ブータン国テインプー地域母子保健施設の EPI 簡易調査

医療施設	対象人口（１歳人口）	EPI サービス	ワクチン接種状況 drop-out など (2006-08 年)	EPI 管理	スーパービジョン
JDW National Referral Hospital MCH	？（1300～1500と推定）	毎日	MR 接種数 1, 541（06） 2, 341（07）	国レベルの MCH 専任スタッフが管理監督	
Motithang Satelite Clinic	＞1 万？（詳細不明）	毎日 7～10 人/日（check-up を含む）	drop-out（<1y） 10/40 （主に外国人流動人口）	EPI ポスター 1 枚 接種モニターなし	なし
Dechencholing BHU	8, 660？（217：出生率 2. 5%で推定）	週 1 回 約 18 人/月と予測	MR2 接種 20/50（40%）	モニター 06、07 年分。今年なし（カバー率と勘違い） BCG、MR ワクチンの高い廃棄率	DHO 1 回/月
Jungshina Satelite Clinic	1 万？（130：出生率 1. 3%で推定）		drop-out（<1y） 6/50 MR2 接種 15/20（75%） (06 年生まれのみ)	EPI ポスターなし 接種モニターなし	DHO 一般的
Thinleygang BHU	4, 850 (64：08 年調査)	2 回/月（BHU） 3 回/月（2ORC 合計）	drop-out（<1y） 2/20、3/20 MR2 接種 11/18、5/15 (30～60%)	接種モニターあり BCG、MR ワクチンの高い廃棄率	DHO 1 回/6 月 一般的

drop-out、MR2 接種の分母は登録簿上での調査人数

REPORT

Field Survey of the Vaccine Preventable Disease Program

JICA & Department of Public Health
Ministry of Health
Bhutan

Study conducted by CRI-Bhutan.
(August 2008)

Field Survey of the Vaccine Preventable Disease Program
Ministry of Health Bhutan, 2008

This study was conducted by Dr. Tandi Dorji and Mr. Gyambo Sithey, Centre for Research Initiative, Bhutan for Japan International Cooperation Association of Bhutan.

ACKNOWLEDGEMENT

Center for Research Initiative would like to thank all those who contributed to the completion of this important field survey of the EPI services in Bhutan. We would like to acknowledge the services of all the interviewers, supervisors, advisors and data mangers for all their efforts in completing this survey. The inputs from all the health staff of the various health centers surveyed was instrumental for the survey and we thank them all for taking their time to answer the questions and making their center accessible for our study. The Superintendents of the three regional referral hospitals and the cold store in charges helped and extended their full support to our teams during the survey for which we are most grateful.

This study would not have been possible without the support and cooperation of the Vaccine Preventable Disease Program and the Department of Public Health, who readily provided all supporting documents and gave valuable comments and suggestions. We also acknowledge the contributions of the staff of the BHMIS, HRD, BHTF, DVED, HIDP, WHO and UNICEF for providing key information and relevant data regarding Vaccine preventable diseases.

Finally we would like to thank JICA for initiating and implementing this survey which will definitely help to improve the EPI services in the country. We are confident that the findings and the recommendations we have provided will assist JICA and the VPDP, Department of Public Health for expanding the EPI services and ultimately benefiting all the women and children of Bhutan.

(Dr Tandi Dorji)
Center for Research Initiative, Bhutan

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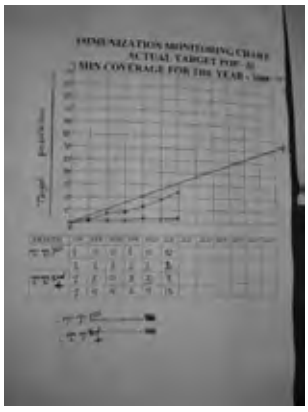
ABBREVIATIONS

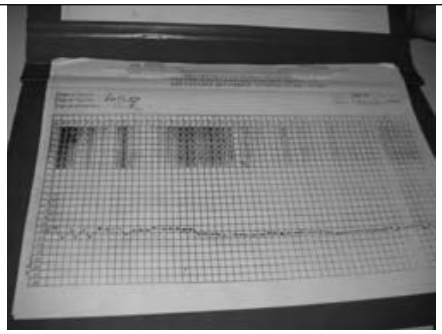
AD	Auto Disposal
AEFI	Adverse Effects Following Immunization
AFP	Acute Flaccid Paralysis
ANM	Auxiliary Nurse Midwife
BHU	Basic Health Unit
BHMIS	Bhutan Health Management Information System
BHW	Basic Health Worker
BHTF	Bhutan Health Trust Fund
CRRH	Central Regional Referral Hospital
CRS	Congenital Rubella Syndrome
DHO	District Health Officer
DMO	District Medical Officer
DMS	Department of Medical Services
DPT-Hep B	Diphtheria Pertussis Tetanus – Hepatitis B
DT	Diphtheria Tetanus
DVED	Drugs Vaccines Equipment Division
DYT	Dzongkhag Yargay Tshogchung
DoPH	Department of Public Health
ECCD	Early Child Care and Development
EEFO	Early Expiry First Out
EK	Electric and Kerosene
EPI	Expanded Program on Immunization
ERRH	Eastern Regional Referral Hospital
FYP	Five Year Plan
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
GYT	Gewog Yargay Tshokchung
HA	Health Assistant
HiB	Haemophilus Influenza
HERM	Health Equipment Repair and Maintenance
ICC	Interagency Coordination Committee
IEC	Information Education Communication
IgM	Immunoglobulin M
ILR	Ice Lined Refrigerator
IMR	Infant Mortality Rate
IPC	Inter Personal Communication
JDWNRH	Jigme Dorji Wangchuk National Referral Hospital
JICA	Japan International Cooperation Association
MCH	Maternal and Child Health
MCV	Measles Containing Vaccine
MNT	Maternal and Neonatal Tetanus
MR	Measles Rubella
MYPOA	Multi Year Plan of Action
NCCP	National Certification Commission for Polio

NCIP	National Committee on Immunization Practices
NID	National Immunization Day
NIFH	National Institute for Family Health
NNT	Neonatal Tetanus
OPV	Oral Polio Vaccine
ORC	Out Reach Clinic
PHL	Public Health Laboratory
RGOB	Royal Government of Bhutan
RHU	Reproductive Health Unit
RIHS	Royal Institute of Health Sciences
SEARO	South East Asian Regional Office
SNID	Sub National Immunization Day
TT	Tetanus Toxoid
ToT	Training of Trainers
UCI	Universal Childhood Immunization
UNICEF	United Nations Children's Fund
VAP	Vaccine Arrival Process
VMAT	Vaccine Management Assessment Tool
VVHW	Voluntary Village Health Worker
VPD	Vaccine Preventable Disease
VPDP	Vaccine Preventable Disease Program
VVM	Vaccine Vial Monitor
WHO	World Health Organization

PICTURES FROM THE SURVEY

			
Stock register in BHU	EPI Poster BHU	Monitoring chart being used in BHU	Vaccine storage

		
Ice Lined Refrigerator	Walk In Refrigerator	Vaccination at ORC

		
Other Medicines stored in walk in cold room	Temperature Monitoring of Cold chain	Ready for ORC

		
Correct use of diluents	Maintaining Registers in health center	Transport refrigerated Van

		
Registering Vaccination at BHU	Out Reach Clinic	Out reach Clinic- Shed

	
Out reach Clinic	ORC being conducted at residence of VVHW: Ganglapong

EXECUTIVE SUMMARY

Background

Bhutan has made exceptional progress in immunization having achieved universal childhood immunization (UCI) in 1991. Although there is a strong political will and commitment from the government, the EPI services in the country is heavily dependent on donor agencies for funding. Since there is a state policy to provide free basic health services including immunization to all citizens, the country established the Bhutan health Trust Fund to finance purchase of essential drugs and vaccines. However it has yet to reach its target of US $ 24 million.

JICA has been supporting the then EPI program, now the Vaccine Preventable Disease Program (VPDP) under the UNICEF-Japan multi-bilateral cooperation since 1995 with the objective of sustaining the immunization services. In 2007, the Royal Government of Bhutan (RGOB) submitted an official request to the Government of Japan for further assistance through Japan's Technical Cooperation. This field study is thus a preliminary study to assess the situation of the VPDP program and to update on all aspects of the services provided at different levels. It is expected to be used by the JICA preliminary study team from Japan to design the project framework and to explore better working partnerships with other donor agencies.

Objective

The overall objective of the field survey for the EPI in Bhutan was to identify the implementation structure of the VPDP, its current activities, progress and challenges from the central to the community level. It would also confirm the current status of the management and delivery of vaccines, status of cold chain equipments and update related information such as health infrastructure, human resources and health information.

Methodology

The field survey was conducted at all levels of the health care system, from the central Ministry of Health, VPDP to the districts, Basic Health Units (BHU) and the Out Reach Clinics (ORC). The sites to be surveyed were decided by JICA covering the three regions. The health centers were selected based on the location and proximity of the regional cold stores. One hospital, three BHU's and three ORC's were selected in the district where the cold store was located except for Thimphu where ORC was not included. In depth interviews were used to collect information from all relevant agencies involved in Immunization.

The WHO/UNICEF Immunization services assessment tool was adapted and used for collecting data for the survey. The consultants with an advisor adapted the tools and then conducted training for the team members. The training was for three days and included both classroom work and field testing of the tools.

Two teams were formed with one assessing the eastern region and the other central region. At the capital, the study was conducted jointly. Each team consisted of three members each and one of the consultants served as the overall team leader. An advisor from the National Committee for Immunization Practices served as the External reviewer.

Major Findings

Strengths

The success of the immunization services in the country is exemplary in that even after achieving UCI in 1991; it has consistently maintained coverage rates of over 90%. This has largely been due to strong political and donor support along with committed health workers and an efficient VPDP. The key achievements and the strengths of the EPI services are summarized below:

- High access to health and MCH services including immunization. All health centers in the country provide immunization services both at fixed and a number

of out reach sites. Most of these outreach sites are permanent having been built and maintained by the community themselves. The catchment population around the health center and the ORC is aware of the days when immunization in provided and there is strong confidence in the services provided.

- The Voluntary Village Health worker (VVHW) is an integral and important person in conducting immunization being involved in social mobilization and Inter personal communication (IPC)
- Highly successful Rubella vaccination campaign in 2006 and inclusion of rubella vaccine as combination with measles (MR) in the national schedule.
- Increased budgetary support from the government for health over the last two years and nearly 2.6 % of the health budget allocated for immunization.
- Establishment of Bhutan Health Trust Fund for funding purchase of essential drugs and vaccines with an initial target of US $ 24 million. Proceeds from existing accumulation of 22 million have already been used for buying new vaccines.
- The country is well on its way to polio eradication having no reports of polio since 1986. All other vaccine preventable diseases (VPD) are on the decline and on target for elimination.
- There are adequate number of health workers, vaccines and equipments in all the health centers.
- The program has adequate guidelines and forms in all aspects of immunization service delivery and has prepared a multi year plan of action (MYPOA) starting from 2009.

Challenges

- Sustaining UCI and inclusion of new vaccines because of donor dependency for vaccine funding, training and logistics. Although the BHTF has already started using the proceeds to buy new vaccines, it has yet to reach its target and this too is likely to be revised given the increase in costs of most everything.

- Lack of technical expertise at the central level to make decisions, by conducting operational research and analyzing the reports sent from the field. New appointees also lack managerial skills at the district and community level.
- Aging cold chain equipments is a major concern, given that 63 % of the equipments are more than five years and 25 % are more than 10 years old. Making a plan to replace them and getting funds for new equipments is a major challenge for the program.
- The high wastage rate for all vaccines, in all health centers has always been a major challenge having received attention in many forums. Health centers are also not monitoring wastage rates routinely.
- There is no separate surveillance unit at any level and this is further compounded by an acute shortage of trained personnel such as epidemiologists and biostatisticians.
- Utilization and compilation of health information is weak. The data sent from the districts to the BHMIS is not analyzed and neither is it shared with the respective programs. There are serious errors in the published reports by the BHMIS making information unreliable.
- Coordination is weak at all levels, between donors, program, district managers and health workers.
- There is no planned and systematic monitoring and supervision mechanism in place, especially at the district level. From the central level infrequent visits are made but the impact from this is yet to be evaluated.
- Lack of adequate storage facilities like walk in cold room at the regional cold stores. No back up at the central cold store in Thimphu.
- Insufficient funds for fuel, for transporting vaccines in the refrigerated vans making it inconvenient and risky by transporting long distances in ambulances using cold boxes.

Key Recommendations

- Government should ensure continuous availability of vaccines through
    - Active mobilization of donors for BHTF to meet its target
    - Utilize proceeds from the fund for purchasing traditional vaccines (Co-financing with GAVI from 10th plan)
    - Explore other sources for vaccine funding and other components through competitive proposal writing.
- Replace all aged cold chain equipment according to a plan and procure appropriate walk in cold rooms for the regional cold stores
- Institute a surveillance unit at the central level and appoint an epidemiologist for disease surveillance.
- Strengthen technical capacity of the NCIP to guide the VPDP through appropriate training and attachment.
- Provide relevant training to EPI technicians both at pre service and in service levels. Health workers should be trained in monitoring their respective immunization coverage, wastage rates, and using monitoring charts for evaluation.
- Strengthen staff in the BHMIS and district managers to analyze the reports and develop a more efficient means of sharing health information.
- Conduct in depth research/study on waste disposal and develop a strategy for not only disposing wastes appropriately but monitoring and evaluating the methods. Better means of waste disposal should be explored.
- Implement systematic monitoring and supervision activities at all levels of the health care system. Use these opportunities to improve and enhance the immunization services.

1. BACKGROUND

1.1 Geography

Bhutan is a landlocked country in South Asia located in the southern foothills of the Himalayas. It covers an area of 38,394 sq. km, and stretches for 300 km from East to West and about 170 km from North to South.[1] It is bordered by the Indian states of Arunachal Pradesh, Assam/West Bengal and Sikkhim in the East, South and West respectively extending for 605 Km while the Tibetan region of China borders it in the North and extends for 470 Km.

The country can be divided horizontally into 3 regions consisting of the duars and the terrain region in the south which mainly consists of plains and low hills with tropical vegetation. The middle region consists mainly of lush valleys and densely forested hills with elevations ranging from 1000-3500 meters. Most of the districts of Bhutan lies in this region and so does the majority of its population. The Northern region lying above 3500 meters is in the Greater Himalayas and most of this part remains covered by snow all year round. The population is small and consists of nomadic yak herders.

72.5 % of the Kingdom is covered with forest and only 8 % of it is used for human habitation and cultivation[2]. Although considered one of the world's ten biodiversity hotspots, Bhutan has committed to maintain 60 % of its land area under forest cover for all time and to reserve one quarter of its territory as national parks, reserves and other protected areas[3].

[1] National Statistical Bureau. Statistical Yearbook of Bhutan, 2007. Royal Government of Bhutan, Thimphu 2008, p iv-v.
[2] ibid
[3] Planning Commission. Bhutan 2020, A vision for Peace, Prosperity and Happiness. Royal Government of Bhutan, 1999; p 37.

1.2 Population

The total population of the country in 2005 was 634,982[4] with an annual growth rate of 1.3 %. Females constitute 47.5 % of the population and women in the reproductive age group (15-49 years) comprise 25 %. There were 12,314 (2 %) children below one year and 62,553 (10 %) children below 5 years of age. Birth rate was estimated to be 19.7/1000 population and infant mortality rate is 40/1000 live births.[5] The population per household is 4.6 and population density is 16 per sq. km. The total fertility rate is 2.6 %. The median age of the population is 22.3 years and the ageing index (the ratio of population above 65 years of age to the population of children below 15 years of age for every hundred persons) is 14.2 implying that Bhutan has a young population.

1.3 Literacy

National Literacy rate for all persons 6 years and above is 59.5 %. In terms of gender, 69.1 % of the male population is literate compared to only 48.7 % of females. The population that is literate is higher than the illiterate in all districts except for Gasa, and the percentage of population that is literate is much higher (75.9 %) in the urban areas as compared to rural areas (52.1 %). Overall 41.7 % of the population, 6 years and above have never been to school, with females numbering more (148,248 or 56 %) than males (116,679 or 44 %).

1.4 Health

The Royal government of Bhutan since its inception of developmental activities in 1961 has been providing health care free of cost to its people. Although rapid advances have been made in the field of medicine especially technological and sophisticated equipments along with more expenses, the government has continued to deliver and expand its services. From the beginning, it adopted the Primary Health Care approach to deliver basic health care equitably and made access to these services its priority while continuing to improve the quality through provision of highly advanced diagnostic and therapeutic

[4] Office of the Census Commissioner. Population and Housing Census of Bhutan, 2005. Royal Government of Bhutan, Thimphu.
[5] Ministry of Health. Annual Health Bulletin 2007. Royal Government of Bhutan, 2007, p 7-8.

services. This has resulted in spectacular improvement in the health status of the people as reflected in the health indicators in table 1.

Table 1: Health Indicators

Indicator		National Health Survey		
	1977	1984	1994	2000
Infant Mortality Rate (per 1000 live births)		103.0	71.0	60.5
IMR boy		NA	74.0	NA
IMR girls		NA	66.0	NA
Under five Mortality Rate	162	162.4	96.9	84.0
Under five mortality Rate Boys		NA	96.9	NA
Under five Mortality Rate girls		NA	92.0	NA
Maternal Mortality Rate (per 100,000 live births)		773.0	380.0	26.0
Crude Birth Rate	43.6	39.1	39.9	34.1
Total Fertility Rate		5.9	5.6	4.7
General Fertility Rate		170.0	173.0	142.7
Crude Death Rate		1.3	9.0	8.6
Population Growth	3.1	2.6	3.1	2.5
Life expectancy (in years)	46.1	46.0	66.0	-

1.4.1 Organizational Structure of the Ministry of Health

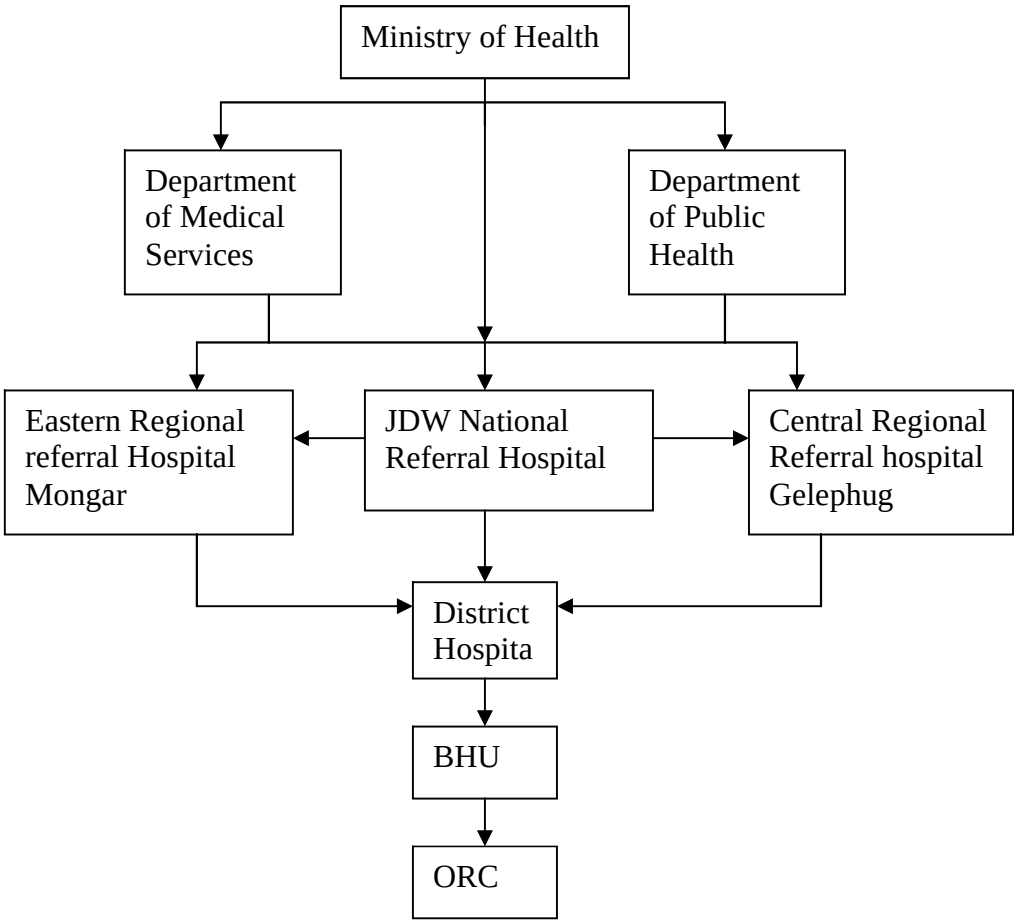
The Ministry of health is organized into two departments each headed by a Director General, Department of Medical Services (DMS) and a Director, Department of Public Health (DoPH). The organogram of the Ministry and the respective departments is shown below.

