THE BOTSWANA

MULTI-YEAR IMMUNISATION PLAN

2006-2010

EXECUTIVE SUMMARY

OVERVIEW OF THE STRATEGIC PLAN

1. BACKGROUND

1.1 Geo-political information

Botswana is a landlocked country and straddles the Tropic of Capricorn in the centre of the Southern African plateau. The country's total land area is 582,730 square kilometres. Botswana shares borders with Namibia, the Republic of South Africa, Zambia and Zimbabwe.

More than two-thirds of Botswana is covered with the thick layer of sand of the Kgalagadi desert. The Kgalagadi supports a vegetation of scrub and grasses, but there is almost complete absence of surface water. The maximum temperatures in summer may reach over 40 degree Celsius, while winter temperature may fall to below zero. The Eastern region has somewhat a less harsh climate and more fertile soils than elsewhere; and it is here that most Batswana live.

Botswana is situated close to the subtropical high-pressure belt of the Southern hemisphere. As a result the country's climate is largely arid or semi-arid and is prone to drought spells. The rainfall is unreliable, highly erratic and seasonal and occurs in the summer months, from October to April while the period from May to September is generally dry. Water is therefore scarce with rivers that are ephemeral and subterranean.

The country is divided into 15 administrative districts that are sub-divided into 24 health districts. According to the 2001 National Census, the population for 2001 stood at 1,680,863 with women constituting 52% and men, 48%. The population is urbanised with 56%, of the people living in urban areas 44% live in rural areas. The population growth rate is 2.38% and the population estimate for 2005 is 1,727,372 million. The main occupation of the people is pastoralism.

The main energy source is electricity with firewood, which is also used in rural areas. In terms of communication, the country is served with a telephone network, which covers the whole country. Furthermore the whole country is covered by cellular phone network. In rural areas communication is mainly by both telephone and radio in health facilities

1.2 Socio-economic situation

The economy of Botswana thrives mainly on the diamond industry. The GNI per capita in Botswana is estimated at USD 3630 Pula.

The national budgetary allocation to the Ministry of Health over the period 2000-2004 shows a steady increase in percentage allocation from % in 2000 to % in 2005. In terms of allocation of funds to the EPI Programme, the ministry…..

Table 1: Increase in Development Funds 2000-2005

Year	Recurrent Fund	Development Fund	Consolidated Fund	PHC (estimated exp. From the consol. Fund)	Increase over 2000 in development funds	Year on increase in development funds
2000/01	449,940,030	162,903,000	612,843,030	115,888,280		
2001/02	303,885,670	398,872,000	702,757,670	124,123,110	14.7%	14.7%
2002/03	440,109,430	379,900,000	820,009,430	130,589,620	33.8%	16.7%
2003/04	494,337,610	406,062,000	900,399,610	138,944,710	46.9%	9.8%
2004/05	613,530,530	411,475,000	1,025,005,530	145,525,480	67.3%	13.8%
2005/06	735,518,290	606,000,000	1,341,518,290	184,176,350	118.9%	30.9%

The country embarked on health reforms as part of the public sector reforms in 2002. The broad objective of the reform programme is to review the ministry's organisational structure in view of epidemiological changes that have taken place nationally and globally.

1.3 Health information

The Botswana National Health Policy states that the government prioritises health promotion and care, and disease prevention. The government further commits itself to taking special measures in respect of high-risk groups such as women and children as it pursues its set objectives. The main demographic and health indicators are shown in table 2 below:

Table 2: Main demographic and health indicators (Verify info and source)

Indicator	Value	Year	Source
Population	1,680,863	2001	National census
Growth rate	2.3%	2001	National census
Infant mortality rate (per 1000)	56	2001	National census
Under five mortality rate	74	2001	National census
Maternal Mortality rate (per 100,000)	326	2001	National census

In general, the HIV/AIDS Pandemic that has ravaged mostly Southern Sub-Saharan Africa has taken a heavy toll on Botswana. In 2004, the HIV prevalence rate was estimated to be approximately 17% and the pandemic threatens to reverse the gains made in health prior to its onset. The leading causes of morbidity for adults include HIV/AIDS, Tuberculosis, Malaria, and Sexually Transmitted Illnesses. For children the leading causes of morbidity include HIV/AIDS, Acute Respiratory Infections and Diarrhoeal Diseases.(Verify info and sources on both adults and children).

