areas related to registration of medicinal products and other technical matters as and when required by the board.

Pre-marketing control and post marketing control are major functions performed by the DRA. Registration of vaccines, new vaccines under pre marketing control and monitoring of adverse drug reaction are two major activities related to the immunization program, carried out by the DRA.

Bhutan has no modern pharmaceutical industries and relies on imports for its entire requirements of medicines, vaccines and reagents. The country also relies on WHO collaborating laboratories in the region for testing the quality of imported drugs and vaccines. However, with establishment of Drug Regulatory Authority, all the products must be registered with the authority prior to their arrival into the country. Bhutan Medicine rules and regulation, 2005 also has a section on the vaccine import.

Procurement of vaccines shall be as per the Drugs, Vaccines and Equipment Division (DVED) norms which state that:

1. The vaccines should be WHO pre-qualified
2. They should meet international test reports
    a. batch release certificates
    b. Quality analysis report

2.11 Health workforce

Human resource availability is a major issue in Bhutan. Inadequacy in terms of number and technical capacity of the staff at all levels has been a major barrier for the country's EPI program. Currently, EPI is manned by two officials at the central level, and assisted by 6 cold chain technicians at regional level. The problem at the central level contributes to weak program management and supervision of EPI activities at district levels. Due to decentralization of Dzongkhag (District) health sector, there are capacity problems with respect of program management.

Community level volunteers, called as village health workers (VHW), have been a crucial link between the health setting and community in Bhutan. It was introduced to supplement the work of rural health facilities since early 1980, after starting of PHC. Currently, about 1,200 VHWs are functioning in the country and their contribution to improve the rural health situation is highly recognized. They assist the BHU staff in delivering service to the target population. The main roles of VHW are 1) to facilitate increased access to health care services 2) to improve healthy lifestyle of the community, and 3) to provide first aid and treatment of minor ailments

Amongst 21 tasks identified in 1995 at the review meeting between the health Division and donor agencies (UNICEF and WHO), VHWs have a specific task in immunization to "help mothers to attend maternal and child health clinics regularly". They also have a task to "observe for any disease outbreaks in the community" and "notify the nearest health center immediately". Beside, they are a good source of notifying the existence of new mothers, or migration of the target population to the BHU.

The work of VHWs contributed to the improvement of health status is highly praised. Results from the "Rapid Needs Assessment for Better Community Health: Focus on VHW" conducted by JICA in February 2005 suggested that supporting system for VHW needs to be improved.

1. refresher training should be curried out regularly
2. training for new VHWs should be held
3. drugs for VHWs from BHU should be appropriately supplied
4. VHW medical kit should be reissued

5. Government should commend VHWs with extraordinary work and giving VHW certain authority together with responsibility.

The Ministry of Health fully supported the suggestions and also recognized the need to strengthen the capacity of BHU staff to become strong supervisors for VHW. It is planned to strengthen the Human Resource Development unit of the Ministry of Health to take over training of the health staff, maintaining long-term sustainability.

2.12 Introduction of new vaccines

Since starting of EPI in 1979, Bhutan is striving for a better immunization service to its population. In 1997, Bhutan introduced hepatitis B vaccine into its schedule of existing 6 basic antigens; by 2004 it was replaced by DTP-HepB combination vaccine. In 2006, Bhutan introduced the combination measles-rubella (MR) to replace measles at 9 months as well as a second dose of MR at 24 months of age.

In Bhutan, respiratory infection is a major cause of morbidity and, probably mortality as well. In 2005, among children under 5 year old, the number of pneumonia cases reported was 8121. In the same year, meningitis/encephalitis cases reported among those children was 50. According to the result from the 2002 WHO study to estimate burden of Hib in Bhutan (the Hib rapid assessment tool: HibRAT) among children under 5 year old, the Hib meningitis cases was estimated at 16-54 cases per year, while the Hib pneumonia cases was estimated at 80-270 cases per year. These incidences are high compared to incidences in other countries,

WHO revised the position on Hib vaccine in November 2006. It now recommends that each country should introduce Hib vaccine unless there is strong evidence to the contrary. The GAVI phase II gave a window opportunity for Bhutan to start introduction of this new vaccine as soon as 2007. The co-payment requirements are attractive. Various funding options in future and possibility of higher government resources for immunization will drive sustainability; therefore, they provide an excellent opportunity to introduce the new antigen. Therefore, with the future hope of expanding the number of antigens available for children, Bhutan is planning to introduce Hib antigen as the pentavalent vaccine (DTPHepB-Hib) from January 2009.

WHO has been working on compiling estimates for the burden of Hib and Pneumococcal disease for each country. Informal consultation indicates that South Asia region, including Bhutan, carry significant load for both diseases. In 2006 common cold was the leading hospitalization condition among Bhutanese children under 5 years of age. There were 65,379 hospitalizations for common cold (28.4% of all)

in 2006 and Pneumonia (11,981 hospitalizations, 5.2%) was the 4th leading cause. Acute Pharyngitis/tonsillitis (9,962 and 4.3%) is the 7th and other respiratory diseases (9,019 cases and 3.9%) is the 8th leading cause of hospitalization among under fives. Event though there are no surveillance data on pneumococcal disease in Bhutan possibility of most of the above episodes being pneumococcal infections cannot be ruled out.

GAVI has recently made available the Pneumococcal vaccine for eligible countries to be introduced under new vaccine support in Phase II. Government has studied the revised terms of co-payment and will consider suitability and feasibility of Pneumococcal vaccine introduction. This subject will be discussed in next meeting of PCM after WHO publishes the information on disease burden. An appropriate decision will be made by the government in the PCM meeting and after GAVI calls for funding applications.