The Department of Medical Services has the responsibility of delivering clinical services throughout the country. The department is divided into various divisions and units who look after health infrastructure, management of human resources, diagnostic and therapeutic services, planning, procuring and distributing drugs, vaccines and biologicals. All the hospitals and the other health centers including the Referral hospitals are under the Department of Medical services.

The Department of Public Health is mainly concerned with protecting, promoting and preventing the health of the population of Bhutan.

The department also has various divisions and public health programs that plan and execute preventive services to the public. The Vaccine Disease Control Program is one of the programs under the wings of the Department.

Figure 1: Organizational structure of the health care services



Administratively there have been attempts to decentralize decision making to the regions especially to the Superintendents of the Regional Referral hospitals in the East at Mongar, Central Regional Referral hospital at Gelephug and JDWNRH at Thimphu, however in reality most of the district hospitals through the District Medical Officer (DMO) and the District health Officers (DHO) report to the Department of Medical

Services. All matters related to public health are conveyed to the respective program of the DoPH and to the Health information System (BHMIS).

The Out Reach Clinic (ORC) is the smallest health facility and serves populations that live far away from fixed health centers. Health workers from the District hospital or the BHU go to these ORC's once a month on a fixed date that is known by the people of the community and mainly provide antenatal, immunization and treatment of minor ailments. Whenever time permits health promotion and education sessions are also carried out. The location is usually in the center of the community and a small shed/hut built for this purpose is used, however in certain locations where there are no sheds, the house of the VVHW or some other place is used. All the drugs, vaccines and equipments are carried from the health center in appropriate containers such as ice boxes and sterile packs. A Health Assistant (HA) or an Auxiliary Nurse Midwife (ANM) is the person responsible for carrying out this activity.

The next level is the Basic health Units (BHU) which is the health facility serving the gewog (sub-district/block). There are 205 gewogs in the country but only 176 BHU's indicating that 29 gewogs do not have a BHU. Each BHU has three health workers who are trained for two years at the Royal Institute of health Sciences (RIHS). The HA is in charge of the BHU and he is assisted by an ANM and a Basic Health Worker (BHW). A new policy adopted by the MoH however indicates that only one category, that of HA will remain while the nomenclature of ANM and BHW will be abolished. Existing ANM's will therefore change their designation to HA, while BHW's will undergo an up gradation course at the RIHS. The up-gradation course for BHW has begun and the first batch is currently undergoing training at JDWNRH.

Every BHU is equipped with a refrigerator to store vaccines, essential drugs and equipments to deliver immunization and basic health care to the people. Since the overall policy of the Ministry is to deliver an integrated system of health care, the staffs at the BHU are responsible for delivering curative, promotive and preventive services to the people. It has facilities to admit 10 patients although the services are very basic.

Several BHU's have been strategically chosen as grade I BHU's where a medical officer (MBBS) is posted in addition to the three health staff. Some districts such as Wangdi Phodrang, Gasa and Dagana do not have a district hospital; instead have Grade 1 BHU, with additional staff.

The next level is the hospital and there are 29 of them in the country located equitably in all the districts. Some of the larger districts such as Chukha, Samtshi and Trashigang have more than one hospital. These hospitals serve the population at the district level and also serve as referral centers for the BHU's. The number of beds available for in patients ranges from 20-40 and provides all types of health care including laboratory services, minor operations and obstetric emergencies. Each hospital has a Maternal and Child center (MCH) which provides immunization, antenatal, family planning, nutritional and postnatal services to women and children. They are also involved in providing Information, Education and Communication (IEC) on various health issues to the clients and to the community. The staffs from the MCH are also responsible for conducting the ORC activities in and around its facility in a timely schedule. The DMO or the superintendent is in charge of the hospital while the DHO is the overall in charge, administratively of all health services in the district.

The three Regional Referral hospitals at Mongar in the East, Gelephug in Central and Thimphu in the West serve as the tertiary centers for health care services. The regional referral hospital provides specialist services in various disciplines of medicine to the region and also caters to the health needs of the particular district where it is located. Jigme Dorji Wangchuk National referral hospital (JDWNRH) in addition also serves as the National referral hospital for the country. While Mongar and Gelephug each have a MCH center providing immunization serves, JDWNRH has a community health department headed by a senior doctor with a background in public health. Immunization is provided by 3 health workers in the EPI section of the department and is located close to the Pediatric department.

The total number of health facilities and health workers in different categories is provided as Annexure A at the end of the report.

1.4.2 Immunization services within the health care system

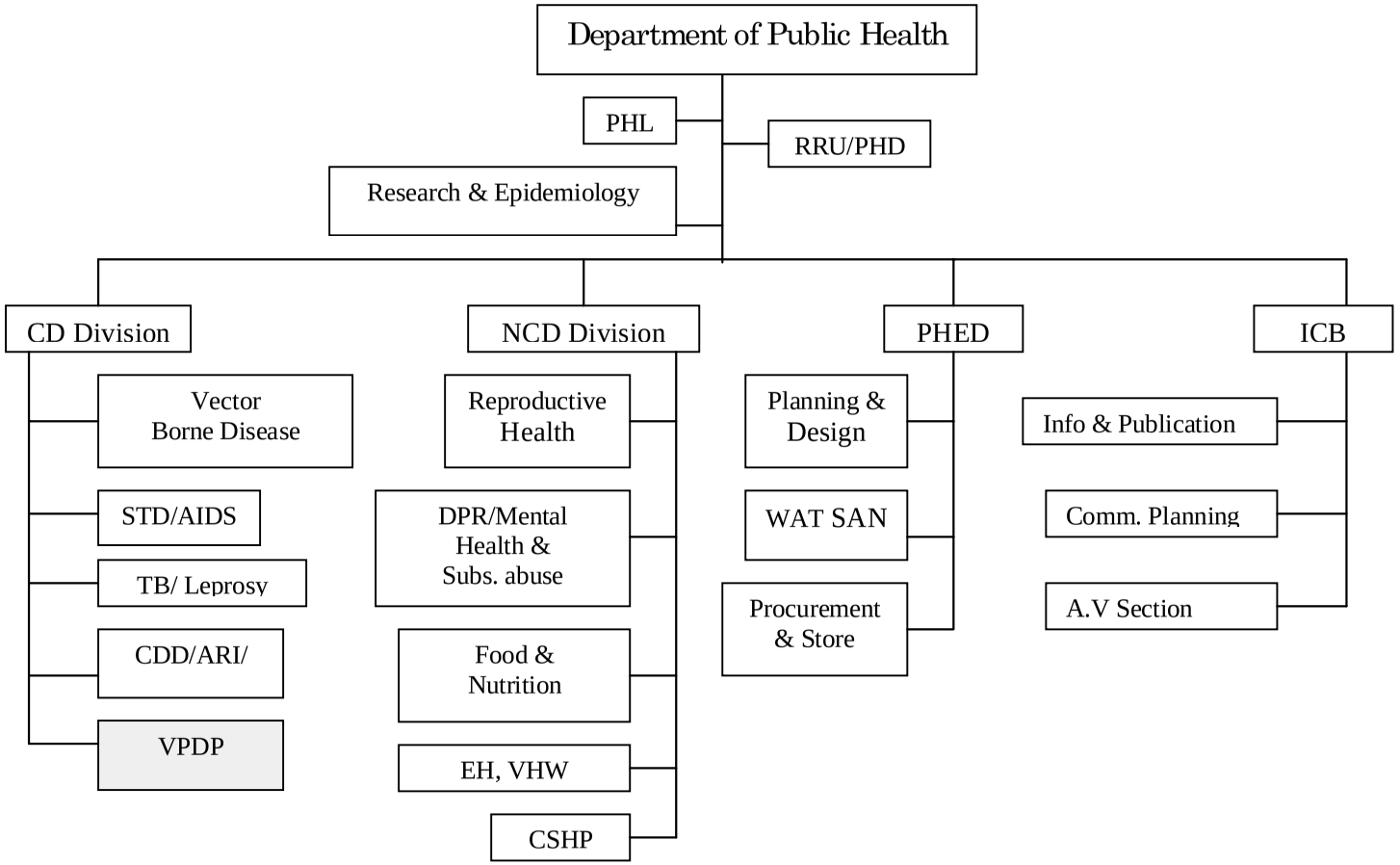
Immunization services are provided in an integrated way along with MCH, Family planning and Health education, in the MCH center in all health centers except at JDNWRH. A mother visiting the health center with her child receives all the services at that one visit, both for herself and for her child. Besides offering these services at the hospital, one health worker from this center, according to a pre determined schedule, on a rotational basis among the three staffs also offers the same services in a number of ORC. Each ORC is conducted once or twice a month. Mothers from the catchment area around the ORC come to the center to avail the services. There is usually only one health worker who conducts the ORC and s/he is assisted by the Voluntary Village Health Worker (VVHW). On occasions two staffs of the BHU conduct the ORC especially when the catchment area is large and number of clients is high.

This system of MCH services are available at all BHU's and hospitals. As mentioned above the staffs manning the MCH center consists of HA's, ANM's and BHW's. They are responsible for providing EPI services in the BHU and the hospital. There are no fixed days for these services and mothers and children can avail these services any day of the week except on government declared holidays.

At the National referral hospital though, immunization is offered by the EPI unit of the Community health department. There are 3 staffs who offer immunization, early child care and development (ECCD) services and conduct growth monitoring. Maternal and family planning services are separate and provided by a different set of trained health worker.

At the national level, planning and management of immunization services is done by the Vaccine Preventable disease program (VPDP) under the DoPH. The organogram of the DoPH is shown below in Fig 2.

Figure 2. Organogram of the Department of Public Health



1.4.3 Vaccine Preventable Disease Program (VPDP)

Vaccination was first introduced in Bhutan by British doctors who accompanied political officers during their visits in the beginning of the 20th century. These were directed mainly towards small pox and were conducted in few places and in small numbers. The only mass campaign documented was in 1906 when more than 800 people in Eastern Bhutan were vaccinated on the request of Gongsar Ugen Wangchuk the first king of Bhutan. Since then without any agent or any planned developmental activity and with very limited resources all activities including health were static. In 1961 when developmental activities formally began with limited resources, vaccination began as part of the global drive to eradicate small pox. By 1976 several other vaccines; DPT, OPV and BCG was introduced in selected districts although financial and human resource constraints provided huge barriers in implementing them effectively. In 1979, Bhutan adopted the Alma Ata declaration and with it the Primary health care model for attaining health for all by year 2000. As a result the National policy to immunize all children with DPT, OPV, BCG and Measles vaccines was adopted and the Expanded Programme on Immunization (EPI) was launched. In 1980, EPI was expanded to all districts and was fully integrated as part of the general health services and was being delivered by the health workers. The erstwhile National Institute of Family Health (NIFH) was established in Gelephug to facilitate in country training of health workers on immunization practices. In February 1988, the 66th National Assembly passed a resolution calling for all children and pregnant mothers to have access to immunization and to be fully vaccinated. In the next few years, immunization services were given high priority and in addition the requirement of producing the immunization card for admission to school made people bring their children for immunization. All this proved to be effective and by 1991 Bhutan had achieved Universal Child Immunization (UCI).

Encouraged by the success of the programme, the government took the decision to add newer vaccines into the child immunization schedule as and when indicated by the disease burden. In 1995 Bhutan joined the Global polio eradication programme and subsequently conducted several national and sub national immunization day programs from 1995 to 2002. To further strengthen polio eradication efforts, the AFP surveillance protocol was instituted in 1996. The last case of polio was reported in 1986 and since then Bhutan has maintained a "Zero" polio status and is awaiting certification for declaring polio eradication. Another

Vaccine preventable disease, neonatal tetanus has not been reported since 1994. In other significant milestone achievement, Bhutan introduced Hepatitis B vaccine in 1997 and Rubella vaccination for women and children in 2005. A nationwide Measles and Rubella (MR) vaccination campaign was conducted in 2006 which saw a MR coverage of 88%. Today MR combination vaccine is included as a regular vaccine to be delivered to all children at 9 months and 24 months of age. Tetanus Toxoid (TT) immunization of pregnant mothers was introduced in the year 1983 and has contributed to the success in near elimination of neonatal and maternal tetanus. All vaccines used in the Immunization schedule are supplied through UNICEF and meets the requirements of the WHO standard in terms of quality and efficacy. The transportation of vaccines is done according to a standard guideline.

Programme General Objective[6]:

Reduce child mortality and morbidity associated with vaccine preventable disease in line with the Millennium Development Goal 4 (Reduction of under-five child mortality by two thirds by year 2015.)

Specific objectives:

- To sustain the high national immunization coverage level at or above 90 percent for all children less than one year of age.
- To achieve polio free certification by the end of 10FYP.
- To prevent Congenital Rubella Syndrome
- To eliminate rubella infection by maintaining high immunization levels through the routine immunization services
- To reduce morbidity and mortality due to measles in children.
- To maintain the elimination status of Neo-natal Tetanus.
- To integrate and strengthen the surveillance for the vaccine preventable disease
- To improve the vaccine logistics, safety, quality and cold chain management at all level.
- To strengthen the technical capacity and resources for the VPDP.

[6] VPDP. 10th Five Year Plan document plan and strategies document. (Unpublished)

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 logistic s and cold chain system management.
4. Effective monitoring and integrated surveillance of vaccine preventable diseases.
5. Strengthened technical capacity and resources for the 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.

Program Milestones:

- EPI started in 1979 with DPT, measles, BCG and Polio vaccines
- TT introduced in 1984 for pregnant women
- Last case of clinically compatible polio in 1986
- **NCCPE** set up in 1997
- UCI achieved in 1991.
- Immunization sustained >90% since achieving UCI in 1991.
- Last case of Neonatal Tetanus reported in 1994.
- Launched National Immunization days in 1995
- Hepatitis B vaccine introduced in 1996.
- AFP surveillance started in1997
- Launched successfully multi antigen NID in 1995.
- Conducted 7 rounds of SNID's from 1995-2007
- Rubella vaccine introduced as MR vaccine in 2006.
- Conducted nationwide Rubella vaccination campaign in 2006.

2. RATIONAL FOR EPI FIELD SURVEY

EPI is an important preventive public health program which directly benefits the women and children by preventing them from common preventable diseases. Bhutan has made remarkable progress in the implementation of the EPI program since its inception in 1979. The 2002 EPI coverage study shows that 89.7% of the children aged 12-24 months were fully vaccinated and 64.5 % had valid coverage. Bhutan has been successfully implementing its vaccine preventable disease program and has been exemplary with over 90% immunization coverage for all antigens. However it is a fact that the success of the program mainly depends on the following factors:

1. Timely procurement of the vaccines
2. Proper vaccine storage facilities at both central and district level
3. Existence of systematic distribution system.
4. Well trained health workers particularly in the mid level management
5. Community awareness on immunization benefits and schedules

All of the above factors are critical and needs to be functioning efficiently to contain the targeted diseases, as many of them cannot be eradicated. Therefore continued political commitment and availability of adequate funds are required to sustain the success the of the EPI programme. Aware of the immense costs to the government and in the sustainability of the EPI and Essential Drugs programme, the Royal Government of Bhutan initiated the Health Trust Fund in 1997. The goal was to raise a principal amount of US$ 24 million from which the funds generated could be used to buy essential drugs and vaccines. Today the total amount collected stands at US$18 million and is still short of the target to really make it operational. It is at this critical juncture that the MoH, RGoB has requested JICA, a long term development partner, who has been supporting the EPI programme since 1990 to further extend its assistance.

JICA now deems it necessary to do a preliminary study to get first hand information on the EPI program in light of all the developments and use the evidence generated from this study to channel its assistance in appropriate areas, particularly as immunization has multiple

donor assistance, thereby avoiding duplication of activities and assistance. Therefore it is timely and necessary to do a study to get the most recent information on the EPI programme status right from the central level to the district, BHU and ORC levels.

2.1 Objective of the Study

1. To identify the implementation structure of EPI program from central to community level
2. To identify the current program status and the challenges for implementing the routine immunization activities at all levels (Hospitals, Basic Health Units and Out reach Clinics.
3. To determine the current management and delivery of vaccines and cold chains equipments from central cold store to regional cold store to hospitals, Basic Health Units and Out Reach Clinics.

2.2 Expected outcome from the JICA field survey of EPI Programme

1. EPI program policies and its current plan of operation in reference to 10FYP goals and objectives.
2. Overall program management and organizational structure within MoH. How the EPI program functions at the ministry level and how it coordinates and implements it activities in the districts.
3. Current EPI program status.
4. The process of indenting vaccines, vaccines storage facilities at central and regional stores and management of vaccines.
5. The process and method of vaccine distributions.
6. The maintenance of cold chain right from the time of supply by supplier to central cold store to the community up to the ORC.
7. Its sustainability plan beyond 10 FYP plan.
8. Flow chart of information exchange between EPI program, regional EPI stores, districts and the information unit in MoH.
9. All issues, challenges and strengths of the EPI programs in different stages of implementation levels (district, regional etc) will be clearly indicated.

3. METHODOLOGY

The EPI study conducted a thorough desk top review of all relevant documents and reports of the immunization services in Bhutan. It then conducted in depth interviews with all stakeholders especially with all key personnel in the Ministry of health to understand the constraints, strengths and challenges of the VPDP.

It then assessed health facilities delivering immunization services at all four levels of the health care system, at the national, regional, district and community levels. Health workers, immunization personnel, EPI technicians, administrators and community leaders were all interviewed.