The Ministry of Health, being the central government organ responsible for health, sets broad policy directions, goals and strategies for health service development and delivery. The health care system is founded on the principles of Primary Health Care as contained in the Alma Ata Declaration of 1978.

Health care services are decentralised to the district level and delivered through a hierarchical network of health care facilities, ranging from referral hospitals to district and primary hospitals, clinics, health posts and finally mobile stops.

Health services comprise a public sector, consisting of 667 fixed government health facilities; 3 Referral hospitals (including one mental hospital), 9 District Hospitals, 16 Primary hospitals, 243 clinics and 340 health posts (2002, Health Statistics Unit, Master Health Facility List). Others are private sector, which caters for about 10-20% of the population. In addition, traditional healers provide informal health care.

The Ministry of Health sets and communicates national health policies, standards and strategies to the districts. The Ministry of Local Government translates the policies of various ministries into action. This function is delegated to the local authorities. The health districts provide preventive and curative services, and are responsible for the implementation of programmes for the control of major public health diseases. An inter-ministerial PHC co-coordinating committee ensures coordination by the two ministries.

The immunisation policy is a consolidated national effort to deliver safe, potent, reliable and free immunisation services available and accessible to all eligible children regardless of their ethnicity, race, religion, gender, geographical location and political affiliation. The objectives of the immunisation policy are:

1. To immunise all children below one year and women in reproductive age group (15-49) with potent vaccines against targeted vaccine preventable diseases;
2. To implement immunisation and disease surveillance strategies according to established norms and procedures;
3. To provide immunisation procedures according to international standards and norms
4. To provide booster doses of OPV, DPT, DT and TT to the appropriate age groups (Update objectives in draft EPI policy document)

The childhood vaccination schedule is indicated in table 3 below

Table 3: Botswana Childhood Immunisation Schedule

Contact	Age of Child	Vaccine
1	At birth	BCG and HBV1
2	2 months	DPT1, OPV1 and HBV2
3	3 months	DPT2, OPV2
4	4 months	DPT3, OPV3
5	9 months	Measles and HBV3
6	18 months	DPT and OPV boosters
7	7 years	DT and OPV boosters
8	13 years	TT booster

The schedule for Vitamin A supplementation is indicated in table 4 below

Table 4: Vitamin A Supplementation Schedule

Age of Child	Vitamin A Dose	Comment
0 – 6 months	50 000 IU	If not breastfed
9 months	100 000 IU	-
18 months	200 000 IU	-
24 months	200 000 IU	-
30 months	200 000 IU	-
36 months	200 000 IU	-
After delivery or within 6-8 wks	200 000 IU	Given to all mothers

The schedule for immunisation with TT is given in table 5 below.

Table 5: Tetanus Toxoid Vaccination Schedule

Dose	Timing	Duration of protection
TT1	At first contact with the woman of child bearing age, or as early as possible.	No protection
TT2	At least 4 weeks after TT1	3 years
TT3	At least 6 months after TT2	5 years
TT4	At least 1 year after TT3	10 years
TT5	At least 1 year after TT4	All childbearing years

Administration of vaccines to eligible children and women is explained below:

- **DPT** vaccines are be injected intramuscularly at the antero-lateral aspect of the left thigh. The dose is 0.5ml.

- **HBV** monovalent vaccine is administered simultaneously with DPT but at different sites (right thigh for HBV). The dose is 0.5ml.

- **Polio (OPV)** vaccine is an oral vaccine and is administered by mouth. The dose is 2-3 drops depending on manufacturer.

- **Measles** vaccine is administered subcutaneously in the left upper arm. The dose is 0.5ml.

- **BCG** (vaccine against tuberculosis) is administered intradermally on the outer aspect of the left forearm. The dose is 0.05ml for infants below 1 year of age and 0.1ml for older children.

- **Tetanus Toxoid (TT)** should be injected intramuscularly in the left upper arm. The dose is 0.5 ml.

The policy of the Botswana Expanded Programme on Immunisation (BEPI) on injection safety is "Use one sterile syringe and needle per child". Effectively the country has continued to use disposable syringes in the routine immunisation programme. This notwithstanding, BEPI asserts that the safest injection practices can only be achieved with the use of newer technologies such as AD syringes

and preferably, retractable syringes. Waste disposal is achieved by incineration in all the health facilities but some facilities use shared incinerators.