The vaccine preventable disease control programme will start pneumococcal surveillance activities as a sentinel surveillance based at Thimphu JDWNRH hospital. It is planned to communicate and collaborate with the existing regional surveillance networks through WHO regional office.

Dirrhoea among under fives continues to be a major and leading morbidity in Bhutan despite significant improvements in the safety and supply of drinking water and improved sanitation. In the year 2006 diarrhoea was the second leading hospitalization among under fives (25,563 cases and 11.1%). The Ministry of health plans to start on rotavirus surveillance activities to study the disease burden due to Rotavirus in view of never and safer Rotavirus vaccines becoming available. The Ministry of Health will improve facilities at the Public Health Laboratory in Thimphu to establish and continue Rotavirus surveillance activities. It is also planned to collaborate with existing regional Rotavirus surveillance networks.

Bhutan has not reported Japanese Encephalitis (JE), and in the absence of JE case, no standard case definition has been adopted. However, there is a possibility of encountering occasional suspected cases. Clinicians have encountered several patients meningitis/encephalitis syndromes form southern areas of the country which boarders India. Through routine surveillance & reporting of malaria cases, the data gathered so far indicate the existence of epidemiological factors conducive for JE. JE vectors (*Cx vishnui, Cx pseudovishnui and Cx tritaeniorhynchus*) are present in high density along with malaria vectors in all malaria endemic areas. Therefore, the threat of JE outbreak looms large over all malaria endemic areas of the country. It is planned to develop links with regional laboratories to investigate any future suspected meningitis/encephalitis like outbreaks/syndromes to verify diagnoses and identify any possible JE cases.

3. Comprehensive Multi Year Plan of Immunization

Comprehensive Multi Year Plan (c-MYP) of the immunization program is a tool for setting priorities, mobilizing resources, and using resources effectively throughout the program implementation. The MYP gives an opportunity for countries to consolidate existing plans into a single document that addresses national immunization objectives, which are broadly consistent with objectives and strategies enunciated in the Global Immunization Vision and Strategy (GIVS). The validity period of the first cMYP was from 2002 to December 2006 and a supplementary cMYP was prepared in alignment with the extension of the 9th five year plan, for the period of January 2007 to December 2008. The present cMYP covers period of January 2009 to December 2013.

Bhutan follows five year planning cycles. The 9th five year plan ended in June 2007. However, Bhutan is undergoing transition towards a democratically elected government in 2008. Accordingly, the life of 9th five year plan has been extended by a year and the new plan period for the 10th plan will be form July 2008 to June 2013. This will enable the newly elected government to align the planned activities along with its long term agenda. However, it is expected that the new government will continue with existing policies and activities with respect to the health sector.

Another step towards financial planning was taken two years ago, when the country prepared the Financial Sustainability Plan (FSP), and submitted this to GAVI. Since then, the FSP has been dovetailed more effectively into the c-MYP, based on a tool developed jointly by WHO-UNICEF

The c-MYP helps the government and its partners to identify critical program weaknesses and financing issues including gaps; develop targets for sound financing that are consistent with the stated objectives; and agree about specific steps to move toward those targets. The methodology of developing the c-MYP for Bhutan is based on information and analysis of various plan documents such as the Health Sector Review of the 9th five year plan, Mid term review of 9th five year plan, MYP for period 2002-2006, National EPI review (2002), Joint WHO/National Review of Surveillance (2005), Coverage Evaluation Survey (2002), Report of National Health Survey (2002), Cold Chain Assessment (2004), Population & Housing Census of Bhutan (2005), Annual health Bulletin (2006), and RGOB Budgets/Expenditures and related data from Ministries of Health and Finance. Critical inputs and feedback was obtained from a series of discussions and meetings with stakeholders like WHO, UNICEF and JICA, policy makers, and ICC members.

3.1 National Goal

To reduce child mortality and morbidity associated with vaccine preventable diseases to achieve the Millennium Development Goal 4 of reduction of under five child mortality by two thirds by year 2015.

3.2 Objectives

1. To sustain high national immunization coverage level at or above 90% for all children less than one year of age.
2. To achieve polio free certification
3. To prevent congenital rubella syndrome
4. To eliminate rubella infection by maintaining high immunization levels through the routine immunization services
5. To reduce morbidity and mortality due to measles in children
6. To maintain elimination status of neo-natal tetanus
7. To integrate and strengthen the surveillance of for the vaccine preventable diseases
8. To improve the vaccine logistics, safety, quality and cold chain management at all level
9. To strengthen the technical capacity and resources for VPDP

3.3 Strategies

1. Increasing the immunization coverage (more than 90%) and the quality of immunization services
2. Continued advocacy, social mobilization and program communication
3. Efficient vaccine logistics and c cold chain system management
4. Effective monitoring and integrated surveillance of vaccine preventable diseases
5. Strengthened technical capacity and resources for VPDP
6. Introduction of appropriate new vaccines and technology
7. Partnership with international and national agencies for resources mobilization and technical support
8. Capacity building of community health workers and village volunteers