3.1 Sampling of the study sites

The study sites were pre selected by JICA although the health centers at the community level were recommended by the consultants. The study sites were mainly selected on regional basis and for the location of the regional cold stores. One hospital, BHU and an ORC were each selected from the respective district. BHU and ORC were selected in such a way that it would include some located near the road point as well as those located further and more remotely so that other aspects such as transportation and logistics could be studied and compared. The study sites consisted of the following centers:

Table 2: EPI field study sites

Districts	Hospitals	Cold stores	BHU	ORC
Thimphu	JDWNR Hospital	DVED	Dechencholing	
			Thinleygang	
Gelephug	Central regional Referral hospital	Gelephug	Jigmecholing	Taklai
			Norbuling	Chuzagang
			Umling	Tashithang
Mongar	Eastern Regional Referral hospital	Mongar	Yadi	Sherichu
			Gyelposhing	Ganglapong
			Dremetshe	Waichure

3.2 Data Collection Technique

Data was collected using the WHO/ UNICEF Immunization Service assessment tool which was adapted for the situation in Bhutan. A set of check lists was also prepared for each of the center and with the focus of the study. An interview guide and check list was also used while interviewing health personnel and key post holders in the program both at the national and at the district level. Observations of all immunization procedures during the clinics especially at the ORC and BHU were also undertaken along with physical verification of all data and reports submitted. As such, the timings of the visit was planned to coincide with the days of the immunization wherever feasible.

3.3 Data Analysis and Report writing

The data collected was entered into the WHO immunization services assessment software by the consultants and analyzed. The responses from the in depth interviews were triangulated and analyzed for completeness. All the members of the team participated in the data entry and analysis. An external expert, with experience in EPI reviews was consulted for the final analysis and comments sought for the findings from the study. The final report was prepared by the consultants.

***Step 1: Initiating the process*:**

Meet with the Project Formulation Adviser JICA/ Bhutan. Discuss and finalized the scope and the expected outcome of the consultancy. The areas and the health centers to be surveyed were also discussed.

Step 2: Preparation for the Field Study

- Identified a focal person in each of the relevant agencies of JICA, UNICEF, WHO and Ministry of Health.
    a. JICA: Project Formulation Officer
    b. UNICEF: Dr. Shakurat, Health & Nutrition Officer
    c. WHO : Mr. Norbu wangchuk, NPO, WHO/ Thimphu
    d. Ministry of Health: Ms. Karma Tshering, EPI Programme Manager, MoH.

- Collected all relevant reference materials (Desk top review of all relevant EPI policies, strategy papers, manuals, guidelines and reports).

  A list of all references and bibliography has been provided at the end of the report.

  a. National Immunization Policy and Strategic Guidelines for national Immunization Services, Department of Public Health, MoH, Bhutan, 2004.
  b. National EPI Review Report, DoPH, MOH, 2002
  c. Bhutan national EPI Coverage Evaluation Survey, DOPH, MOH, 2002.
  d. State of Bhutan's health 2007, Annual Health Bulletin, 2008
  e. Immunization coverage cluster survey, reference manual, WHO2005

- Met with key stake holders (listed below) here in Thimphu and conducted in-depth interviews to find out the issues/ challenges related to EPI program management, planning, vaccine inventory, vaccine storage, distribution, cold chain management etc.

Step 3: Planning field data survey

Two teams of two members each were formed, led by the consultants, advisors and surveyors. All members participated actively in the activities carried out during the planning and finalizing the protocol for the study and also during the following steps. The main activities carried out were:

1. Orientation of all team members on the study objectives and the methodology
2. Adapting and finalizing the data collection tools
3. Training the surveyors and field testing the tools
4. Procuring the supplies and hiring of vehicles for the field survey

Step 4: Implementation of the survey

- The teams visited the pre selected sites at the National, Regional and District level. The health centers including hospitals, BHU and ORC's; and the regional cold stores were visited and data collected using the survey tools.
- Data entry, analysis and report writing was done
- Debriefing of all stakeholders on the survey

3.4 Limitations of the study

1. There was no coverage survey in the last 6 years and as a result authentic data on EPI coverage is not known although figures gathered from the BHMIS has been included in the report. The focus of selecting these sites was mainly because of the location of the regional EPI stores.
2. A small number of pre-selected sites were chosen for this small study and this may not be representative of all the health centers in the country.
3. The short duration of the study also inhibited the team from conducting a more in depth study on EPI especially in the ORC which had to be timed with those of the clinic timings.

Fig 3: Map showing districts and regional referral hospitals and stores

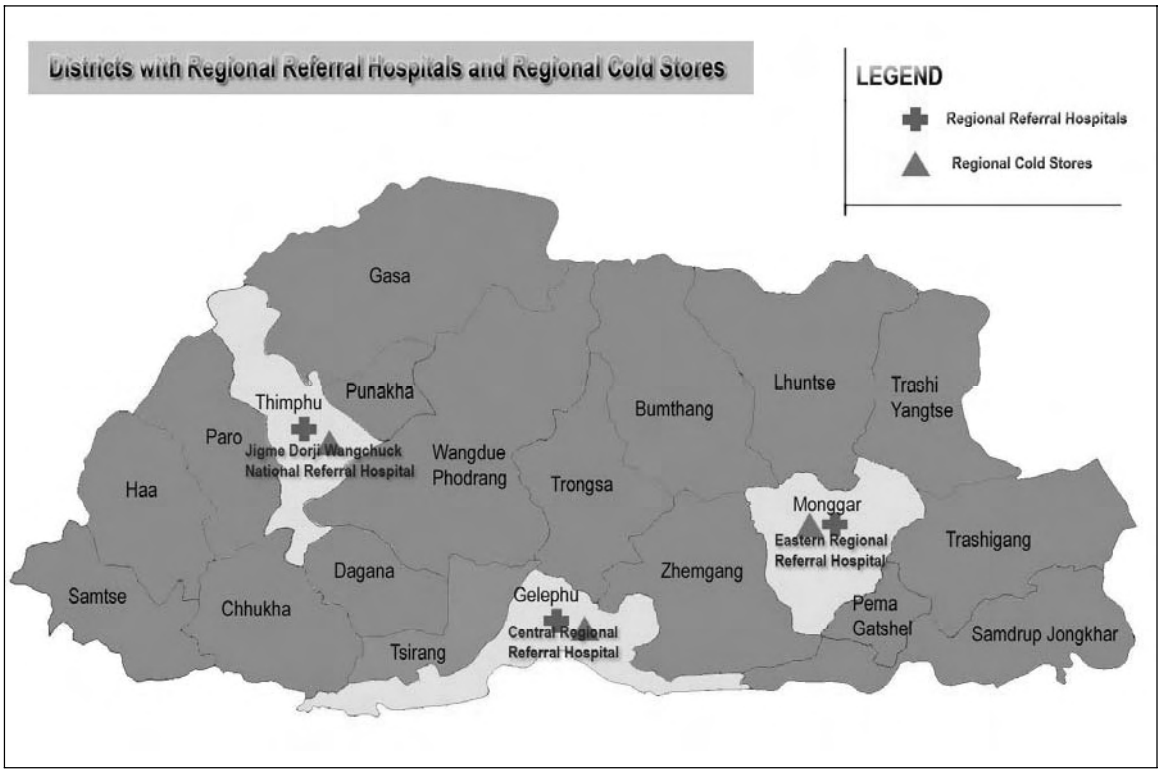
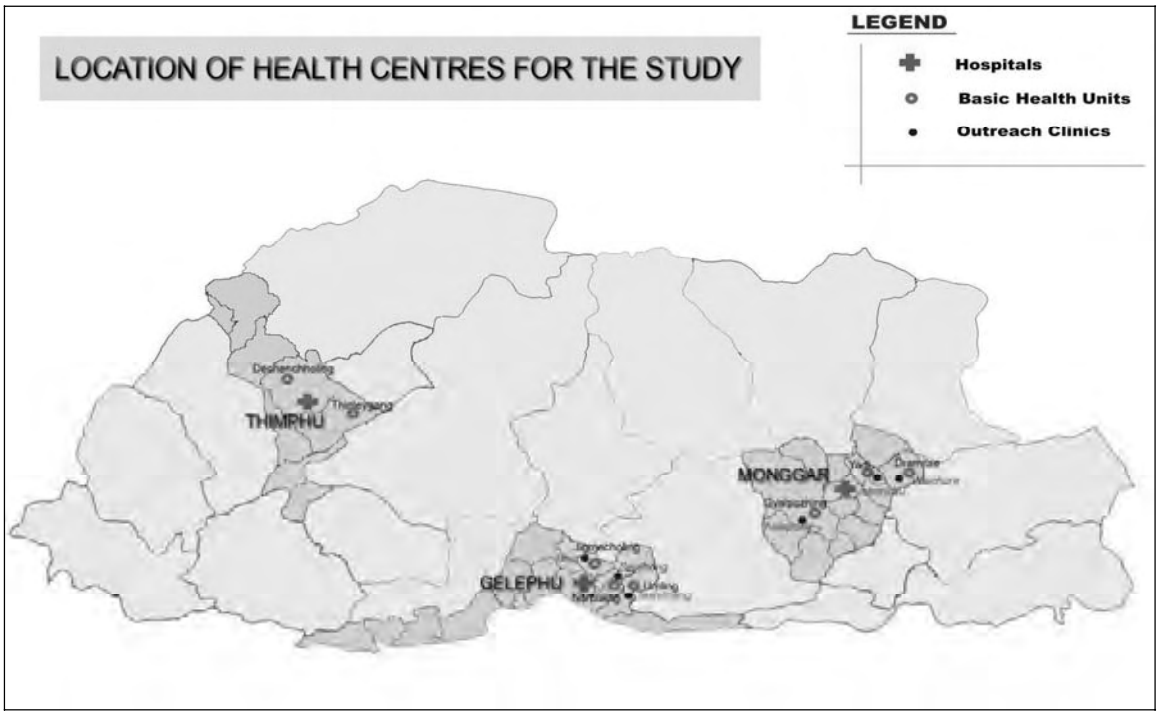


Fig 4: Map showing the health centers surveyed during the study



4. DISCUSSION OF FINDINGS

4.1 PROGRAMME MANAGEMENT AND COORDINATION

The Vaccine Preventable Disease Program of the Ministry of health is located in the Department of Public Health and consists of two cubicles. At the national level the program is managed by two people, the National Program manager and the Assistant program manager. They function independently of the other programs and report to the Director of Public health. The program began as the EPI program but changed its name to VPDP in 2004 because of the inclusion of other diseases which were not included in the EPI target diseases such as rabies, Japanese Encephalitis and Influenza. The VPDP in the DoPH is the lead organization in managing, planning and implementing the immunization services in the country.

The roles and responsibilities of the Program managers are not well defined and their job responsibility is not included under the medical services or the public health services. There is no clear distinction and separation of work between the Program Manager and the Assistant program manager, frequently resulting in overlap of functions. From the account of the managers themselves, their main roles and responsibilities can be summarized in the following points;

- Planning and managing the EPI services
- Management of vaccines and cold chain equipments for the country
- In collaboration with the Health Information System, collect all data and surveillance reports from the districts and compile yearly reports. The reports consist of number of reported vaccine preventable diseases, adverse effects of immunization and also EPI coverage.
- Advice and assist the district managers through the regional cold chain centers in ensuring steady and timely distribution of vaccines.
- Monitoring and evaluation of immunization services in the districts and gewogs through surveillance reports, feedback, monthly health reports and occasionally visits to health centers.
- Training health workers especially the MCH in charges and the DMO's in management of vaccines. The training course is a 10 day course titled EPI

Midlevel management course. The program also makes guidelines and recommendations to be adopted by the field health workers.

- Review program and along with the National technical committee consider including new vaccines in the EPI schedule.
- Seek and manage funds for the program and also coordinate and liaise with donor agencies.

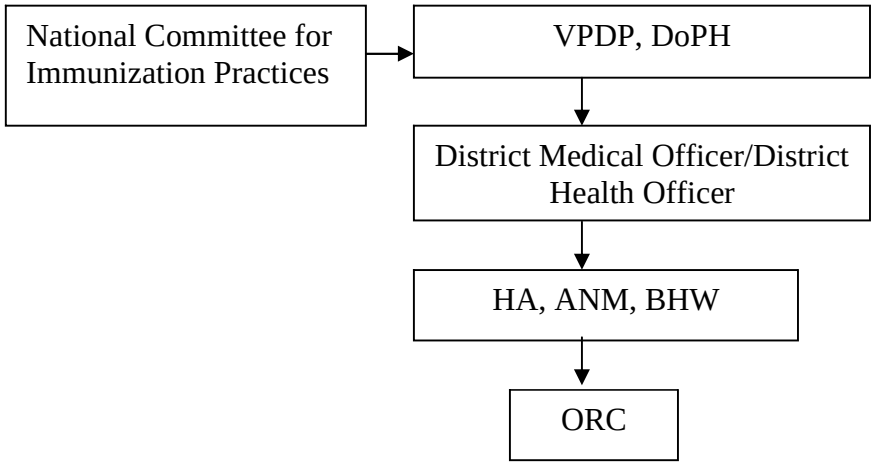
The program used to work with an ad hoc technical committee with non permanent representatives. Acknowledging the lack of technical expertise and realizing the need for a permanent body to advice and guide the program, a National Committee for Immunization Practices (NCIP) was formed in 2007. The terms of reference for the committee are as follows:

- Recommend on the immunization schedules, their adequacy and effectiveness
- Recommend on new immunization initiative (new vaccine, technology, vaccine safety, cold chain)
- Provide technical advice during campaign, outbreaks and emergencies related to VPDs.
- Monitor and evaluate the surveillance, reporting and investigation
- Assist/guide programs in developing proposals.
- Participate in review and assessment of any VPDPs.

There are six members in the committee and all members must be present to conduct a meeting. They must meet every quarterly and more often if required. The program however continues to rely on external consultants and experts to advice and conduct studies/reviews because of the lack of technical experience of the NCIP. It is apparent that this commission needs to be strengthened so as to be more effective and scientific.
In addition there is also a **National certification Commission for Polio (NCCP)** consisting of three members, all of whom are senior, retired health workers. Their roles and responsibilities are to review the AFP surveillance monitor independently on the situation of polio in Bhutan and report to the regional certification commission.

At the regional level there are 7 EPI technicians posted at central and regional stores at Mongar, Gelephug and Thimphu. These are the full time staff working specifically in the EPI. Their main responsibility is to ensure regular supply of vaccines to the health centers and supervision and maintenance of cold chain equipment. In addition, due to lack of alternatives they have been made responsible for stocking and recording of other drugs which also require refrigeration. They correspond and work closely with the central store in charge and the program, however for all administrative issues; the DHO of the particular district is the overall in-charge and must report to him. For the central store in Thimphu, the DVED Joint Director is the responsible head. There is no clearly defined job responsibilities for the EPI technicians and many have been appointed to their position from other sectors without any formal training. Most have learnt their responsibilities on the job and some have availed short term trainings both within the country and the region, however limited to repair of EPI equipments.

Figure 4: The decision making process in the program



At the district level, the MCH center is responsible for delivering immunization services. The staff here also consists of HA and ANM's. The services here are integrated into maternal, family planning, health education, nutrition and immunization services. They function under the direct supervision and management of the DMO while in the hospital.

However all administrative and programmatic matters including submission of monthly reports are forwarded to the DHO. Therefore the reports on the activities of the MCH are submitted to the DHO who forwards it to the program and subsequently compiled with all other BHU reports and then further sent to the BHMIS. The main role of the staff in the MCH center with respect to immunization services is as follows:

- Conduct vaccination for both women and children
- Monitor and report all AEFI
- Calculate requirement of vaccines and wastage and submit report to DHO
- Management of vaccines in the districts
- Plan and implement immunization services in the districts
- Plan and conduct ORC in a timely fashion
- Respond appropriately during outbreak under the guidance of the DMO

Earlier the duties and responsibilities of the DMO and the DHO were not well defined. This created confusion and at times difficulties arose in coordinating health activities. The main problem lay in the DMO taking up administrative responsibilities and also with the notion that he was higher in both qualification and government grade. A new organogram that is being proposed and included in the position classification system of the RCSC hopes to clearly delineate individual duties and responsibilities. The new job descriptions identify the DHO as the overall in charge of all health activities including public health programs in the district while leaving all clinical related activities under the control of the DMO. Therefore the DHO is the person responsible for planning, implementing and monitoring immunization services in the districts. The DMO on his part looks after the clinical services, reports cases of vaccine preventable diseases, adverse effects of immunization and conducts out break responses when it occurs.

At the community level, the person responsible for providing the services to the clients is the Health Assistant, the ANM and the BHW. The HA is usually posted to the BHU, with some HA's also posted in the hospital in the MCH center. As per the job description, the HA is responsible for providing preventive through immunization, promotive through health education and curative services to the population at the BHU.

S/he is the overall in charge at the BHU and must coordinate all community health programs in the gewog. Besides maintaining all relevant data and reporting to the district health administration, s/he must also liaise with other sectors at the community level. With regard to immunization services, the BHU in charge submits a monthly morbidity report, number of vaccinations and ORC conducted adverse effects of immunization and stock of available vaccines. In addition s/he must report and take action immediately during any outbreak such as Acute flaccid paralysis (AFP) and measles/rubella.

The ANM is a nurse midwife and the job responsibility is the same as HA. The training of the ANM is more focused on providing maternal services and in conducting deliveries. All other aspects of the training are to prepare these individuals as community health workers. A recent policy of the MoH however states that ANM and BHW category will be phased out and all health workers at the community level will be HA's. Therefore the designation of ANM has been changed to HA while the BHW's will be provided with an opportunity to upgrade themselves to HA in batch wise.

The BHW is the basic primary level health worker in the Ministry of health and the job responsibility defines the position as providing simple first aid and preventive and promotive services. Immunization is not mentioned specifically as a responsibility, however in practice, the BHW is involved in carrying out vaccination and in the absence of the HA or ANM conducts the ORC.

There is adequate interaction between the National, Regional and District levels in terms of reporting and communicating. Telephone facility is available at all levels of the health care and except for the BHU's, fax and internet facilities are also available in all other centers.

As far as coordination between the different levels of EPI services is concerned it is inadequate and infrequent. There are no planned coordination meetings or any particular forum where immunization methods can be discussed. Most concerns and issues are solved at the individual level between the concerned individual or health center and the

National program managers. Some coordination activities are conducted between the different public health programs at the national level but the field workers are not included. The annual health conferences held yearly gives opportunities for the managers at all levels to come together and coordinate activities. The program also takes opportunities of trainings and other venues when health workers are gathered to coordinate activities and discuss constraints. The management and coordination activities at the regional cold stores are inadequate and weak. While the staffs are fulltime employed for the purposes of vaccine management, most of them have not been formally trained in this subject and even the in charges are unaware of the technical difficulties faced by them.

At the national level there are again no planned coordination meetings between donors and the program or forum for discussion. As mentioned due to lack of technical experience, the program is still dependent on external experts and agencies on certain aspects of the program. This often leads to outside agencies dictating priorities and identifying needs for the program. A clear understanding could be developed among donors and the program through proper planned coordination meetings and formal arrangements of inter agency coordination committees (ICC).

A national EPI policy is in place having been developed in July 2004; however it has not been widely circulated. The articles spelt out in the policy document is out dated and the new EPI manual (2007) has incorporated changes which are not in line with the policy. As such the policy document needs to be reviewed.