The Multi-Dose Vial Policy (MDVP) was introduced in May 2002. The policy has been implemented on all liquid vaccines namely DPT, DT, HBV, OPV and TT. BCG and Measles are not affected by this policy since they are reconstituted vaccines and therefore must be discarded after six hours or at the end of the session, whichever comes earlier.

Routine immunisation is provided at:

- Static sessions: All health facilities in Botswana as part of family health services. Urban health facilities use this strategy. Nearly 90 % of children in the country are vaccinated at static sessions
- Outreach sessions: This strategy is employed using the network of health clinics, mobile stops and health posts. The strategy is particularly important when it comes to serving underserved population groups.

1.4 Target populations (Routine, SIAs; Polio & Measles, MNTE)

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The target populations differ depending on the strategy employed:

Routine Immunisation

The target groups for routine immunisation are:

1. Children under the age of one, for BCG, DPT, HBV, OPV and Measles vaccines. In addition to these antigens, non-breast feeding infants between 0-6 months and all children between 9 months and three years of age receive Vitamin A supplementation.
2. Women of childbearing age i.e. 15-49, for TT vaccines. All lactating mothers receive Vitamin A supplementation during the post-partum period.

The schedules for routine immunisation are in tables 2-4 above. However, table 6 below shows the ages and the different antigens that are given as booster doses including Vitamin A supplementation.

Table 6: Booster Doses

Age	Antigen/Supplement	Remarks
18 months	DPT & OPV, Vitamin A 200 000 IU	
24 months	Vitamin A 200 000 IU	
30 months	Vitamin A 200 000 IU	
36 months	Vitamin A 200 000 IU	
7 years	DT & OPV	Given in school
13 years	TT	Given in school

Supplemental Immunisation Activities (SIAs)

Supplemental immunisation activities are implemented only under the following:

Polio Eradication

The age group for polio campaigns is 0-59 months. This applies to NIDs, SNIDs and Mop-up campaigns.

Measles Control
The age group for catch-up campaigns is 9 months-14 years while that for follow-up campaigns is 9-59 months.

Maternal and Neonatal Tetanus Elimination (MNTE)
Botswana has eliminated MNTE and has not recorded a case of suspected NNT since 1994. The target age group is women of childbearing age (15-49).

1.5 Epidemics/Endemics
During the last five years the following epidemics have occurred:

Measles
A catch-up measles campaign was conducted in 1997-98. Since then the incidence of measles has been markedly reduced. There have only been importations of single cases annually from 2002 to 2004. In 2005, 5 cases of measles were confirmed. A follow up measles campaign was conducted in October 2005 with 99.6% coverage. With this intervention it is unlikely that measles will be a serious problem for several years to come.

Polio:
The last indigenous polio case in Botswana was reported in 1989 and starting from 2001 the country has been implementing high quality AFP Surveillance. It was because of the high quality surveillance that an importation of wild polio virus was detected in Ngamiland in April 2004. A national polio campaign was conducted in May and June 2004 with 110% coverage. With high routine immunisation coverage and certification level surveillance Botswana shall remain alert until the rest of world becomes polio free. In 2005, certification documents from Botswana were accepted by the African Region Certification Commission (ARCC)

1.6 School Health Services
The Ministries of Education in collaboration with the Ministries of Health and Local Government have incorporated immunisation into the school health programme. Immunisations in schools are administered according to the Botswana EPI guidelines.

1.7 Community Participation
The Ministry of Health promotes and supports initiatives aimed at awareness creation, demand generation, attitude change and community participation in immunisation activities.

The ministry works closely with community, in collaboration with the Ministry of Local Government and organisations working at grass root level, such as Botswana Red Cross and other NGOs. In this regard, the ministry collaborates with community leaders such as village chiefs, religious leaders and

parliamentarians, teachers and women's groups, traditional healers, family welfare educators and health committees.