3.4 Activities

Objective	Strategy	Activities
To sustain high national immunization coverage level at or above 90% for all children less than one year of age	Increasing the immunization coverage (more than 90%) and the quality of immunization services	• Annual micro planning in each district • Close monitoring in 2 districts with less than 90% coverage • Ensuring vaccine supplies and logistics • Improved registration of pregnancy and TT vaccination • Use routine data for district level monitoring
	Supportive supervision	• Finalize checklists and supervision plans
	Capacity building of Village Health Workers (Volunteers)	• Train the Supervisors • Implement plan of half yearly field visits to all vaccine storage points and feedback to district level • Refresher training of all vaccinators (HAs, ANMs and BHWs) • Integrated health training of 1,200 VHWs • Update and distribute revised EPI manual
	Introduction of appropriate new vaccines and technology	Launching of Hib vaccine in Pentavalent form in January 2009
		Start pneumococcal surveillance activities at the JDWNRH based at clinical laboratory
		Start sentinel rotavirus diarrhea surveillance activities based at the Public Health laboratory
	Strengthen AEFI surveillance	• Strengthen AEFI monitoring through primary health care system • Operationalize AEFI investigation team • Monitor AFEI reporting at national level

Objective	Strategy	Activities
To achieve polio free certification	Achievement and maintenance of global AFP surveillance criteria	• Carry out training of health staff to improve timeliness and completeness of sample collection of AFP cases • Refresher training of health staff with AFP surveillance guidelines
To prevent congenital rubella syndrome	Achieve 100% MR coverage	Monitor MR converge in routine immunization
To reduce morbidity and mortality due to measles in children	Achieve 100% MR coverage	Monitor MR converge in routine immunization
To maintain elimination status of neo-natal tetanus	Improve TT2+ coverage for antenatal group	Improved registration of pregnancy and TT vaccination
To integrate and strengthen the surveillance of for the vaccine preventable diseases	Initiate surveillance activities for new vaccine preventable diseases Develop partnerships with international and national agencies for resources mobilization and technical support	• Initiate regular internal and external reviews of surveillance activities. • Adopt standard surveillance, clinical and laboratory methods • Participate in external quality control for surveillance laboratories
To improve the vaccine logistics, safety, quality and cold chain management at all level	Efficient vaccine logistics and c cold chain system management Optimal mobilizing Cold chain equipment	• Monitoring of vaccine wastage by 6 EPI technicians every month • Assessment of central vaccine store • Conduct EVSM • Procure 10 refrigerators through UNICEF for pentavalent vaccine at regional stores • Refresher training of cold chain personnel • Introduce freeze monitoring to the cold chain
	Capacity building of cold chain handlers	• Monitoring during supervisory field visits • Training of all vaccinators (integrated with refresher training)

4. Indicators, Monitoring and Evaluation

4.1 System Indicators for monitoring

System component	***Suggested indicators***	***Indicator baselines***	
		2004	***2005***
Routine coverage	DTP 3 coverage (%)	89	95
	% of district with > 80% coverage	100	90
	National DTP1-DTP3 drop out (%)	4	2
	Percentage of district with drop out rate DTP1-DTP3 > 10	0	0
New vaccine Coverage	HepB3 coverage	89	95
Routine surveillance	% of surveillance reports received at national level from districts compared to number of reports expected.		
Cold chain/logistics	% of districts with adequate numbers of functional cold chain equipment	100%	100%
Immunization safety	% of districts that have been supplied with adequate number of AD syringes for all routine immunization	100%	100%
Vaccine supply	Shortage of vaccines stocks at national level	No	No
Communication	Availability of a plan	No	partial
Financial sustainability	% of total routine vaccine purchase financed using govt. funds. (including loans and excluding external public financing)	NA	50%
Human resource availability	Number of health workers/vaccinators per 10000 population		14/10000
Management planning	Collection of district level indicators regularly at national level.	Yes	Yes
NRA	Number of functions conducted	Nil	Nil
ICC	Number of meetings held per year		2
Waste disposal	Availability of a waste management plan		Yes
Program efficiency	Vaccine wastage monitoring at national level for all vaccines	No	No

4.2 Program Monitoring and Evaluation

The EPI program will be monitored at four levels – impact, outcomes, outputs and inputs. The following is illustrative list of indicators to be used for monitoring EPI program in Bhutan.

Attribute	***Indicator/s***	***How will it be verified***
Program Impact		
Reduction in infant and under five mortality	IMR (baseline – 40.1) Target 30/ 100 live births by 2012. U5MR (baseline 60) Target 41/100 live births by 2012.	National Statistical Bureau Report Annual Health Bulletin HMIS
Program outcomes		
Disease reduction and elimination	Zero Polio status Reduction of Measles cases/deaths Reduction of other VPDs Reduction of Pneumonia and meningitis cases/deaths Elimination of MNT	Routine surveillance system, reviewed monthly in districts and quarterly nationally
Reduction in morbidity and mortality due to VPDs	Number of cases and deaths due to VPDs	Annual health Bulletin HMIS
Immunization coverage	Districts >90% DTP-HepB3 coverage. Baseline 17 , target 20 by 2012.	EPI coverage evaluation survey
Program evaluation	Strengths and weaknesses in EPI program	National EPI review
Uptake of Pentavalent vaccine	Proportion of utilization of Pentavalent vaccine as compared with DTP-HepB vaccine	Routine HMIS in each district bi-monthly
Improved immunization quality through vaccine logistics and safety	Vaccine stock outs AEFI cases	Vaccine supply register HMIS reports AEFI Reporting format
Cold chain management	Disappearance of wastage due to freezing or excessive heat	Reports from supervisory field visits
Strengthened	Improved technical	Reports from