4.1.1 Training &Human Resources

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. All the health centers surveyed had the staff strength as per the standard staffing entitlement of the type of health facility. These health workers received their pre-service training in EPI activities at the RIHS. The in service training for EPI activities are not adequate especially for the technicians as there is no formal training curriculum for EPI

technicians. For the health workers especially at the managerial level a 10 day mid level management training used to be conducted, however because of the relevancy for the MCH in charges a new 4 day training on the revised EPI manual is being conducted. While vaccine handling and injection practices are satisfactory, it is apparent that some of them, the senior staffs needed refresher courses especially in the use and management of the newer vaccines. There is a demand from the health worker for more frequent refresher training and there is clearly a benefit in prioritizing trainings for the EPI technicians and the senior health workers involved in providing immunization services at the community level.

Table 3: List of training activities conducted by program

Year	Activity	Status	Remarks
2005	ToT for screening of CRS for DMOs	completed	
	Training of one lab Technician of diagnosis capacity on Hep.B	Completed	
	Training of BHus in charges and medical officers on CRS screening	completed	
	Training of BHU in charges on cold chain, vaccine management and service delivery	completed	
	Mild level EPI management training for health workers	completed	
2006	Training for new doctor and other health workers on revised EPI manual	completed	
	Sanitization on AEFI for RHU staffs and doctors	completed	
2007	ToT for health workers on revised EPI manual	completed	
	Training of health workers on revised EPI manual	completed	

4.2 SERVICE DELIVERY

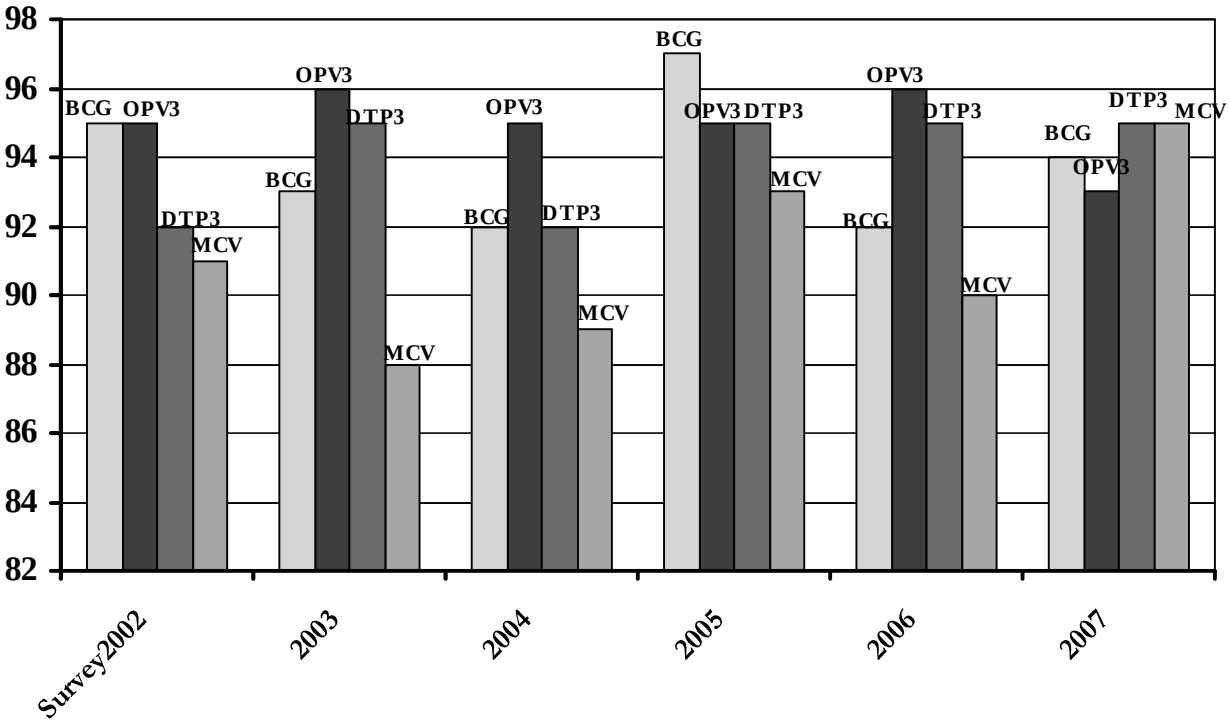
The National schedule for infant vaccination is based on the schedule recommended by the WHO and endorsed by the technical committee formed in the Ministry of Health. The National Policy states that all children should complete the primary immunization series before the age of one year. However, older children requiring immunization are also vaccinated.

Table 4: National Immunization Schedule

Age	**Vaccine/ Vaccines**
Birth or first contact	BCG/ OPV '0'
6 weeks	$OPV_{1,}$ DPT-$HepB_1$
10 weeks	OPV_2, DPT-$HepB_2$
14 weeks	OPV_3, DPT-$HepB_3$
9 months	Measles, Rubella (MR)
24 months	MR, DT

The immunization coverage for children < 1 year was 43% in 1988 (1988 coverage survey) and 84% in 1991 (1991 UCI). Since the declaration of UCI in 1991, Bhutan has been successful in sustaining > 80% coverage of children < 1 year of age for all EPI diseases. In addition several successful rounds of supplementary immunization through National and Sub-national immunizations days have been conducted targeting polio, measles and tetanus. This has been possible despite the challenges such as difficult terrain and limited resources. The EPI coverage for the previous five years is shown below. Although the coverage for individual districts is not known and is not calculated at the districts, the figure below is compiled by the VPDP from the data received by BHMIS.

Figure 5: National Immunization coverage (2002-2007 in percent)



4.2.1 Recording &, reporting:

Record-keeping and reporting are extensive, meticulously maintained, and mostly complete for all aspects of the immunization program. All sites visited used tally sheets, immunization cards and registration books during immunization sessions. EPI manuals and guidelines were available in all the health centers. Monitoring chart use was not uniform. Some of the Health workers do not know how to prepare the monitoring chart and use them. The latest BHMIS guideline does not require the health centers to display the coverage rate for the various antigens; instead they displayed only the absolute number of vaccines administered. The field health workers and the in charges did not know how to calculate the coverage rate because of lack of knowledge of the denominator. The districts report only absolute number of vaccine doses is known.

4.2.2 Monitoring and Supervision

The Monitoring and supervisory activities for EPI are generally not adequate. There is very little information of supervision conducted at all levels. At the district level the DHO does the supervision of the Basic health units, but there is no time bound plan for monitoring and supervision of EPI activities. The supervisory visits from the national EPI level to the service delivery are very infrequent. Even at the regional EPI stores there is no one responsible to conduct monitoring and supervision. Except for some infrequent visits by the Program managers and donor agencies there is no formal supervision. A standard checklist is used only by the VPDP when it conducts supervision and at the district level there is no supervision at all. A list of supervisory visits is maintained in most of the BHUs but it not maintained at the regional referral hospitals.

Drop out rates for DPT1-Measles in the 2002 coverage survey was 3.3 % and invalid doses for Measles 14.8 %. Although the figures are low, it could be further improved with better monitoring and training. This kind of data is also not available yearly for monitoring purposes as coverage surveys are done infrequently due to lack of adequate resources.

INJECTION SAFETY

Guidelines on injection safety are available at most health centers and there is good understanding about injection safety measures. Health workers take proper precautions before giving vaccination. Adequate Auto Disposal (AD) syringes are supplied and only these are used for immunization in the health facilities surveyed. None of the health centers reported shortage or stock out of these syringes.

Safety boxes are supplied in adequate quantities in all the health centers and are being used appropriately in all the immunization clinics. Waste disposal including sharps is done by open pit burning in all the health centers. Incinerator is used only in Thimphu. An assessment of injection safety was carried out in 2005 which noted that AD syringes were used in 77 % of the cases with disposal syringes used in 23 %. The disposal syringes were used when the stocks of AD were exhausted and only till the stocks were

replenished. The field study however found adequate stocks of AD syringes and all health centers were using good safety practices while injecting. The assessment in 2005 also noted that steam sterilizers were not maintained as its use had become limited with the introduction of AD syringes. There is a possibility of reusing disposal equipments by boiling rather then sterilizing in such cases. Therefore the issue of what to do with steam sterilizers should be discussed and implemented.

Correct diluents and correct doses are administered at the right site with proper technique of injection. All the health workers follow the open vial policy for TT, DT, DTP-HepB, OPV in fixed clinics only.

Health workers are aware about AEFI. There are proper guidelines for AEFI management available in the health facilities. AEFI reporting forms are not sufficiently supplied in all the health centers. There has been no severe AEFI reported from any of the health centers under the survey.

Table 5: Reported Adverse Effects Following Immunization, 2005-2007

Year	Case	Death	% Fatal	Number classified vaccine related/ programmatic/coincidental			
				Vaccine	Programme	Coincidental	Unknown
2005	5	0		0	5	0	0
2006	11	0		0	11	0	0
2007	2	0		0	2	0	0
Total	18	0		0	18	0	0

The primary responsibility for investigating cases of serious adverse events remain with the program at the national level, usually involving the AEFI focal person and officials from the VPDP. At the district level the DMO is responsible to investigate any severe AEFI. Most of the AEFI reported are from the referral hospital where there are pediatricians.

Other categories of health workers have rarely reported AEFI due to lack of knowledge of the reporting procedure. There is a need to increase capacity of district level staff to conduct AEFI field investigations.

4.4 DISEASE SURVEILLANCE

Disease reporting system existed since the development of health care delivery system. Compulsory reporting of six EPI target diseases started with introduction of EPI in Bhutan in the year 1979. This reporting has subsequently been modified to accommodate vaccination status of the children. After the establishment of the BHMIS in 2003, this was further modified and it recommended for immediate reporting of all EPI target diseases.

The BHMIS in the Ministry of health is responsible for collecting and compiling all reports submitted from the districts. All surveillance reports including notifiable and vaccine preventable diseases are also collected by the BHMIS and reports published quarterly and in the annual health bulletin. It does not provide the reports or the data to the program directly but must be requested by the concerned program.

There is no separate surveillance unit in the MoH and each program including the VPDP is responsible for initiating and monitoring its own surveillance. There is a research and epidemiology unit but it is weak due to lack of adequate trained human resources such as epidemiologist, biostatistics and public health. In the last five year plan (2002-2007) attempts have been made to integrate surveillance of various diseases into one report with emphasis on notifiable and epidemic prone diseases. At present there are only 10 diseases on the notifiable list including measles, polio, diphtheria, pertussis and tetanus from among the vaccine preventable diseases.

The program started carrying out active surveillance for AFP and zero reporting from 1997 to fulfill the criteria of WHO for polio eradication and it has proved very successful with no cases having been missed. In 2003, the program decided to integrate this process with other VPD's and developed field guidelines to that effect.

It also developed forms for reporting and these have been operational since 2005. There are specific mechanisms in place such as when to send and last date for receiving reports which are used for monitoring and evaluating the effectiveness of reporting. As an impact of high EPI coverage in less-than-one-year-group, reported cases of the six EPI target diseases are decreasing.

Health workers are required to notify the DHO immediately on all epidemic prone diseases and also on diseases targeted for elimination and eradication as per the list. The DHO then informs the DMO and together initiate health intervention and conduct activities for disease containment. The health workers in the field however are not confident to investigate outbreaks and the laboratory services are limited at the district level. They report to the respective program and where appropriate to the PHL for guidance and support. All other diseases are reported on a monthly basis as per the monthly morbidity reporting form to the DHO who compiles the reports and sends it to the BHMIS on a quarterly basis. Since the beginning of 2008, all reports from the districts are sent in electronic format which is then analyzed at the health information unit and is targeted to be made available on the website of the MoH.

Table 6: Yearly reported cases of selected vaccine preventable diseases[7]

Disease	2003	2004	2005	2006	2007
Measles	34	68	69	21	12
Rubella*	NA	NA	41	9	3
Neonatal tetanus*	0	0	0	1	0
Diphtheria	23	0	0	0	0
Pertussis	10	0	0	0	0
Polio	0	0	0	0	0
Tetanus	21	1	5	58	20

* Data for these two sourced from VPDP and PHL

[7] Health Information and Research. Annual health Bulletin, 2008. Policy and Planning Division, Minisry of Health, Thimphu Bhutan, 2008; p 87.

All the health centers assessed were adequately supplied with reporting and investigation forms for reporting vaccine preventable diseases. Though they have not reported any VPD over the past three years the surveillance activities are on going. All the health centers have the AFP surveillance guidelines and awareness is good. Although AFP surveillance is well established activity none of the basic health units assessed have initiated or reported any AFP cases. There is regular weekly zero reporting and active surveillance are done by surveillance officers. Measles and MNT surveillance is integrated to AFP surveillance. The completeness and timeliness of sending integrated AFP, measles, NNT report from health centers has been generally good.

4.4.1 Health Information

The health information and data compiled by the BMHIS and published yearly is however unreliable and flawed due to limited circulation of the data to the program or health centers for verifications and confirmation. This is mainly due to a large bulk of the data being sent from the BHU as reported by primary health workers, purely on clinical suspicions, without any confirmation by qualified physicians or laboratory results. As an example, there were 20 cases of tetanus reported in 2007, 3 below the age of five and the rest above the age of 5 years. Four were admitted in hospital while 16 cases were seen at the BHU. Given the lack of facilities to treat this serious infection at the BHU, it would be expected that there be significant mortality, however there were no reports of any death from tetanus in the same year. The same can be said of rabies although it is improving to some extent.

There are also major differences in the data and information maintained by the BHMIS, and the VPDP/PHL. This is particularly so for measles and rubella. The total number of measles and rubella cases reported by the BHMIS is different from those of the reports of the PHL which tests and confirms all samples sent from the districts with suspicion of measles or rubella. There are no distinctions made between clinically diagnosed disease and laboratory confirmed diagnosis. In addition the PHL is not involved in the surveillance for AFP, with all stool samples being routed through the program directly to the reference laboratory in Thailand.

4.4.2 Epidemiological status of vaccine preventable diseases

Polio and AFP surveillance

In keeping with the international objective of eradicating polio, this disease is well addressed with adequate stock of vaccines and a very effective surveillance system which has been operational since 1997. There has been no case of polio reported in the last 23 years. A national commission for the eradication of polio has been formed which meets biannually and Bhutan is on track to have the WHO certification of a polio free status.

Bhutan is a non-endemic country for poliomyelitis in the SEARO region. The last case of reported and clinically verified (by DMO) case of poliomyelitis was from Tsirang, (Damphu Hospital) in the year 1986. During that time Bhutan was still using the clinical criteria for confirming cases of polio as it did not have the resources or the facilities for laboratory tests. Since 1998, with assistance from WHO the program has initiated and enabled health workers to collect stool samples in all AFP cases and then sending it to the reference laboratory in Thailand for laboratory confirmation. Vaccination against polio (OPV1) has been maintained at > 90 % and the program aims to maintain this coverage at 95 %.

Table 7: Surveillance of Vaccine preventable diseases 2005-2007 (NCCPE report 2007)

Disease	2005	2006	2007
Wild Polio	0	0	0
Compatible polio	0	0	0
AFP cases investigated	6	6	4
Non polio AFP rate per 100000 children < 15 years of age	1.99	2.86	1.91
Adequate stool collection rate**			50%

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

Table 8: Tabulation of AFP Report from Districts, 2007

Dzongkhags	Total reports received A	Total reports expected B	% in Completeness (A/B)*100	Total reports reported before 10th C	% in Timeliness (C/B)*100
Bumthang	48	48	100	48	100
Chukha	144	144	100	108	75
Dagana	101	101	100	89	88
Gasa	46	46	100	46	100
Haa	49	48	102	44	92
Lhuntshe	144	144	100	144	100
Mongar	240	240	100	240	100
Pemagatshel	120	120	100	110	92
Paro	48	48	100	48	100
Punakha	72	72	100	72	100
Sarpang	137	148	93	136	92
Samtse	132	132	100	132	100
S/jongkhar	108	108	100	99	92
Tsirang	60	60	100	55	92
Trongsa	81	81	100	81	100
Trashiyangtshe	96	96	100	96	100
Trashigang	264	266	99	250	94
Thimphu	132	132	100	132	100
Wangdue	120	120	100	90	75
Zhemgang	170	175	97	131	75
TOTAL	2312	2329	99	2151	92

Neonatal and Maternal tetanus

This is another disease which is slated for elimination and since 2002 the surveillance neonatal and maternal tetanus has been integrated with AFP. Although there had been no reported cases from 1986 to 2005 a single case of neonatal tetanus was confirmed in the JDWNRH in 2006. Vaccination of infants with OPV 3 is 94 % and antenatal tetanus coverage is with TT 1 is > 90 % while TT2 is > 85 %.

Measles and Rubella

Prior to the introduction of rubella vaccination, there were frequent reports of the outbreak of measles.

Table 9: Measles cases reported 1993-2002

Year	1993	1994	1995	1996	1997	1998	1999	2001	2002
Reported measles cases	505	683	148	9	157	207	350	460	682

In 2004 during one such report in Trongsa, the VPDP and the PHL with technical assistance investigated and found it to be rubella. Subsequently all the outbreaks were confirmed to be rubella and plan to introduce vaccination took off.

Table 10: Samples tested positive for rubella in 2004

Sl No	Dzongkhag	Sample collected	Sample positive for rubella
1	Thimphu	27	1
2	Haa	20	12
3	Sarpang	27	7
4	Zhemgang	4	2
5	Lhuntshe	9	2
6[i]	Paro	7	Nil
7	Bumthang	5	3
8	Trongsa	102	32
	Total	201	59

In 2006 a mass rubella vaccination campaign was carried out with 98 % coverage after the decision to introduce rubella vaccination in the schedule. Since then MR vaccine has been included in the national EPI schedule and the coverage has been over 90 %.

Table 11: Nation wide Measles & Rubella vaccination coverage

District	Target Population				Number Immusized				Coverage % [(B)/(A)x100]	Number of vaccine Vials Used (C)	Vaccine wastage % [(Cx10)-(b)/(C) x 10)x100]
	9 months - 14 yrs Males	9 months - 14 yrs Females	15 - 44 yrs Female	Total Target (A)	9 months - 14 yrs Males	9 months - 14 yrs Females	15 - 44 yrs Female	Total Immunized (B)			
Trongsa	2232	2204	2747	7183	2188	2129	2619	6936	96.6	733	5.4
Trashiyangthi	3021	2996	3418	9435	3010	3000	3266	9276	98.3	965	3.9
Punakha	2720	3019	3686	9425	2789	2659	4284	9732	103.3	1021	4.7
Thimphu	27596		24332	51928	13639	13903	22969	50511	97.3	5265	4.1
Dagana	4086	3651	4021	11758	3768	3449	3890	11107	94.5	1153	3.7
Sarpang				23220	7426	6353	8978	22757	98.0	2347	3
Samtse	9496	9085	13120	31701	9722	9168	13355	32245	101.7	3323	2.9
Bumthang	2328	2321	2867	7516	2271	2306	2740	7317	97.4	780	6.2
T/gang	8307	8050	10202	26559	8146	7963	9999	26108	98.3	2867	8.9
Gasa	357	360	504	1221	346	350	477	1173	96.1	140	16.2
Tsirang	3996	3909	4900	12805	3567	3409	4632	11608	90.7	1203	3.5
Paro	4774	4980	7679	17433	4694	4930	7503	17127	98.2	1945	11.9
Lhuntse	2492	2583	3006	8081	2463	2552	2849	7864	97.3	871	9.7
S/jongkhar	7341	7456	8796	23593	6904	6969	8292	22165	93.9	2316	4.3
Zhemgang	3601	3590	4222	11413	3144	3010	3666	9820	86.0	1048	6.3
Mongar	6665	6376	8042	21083	6316	6152	7730	20198	95.8	2202	8.3
P/gatsel	1992	2019	2715	6726	2184	2229	2660	7073	105.2	756	6.4
Chukha	11611	11458	12743	35812	10819	10989	15419	37227	104.0	3881	4.1
Wangdue	4425	5116	5620	15161	4963	4878	6162	16003	105.6	1709	6.4
Haa	1702	1608	2364	5674	1633	1571	2279	5483	96.6	574	4.5
Total	108742	80781	124984	337727	99992	97969	13379	33170	98%	35099	5.50%

Hepatitis B

Hepatitis B vaccination was initiated in 2000 with support from UNICEF. The vaccine used was a combination vaccine of DPT + Hep B and given as three doses. Since then the coverage has been good with 94.9% for DPT + Hep B 1 and 93.5% for DPT + Hep B 3. It is difficult to ascertain the burden of Hepatits B in the population as the HMIS reporting form does not differentiate the different forms of hepatitis and very few are confirmed through blood tests.