2. SITUATION ANALYSIS

A. OPERATIONS

2.1 Immunisation Service Delivery

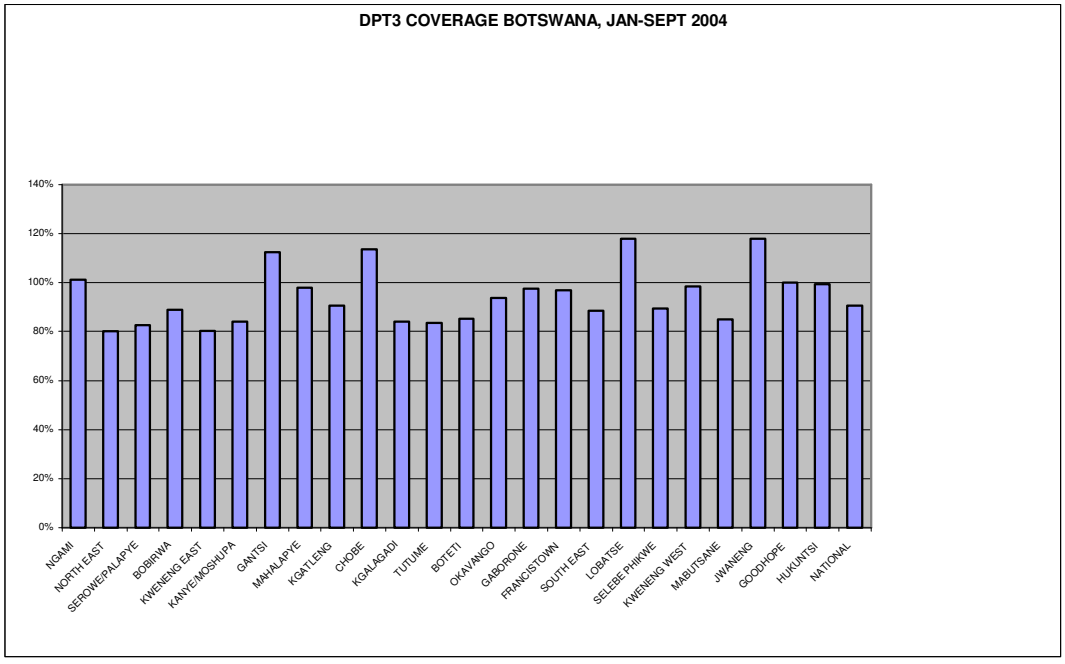
Routine immunisation coverage has remained relatively high in Botswana. The table below shows the trends in immunisation coverage during 2000-2004.

Table 7: Trends in Immunisation Coverage in Botswana, 2000-2004 (Update)

Type	Antigen	2000	2001	2002	2003	2004
Routine Immunisation Coverage	BCG	73	72	77	92	90
	DPT1	94	82	99	101	100
	DPT3	85	74	87	93	91
	OPV1	94	86	90	101	97
	OPV3	85	75	85	91	87
	Measles	84	77	79	90	84
	TT2 Pregnant women	-	-	-	-	-
	TT2 WCBA	45	46	49	55	54
	HBV3	73	64	46	78	79
Vitamin A Supplementation- Routine						
Drop-out rates	DPT1-3	9.6%	9.6%	12%	7.9%	9.2%
	BCG-Measles	-15%	6.5%	2.6%	2.2%	7.5%
Supplemental Immunisation Activities	OPV	-	-	-	-	110%
	Measles	-	85	-	-	-
	Vitamin A	-	85	-	-	-

When DPT3 coverage is analysed by district, it shows a diverse pattern as illustrated in the figure below. Coverage above 100% as achieved by some districts suggests problems with denominators. (Rephrase)

Fig 1: District DPT3 coverage 2004 (Update)



Source: MOH 2003

Immunisation Strategies
Botswana uses two main strategies in routine immunisation namely:

Static Sessions
Static sessions are used by all health facilities. This strategy covers about 90 % of the target population.

Outreach Sessions
This is used mainly in rural areas and it covers about 10% of the target population. This strategy is aimed at reaching the un-reached and hard-to-reach, reduction of missed opportunities and drop-out rates. However, outreach services are still inadequate.