Attribute	***Indicator/s***	***How will it be verified***
human resource and institutional capacity	capabilities	supervisory field visits
<u>Program outputs</u>		
Vaccine wastage	Wastage factor for Pentavalent vaccine	Monthly analysis and review in each district
<u>Program inputs</u>		
Micro planning and scheduling of immunization sessions	Sessions conducted versus planned Per session coverage of children	Monthly monitoring at district level
Training and capacity building of direct service providers	Number of HAs/BHWs/GNMs completing refresher training Number of VHWs trained (integrated training)	District wise assessment of training status
Capacity building of District Medical Officers and District Health Supervisors	Integrated training on Health management	

5. Risks and challenges in the Health Sector

Shortage of human resource

Shortage of human resource has been one of the most deriding factors in the health development system. To strengthen the overall health service and particularly the decentralized management of health services, human resource is required at all levels be it for program management and promotional areas or curative services. The government has been able to train only about 3-5 medical doctors annually that can barely meet the attrition due to retirement, transfer to other ministries, etc. of medical doctors. The situation has been improving with more candidates joining the medical line in the recent years. The number of specialists trained in medical and management areas are even less. As the training of paramedics can be carried out within the country, the situation is much better in this area. It is this category of people who manage the primary health care system as well as service delivery. It is also mainly this category of people who manage most of the public health program in the department of health services. Because of the same reason of human resource shortage, one or two program personal have to cover a lot and many times it leads to inefficiency and managing the program.

As the government's own fund is limited, the ministry relies much on collaborating partners to develop human resources for health. However, as many collaborating partners do not want to commit funds for long-term training, it will take a long time to achieve self-sufficiency in human resources for health and unless the gap in this key component is filled, the programs will continue to suffer.

The Ministry has identified Human Resource Development unit as a strong part of long term training need of health staff. It is planned to strengthen this unit to take over training needs of the ministry.

Geography and scattered settlement

Bhutan is situated in one of the world's most rugged surfaces and hence, the settlements are scattered and far-flung. This makes delivery of health and other social services extremely difficult and expensive. Coupled with the lack of qualified specialists at the district and regional levels, this poses a great challenge to efforts in curbing mortality that could have been prevented with timely care. In order to overcome this problem, the Government, with support from DANIDA and WHO, initially started the solar-powered radio communication system to link the basic health units (BHUs) to the district hospitals. To complement this initiative, the government has then embarked

upon the telemedicine program in collaboration with WHO and the Japanese government. As electricity and the basic telecom infrastructure were also getting developed slowly at that time, the progress in this area has been slow but the country has been able to connect at least one of the two Regional Referral Hospitals to the National Referral Hospital and improving the referrals and consultations between them. The facility is also being used by the hospital staff to access important health literature. But much needs to be done, and materials required for this program are usually very expensive.

Dependency on imports for all health requirements

Be it equipment or drugs and vaccines, the country has to depend on supplies from outside the country. Even if the quality of drugs and vaccines can be assured by purchasing them from WHO authenticated suppliers in the region, the hospital equipment and other supplies are a problem. The long time taken to procure the equipment or their spare parts and consumables (like reagents and x-ray films) continues to hinder surveillance and other vital works at the hospitals.

Shift from coverage to quality of services

Having achieved the desired level of coverage by health, the country now focuses on improving the quality of health care services. There have been cases of enormous structures in the districts with no doctor and hence, patients. The situation has been steadily improved over the years yet large rooms for improvements remain. As three people – one health assistant, one assistant nurse, and one basic health worker staff the basic health units, their functions can hardly be distinguished, as one has to substitute the other every now and then. Similarly, not all the district hospitals have similar facilities. Hence, the whole of next five years will be devoted to setting standards of services and facilities and working towards fulfilling them.

Double burden of diseases

While the battle would continue against HIV/AIDS, Tuberculosis, Malaria and the like emerging diseases, especially non-communicable ones, will entail strengthening their surveillance and development and following strategies for prevention and control. At the tertiary care level facilities need be expanded to deal with the problem of rheumatic heart diseases, cancer, diabetes, etc.

Sustainability of development in the health sector

Although Health Trust Fund initiative has been launched already, much work remains to be done to accumulate the required capital, invest it to a reliable financial institute, and regularize the use of the proceeding from the Trust Fund. Only when everything is in place, Bhutan will be able to assess how much impact the Trust fund initiative has made on making health care services sustainable. On the other hand, the contributing factors to health extend beyond the health sector. Unless due attention is given to coordinate efforts with other important government organizations like Environment, Trade, Industries and Mines, Agriculture, Education, Municipal corporations, Ministry of Health will land up containing the problems caused by other sectors and this aspect is viewed seriously in order to consolidate the progress that has already been made in various areas of health.

Meeting the Challenges

When Bhutan first started its development process, the Ministry of Development contained all social sector departments. Later, the Ministry of Social Services established in 1985 included Health, Education, Culture, and Public Works Departments, concentrated mainly on Health and Education Departments. To give full attention to these two most important public welfare sectors, the government bifurcated the Education and Health Sector in mid 2003. Today Education and Health have separate ministries.

With the major challenges in mind, the Government has already looked two decades ahead and developed its vision for the future. In the document, Bhutan Vision 2020, the Government has set its priorities for all the sectors for the next 15 to 20 years. Eight priorities have been spelled out in this same document to guide the health sector during this entire period. These long-term priorities are further taken into priority consideration during the formulation of the Five-Year Plans of the Health Sector.

6. Financial analysis

6.1 Introduction

The long-term objectives of the health services is to improve the quality of life by promoting the health of the population and providing better health care in the spirit of social justice and equity. Absolute increase in GDP as well as near doubling of health sector allocation will translate into significant increase in government allocations. This will reduce the country's dependence on external resources. Private sector hardly exists and it is the Government that drives health sector in Bhutan.