With regard to vaccination, it has been difficult to do away with the single antigen vaccine as they are required to be given in special cases such as at birth to infants born to

Hepatitis B positive mothers, to the spouse of an infected person and in all other high risk cases. These are however based on clinical conditions and not as guidelines from the VPDP which is not there due to cases being beyond the EPI target population.

BCG & Tuberculosis

The coverage for BCG has been the highest, probably because of the need to register the baby and to make the MCH card which is required for admission to schools and also for other purpose. BCG coverage is 95.3%.

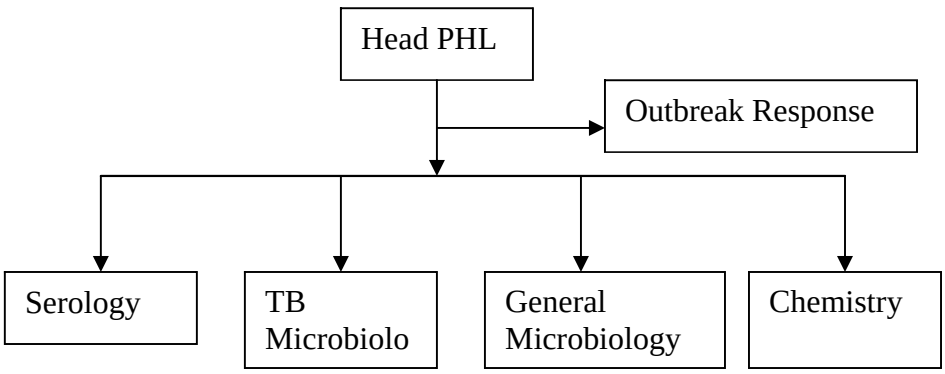
Diphtheria and Pertussis

Since 2004 there have not been any reports of these two diseases. Clear guidelines including clinical criteria for identifying these diseases have been developed for primary health workers. The reporting and surveillance has been integrated with other VPD and as a result the reports from the field in this respect have improved.

4.4.3 Laboratory facility:

The PHL is the main laboratory that focuses on EPI diseases. There are currently 17 staff in the laboratory and it has a unit head. The organogram of the PHL is shown below.

Figure 6: The organizational structure of the PHL



Laboratory test for measles and rubella was started in 2003 for surveillance of the vaccine preventable diseases at the Public Health Laboratory, Thimphu. Hepatitis B serological surveillance is also done at the laboratory. The laboratory test done is submitted to the SEAR- Measles Laboratory Network and to the VPDP. The constraints are that serotyping cannot be done for measles and rubella as molecular and virological facilities are absent. Most of the tests also cannot be done on site and samples have to be brought back to the Thimphu. There is lack of trained manpower as most of the staff have come through the general laboratory and have received limited training in specialized laboratory methods. There needs to be better coordination with the program and clear guidelines on the functions of the PHL vis a vis the General laboratory of the hospital needs to be instituted, to avoid duplication and confusion.

The regional referral hospital laboratory has the capability to carry out the rapid tests but they are not supplied with the kits. However they collect the blood samples and send them to Thimphu for testing. The tests for diphtheria and pertussis are not available in the country.

There is no WHO accredited Poliovirus laboratory in Bhutan. Diagnostic specimens such as stool samples from cases AFP and contacts are sent to Thailand. The samples are air-transported from Paro to Bangkok. Strict reverse cold chain is maintained from collection, storage to transport of stool samples.

Table 12: Laboratory tests done at PHL,2003-2007, Thimphu

Year	Number tested for Measles	Measles IgM Results			Number tested for Rubella	Rubella IgM results		
		+ve	-ve	Equivocal		+ve	-ve	Equivocal
2003	122	0	122	0	164	56	99	9
2004	105	3	101	1	95	12	74	9
2005	190	9	180	1	208	41	154	13
2006	61	2	54	5	62	9	50	3
2007	52	11	41	0	52	3	48	1

4.5 NEW AND UNDER UTILIZED VACCINES

The National Policy clearly states that efforts will be made towards introducing combined vaccines such as DPT + Hepatitis B + Hib to reduce the number of injections, improve injection safety and reduce the vaccination delivery cost. It also states that a disease burden assessment and a financial sustainability plan will be a prerequisite. In addition the epidemiological characteristics of the disease, vaccine efficacy, cost benefit analysis, the programmatic feasibility and the decision of the national technical committee will be considered.

4.5.1 Haemophilus influenza type B (Hib)

A rapid assessment of Hib by a team from WHO in June 2002 estimated that there were 15 cases per 100,000 children <5years with Hib meningitis in the western region and on extrapolation, approximated the burden of Hib at 324 cases of Hib meningitis and pneumonia and 45 deaths each year in the same age group for the country. Further they estimated the cost of this disease for the country to be between US $ 52,000-175,000 for treatment alone while providing immunization with the vaccine would only incur a cost of US $ 63,200 making it hugely cost effective. They however recommended that surveillance for culture confirmed meningitis must be further strengthened and expanded to the regional referral hospitals. The country should also refine the cost effectiveness of introducing the vaccine and consider more accurate estimates by taking the number of doses, the formulations desired and the method adopted to provide vaccination.

4.5.2 Combination vaccines

With the rapid advancement of medical technology and better understanding of the diseases, the number of vaccines has increased and highly innovative and more effective methods of delivery have been devised. The challenge for Bhutan has been to adapt to these changes by balancing the scarce available resources with the benefits. Both Hepatitis B and Rubella vaccines were introduced in combination with DPT and Measles respectively largely for more effective delivery but specifically because of the lower costs. There can be no doubt that combination vaccines are more convenient, easier and faster to administer and more cost effective. Although the need for single antigen

vaccines for the primary series of immunization is removed, there are other conditions such as vaccination for Hepatitis, Tetanus and rubella when they are required. Therefore it is imperative that there be sufficient stock which inadvertently leads to additional costs. There are also no clear guidelines on when and how to use these single antigen vaccines leading to inappropriate and unnecessary usage.

Therefore if we are to introduce Hib, then these considerations must be made along with all the other valid reasons such as reducing disease burden, cost and convenience of vaccination.

4.6 VACCINE FINANCING AND SUSTAINABILITY

Given the scarce resources and limited budget, Bhutan has always been dependent on donor agencies for providing immunization services. Fortunately the population has been small and the political will of the government strong in implementing the program. The government and the MoH has used the resources judiciously and effectively thereby ensuring a universal child immunization. In principle as per the immunization policy at least 2 % of the total health budget is to be allocated for EPI activities, and this has been met consistently with 2.6 % being allocated in 2006. Table below shows the baseline indicators of vaccine financing in Bhutan.

Since the beginning of the EPI program, UNICEF has been the major donor for vaccine financing and partnering with the government in procurement of routine vaccines as well as provision and maintenance of cold chain equipments. The other agencies who have assisted in financing Bhutan's VPDP are WHO, GAVI and JICA. The contributions made at the baseline and expected contributions for the multi year plan for immunization by these organizations is shown below.

Table 13: Baseline indicators of vaccine funding

Baseline Indicators	2006
Total Immunization Expenditures	$650,404
Campaigns	
Routine Immunization only	$650,404
per capita	$1.0
per DTP3 child	$48.7
% Vaccines and supplies	32.0%
% National funding	76.4%
% Total health expenditures	2.6%
% Gov. health expenditures	2.9%
% GDP	0.08%
Total Shared Costs	$508,506
% Shared health systems cost	44%
TOTAL	$1,158,910

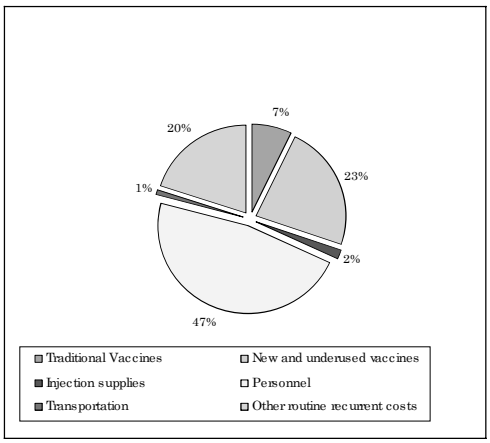
Source: VPDP, MoH Thimphu

Table 14: Baseline and projected Vaccine financing by Government and donors in US Dollars.

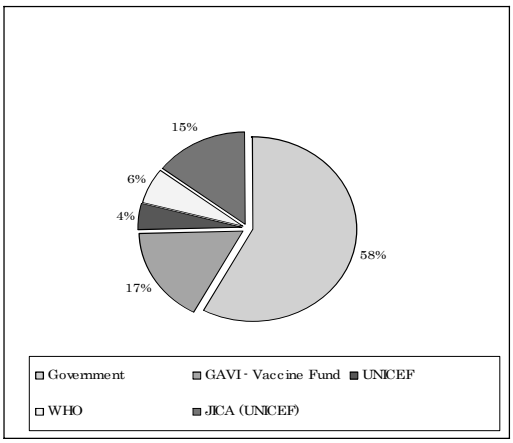
Agencies	2006	2009	2010
RGOB	496,808	350,616	404,474
UNICEF	32,362	35,000	32,131
WHO	53,011	25,000	5,000
GAVI	144,580	262,817	167,010
JICA	52,404	80,000	62,000
Total	779,165	753,433	670,615

☐ Secured Financing

Chart showing baseline costing of vaccines and financing profile of donor agencies



Baseline costing profile



Baseline financing profile

In terms of specific financing profile, the RGOB funds were directed towards personnel salaries, per diem, transportation, maintenance of cold chain and program management. Aid received from GAVI went towards purchase of MR vaccine and injection supplies while UNICEF funds were used for training, IEC mobilization, cold chain management and a small amount for program management. JICA and UNICEF funds were used for the procurement of traditional vaccines through a multi lateral meeting for a period of five years while WHO funded training and disease surveillance.

With limited funding and a wide gap in projected and secured funding the RGOB is expected to contribute more funds in the coming years as per the multi year plan for immunization. This is expected to come largely from the Health Trust Fund which was created to sustain the health services and remove financing uncertainties especially in timely supply of essential drugs and vaccines. The fund has grown to a little over US $ 22 million which is still short of its target of 24 million. There are discussions of reviewing revising the target figure given that additional vaccines have been included in the primary series and also because of the rise in costs of both vaccines and drugs. The BHTF has already funded some activities of the program such as the procurement of vaccines; Hepatitis B, rabies and the largest contribution was financing the mass rubella campaign. From 2008 procurement of new vaccines is being co-financed by the trust fund along

with GAVI. The constitution of the Kingdom of Bhutan in article 9.21 guarantees free access to basic public health services which is further reaffirmed by the National EPI policy which states that "the establishment and operation cost of routine immunization service delivery shall be fully borne by the RGOB" and that "routine immunization activities implementation budget shall be part of the districts health budget and the national EPI budget a part of the health Ministry's budget".[8] While GAVI and WHO financial support has been secured, the government will be mobilizing additional funds from its other partners such as UNICEF, JICA and others. The inputs sought will be utilized in specific areas such as vaccine procurement, cold chain, immunization campaigns and management strengthening.

4.7 COLD CHAIN LOGISTICS AND VACCINE MANAGEMENT

The inventory for cold chain equipment is maintained both by the VPDP and the DVED. The program has been regularly updating the inventory and documentation is well maintained. The team reviewed the records and also made an assessment of the vaccine management system such as cold chain and vaccine supply.

4.7.1 Type of equipment

The estimated total equipment available was 37 in the health facilities assessed. 43% of these were refrigerators and all the BHUs had the EK type. The deep freezers were all in the central cold stores. 73 % of the immunization units in the country had EK refrigerators.

Table 15: Type of equipment in the health facilities surveyed

Type/model	Number	Percentage
EK 170/240	11	29
Refrigerator (Godrej)	5	14
Deep Freezer	11	30
Ice- lined Refrigerator	10	27

[8] Public health department. National Immunization Policy and strategic guidelines for national immunization services. Ministry of Health, Thimphu Bhutan, July 2004; p 37

Graph showing type of cold chain equipment in the health centers surveyed

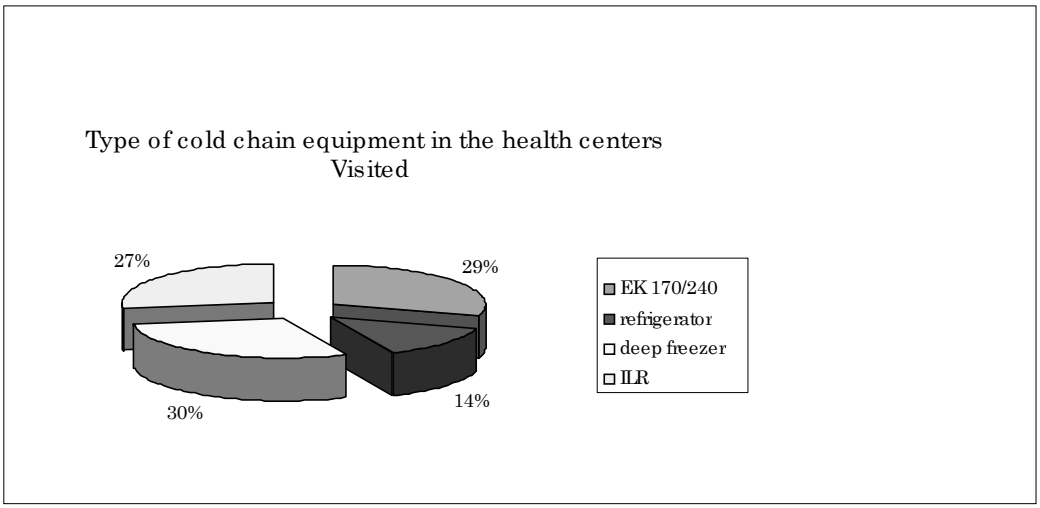
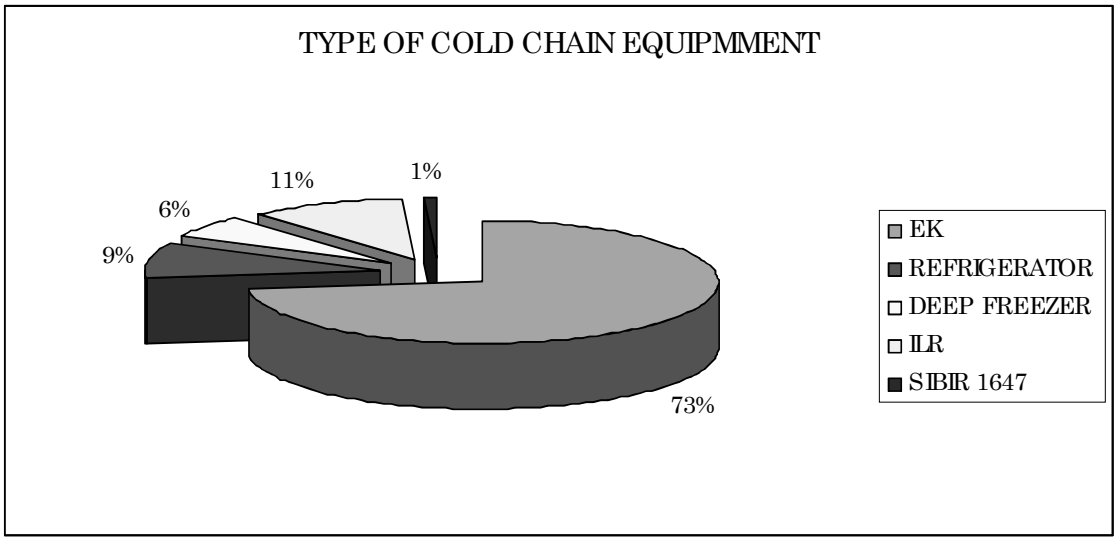


Table 16: Total number of cold chain equipments in the country.

Type/model	Number	Percentage
EK	193	73
REFRIGERATOR	25	9
DEEP FREEZER	15	6
ILR	29	11
SIBIR 1647	2	1
Total	264	100

Graph showing the total number of cold chain equipments in the country (%).



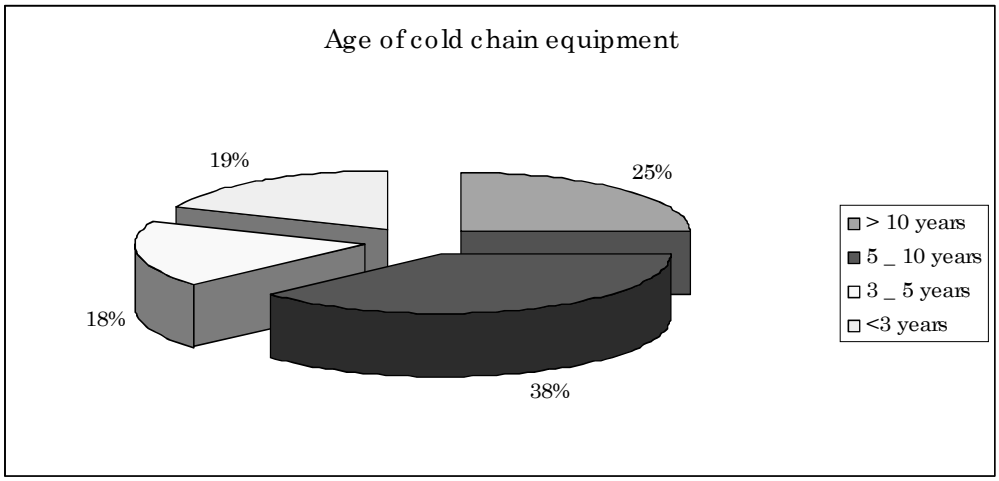
4.7.2 Age of equipment

63% of the cold chain equipment was more than 5 years and 25 % of the equipment was more then 10 years.

Table 17: Age break down of the cold chain equipment

Age	Frequency	Percent
> 10 years	65	25
5 _ 10 years	99	38
3 _ 5 years	47	18
<3 years	48	19
total	259	100

Chart showing age of cold chain equipments in the country



4.7.3 Source of energy

Electricity is the main source of power for cold chain equipments. There is reliable electricity supply in most of the health centers and the health workers have contingency plan for emergency. At the national and regional cold store there is a generator backup to ensure cold chain. At the BHU they have EK refrigerators which can function on kerosene. There were adequate supplies of kerosene. There were no incidences of cold chain failure reported due to power failure.