A rapid EPI Assessment was conducted in May 2002 in response to declining immunisation coverage during 2000-2001. In general it was noted that enormous progress had been made in EPI in Botswana since the inception of the National EPI Programme in 1980. However, it was noted that routine vaccination coverage had declined during 2000-2001 and the following issues were identified:

- National vaccine supply was found to be unreliable; DPT and HBV vaccines had been out of stock for several months.
- Introduction of multiple new initiatives resulted in strong competition for DHT staff time. Lack of transport and staff attrition compounded the situation in some districts.
- The absence of policy documents and guidelines in health facilities seriously hampered the introduction and reinforcement of modern EPI theory and practice; calculation of vaccination coverage, drop out rates and vaccine wastage was not known; case definitions were not known and so were procedures for case investigation; and no kind of data analysis was being performed.
- Information, Education and Communication (IEC) materials (leaflets, fliers and posters) while available at national and district levels, were not available at health facilities

Following the recommendations made, the issues below have so far been addressed:

- Through advocacy the findings of the programme review were disseminated to the top leadership in both the MLG and MOH. Following this advocacy the MoH has conducted training to DHTs and the CMS supported by UNICEF and WHO on Vaccine Management. After the training, vaccine supply has improved.
- The district trainings included disease surveillance and data management. Thereafter disease surveillance guidelines were disseminated. In consequence active surveillance has improved as well as timeliness and completeness of reporting. Immunisation coverage for all antigens has improved except for TT2+.

- The EPI Policy manual has been reviewed and will distributed to all districts when it is finalised and printed.
- The recommended assessments have been done; vaccine management assessment and injection safety assessment. In addition some districts have procured the recommended type of EPI refrigerators.
- There is proper coordination between EPI and CMS as communication has improved.
- IEC materials have been developed and disseminated to districts.

2.2 Surveillance and Disease Control (PEI & AFP, MNTE, Measles Control and Elimination)

The EPI target disease surveillance in Botswana focuses on the three priority diseases with special control initiative; AFP surveillance for Polio Eradication, measles case-based surveillance for Measles Elimination and NNT surveillance for MNTE. In addition, the country established a sentinel surveillance site for Paediatric Bacterial Meningitis at Princess Marina Hospital in Gaborone in 2001 in an attempt to assess the burden of the *Haemophilus influenzae* type b (Hib) disease. Surveillance is still ongoing and one more site has been established in Francistown.

Polio Eradication and AFP Surveillance

The indicators show that the country performed fairly well in AFP surveillance during 2000-2004. However, in 2003 Botswana failed to reach certification quality AFP surveillance as it achieved a non-polio AFP detection rate of 2.3/100,000 children less than 15 years of age, with a stool adequacy of 75%.

By November 2004 the number of AFP cases detected was 27 (a rate of 3.4/100,000 children less than 15 years of age). The stool specimen collection adequacy within 14 days of onset of paralysis is 96.3%. This good performance needs to be sustained.

Table 7: Performance in certification-level surveillance criteria

Year	Expected number of AFP cases	No. of AFP cases	Ann. Non-polio rate	AFP cases with 2 specimens within 14 days of onset		Classification Status					Inadequate stools	Timeliness of district reporting
				No.	%	Conf	Com	Disc	Uncl	>90 days		
2000	7	7	1	3	43	0	0	7	0	5	2	92%
2001	7	8	1.1	6	75	0	0	8	0	3	2	83%
2002	7	9	1.3	7	78	0	0	9	0	2	0	93%
2003	7	16	2.3	11	69	0	0	14	2	1*	1	97%
2004	7	35	5	31	86	1	0	32	3	19	2	96%

For Botswana, districts are the sub-national level and have very small populations ranging from as low as 1,000 to about 200,000 inhabitants. It is therefore expected that some districts will not report a case each year. National AFP surveillance performance indicators may therefore mask performance at the district level.

Maternal and Neonatal Tetanus Elimination
Botswana has eliminated maternal and neonatal tetanus. Although MNT surveillance exists in principle, there is little evidence to show that it is active mainly because of the perception that MNT is no longer a problem. This issue must be addressed.

Measles Control and Elimination
A measles follow-up campaign was conducted in 2000 targeting children from 9 months to 4 years and 85% coverage was achieved. Vitamin A supplementation was also done during the campaign achieving coverage of 85% as well. The next follow-up campaign is planned for 2005.

Case based surveillance was started in 1998. The proportion of districts with at least 1 case with blood specimen per year stands at 54%. The target is 80% so this area begs improvement.

There have only been importations of three measles cases during the last five years namely one case in 2002, another case in 2003 and the last case in 2004. This attests to the impact of the measles control strategies on the morbidity and mortality of measles. However, in 2005, 5 cases of measles were confirmed.