The total GDP estimated in 2006 was Nu 23,104 million (521 million USD) and the GDP per capita was USD 1,320 in the same year. Bhutan has an average GDP growth rate of 7.5%. The planned health budget for 2006-2007 was Nu 2280 million (51.4 million USD), which was 12% of the total budget. (Source: National Budget report, Ministry of Finance). It may be noted that in spite of good GDP per capita of $1,320 and a robust economic growth, Bhutan is classified as a least developed country which allows it to take advantage of very good co-payment options by GAVI.

Hydro power has been the country's largest export for the last fifteen years and now accounts over 40% of the country's total revenue The powerful and fast flowing rivers afford the country enormous hydropower potential estimated at 30,000 MW, which remains still largely untapped. One of Bhutan's mega hydro projects, Tala Hydro Project, which has a capacity of generating 1020 MW of electricity is expected to be commissioned soon. The export of power from this project is expected to boost the GDP and help to reduce the dependency on foreign aids. Several more similar hydro projects are in the pipeline.

The consistent and systematic expansion of the health services with focus on primary health care, education and safe water supply provision has had major impact on the overall health and well being of the people. Today Bhutan has a gross primary school enrolment rate of 72%, the life expectancy of 66.1 years, and adult literacy of 54%. Bhutan ranks 0.551 in 1998 (Bhutan National Human Development Report) on the Human Development Index.

The present c-MYP examines the current status of funding for EPI and projects the future need. As mentioned earlier, the baseline year 2006 and the projections are for 5 years, 2009 – 2013.

6.2 Funding of immunization

Currently, the funding for vaccines is mainly provided by donors although all the personnel expenses for immunization are borne by the Royal Government of Bhutan. The key donors include JICA and UNICEF. These donors are keen that the funding for vaccines provided by country's internal resources increases with time. Bhutan Health Trust Fund (BHTF) was initiated as a long term strategy to provide funding for routine health care activities covering the basic medicine and vaccines. Although the principal amount of the trust fund has not been achieved currently, the trust has already been utilized for few activities. In 2006 the trust financed the Measles and Rubella vaccination campaign and also funded to buy vaccines like Hep-B and anti rabies vaccines. It is expected that this trust fund will fund all basic vaccines, starting with 50% funding for purchase of basic EPI vaccines.

6.3 Bhutan Health Trust Fund (BHTF)

BHTF was conceived as a solution for providing recurrent funding for medicines and vaccines. It was expected to raise a corpus of $24 million and till date, $ 21.5 million have been raised. The fund is expected to be saturated and functional by 2009. The conventional donors are keen that this fund is made operational early and the country should take responsibility for buying vaccines.

It is planned to keep on building the fund beyond the initial target of $24 million so that in the future the fund will be able to cope up with increasing global costs. The fund is meant for buying all vaccines and essential medicines in the future. The fund is already committed to co-finance current and planned GAVI new vaccines and will continue to co-finance other new vaccine to come.

7. Analysis of current immunization finances

Costing of baseline as well as projections are undertaken using the c-MYP tool after taking into account the costs of salaries, allowances, campaigns and program goals with proposed new and underused vaccine introductions.

7.1 Baseline cost indicators

Table 11: Baseline financial indicators for 2006.

Baseline Indicators	**2006**
Total Immunization Expenditures	$797,925
Routine Immunization only	$797,925
per capita	$1.2
per DTP3 child	$42.8
% Vaccines and supplies	27.6%
% National funding	61.2%
% Total health expenditures	3.0%
% Gov. health expenditures	3.3%
% GDP	0.09%
Total Shared Costs	$712,265
% Shared health systems cost	47%
TOTAL	**$1,510,190**

The overall costing in 2006 was $1,510,190 of which 47 percent costs were for shared activities within the government. Since there were no campaigns, the remaining 52 percent of the costs was for routine immunization. If one considers only immunization expenditures leaving out shared costs, the cost per capita is about $1.2, and cost per DTP3 child is about $42.8 in 2006 compared to $65 in 2004. The reason for high cost per DTP3 is because Bhutan is a very small country (14,832 births). This is typical of a small country - the non-vaccine fixed costs of the program cannot be spread over a large enough population, and therefore the unit costs of immunization are much higher.

The pie chart presented below breaks down the total cost by items: as can be seen the bulk of the expenditure comes from personnel costs (56%), followed by new and underused vaccine (19%). The personnel costs are high and the probable explanation is geographical inaccessibility as well as sparse population would require more personnel time for service delivery. The bulk of the health functionaries in peripheral and outreach areas deliver broad package of MCH services, including immunization. Other routine recurrent costs (including training) account for 16%, while traditional vaccine costs are 7 percent.