4.7.4 Working status of the equipment and maintenance

100% of the health facilities surveyed had a functioning refrigerator or a deep freezer. There were adequate supplies of vaccine carriers and cold boxes. The repair and major maintenance of the equipments are done by the EPI technicians from the national or the regional cold store. The spare parts for the cold chain equipments are available adequately. The health workers had limited knowledge on repair although they were aware about some aspects of maintenance. This however did not translate into performing preventive maintenance on a timely fashion.

Transportation of vaccines from the central store is done by refrigerated vans which are five in number, four in the field and one at the MoH as standby. During times of breakdown, ambulances have been used for transporting vaccines using cold boxes.

The drivers also are not confident of maintaining and repairing the refrigerator component of the vehicle. As transportation is expected to rise with increasing number of vaccines and with more focus on quality, additional refrigerated van may be required.

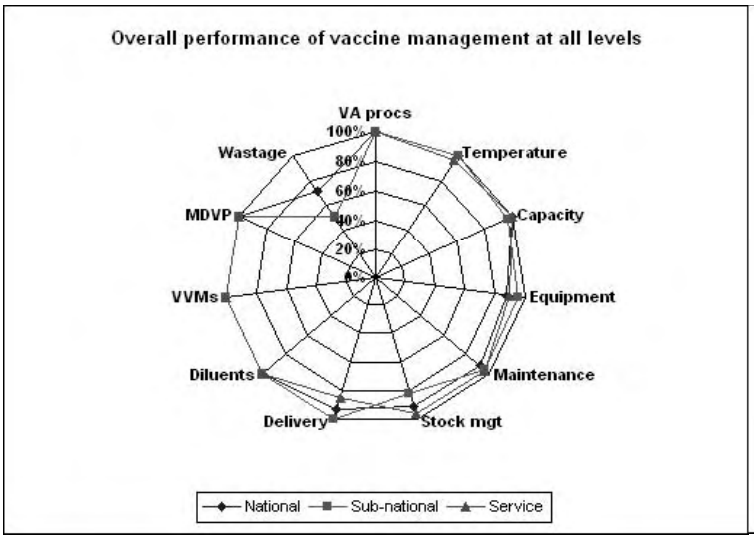
4.8 VACCINE MANAGEMENT

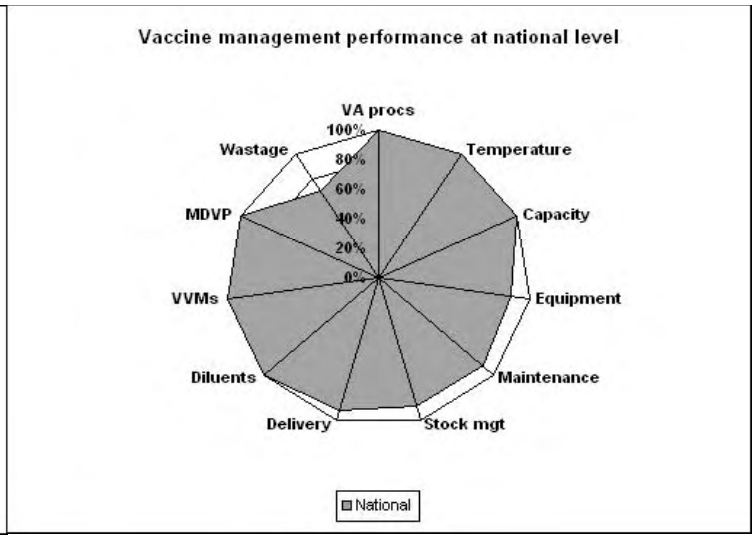
While reviewing the vaccine management and cold chain logistic the focus was on the following nine components related to vaccine management.

1. Vaccines storage temperature
2. Storage capacity
3. Building, cold chain equipment and d transport
4. Maintenance of cold chain equipment and transport
5. Stock management
6. Effective vaccine delivery
7. Correct diluent use for freeze dried vaccines
8. Effective use of VVM
9. Vaccine wastage

These categories were assessed based on the WHO-UNICEF "Vaccine Management Assessment Tool' (VMAT) which defines a specific scoring for each aspect of performance. The result is represented on a spider graph showing the performance from 0 to 100%. The higher the score the better is the performance. The overall performance is above 90 % except for the wastage control.

Spider Web: Performance at the national /sub-national and service delivery level





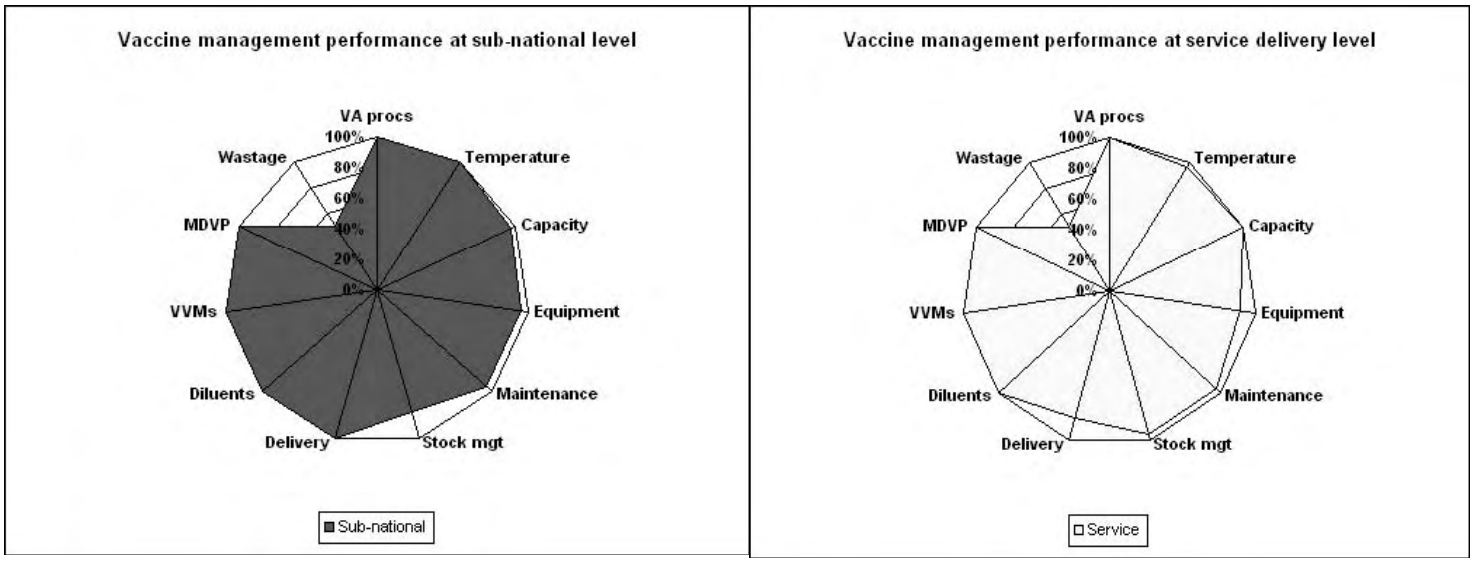


Table 18: Vaccine management performance as per level of service

Facility▼ Criterion▶	1 VA process	2 Temperature	3 Capacity	4 Equipment	5 Maintenance	6 Stock mgt	7 Delivery	8 Diluents	9 VVMs	10 MDVP	11 Wastage
National	100%	100%	100%	88%	91%	91%	93%	100%	100%	100%	71%
Sub-national	100%	100%	96%	96%	95%	82%	100%	100%	100%	100%	50%
Service	100%	96%	100%	89%	96%	96%	85%	100%	100%	100%	50%
Average:	100%	99%	99%	91%	94%	90%	93%	100%	100%	100%	57%

4.8.1 Temperature Monitoring

All manual temperature records have been maintained at all places very meticulously except in one hospital. The records indicate proper storage temperature within the recommended range of temperatures. Most staff had good knowledge about safe storage temperatures. There was no written instruction on how to implement contingency measures, however most of the staff were aware and had some idea on how to handle emergency situations such as, in case of equipment or power failure which could disrupt the cold chain.

4.8.2 Cold Chain Capacity

There is sufficient cold chain capacity at all levels for routine immunization. During the assessment it was found that along with vaccines other drugs and laboratory reagents are also stored despite orders from the VPDP to use it only for vaccines. This could lead to overcrowding of the refrigerators and deep freezers and in addition the cold chain can be hampered due to prolonged and repeated opening. There is also the risk of accidental administration or delivery of the wrong vaccines.

4.8.3 Infrastructure

The condition of the buildings was good and the total space available for the vaccine store is adequate in most places. The regional cold store at Monger is at the basement level and has inadequate ventilation. However there is a plan to make a separate building to house the store in future. Most of the equipments are in good operating condition. The walk in cold room is available only at the national cold store. There is a requirement of walk in cold rooms in the regional cold store in view of the future plans of introducing newer vaccines. There are adequate supplies of spare parts for repair of the cold chain equipments. In case of power failure; the generator back up is available in all the central stores. All the central stores have a cold van for transporting vaccines. But due to fuel shortage and breakdown, at times vaccines are transported in the ambulance using cold boxes.

4.8.4 Maintenance

All equipment has been mostly operational. However, there is no periodic maintenance plans. Engineering interventions are basically on demand. Daily maintenance care is done by the health workers. There is a demand for refresher training for maintenance of equipments by the health workers. Spare parts for equipment repair are adequately supplied at the central stores. Whenever there is equipment break down the EPI technicians are informed directly or through the DHO. All the central stores have adequate technicians for the maintenance and repair works of their catchments area.

4.8.5 Stock Management

The recording forms are very well designed to record all salient parameters. The forms are used at all levels. Physical verification of stock was conducted at random for some of the vaccines and was found updated. There was adequate buffer stock available at all the health units. Vaccine forecasting is not uniform and the health worker has difficulty in doing it correctly. The second edition of the EPI manual is already introduced in some of the districts in 2008 and this will help the health workers to undertake vaccine forecasting correctly.

4.8.6 Effective vaccine deliveries

Vaccines arrive to the country at the national central cold store. From there the vaccines are distributed to the regional stores quarterly and from the regional store, vaccines are supplied to the hospitals on monthly basis. Generally there is good supply of vaccines to all the health facilities. Most health workers are knowledgeable in ice pack conditioning. The vaccine carriers are used for transporting vaccine to the smaller health units and to the out reach clinics. Correct methods of packing the vaccines are used.

4.8.7 Correct diluents use for freeze dried vaccines

In most places, diluents are received and delivered in matching quantities. At the health centers the diluents are stored in the cold storage like the vaccines and transported together for outreach clinics. At the central level the diluents are not kept in the cold chain.

4.8.8 Effective use of VVM

The VVM is well understood and interpreted by all staff. The stage of VVM is well used by the store managers to supersede the Early Expiry First Out (EEFO). VVM posters are present in all the health centers to remind the health workers.

4.8.9 Monitoring Vaccine wastage

There is a vaccine wastage monitoring system and from the service level, reports are sent to the higher level. The health workers know how to calculate the wastage rate and the information has been used to make some operational changes such as conducting twice weekly immunization clinics. Vaccine Wastage is monitored in most of the health units. There is also wide variation in vaccine wastage rates possibly because of differences in catchment population at different clinics

There is also wide variation in vaccine wastage rates possibly because of differences in catchment population at different clinics. The wastage rate of BCG ranges from 70-90 %, wastage rate of DPT-Hep ranges from 1-25%. All the health centers follow open vial policy; however at the outreach clinic the open unused doses are disposed. Adequate diluents are supplied with vaccines requiring reconstitution (BCG and MR). Health workers use the specific diluents for the vaccine reconstitution.

Table 19: Vaccine wastage (%) in the areas studied taking both open and unopened vials

Vaccines	D/ling	T/gang	Mongar	Drem	Yadi	G/sing	G/phu	Nor	Jig
BCG	96	92.5	91	88	95	95	78	92.5	90
MR	80	68	80.7	78	60	83.3	46	60	73
DPT/ HepB	18	20.83	22	21.4	0	0	1	20	0
OPV	0	26.6	33	40	80	0	5.7	40	67

The high wastage factor is already a concern for the VPDP and the donors and an in depth study is possibly required before implementing a strategy to reduce wastage.

4.8.10 Vaccine supply and quality

Generally vaccines have been adequately supplied to health centers. The vaccine forecasting for the whole country is done by the program based on the UNICEF forecasting for vaccines, safe boxes and AD syringes. The district managers do not do forecasting and are unaware of the method although the new EPI manual has step by step

guidelines on this. The Vaccines arrive first in the national central cold store and from there, depending on the indent; placed from the regional central stores the vaccines are supplied. The vaccines are transported in the cold van which ensures the cold chain. From the central regional store vaccines are supplied to district and basic health units on monthly basis. For the out reach clinics the vaccines are taken from the respective hospital or the BHU for the outreach sessions.

There is adequate supply of vaccines and there has never been interruption of immunization services because of vaccine shortage. The vaccine stock register are well maintained. The quality and expiry dates are monitored in all health units.

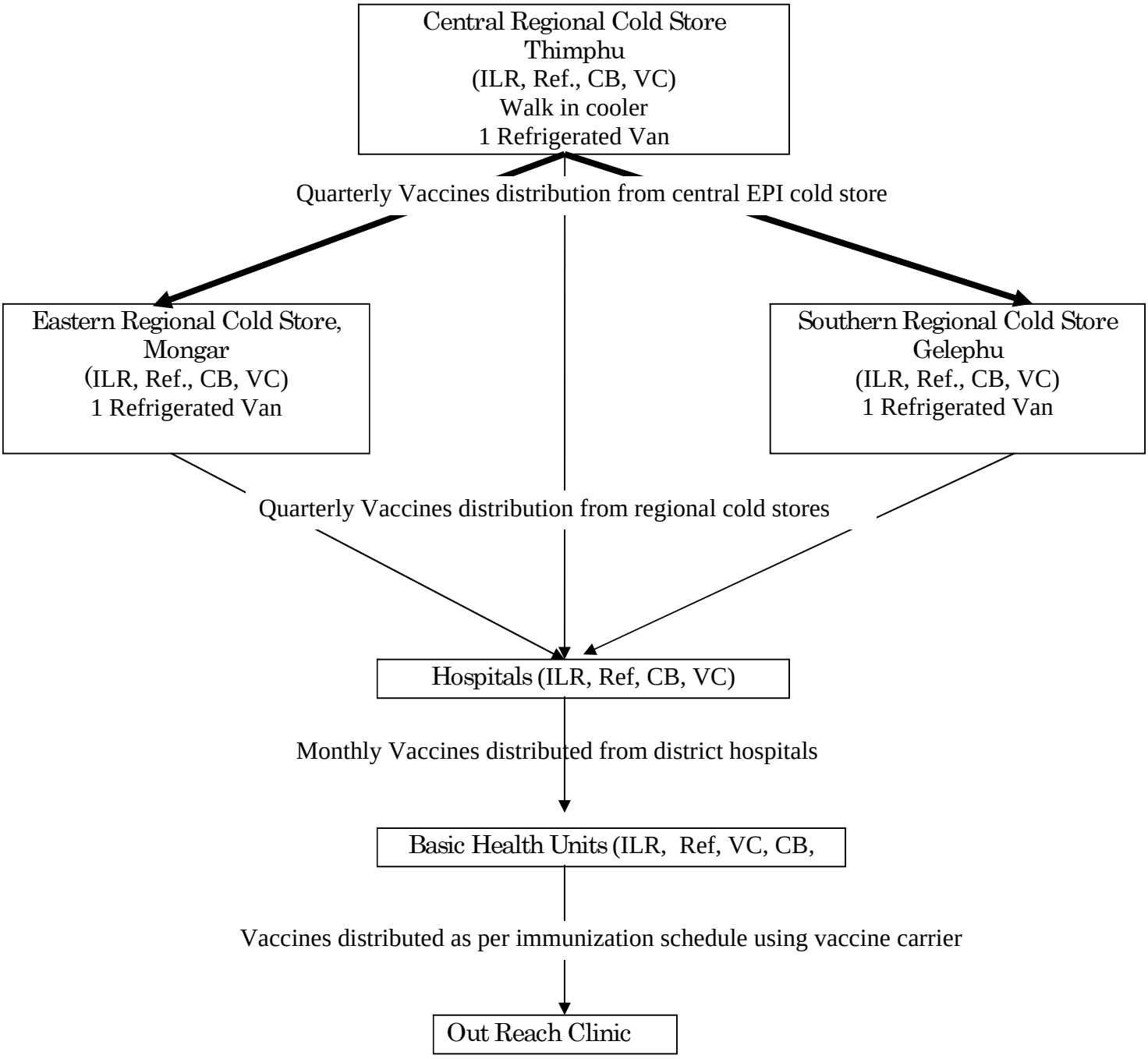
Table 20: Number of doses of vaccines supplied 2007

Year	BCG	Measles	DPT-Hep. B	OPV	DT	HepB	TT
2007	133880	84170	57212	56080	46270	4840	68930

Table 21: Number of vaccine dosed administered

Year	BCG	Measles	DPT-Hep. B 3rd	OPV 0	OPV 3rd
2005	14084	13435	13728	11696	13746
2006	13484	12777	13400	10906	13531
2007	12525	14726	12693	10469	12361

Figure showing distribution process of vaccines



4.9 ADVOCACY AND COMMUNICATIONS

4.9.1 Local Communities:

Advocacy and social mobilization for immunization in the community is very strong. The village health workers play a very important role in making the EPI activities successful. They help the health workers during the clinic sessions, by informing the public about the session schedules and even help in tracking down defaulters. There is good rapport between the health workers and the community. The parents also have good information regarding importance of immunization for their children. Most of the parents can tell the names of the diseases for which immunizations are given.

4.9.2 EPI poster in BHU

Local authorities have been supportive in terms of community mobilization and organization of immunization sessions during campaigns. The existing potential of local administration could be further utilized to support routine services through continuous and effective advocacy. Local communities have desire to support the program as and when approached. This area needs further improvement for community participation and provision of required support to organize immunization sessions.

4.9.3 IEC material

Though the immunization services is well accepted by the community as an important health activity to improve child health, there are very few IEC materials available for the health workers to use for health education. Very few IEC materials were displayed in hospitals and basic health units. IEC materials for routine immunization have been limited in terms of numbers and quality. Almost all available IEC materials are confined in the clinic rooms and display in public places is limited.

4.9.4 IEC by health workers

The team found that IEC activities conducted by the health workers during clinics are inadequate. There is more focus on vaccination and not enough on IEC such as benefits and possible AEFI.

The health workers also do not mobilize community members and there are no records of any IEC activities within the community. Although the new MCH handbook contains relevant information, health workers do not take time to explain the health messages contained in the booklet.

5. CONCLUSIONS AND RECOMMENDATIONS

This rapid field study of the pre selected health centers and the assessment of the VPDP enabled the team to study the strengths, challenges and weaknesses which are summarized below. Recommendations have been made following each of the various programme components which were the focus of the study.

5.1 PROGRAMME MANAGEMENT AND COORDINATION

Strengths

- High priority by the government
- Committed and motivated staff at all levels
- Documentation and plans well developed
- Revised EPI manual more comprehensive and various guidelines covering all aspects of immunization services are adequately supplied to the service delivery facilities.
- Appointments of DHO to administer health activities in the districts and clear delineation of responsibilities of both DHO and DMO
- Categorization of all primary health workers as HA's will help to delegate equal job responsibilities at the BHU, which in any case is the same for all categories.