New vaccines
The country introduced Hepatitis B from own resources in 1994.

Disease Surveillance

The MOH and MLG give high priority to data collection, analysis and feedback. All districts and the central levels closely monitor reporting completeness and timeliness on immunizations and diseases or outbreaks. For polio eradication and measles elimination, there is active surveillance for AFP cases and suspected measles and these have been integrated. All districts have been trained on AFP surveillance and measles case based surveillance including appropriate specimen handling for the two diseases. The Integrated Disease Surveillance & Response (IDSR) strategy was adapted and first implemented in 2003.

The IDSR package uses common methodology in recording, reporting and case/outbreak investigations and response. Districts are required to submit reports on EPI diseases to the EPI Unit, including zero reporting, on a weekly basis. Reports of other diseases are sent to the epidemiology unit on weekly and monthly basis.

The Epidemiology unit in the MoH is responsible for the monitoring of all activities related to epidemic preparedness and disease outbreak response. A national emergency Epidemic Preparedness and Response Committee is in place and the Epidemiology unit coordinates all outbreak response activities. The Epidemic Preparedness and Disease Outbreak Response Committees also exist at the district level

2.3 Logistics

Cold chain and transport equipment

An inventory of cold chain equipment and transport facilities exists but the there is no formal plan on maintenance and replacement of dysfunctional equipment. Nonetheless, districts are advised to replace cold chain equipment after 8-10 years of use. In responding to the Polio importation in 2004, a significant number of new equipment were procured and these included 54 fridges, 175 cold boxes, 1144 vaccine carriers and 300 thermometers.(Update)

In the recent past technicians have been trained at district level, to monitor cold chain equipment and carry out minor repairs while major repairs are done by technicians at national level.

Districts collect vaccines and injection materials including safety boxes from the national stores.

Outreach services are conducted at least once a month in many facilities but it is often hampered by shortage of transport and low staffing levels.

Injection safety and waste disposal

There is currently no formal policy document in place but the standard recommended by the MOH on safety of injections is: One sterile syringe and one sterile needle should be used for each injection.

The MOH/EPI encourages safe injection practices in routine immunisation, as recommended by WHO, an important matter and consistent with international standards. The MOH and MLG will continue to use disposable syringes and needles and establish strict supervision on the proper use of the syringes in all vaccination sites until a safer alternative becomes available. In addition to this, puncture-resistant safety boxes are used for collecting and disposing of used disposable syringes, needles and other sharps such as scalpels; used vaccine or diluent's vials and ampoules. Safety boxes are available at all immunization sessions.

Regarding waste disposal, incineration is employed in all facilities but some facilities use shared incinerators.

An injection safety assessment was conducted in October 2003 in order to validate that all components of safe injection practices were being followed in Botswana. The overall standards of injection safety were high. However, the following issues were noted:

- The unsafe practice of re-capping of needles was observed in some facilities, and some of the surveyed facilities had recapped needles in the waste disposal boxes;
- There were reports of needle stick injuries among injection providers;
- In a few facilities sharps were observed around health facilities; and

- Unsupervised sharps boxes were seen in a few places.

Since this assessment was made, the following measures have been taken:

- The findings have been shared with the policy makers in the MOH.
- The new EPI Policy and Procedures manual for health workers includes a chapter on injection safety.
- The recommendations have been taken on board by the current project on Injection Safety and Infectious Diseases Control, supported by the US Government.

2.4 Vaccines Supply and Quality

The MOH procure vaccines and logistics recommended by WHO and UNICEF and registered by the Botswana Drug Regulatory Unit (DRU). The Government of Botswana wholly finances its vaccine and logistic requirements.

The Central Medical Store (CMS) does vaccine forecasting unilaterally. Ideally this should be done in consultation with the EPI programme. CMS orders vaccines and logistics from pre-qualified suppliers ensuring a twelve-month reserve stock level at all times with six-monthly orders to reach a maximum stock of all vaccines for 18 months. Distribution of vaccines is done by CMS.

Following recommendations of a rapid EPI Review conducted in May 2002; a vaccine management assessment was conducted in 2003 based on a simple and quantitative evaluation. The findings are summarised in table 8 below.