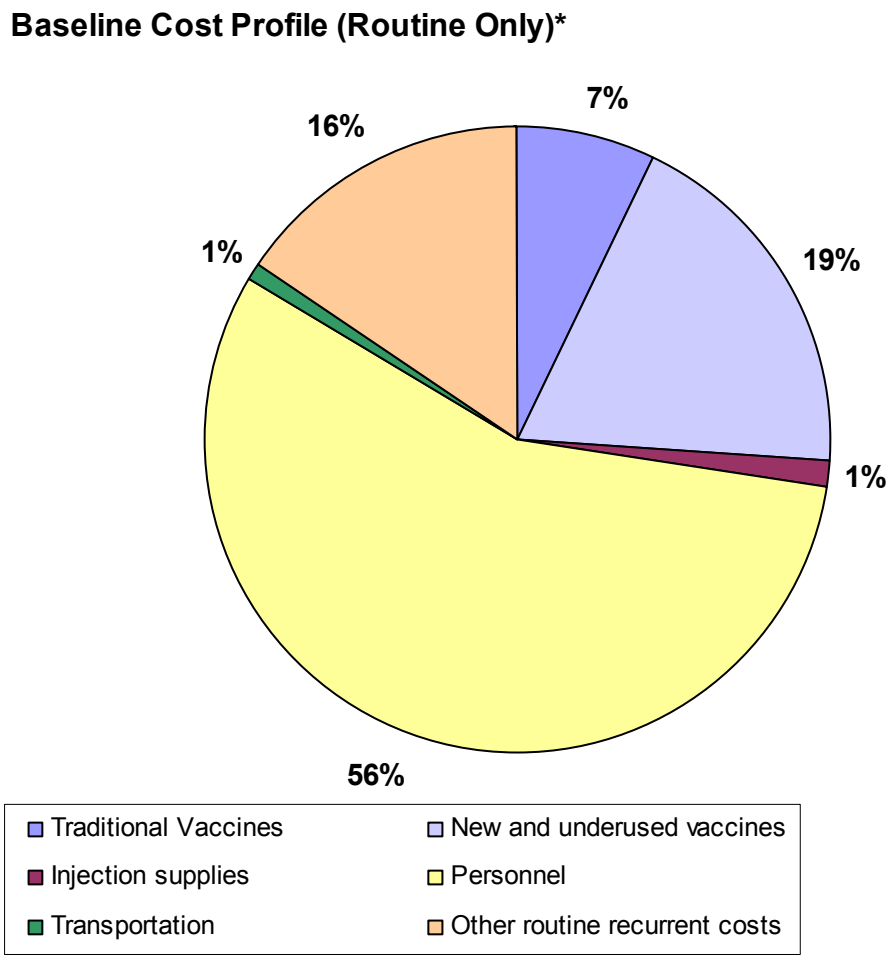

Figure 3: Cost profile of immunization – 2006

When the expenditure is analyzed by type of service delivery, fixed delivery accounts for nearly 60% and outreach activities account for nearly 40% (inclusive of shared costs). As can be expected from a low population density country, the outreach costs are significantly higher since more personnel time and transportation costs are required to reach geographically spread out areas.

7.2 Sources of current immunization finances

The pie diagram below indicates the major sources of financing of immunization expenditure in 2006.

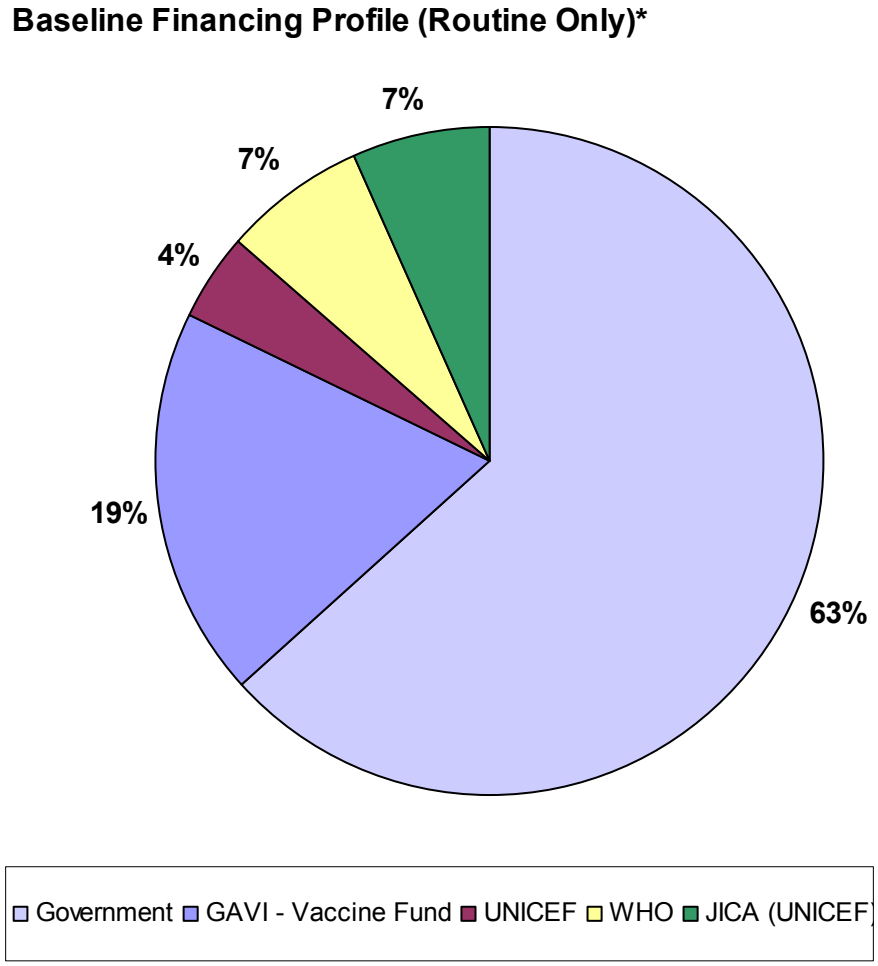

Figure 4: Immunization financing profile – 2006

7.3 Partner involvement in EPI financing

WHO and UNICEF are key partners in delivering immunization service to the mothers and children of Bhutan. Their support to the EPI program is mainly in the areas of consultancies and short-term human resource development focusing on updating knowledge and skills in vaccine delivery and cold chain management. Vaccines & injection equipments are procured through JICA and GAVI support. However, there is no agreement signed between UNICEF, JICA and Ministry of Health specifying the period of support for immunization service. JICA provides support on request through UNICEF, mainly for the procurement of traditional vaccines and cold chain equipments, since almost ten years. JICA is interested that BHTF takes over funding for vaccines and immunization supplies. The DANIDA support to EPI came to an end in 2002, and since then the funds are directed towards the budget support to the health sector as a whole. The following has been the trend of immunization funding in past:

Table 12: Immunization funding 2001 – 2003

Funding	2001	2002	2003
Government	$538,968	$535,118	$563,667
GAVI – Vaccine Fund	-	-	$57,219
UNICEF	$139,214	$35,745	$40,043
WHO	$184,175	$68,586	$100,139
JICA (UNICEF)	$128,481	$124,840	$62,394
DANIDA	$20,778	$12,229	-

GAVI has awarded funds for the introduction of tetravalent vaccine (DTP-Hep B) and injection safety for all vaccines from the year 2003 to 2007. This includes $439,500 for new and underused vaccines with $29,000 for injection safety and a sum of $100,000 for other support, which has been donated to the Bhutan Health Trust Fund (BHTF).

As long-term partners, WHO, UNICEF and JICA are expected to continue to support EPI activities. GAVI, though the current funding for tetravalent vaccine is going to end in 2007, is expected to continue its support with new vaccines through supporting pentavalent vaccine and other new vaccine introduction as Bhutan has achieved the commitments expressed in the first phase.

The government of Bhutan remains the major contributor to immunization with 63 percent of total expenditure. The other major donor was GAVI vaccine fund (19%); the WHO and JICA contributed 7% each. It may, however, be noted that the Government meets the bulk of personnel costs whereas donors fund other program costs. The government funding is included in shared costs since the staff delivers package of MCH services, including immunization.

8. Future program financing, sources and funding gap analysis

8.1 Future requirements

As discussed earlier, Bhutan intends to introduce Hib vaccine as pentavalent form and expects GAVI to co-finance the vaccine over the next five years 2009-2013.

Table 13: Total Recurrent costs for Immunization 2009 -2013

Year	Total recurrent cost $
Baseline year-2006	792,925
2009	954691
2010	846624
2011	775691
2012	772397
2013	753512

The percentage increase in routine immunization costs in the first year of pentavalent introduction is only 20%. And over the subsequent years there is a consistent reduction of total costs. The key driver seems to be target to drastically reduce vaccine wastage from 60 to 20 percent in first year itself and further reduction over the years. Second, shifting over to pentavalent does not involve additional delivery costs. Also the first year/ introduction year cost is inflated by the inclusion of a 25% buffer stock for start. The buffer pentavalent vaccine stock is calculated at 25% of annual requirements. Therefore, one can conclude that introduction of Hib vaccine will not tremendously increase the program costs; rather this would drive program efficiencies.

8.2 Future funding sources

The tables below give the details of sources of funding, describe secure and total (secure and probable) funding, and gaps in funding. With the application to GAVI for introduction and co-financing the vaccine form 2009–2013 GAVI funds are considered as secure. The Royal Government of Bhutan is committed to the EPI program and will provide secure funds to finance the personal costs. And with the Bhutan Health Trust Fund to be operational form 2009, no gap of funding is expected.

Table 14: Secure funding for 2009 - 2013

Secure Funding	2009	2010	2011	2012	2013
Government	481,600	497,453	501,814	513,327	523,509
GAVI - Vaccine Fund	241400	167010	143799	134878	103842
UNICEF					
WHO					
JICA (UNICEF)					
BHTF (Trust fund)					
Total Secure Funding	725,009	666,473	647,624	650,217	629,364
Total Cost / Resource Needs	954691	846624	775691	772397	753512
FUNDING GAP	231691	182161	130078	124192	126161
% Gap	24%	22%	17%	16%	17%

Table 15: Probable funding for 2009 - 2013

Probable Funding	2009	2010	2011	2012	2013
Government	152,455	146,735	152,455	152,455	152,455
GAVI - Vaccine Fund					
UNICEF					
WHO					
JICA (UNICEF)					
BHTF (Trust fund)					
Total probable funding	152,455	146,735	152,455	152,455	152,455
Total secure funding	725,009	666,473	647,624	650,217	629,364
Probable+Secure funding	877,464	813,208	800,079	802,672	781,819
Total Cost / Resource Needs	954691	846624	775691	772397	753512
FUNDING GAP	79236	35426	-22377	-28253	-26284
% Gap	8%	4%	-3%	-4%	-3%

The probable funding from the government from the 10th Five Year Plan is equally distributed over the five years as detailed financial allocations are not worked out yet. It is evident that if these funds are used as and when the need arises over the five years there will not be any funding gap, if the probable funds are realized.

From the analysis it can be concluded that Bhutan can sustain the immunization program continuing with traditional vaccines and introduction of new vaccines. However, external support will be crucial in bridging the funding gaps until such time the Bhutan Health Trust Fund becomes fully functional and self sufficient.

The main effort would lie in making the probable sources secure in the near future, so that there is no uncertainty of funding, even in the enhanced immunization program with newer vaccines. However, while negotiating for the next round of funding for existing vaccines, introduction of Hib makes a stronger case, mainly because with the introduction of the single dose vial, the net cost of new vaccine introduction reduces significantly because of reduction of wastage rates. Bhutan Health Trust Fund remains an important source for

vaccine procurement. EPI will advocate strongly for the secured commitment from BHTF, with the aim of increasing self-sustainability.