Challenges

- There is no clear delineation of roles and responsibilities or job description of staff at the national level
- Lack of co-ordination among staff at all levels and among donors vis a vis with the program.
- Lack of managerial skills and technical knowledge at all levels especially for new appointees and at the first level
- Absence of formal training and inadequate training for EPI technicians
- National policy and strategy is outdated and not distributed widely, therefore lack of awareness

Recommendations

- Delineate clear responsibilities and provide job descriptions for programme managers by the HRD for better performance
- Organize regular coordination meetings between donors, between donors and program and between program, district managers and field workers. Review utility of Partners Coordination Mechanism and institute inter agency coordination committees
- Institute systematic monitoring and supervision with appropriate checklist at all levels of the immunization services.
- Strengthen the NCIP through training and opportunities for enhancing technical experience to effectively guide the program
- Institute formal training program for EPI technicians which will include vaccine management in addition to repair and maintenance.
- Review and revise the national policy to incorporate changes made in the national immunization schedule and the new strategies adopted.

5.2 TRAINING

Strengths

- Adequate human resources with all health centers surveyed having the requisite number of health workers
- EPI training incorporated in the pre service curriculum at the RIHS
- Revised EPI manual is used for training MCH in charges which has replaced the midlevel training and is better suited for the needs of the actual providers
- Demand for training by the health workers themselves which shows the interest and needs by the health workers and technicians

Challenges

- Reviewing and Revising the curriculum at the RIHS at regular intervals to meet new challenges and include new changes
- EPI technicians are mostly senior people who lack the basic minimum education for obtaining formal training and further education

- Involving HERM unit in facilitating and teaching pre service candidates on repair and maintenance of EPI equipments.
- Capacity building of trainers to conduct operational research and identifying training opportunities so that appropriate training packages can be developed for the different categories of EPI service providers

Recommendation

- Training needs assessment should be done with development of long term training plan for all categories of staff involved with immunization.
- Design and implement an appropriate training package for EPI technicians including repair, vaccine management, logistics and also for the drivers of the refrigerated van on repair and maintenance of cold chain component..
- Continue regular training for staff and post training supervisory support

5.3 SERVICE DELIVERY

Strengths

- Access to health services is high – 90% of population lives within 2 hours of walk from the health facility
- Access to immunization and other MCH services is very high. Services are provided free and at both fixed sites and also in a number of out reaches. The ORC sites are permanent and are maintained by the community themselves. The catchments population is aware of the benefits and the schedule with the active participation of the VVHW.
- 100% of the scheduled outreach clinics are conducted as per schedule.
- High commitment by the staff for immunization activities.
- All efforts are made to achieve 100% of the catchments area by the health workers in the service delivery center.
- All the out reach clinic in the assessment have a proper shed except one.

Challenge

- Lack of planned monitoring and supervision from all the levels to the service delivery points.

- Staff at service delivery level not using monitoring chart uniformly for monitoring drop-out rates and monitoring the target achievement.
- In the urban centers there is no reliable household population census to estimate the target population. Therefore it is very difficult to calculate the coverage rate of the facility.
- Feedback not provided to lower levels
- Immunization coverage survey not done for the past 6 years.

Recommendations

- Develop EPI supervision protocol/ supervision checklists including reporting formats of supervision activities to the next higher level and devise a feed back mechanism.
- Health workers should be trained to maintain uniform coverage rate of their catchments areas and use monitoring chart to monitor immunization achievement and drop out rate at the health facility. Household survey of the urban area should be done from time to time to estimate the vaccine coverage correctly.
- Immunization coverage survey should be conducted at regular interval to know the status of the immunization coverage to identify difficult and poor performing areas and to validate the data generated by the health facilities.
- National level to train all levels on how to monitor drop out rate and institute system of reducing drop out rate

5.4 INJECTION SAFETY

Strengths:

- Guidelines on injection safety available at all health centers
- An assessment of injection safety practices has been conducted and all constraints and challenges identified
- Universal usage of AD syringes in all health centers
- Adequate stock of AD syringes and safety boxes
- Proper use of safe practices and high degree of awareness on safety issues such as collection of sharps

Challenges

- Rising trends in blood borne infections in all health centers
- Utility of steam sterilizers has decreased with the introduction of AD syringes
- Increase in quantity of wastes generated by increasing number of vaccination and inadequate means of waste disposal
- The low reporting of AEFI
- Limited facilities of the district laboratories and also at the PHL to adequately investigate AEFI

Recommendation

- A proper assessment of waste disposal needs to be done so that a more efficient waste disposal method is designed. Further MCH in charges needs to follow recommendation of covering disposal sites adequately
- The utility of steam sterilizers needs to be addressed and clear guidelines issued on what needs to be done with this equipment
- More awareness needs to be made among health workers on AEFI and on the proper means of reporting and investigating
- District laboratories and health centers need to be strengthened to adequately investigate all AEFI's in time

5.5 DISEASE SURVEILLANCE

Strengths

- There are adequate guidelines and manuals for the purpose of surveillance
- Integrated surveillance and zero reporting for all targeted EPI diseases in place and routinely carried out.
- There has been a decline in the incidence of vaccine preventable diseases over the past decade
- Deaths due to vaccine preventable diseases are reduced significantly.
- Adequate surveillance forms available and timeliness of reporting
- Efficient AFP surveillance in place along with the NCCP

Challenges

- Lack of a separate surveillance unit at the national level
- Lack of qualified personnel in the research and epidemiology unit such as epidemiologist to manage this function.
- Limited and inadequate coordination between BHMIS and program in surveillance of diseases.
- Health workers lack experience and training in investigating disease outbreak
- List of notifiable diseases is limited and does not reflect all the EPI diseases Rubella and in general should include other relevant epidemic prone diseases such as dengue.
- Lack of adequate diagnostic facilities such as kits and appropriate tests n all the laboratories at both the district and the national level in particular the PHL. No virological unit in the PHL which seriously limits surveillance activities
- Strengthening surveillance at the community level
- Staff in the BHMIS not aware about surveillance and limited knowledge on the notifiable diseases as they do not handle the reports themselves, limiting their role in only compiling.
- Lack of resources and donor dependency makes it difficult to make appropriate long term costing plan when introducing new vaccines.
- Increasing work load of the health workers with increasing number of reporting activities.

Recommendations

- Strengthen the Integrated Diseases Surveillance strategy nation wide. Conduct regular trainings for the health workers in surveillance activities using the surveillance data.
- Institute regular co-ordination meetings between BHMIS, the program and the DHO/DMO for improving surveillance
- BHMIS should share data submitted from the districts with the VPDP for verification and also confirm all reports with the DHO/DMO.
- Develop a surveillance unit within the Research and epidemiology unit and appoint or train an epidemiologist to head this organization

- The laboratory facilities at both the district and the national level in particular the PHL needs to be strengthened to address virology section and also appropriate tests for EPI diseases.
- Strengthen surveillance at the community level through training and awareness
- Staff in the BHMIS should be made aware of the diseases that need to be under surveillance through appropriate training forum so that data collected can be scrutinized and made more reliable.
- While introducing new vaccines, a long time costing plan that includes accurate estimates, cost effectiveness and sustainability should be incorporated

5.6 NEW AND UNDERUTILIZED VACCINE

Strengths

- Disease burden studies successfully carried out prior to introducing new vaccines especially for rubella and hemophilus influenza
- Successfully introduced routine rubella vaccination (MR) after a very successful mass vaccination campaign in the whole country

Challenges

- Absence of a long term plan for vaccine financing especially when introducing new vaccines
- Absence of clear guidelines for single antigen vaccines (TT, Hepatitis B)

Recommendation

- The VPDP should prepare a long term strategic costing plan for all new vaccines
- Clear guidelines should be developed for use of single antigen vaccines and these should be monitored
- VPDP should be involved in the planning and management of all vaccine related diseases and not be limited to the target population related vaccines

5.7 VACCINE FINANCING

Strengths

- Multi year plan for immunization in place
- Adequate infrastructure, equipments and human resources
- Strong donor support given the effective utilization of funds
- Storing political support in that, of the total budget, 2.9% is given to health and out of which 2.6% is for the VPDP activities.
- Bhutan health trust fund established and within reach of the initial target of US $ 24 million

Challenges

- State policy to provide free provision of health care to all citizens including immunization
- Dependency on donor for funding vaccines, logistics and training
- Maintaining universal child immunization and attaining the immunization and millennium development goals.
- Introducing new vaccines sustainably

Recommendation

- Revision of the BHTF target given the increased in costs of vaccines, transportation and addition of new vaccines. (Already under discussion)
- In consultation with donor agencies, institute a sound long term costing plan with accurate estimates and follow up through regular coordination meetings
- Begin using the funds from the BHTF for purchasing traditional vaccines
- Prioritize new vaccines according to burden of disease, estimated through regular surveillance
- Explore other sources of funding for vaccines through partnership and competitive proposals. The capacity of the staff for doing this must be improved through appropriate training and internship.

5.8 VACCINE LOGISTICS, SUPPLY AND QUALITY

Strengths

- The programme follows the established stores procedure for request and issues with appropriate requisition books.
- Satisfactory recording system for vaccine received and distributed both at the national and the district level.
- At all levels, vaccine storage temperatures were monitored twice daily and recorded on appropriate form.
- Adequate refrigeration for service delivery exists at facilities. Sufficient cold boxes and vaccine carriers for transporting and distribution of routine vaccines are available.
- Vaccine managers or the health workers know and follow the correct procedures for vaccine handling in case of breakdown in the cold chain.
- Vaccine managers are knowledgeable in interpreting VVM on OPV and fully use it as a management tool.
- Forecasting of vaccines done at the national level using standard format
- Adequate buffer stock in all health centers and use of standard dose vials

Challenges

- More than 60 % of the cold chain equipments are more than five years and 25 % are more than 10 year old.
- Replacing all the old equipments in a timely fashion and generating funds for the same
- Sharing of refrigerators, deep freezer and cold room space for stocking other drugs and laboratory reagents.
- Limited number of walk in cold room at the national level and none at all in the regional stores
- Vaccines are some times transported in ambulances due to shortage of fund for fuels.
- High wastage rates for most vaccines in all health centers
- Inability to correctly forecast vaccines at the district level

Recommendations

- There is urgent need to develop and implement a plan for the rehabilitation and replacement of aged and non-functioning equipment.
- Improve the vaccine storage capacity at the regional cold store by procurement of walk in cold room.
- Provide separate storing space or cold chain equipment for non vaccine and other drugs which are to be strictly adhered to by way of a clear policy guideline.
- Provide refresher training for the health workers in daily maintenance and minor repair works for cold chain equipment.
- A periodic maintenance plan of all the EPI equipments must be put in place for implementation by the health workers or technicians
- Requirement of additional refrigerated vans for more efficient transportation of vaccines and also allocating additional funds for fuel and maintenance of these vans
- Although vaccine forecasting guidelines are included in the EPI manual, district managers and health workers need to be trained on this aspect and made an integral component of their work
- In depth study on vaccine wastage needs to be done and a strategy that is innovative without compromising on the delivery of vaccination needs to be instituted.
- All health centers should calculate wastage rates of all vaccines and submit their reports in time. More than just submitting they should be taught to interpret the results and then make recommendations on how this can be reduced.

5.9 ADVOCACY AND COMMUNICATIONS

Strengths

- The programme has a high level of political commitment. Decision makers consider EPI as the most successful health programme in the country. The government has increased its spending on the procurement of essential drugs and vaccines over the past two years.
- Interviews conducted with mothers at immunization sessions during the field study revealed that health workers are the most important source of information on EPI to care givers
- There is a high level of awareness about the importance of immunization in communities
- Active participation of the VVHW both for mobilization and follow up of drop outs
- Information on the timing of the ORC and the immunization clinics are well known to most of the service users

Challenges

- Lack of strategic plan on communication for Routine EPI, NID's and Surveillance
- No recording or documentation of IEC activities conducted
- Health workers giving more focus on providing vaccination and not on comprehensive care, such as educating and informing on AEFI, when to report and what to do.
- Insufficient IEC materials at the service delivery level and even the few are not placed in appropriate places
- Involving local community and district leaders in EPI activities

Recommendations

- Over the years IEC materials for EPI activities has been reduced to only few old posters in all the health centers. The programme may reinforce the IEC materials and provide the health centers with upgraded IEC materials for health education.

- Refresher training to health workers on providing comprehensive health care with stress on IEC. This van be done as part of all other trainings and in particular during the training of the new MCH handbook
- TV and radio programmes to promote routine immunization should be used to sustain the immunization coverage
- The local leaders both at the gewog and the district level can be more involved through IEC and social mobilization during the GYT and DYT.

Annex 1: Health centers Visited: Vital statistics and Immunization coverage in 2007

	No. house hold	Population	<1 yrs	Pregnant	WCBA 15-45	BCG	OPV1	OPV3	DPT-Hep B 1	DPT-Hep.B3	Measles	TT2+
CRRH-Gelephu	3089	16041	432	445	4460	501	362	337	337	337	357	
Umling BHU	325	1451	30	27	465	40	32	38	32	38	41	26
Norbuling BHU	481	2616	44	45	665	32	43	38	43	38	41	
Jigmecholing BHU	486	2590	56	62	628	55	61	64	61	64	66	
Monger Hospital	1340	7455	116	189	1894	144	142	138	142	138	164	
Gyelpozhing BHU	450	2773	52	79	801	49	57	50	57	50	54	
Yadi BHU	219	1456	25	27	444	25	24	20	24	20	29	
Drametse BHU	455	2424	67	67	615	98	111	111	109	112	108	
Thimphu JDWNRH	n/a	n/a	n/a	n/a	n/a	2641	1484	1358	1484	1358	2341	694
Dechencholing BHU	1439	8660	137	137	2019	107	111	122	111	122	138	
Thinleygang BHU	900	4580	59	59	1283	57	51	54	51	54	47	32

Annex 2: List of people interviewed

Sl No	Name	Designation	Organization	District
1	Dr Ugen Dophu	Director	Department of Public Health, Ministry of Health	Thimphu
2	Ms Karma Tshering	National Program Manager, VPDP	Department of Public Health, Ministry of Health	Thimphu
3	Mr Tshewang Tamamg	Assistant Program Manager, VPDP	Department of Public Health, Ministry of Health	Thimphu
4	Mr Thinley Dorji	Head of HRD	Ministry of Health,	Thimphu
5	Mr Kado Zangpo	Head, Research and BHMIS	Ministry of Health,	Thimphu
6	Dr Chandra	Project Officer	Health and Nutrition, UNICEF	Thimphu
7	Mr Norbu Wangchuk	National Program officer	WHO	THimphu
8	Mr Giri	EPI store manager	DVED, Department of Medical Services, MoH	Thimphu
9	Mr Chencho	Health Assistant	EPI Unit, Reproductive health unit, JDWNRH	Thimphu
10	T R Chhetri	Health Assistant	Dechencholing BHU	Thimphu
11	Ms Dhan Maya	ANM	Thinleygang BHU	Punakha
12	Mr Tshewang Dorji	Health Assistant	Dremetshe BHU	Mongar
13	Mr Y N Sharma	Health Assistant	Yadi BHU	Mongar
14		Health Assistant	Gyelposhing BHU	Mongar

15	Mr Rinzin Wangdi	Health Assistant	MCH center, Gelephu Regional Referral hospital	Sarpang
16	Mr Tashi Tshering	Health Assistant	Umling BHU	Sarpang
17	Mr Sonam Tenzin	BHW	Umling BHU	Sarpang
18	Mr Melam	Health Assistant	Norbuling BHU	Sarpang
19	Mr Samba Dupchu	Health Assistant	Jigmecholing BHU	Sarpang
20	Mr Jambay	GNM	EPI Unit, RHU, JDWNRH	Thimphu
21	Mr Tandin Dorji	Head	Public Health Laboratory, DMS, MoH	Thimphu
22	Dr H P Chetri	Pediatrician	JDW National Referral Hospital	Thimphu
23	Dr Purushutam	Pediatrician	Eastern Regional Referral Hospital	Mongar
24	Dr Tapas Gurung	Superintendent	Eastern Regional Referral Hospital	Mongar
25	Mr Nawang Pelzang	EPI Supervisor	Eastern Regional Referral Hospital	Mongar
26	Dr T B Rana	Superintendent	Gelephu Regional Referral hospital	Sarpang
27	Mr Ugen Dukpa	EPI Technician	Central Regional Cold store	Sarpang
28	Mr Nawang	Joint Director	DVED, DMS, MoH	Thimphu
29	Dasho Kunzang Tangbi	Member	National Certification Commission for Polio	Thimphu
30	Dr Ripa Chakpa	Tutor	Royal Institute of Health Sciences	Thimphu
31	Mr Leki Dorji	Director	Bhutan Health Trust Fund	Thimphu

Annex 3: Health Facilities and Man Power

A. Health Facility

Type of facility	Number
Number of Hospitals	29
Number of Basic Health Units (BHUs)	176
Indigenous Hospital	1
Indigenous Units	19
Training Institute (including NIFH, Gaylegphug)	3
Out Reach Clinics (ORC)	514
Total Hospital beds	1093
Population per Hospital bed	668
Hospital bed per 10,000 population	15.0

B. Human Resource

Category of Manpower	Number
Number of Doctors (including non-nationals)	140
Doctors per 10,000 population	1.9
Ratio per doctors to hospital bed	1:8
No. of Drungtshos (Indigenous physicians)	30
No. of Menpas (Indigenous compounders)	42
District Health Supervisory Officers (DSHO)	24
B.Sc. Nurses	233
General Nurse Midwife/ Staff Nurse (GNM)	173
Auxiliary Nurse Midwife (ANM)	144
Assistant Nurses	176
Health Assistant (HA)	229
Basic Health Workers (BHW)	173
Ratio of nurses to hospital bed	1:2

Nurses per 10,000 population	6.8
Laboratory Technicians	115
Dental Technicians/Hygienist	58
X-Ray Technicians	41
Pharmacy Technicians	77
O.T. Technicians	31
Eye Technicians	25
Other Technicians	29
Compounder/Para medical workers	22
Malaria Workers	48

Annex 4: Human Resources in the Ministry of Health

District	GDMO	SPECIALIST	Drungtsho	ACO	ANM	AN	GNM	HA	BSc	BHW	Traditional Clinical Asst.	Menpa	Nursing Superintendent	Pharmacy	Medical Superintendent	Dietician	Nonmed Superintendent	Compounder	Dental Hygienist	TECHNICIAN	Staff Nurse	TOTAL
Bumthang	3	0	1	1	0	0	3	11	0	5	2	0	0	0	0	0	0	1	0	10	0	37
Chhukha	6	3	2	2	0	4	16	31	1	11	1	1	0	0	0	0	0	3	0	41	2	124
Dagana	2	1	0	2	0	0	1	7	0	10	1	0	0	0	0	0	0	0	1	3	0	28
Gasa	1	0	1	0	0	0	0	8	0	0	1	0	0	0	0	0	0	0	0	1	1	13
Haa	1	0	1	3	1	0	1	6	0	3	0	0	0	0	0	0	0	1	1	4	1	23
Lhuntse	2	0	1	1	1	2	2	15	0	5	1	0	0	0	0	0	0	0	1	5	3	39
Monggar	3	11	1	3	0	0	21	26	1	19	2	1	1	1	1	0	0	0	0	49	9	149
Paro	3	3	1	3	1	0	6	12	0	5	1	0	0	0	1	0	0	0	2	12	1	51
Pema Gatshel	3	0	1	1	0	0	4	11	0	7	1	0	0	0	0	0	0	0	1	11	2	42
Punakha	3	3	1	0	2	0	4	13	0	6	0	0	0	0	0	0	0	1	1	9	2	45
Samdrup Jongkhar	4	3	1	2	0	1	11	18	0	12	1	0	0	0	0	0	1	0	2	17	1	74
Samtse	5	0	1	2	1	0	12	21	0	10	2	0	0	0	0	0	0	0	2	26	0	82
Sarpang	5	10	3	1	3	0	12	18	0	15	0	1	1	0	0	1	0	1	4	51	1	127
Thimphu	20	57	17	11	7	2	0	35	1	8	7	9	1	7	2	1	0	0	9	158	14	366