Table 8: Scores of vaccine management

Level	Flexible cold chain	Availability of vaccines	Stock recording system	Vaccine distribution system	Reliable cold chain	Proper diluent use	Effective VVM use	Multi Dose Vial Policy	Vaccine wastage	Total (out of 5)
CMS/EPI	3.3	1.7	2.0	2.5	3.9	0.0	3.8	5.0	0.0	2.5
District	2.3	1.5	0.3	1.3	1.8	0.6	3.1	3.1	0.6	1.6
Service	3.2	1.1	0.0	2.7	2.7	1.1	1.5	1.8	0.0	1.6

At national level availability of vaccines, stock recording system, diluent use and vaccine wastage were to be the weakest indicators. There were stock outs of Hepatitis B and measles vaccines and an overstock of OPV. Diluents were not being distributed properly and vaccine wastage was not being monitored.

At district level, there were reports of stock outs of all antigens. There was no stock record system and expired vaccines were kept in vaccine refrigerators. Diluents were neither received nor distributed systematically with freeze-dried vaccines and vaccine wastage was not monitored.

At the service level, most of the equipment was not the recommended model. There were reports of stock outs of all but DPT vaccine in most facilities. Diluents were sent with mismatching numbers of vaccine vials and sterile water was being used as diluent. VVM was unknown and MVDP was not well implemented. Vaccine wastage was not monitored.

In line with the recommendations of this assessment, BEPI has implemented the following:

- Monitoring of vaccine use at all levels and use of target populations to order vaccines
- Trainings conducted on general EPI, vaccine management and cold chain maintenance, and monthly feed back on routine immunisation is provided to the districts
- An EPI Policy manual has been developed; MDVP Policy has been implemented including the use of VVM, vaccines are supplied with matching diluents

2.5 Advocacy, Social Mobilisation and Communication

While many activities have been implemented in this area there is still need to continue orienting community leaders, religious leaders and community-based organisations to increase the demand for immunisation. This could be done through training Family Welfare Educators on communication for EPI. The other potential partners include the youth organisations, women/men's organisations, Botswana Red Cross Society at all levels and School Clubs. (Recast)

The available structures for communication include Kgotla meetings, village health committees and village development committees or ward development committees. The target groups for social mobilisation are caretakers and siblings while teachers and pupils are targeted through school health programmes.

B. HEALTH SYSTEMS

2.6 Management

The EPI/IMCI Unit falls under the department of Public Health in the Ministry of Health.

The Principal Health Officer (EPI Manager) heads the unit and she is assisted by the Senior Nursing/Health Officer. A need for a Logistician at national level has been identified arising from the problems that the programme has faced with vaccine and logistics management. However, this position has not yet been created.

At district level there is no specific EPI Officer so EPI is integrated within the PHC programme package and Community Health Nurses (CHN) are usually designated to handle this responsibility. The EPI/IMCI Unit deals most directly with CHNs in the DHT structure. As a consequence of integration, EPI has to compete with other priority programmes especially HIV/AIDS and TB. This situation is worsened by the high staff attrition rate.

2.7 Human Resources

Personnel Situation
Botswana is faced with a critical shortage of qualified staff to run health services in the country.

District Health Teams are established in all 24 health districts in Botswana. Managing approximately 667 health facilities nationwide, DHTs are technical implementers of national health reform and decentralisation policies. DHTs are headed by a Public Health Specialist and in general have a staff complement of a second MO, 2 Matrons, a Senior Nursing Officer (SNO), CHN, a Health Education Officer (HEO) and an Environmental Health Officer (EHO).

The overwhelming numbers of well-funded initiatives, particularly those related to HIV/AIDS prevention and control, have competed successfully for time and attention of health workers at all levels. This has impacted most severely upon CHNs in DHTs, and also to a lesser extent upon staff at health facilities inevitably leading to reduction in the time spent on EPI. Secondly staff attrition at both DHT and health facility level has worsened this problem.

Quality Assurance and Supervision
Vaccine quality is assured by the Central Medical Stores (CMS) at the national level and the EPI Unit and DHT at district level. CMS procures vaccines only from pre-qualified suppliers after conducting quality assessment on these vaccines. In addition, CMS carries out pharmacological inspection on storage, labelling, packaging and expiry dates. If a vaccine quality assessment reveals unacceptable standards, vaccines are recalled. At the district level, the EPI Unit and DHTs conduct regular supervision and periodic surveys on cold chain maintenance and vaccine management.