The major sources of "probable" funding are UNICEF and JICA. The government is also confident of continued support from WHO and UNICEF in the coming years. There is also a good possibility of support from the Government of Japan in the area of cold chain strengthening, like it has already done in the past, though since the funding is on annual basis, it may need a stronger advocacy for continued support next year

The government of Bhutan expects continued support from GAVI in future too for initiating other new vaccines like pneumococcal and rotavirus vaccines subject to demonstration of disease burden and vaccine efficiency data.

8.3 Reliability of future funding sources

The Policy and Planning Division (PPD), MoH, will advocate for creation of a budget head for immunization service, and pursue the matter with the MoF commencing from the 2005-2006 fiscal year. It is expected that when Tala Hydel Project gets commissioned, the revenue situation of Bhutan will improve further and budget head could sustain the combo vaccines currently supported by GAVI.

MoH will also advocate with BHTF for a firm commitment for longer-term support to immunization in keeping with fund's mandate.

JICA's support to the immunization program is currently through UNICEF. In order to improve the reliability of its continued support, the program will JICA's input much more visible in the government and as well as in the communities at large through available media focus. High level advocacy will be carried out in an effort to garner enhanced JICA support for the immunization program.

8.4 Strategies to attain financial sustainability

The c-MYP identifies 'resource mobilization' as one of the program objectives. The various activities have been described in the plan. In summary the following five strategies will be implemented to achieve this:

1. Seek GAVI funding for introduction of new vaccines
2. Negotiate with JICA for another cycle of financial support for traditional vaccines and cold chain
3. Make BHTF operational to finance traditional vaccines as well as to co-finance new vaccines, bulk of which will be supported by GAVI
4. Cost reduction with aggressive attention on reducing vaccine wastage, and improved monitoring and supervision

5. Advocate for more government resources for immunization in the future.

Table 16: Planned activities to implement the above strategies:

Strategy	**Activities**
GAVI funding for new vaccines	Apply for Hib vaccine support from January 2009 – 2013 Start on surveillance activities to decide on Pneumococcal and rotavirus disease burden.
JICA funding for traditional vaccines	Negotiate and agree with JICA, on support for traditional vaccines
BHTF	Plan of action developed by end 2008, starting with 50% sharing of costs for traditional vaccines with JICA Co-financing for new vaccines to be paid from BHTF
Reduction in vaccine wastage and improved supervision to enhance program efficiency	Introduction of single dose pentavalent vials. Monitoring of vaccine wastage for pentavalent vaccine by 6 EPI technicians every month Regular program reviews at district and regional levels Supportive supervision for all health units
Advocacy with new c-MYP	Prepare new c-MYP by June, 2008 Identify resource gaps and mobilize full funding from Government, BHTF and GAVI

Although this analysis is suggestive of some risk to the financing of immunization services, part of the risk is simply due to the long length of the forward time commitment covered by the analysis. However, it is an accepted fact that fixed costs like personnel, which constitute almost 50% of the total immunization costs, will continue to be entirely supported by the government. It is also rational not to entirely pre-commit the health budget in this way as it allows for some flexibility in being able to divert health funding to emerging crises such as newer disease threats. As such there is no threat of basic funding to immunization services in Bhutan.

Annex 1: Introduction plan for Hib into routine immunization schedule.

References

1 National Health Survey 2000: A Report. Department of Health Services, Ministry of Health and Education, Royal Government of Bhutan.
2 Bhutan National Human Development REPORT 2000: Gross national happiness and human development - searching for common ground, The Planning Commission Secretariat, Royal Government of Bhutan
3 Proposal to GAVI, June 2000: The Royal Government of Bhutan
4 Ninth Plan Sector Document (2002-2007). Health Sector. Policy and Planning Division (Health). Ministry of Health and Education.
5 Expanded Programme on Immunization (EPI) Bhutan. Multi-Year Plan of Action 2002-2006. Public Health Division. Department of Health Services. Ministry of Health and Education
6 Bhutan National EPI Coverage Evaluation Survey, 2002 : Public Health Division, Department of Health Services, Ministry of Health & Education, RGB, Thimphu
7 Annual Health Bulletin 2003, Royal Government of Bhutan, Ministry of Health
8 National EPI Services Manual. Public Health Division. Department of Health Services. Ministry of Health and Education
9 DANIDA in Bhutan : Liaision Office in Denmark.
10 Annual Health Bulletin 2004, Royal Government of Bhutan, Ministry of Health
11 Statistical Yearbook of Bhutan 2004. National Statistical Bureau. Royal Government of Bhutan.
12 WHO/UNICEF Review of National Immunization Coverage 1980-2003, Bhutan, August 2004
13 Bhutan EPI Fact Sheet, 2004: World Health Organization, SEARO – IVD
14 Annual Health Bulletin 2005, Royal Government of Bhutan, Ministry of Health
15 Health Trust Fund: Partnership for sustainable Primary Health Care. Royal Government of Bhutan
16 Fact Sheet, Population and Housing Census of Bhutan 2005, Office of the Census Commissioner, Royal Government of Bhutan
17 Annual Health Bulletin 2006, Royal Government of Bhutan, Ministry of Health
18 Annual Health Bulletin 2007, Royal Government of Bhutan, Ministry of Health
19 Expanded Programme on Immunization (EPI) Bhutan. Multi-Year Plan of Action 2007- 2008. Public Health Division. Department of Health Services. Ministry of Health and Education
20 Proposal to GAVI April 2007
21 10th Five Year plan (Draft), Ministry of Health
22 Cold chain and Vaccine Wastage assessment report, 2007