Tashigang	5	2	1	4	4	0	0	31	0	18	2	0	0	0	0	0	0	1	2	20	0	90
Trashi Yangtse	2	0	1	2	1	0	0	10	0	7	1	0	0	0	0	0	0	0	2	6	1	33
Trongsa	2	0	1	1	2	0	0	8	0	6	2	0	0	0	0	0	0	0	1	6	0	29
Tsirang	3	0	1	0	1	0	0	10	0	4	2	0	0	0	0	0	0	1	1	10	1	34
Wangdue	2	0	1	1	1	0	0	15	0	11	2	0	0	0	0	0	0	0	2	5	0	40
Zhemgang	3	1	1	2	0	1	5	15	0	3	1	0	0	0	0	0	0	0	1	11	0	44
Sub Total	78	94	38	42	25	10	98	321	3	165	30	12	3	8	4	2	1	9	33	455	39	1,470
Ministry of Health		1												2						9		13
DoPH		3																		15		17
DoMS		2									1			1						12		15
TOTAL	0	6	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	36	0	45
GRAND TOTAL	78	100	38	42	25	10	98	321	3	165	31	12	3	11	4	2	1	9	33	491	39	1515

Annex 5: List of Health Centers by district – 2007

Dzongkhag	Hospital	Basic Health Unit	No. of ORC	
			With Shed	Without Shed
Bumthang	Bumthang		4	0
		Chumey	3	0
		Tang	3	1
		Ura	3	0
Total	1	3	13	1
Chhukha	Tsimalakha		2	1
	Phuentsholing		5	1
	Gedu		2	1
		Chapcha	2	0
		Chukha I	1	4
		Tala	1	5
		Bango	3	1
		Getana	1	4
		Chongekha	3	1
		Dungna	6	0
		Logchina	1	2
Total	3	8	27	20
Dagana		Dagana I	2	0
		Bjurugang	1	0
		Dagapela	5	0
		Khagochin	0	0
		Akochin	1	2
		Drujegang	1	0
		Tshangkha	1	0
		Lajab	1	2
		Lhamoizingkha I	0	0
Total	0	9	12	4
Gasa		Gasa I	0	0
		Laya	1	2
		Lunana	7	0
		Damji	1	2
Total	0	4	9	4
Haa	IMTRAT		0	0
		Bali I	5	2
		Yangthang	1	1
		Sangbaykha	1	2
		Dorithasa	0	3
Total	1	4	7	8

Dzongkhag	Hospital	Basic Health Unit	No. of ORC	
			With Shed	Without Shed
Lhuentse	Lhuentse		3	0
		Autso	2	0
		Dungkar	3	0
		Gortsum	2	0
		Khoma	5	0
		Ladrong	3	0
		Menji	4	0
		Ney	1	0
		Patpachu	3	0
		Tangmachu	4	0
		Tshenkhar	2	0
		Zangkhar	1	0
Total	1	11	33	0
Mongar	Mongar		3	1
		Balam	2	0
		Banjar	1	0
		Bumpazor	3	0
		Chaskar	3	1
		Dremtse	5	0
		Daksa	2	0
		Gylposhing	1	1
		Jurmey	3	0
		Kengkhar	3	0
		Lingmethang	5	1
		Nagor	4	0
		Ngatshang	0	0
		Shershong	3	0
		Tsamang	0	1
		Thangrong	4	0
		Tshakaling	5	1
		Yangbari	1	0
		Yadhi	1	0
		Silambi	0	0
		Panthang	0	0
		Tongla	0	0
		Resa	0	0
		Muhung	0	0
		Takambi	0	0
		Ganglapong	0	0
		Chali	0	0
		Narang	2	0
Total	1	27	51	6

Dzongkhag	Hospital	Basic Health Unit	No. of ORC	
			With Shed	Without Shed
Paro	Paro		7	2
		Betikha	5	2
		Dawakha	4	1
		Drugyel	4	2
Total	1	3	20	7
Pemagatshel	Pemagatshel		5	0
		Tshatse	2	0
		Nanong	2	0
		Gonpasingma	3	1
		Yurung	3	0
		Chimong	1	0
		Tshebar	3	0
		Dungmin	3	0
		Thrumchung	2	0
		Decheling	3	0
		Norbugang	0	1
		Nganglam I	2	1
		Chokorling	0	1
Total	1	12	29	4
Punakha	Punakha		0	0
		Nobgang	1	0
		Kabjisa	4	0
		Samadingkha	2	0
		Tshochasa	0	0
		Shengana	0	0
Total	1	5	7	0
Samdrupjongkhar	Samdrupjongkhar		4	0
	Deothang RBA		0	0
		Louri	3	0
		Minjiwoon	2	0
		Jomotsangkha I	0	2
		Samdrup Choling I	10	3
		Martsalla	6	0
		Orong	2	0
		Gomdar	4	0
Total	2	7	31	5
Samtse	Samtse		2	0
	Gomtu		3	0
	Sipsu		2	0

Dzongkhag	Hospital	Basic Health Unit	No. of ORC	
			With Shed	Without Shed
		Dumtoe	1	0
		Denchukha	2	1
		Bara	0	0
		Tendu	0	1
		Panbari	1	0
		Sengdyen	1	0
		Chengmari	0	1
		Ghumaney	1	1
		Dorokha	1	0
Total	3	9	14	4
Sarpang	Sarpang		2	1
	Gelephu		1	0
		Norbuling	1	1
		Jigmecholing	1	0
		Umling	1	0
		Chuzergang	0	0
		Jigmeling	0	0
		Pangkhey	1	1
		Gongdara	1	0
		Phibsoo	0	0
Total	2	8	8	3
Thimphu	JDWNRH		1	7
	IBH Hospital		0	0
	Lungtenphug RBA		0	0
	Gidakom		3	0
		Dechencholing	0	2
		Genekha	0	1
		Thinlaygang	2	0
		Lingzi	2	1
		Jungshina	0	0
		Motithang	0	0
		RBP	0	0
		Chamgang	0	0
Total	4	8	8	11
Trashigang	Trashigang		3	0
	Riserboo		1	1
	Yongphula RBA		0	0
		Rangjung I	1	1
		Kanglung I	6	0

Dzongkhag	Hospital	Basic Health Unit	No. of ORC	
			With Shed	Without Shed
		Merak	1	1
		Changmey	2	0
		Bartsham	3	0
		Bidung	2	0
		Sakten	2	0
		Radhi	3	0
		Phongmay	2	0
		Bikhar	2	0
		Uzorong	5	0
		Yangneer	4	0
		Kangpara	3	1
		Tshangpo	1	0
		Thungkhar	2	0
		Khaling	6	0
		Yabrang	1	0
		Challing	0	0
		Lumang	3	0
Total	3	19	53	4
Trashiyangtse	Yangtse		0	0
		Khamdang	5	0
		Khini	4	0
		Tongshang	4	0
		Thragom	4	0
		Dungzam	2	0
		Jamkhar	2	0
		Ramjar	2	0
Total	1	7	23	0
Trongsa	Trongsa		3	0
		Bemji	3	0
		Tashiling	2	0
		Kunga Rabten	4	0
		Tongtongphy	3	0
		Jangbi	2	0
		Korphu	2	0
Total	1	6	19	0

Dzongkhag	Hospital	Basic Health Unit	No. of ORC	
			With Shed	Without Shed
Tsirang	Damphu		3	1
		Khorsaney	2	0
		Tsirangtoe	2	1
		Mendaygang	2	0
		Patalay	2	0
Total	1	4	11	2
Wangdi	Tencholing RBA		0	0
		Bajo I	1	0
		Gaselo	3	0
		Sephu	2	1
		Phobjukha	2	0
		Dangchu	2	0
		Kamichu	3	1
		Uma	0	0
		Samtegang	1	2
		Jalla	1	1
		Teki	2	1
Total	1	10	17	6
Zhemgang	Yebilaptsa		5	1
		Zhemgang I	1	0
		Buli	2	1
		Shingkhar	3	1
		Khomshar	1	1
		Langdurbi	1	1
		Tshaidang	1	2
		Gongphu	1	0
		Pantang	4	0
		Goshing	2	1
		Kaktong	1	0
		Bjoka	2	1
		Panbang I	3	1
		Kradithang	0	1
		Manas	0	0
Total	1	14	27	11
National	29	178	419	100

Annex 6:
Assessment check list for EPI activities
Ministry and Programme Level

Checklist conducted by: .....

Central Level, MoH:.....

Name of EPI Program manager: 1..... ..... 2.....

Name & Title of Supervisor: .....

Date:..... Time:.....

S.No	Indicators				
	Policy & Planning & Management	**Method**	**Yes**	**No**	**Comment/ Recommendation**
1	Is there a Multi Year Plan of Action	Review			
2	Is there a Financing plan	Review & Interview			
3	Is operations Research a component	Review			
4	Is there a clear EPI policy	Review			
5	Have all activities been conducted as per schedule as of date	Review & Interview			

6	Is there a committee to guide and steer the program	Review			
7	Is there an emergency plan for outbreak situation	Review			
8	Is there a Regulatory Authority				
9	Do Program Managers have management Skills	Review & Interview			
10	Are human resources adequate and in line with the HR requirements	Review			
11	Have Program Managers received training in EPI	Interview			
12	Is there a written job responsibility of the program managers	Observation			
	Documents & Information Management				
1	Is there a Manual on EPI Program	Observation			
2	Is there a National Training manual	Observation			
3	Is there a manual for use by Health workers	Observation			
4	Is there a manual for Cold chain management	Observation			
5	Does information from the districts come in time	Interview & Observatio			
6	Does the program have updated information on EPI activities	Observation & Interview			
7	Is there coordination with HMIS	Interview			
8	Does the program have adequate copies of EPI surveillance forms	Obsevation			
9	Does the program have IEC materials on EPI	Observation			

	Monitoring and Supervision				
1	Is there a time bound plan for monitoring EPI activities	Observation & Interview			
2	Is there a systematic supervision protocol	Observation & Interview			
3	Are there records of supervisory and monitoring visits	Observation & Interview			
4	Is there a checklist for supervision or monitoring	Observation			
	Vaccine Management				
1	Is there a written plan for vaccine management	Observation			
2	Is there guidelines/ instructions on order/ delivery and reporting of vaccines	Observation & Interview			
3	Does the manager know the requirement of vaccines for the country	Interview			
4	Does the program have latest reports on vaccine wastage	Observation			
5	Does the program have reports on Adverse Effects of Immunization	Observation & Interview			
	Training				
1	Has the program trained HW on EPI management	Interview			
2	Is training component included in the activity plan	Observation			
	Surveillance				
1	Are there EPI surveillance forms	Observation			
2	Does the program have reports on surveillance of EPI diseases	Observation			
	Coordination				

1	Is there a coordination mechanism between the program and the district hospitals/ BHU	Interview			
2	Is there a coordination committee	Interview			
3	Has there a been regular coordination meetings with agencies involved in EPI	Interview			

Annex 7: Data collection guide for EPI activities

Name of the health facilities: _____District : _____

Health worker :_____

Sl.No.	Indicators				
	Planning & Management	Method	Yes	No	Comments/ recommendations
1	Is there a micro-plan for routine EPI (map, target, ORC, travel distance)	Review			
2	Has ORC been conducted as per schedule	Interview			
3	Does the health worker know target population for TT and childhood immunization	Interview			
4	Does HW know EPI target coverage for the year?	Interview			
5	Are there any migrant/hard to reach population in your area	Interview			
	Recording, reporting and monitoring				
	Documents	Recording			
1			Yes	No	Remarks
	Tally sheet				
	Immunization cards				
	Registration book				

Sl.no	Indicators	Recording			
	Recording, reporting and monitoring	Methods	Yes	No	Remarks
2	Does the HW report on due time and receive feedback?	Review and interview			
3	Is the date and antigen written in the cards and tally sheet corresponding to the registration book?	Review and observation			
4	Is there any supervisory logbook?	Review			
5	Does the HW use monitoring chart?	Observation			
6	Is the monitoring chart correct & updated?	Observation			
7	Is there AFP,MNT, Measles, Rubella guidelines available	Observation			
8	Is there AEFI reporting forms available	Observation			
9	Is there notifiable disease reporting forms	Observation			
10	Does the EHW know how to calculate coverage rate and dropout rate?	Observation			

Annex 8: Overview of immunization services

1. Immunization service delivery health center: ……..

Indicator	2005	2006	2007	Remarks on reliability / quality of data
Coverage level for each vaccine during last 3 years (%)				
BCG				
DPT1				
DPT 3				
OPV 3				
Measles				
Hepatitis B				
TT2 for pregnant women				
Health facility drop out rate (%)				
DPT1 to DPT 3				
BCG to Measles				
Completeness of routine coverage reporting To higher level center				
Proportion of catchments areas by coverage level for DPT 1 and DPT 3 (e. g. < 50%, 50-79%, >80 %)				
Effective out reach schedule available				
Planned for the whole year				
All areas are covered				
% of planned sessions conducted				
High risk populations identified				
Is there any system to trace out for immunization defaulter				

Overview of immunization services

2. Injection safety

Indicator	Method	Yes	No	Remarks
use of auto-disable /disposable syringes?	Observation			
Does the HW screen eligible child/mother?				
Does HW use right diluents & mix it in proper manner?				
Does HW administer the recommended dose of vaccine ?				
Does the HW administer the vaccine in correct site and technique?				
Does HW follow open vial policy?				
Use of safety box?				
Appropriate disposal of injection equipment (waste disposal)				
Knowledge of what should be reported as an AEFI				

Overview of immunization services

3. Disease surveillance

Indicator	2005	2006	2007	Remarks
Vaccine preventable disease incidence				
% of AFP cases with 2 adequate stool samples				
% of measles out breaks investigated % of measles cases with information on age and vaccination status				
Timeliness of routine reporting				
Completeness of routine reporting				

4. Cold chain &Logistics

Indicators	Method	Yes	No	Remarks
Cold chain equipments operating and in good repair (if not available what is the process to ensure effective cold chain)	Observe and interview			
Monitor /record temperature of refrigerator at least twice a day.	Review			
Is the current temperature of the refrigerator between +2 - +8 ○C?	Observation			
Is the refrigerator /cold box filled properly	Observation			
Is the refrigerator located in a proper place?	Observation			
Does the HW know how to interpret VVM	Interview			
Do HW have knowledge on freezing of vaccine & shake test	Interview			
Is functional freeze watch & dial thermometer inside the refrigerator/cold box?	Observation			
Is foam pad being used properly during immunization sessions	Observation			
Vaccine distribution plan: How vaccine is delivered from the central store to District hospitals ? How vaccine is delivered from the district to BHU/ How vaccine is delivered from the BHU to immunization clinics ?				
Contingency plan for logistic for HC				

5. Vaccine supply and quality

Indicator	Method	Yes	No	Remarks
Supply : Adequate supply Vaccine forcasting	Review			
Is there any stock record in proper use?	Observation			
Is there any expired vaccine in the center	Observation			
Vaccine utilization and wastage monitoring Wastage rate: BCG: MR : DPT-hep-B OPV:	Review			
Vaccine stored and handled properly	Observation			
Quality and expiry date of vaccine checked before use	Observation			

6. Advocacy and communication

Indicator	Method	Yes	No	Remarks
Is there adequate and appropriate IEC materials	Observation			
is the HW courteous & friendly to the clients	Observation			
Are mothers interacting in health education sessions	Observation			
Are teaching aid materials used in health education sessions?	Observation			
Knowledge of public – including parents about immunizations	Interview			
Community involvement in planning and monitoring of health services	Interview			
Active attempts to reach un-reached, defaulters and non-users.	Interview			

Annex 9: Discussion guide

Health center: _____

Overview of the health system

date: _____

Describe briefly the roles and responsibilities and functions.

1. Responsibility for stewardship functions

1. planning function				
Indicators	Methods and sources	Yes	No	Remarks
Health facility plan	Review			
Health facility budget	Review			
Schedule of services	Review			
2. information management function				
Health workers receive timely information on new policies and guidelines	Review reports			
HW receive reports on national progress towards meeting disease reduction and other goals.				
HW workers use information they collect without waiting for feedback.				
HW get feedback on reports they submit.	Review feedback documents			
3. coordination among health providers function				
The facility managers coordinate services with other health providers in	Review service plans for the catchment area			

the area, when appropriate.				
How are referrals managed ?	Discuss			
Are personnel ever shared?				
How are resources. Such as transportation, equipment, supplies, drugs, vaccines, and consumables shared, if at all?				

2. Responsibility for human resource development functions

1- staffing function				
Indicator	Method	Yes	No	Remarks
There are enough staff with the appropriate skills to meet the facility's needs.	Review : The staffing plan Staffing list for a facility			
Staffs meet national staffing standards.				
Staff receive adequate salaries on a regular basis				
2. training function				
All staff have the knowledge and skills they need to do their jobs.	Review the master training plan for health facility			
Has the program trained HW on EPI management				
Has the program trained HW on EPI management				

Is training component included in the activity plan				
3. supervision				
HW receive the supervision , and administrative and technical support they need to perform effectively.				
HW performance is regularly evaluated and feedback is provided.				
Is there a time bound plan for monitoring EPI activities				
Is there a systematic supervision protocol				
Are there records of supervisory and monitoring visits				
Is there a checklist for supervision or monitoring				

3. Responsibility for finance functions

Management functions	
Budgeting	
Identifying budget sources	
Tracking expenditures	

4. Operational responsibilities

	Information management	Procurement of supplies and equipment	Distribution of supplies and equipment including drugs and vaccine	Maintenance and repair of vehicles
Mode of operation	□ separate □ all services integrated □ some services integrated	□ separate □ all services integrated □ some services integrated	□ separate □ all services integrated □ some services integrated	□ separate □ all services integrated □ some services integrated
Implication for immunization services				
Implications for all basic health systems				
Mode of operation	Maintenance and repair of equipments	Supervision	Training	
	□ separate □ all services integrated □ some services integrated	□ separate □ all services integrated □ some services integrated	□ separate □ all services integrated □ some services integrated	
Implication for immunization services				
Implications for all basic health systems				

Annex 10: Data Collection Guide

Service Delivery Level

Region/hospital …….

Basic health unit ……

Out reach clinic …….

1. Health facility fact sheet

Basic facts

Total population …….. children under 1 year old……

Crude birth rate …….infant mortality rate/1000……..

Women of child bearing age……..

Health facility description

Number of staff …….

Job titles

……

……..

……

……

……

……..

……..

……..

Number of immunizing staff ……..

Service provided please tick

Fixed Scheduled immunization sessions

Out reach clinic

Number of days of outreach clinic/per week……..

Outreach services provided

……

……

……

……

……

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