Health Management Information System
The Central Statistics Unit in the MoH receives and analyses data on diseases and other district health information from all the districts on a monthly basis. It has recently undergone changes to improve efficiency. New data collection forms have been introduced to incorporate components of IDSR.

Monitoring and Evaluation
All EPI staff in districts monitor the programme using standard tools and conduct regular support supervision. In addition districts submit EPI monthly reports to the national level where they are analysed and feedback provided. The report form includes components on vaccine use and wastage. The programme is reviewed regularly to evaluate its performance and the last review was conducted in 2002.

Interagency Coordinating Committee (ICC)
The MOH shall replace the current EPI/IMCI Advisory Committee with the Interagency Coordinating Committee (ICC) on immunization with decision-making responsibility at national level on all matters concerning programme development, advocacy and resource mobilisation. The ICC shall meet on a

quarterly basis and convene extraordinary meetings when need arises.

The members of the ICC shall be drawn from but not restricted to the following: MOH, MLG, WHO, UNICEF, USAID, John Snow International, Child Line, Baylor's Children's Clinic, Princess Marina Hospital, National AIDS/STD Coordinating Agency and Botswana Defence Forces.

2.8 Financial Resources

The government of Botswana wholly finances vaccines, logistics, cold chain equipment, transport facilities and personnel. Operational costs are also largely met by Government but there are contributions from partners like WHO and UNICEF towards certain programme components like surveillance and supplementary immunisation activities.

C. SUMMARY OF STRENGTHS AND WEAKNESSES OF THE IMMUNIZATION PROGRAMME

Component	Strengths	Weaknesses
1. Service Delivery	▪ Existence Primary Health Care Coordinating Committees ▪ Proper coordination between EPI and CMS ▪ High routine coverage ▪ Combination of immunization strategies ▪ Standardisation of EPI monitoring tools ▪ Monthly analysis of immunization data and regular feedback by EPI	▪ Low coverage of HBV3, OPV3, and Measles ▪ Low TT2+ coverage ▪ High drop out rate for DTP1-Measles ▪ Inadequate outreach services ▪ No special strategy for hard to reach and un-reached populations ▪ Absence of EPI policy document and guidelines at district level ▪ Problems with denominators at district level ▪ Data analysis not done at district level
2. Disease Surveillance	▪ All districts trained on AFP and Measles Case Based Surveillance ▪ Active Disease Surveillance ▪ Introduction of IDSR ▪ Disease Outbreak Response Committee in place	▪ Non-submission of reports by some districts ▪ NNT surveillance not implemented ▪ Inadequate Measles Case Based Surveillance ▪ Inadequate AFP surveillance
3. Logistics (cold chain, injection safety and waste disposal)	▪ Inventory on Cold Chain done ▪ Refrigeration Technicians trained at district level ▪ Proper disposal of injection waste ▪ High standards of injection safety	▪ No plan on maintenance and replacement of dysfunctional equipment ▪ No formal policy on injection safety ▪ Most equipment are not suitable for vaccine storage ▪ Major repairs of equipment only done at national level ▪ Inadequate transport
4. Vaccine Supply and Quality	▪ Government wholly finances vaccines and logistical supplies ▪ Presence of National Drug Regulatory Unit which registers drugs and vaccines	▪ Unilateral vaccine forecasting by CMS ▪ National vaccine supply unreliable ▪ Vaccine stock-outs at all levels ▪ Lack of stock records at district level ▪ Vaccine wastage not monitored ▪ No procedures for disposing of expired vaccines ▪ Diluents not matched with vaccines ▪ VVM not known at district and facility levels ▪ MDVP not well implemented
5. Advocacy, Social Mobilisation and Communication	▪ Availability of family welfare educators at health facility level ▪ Availability of IEC materials at national levels	▪ Lack of communication plan ▪ IEC materials not distributed at district level ▪ Inadequate social mobilisation
6. Health Systems (Management, Human Resources, Financial Resources)	▪ Availability of National Surveillance and Social Mobilisation Officers ▪ Well established DHTs in 24 districts ▪ Regular supervision at district level ▪ Availability of budget line for EPI ▪ Formation of ICC	▪ Inappropriate management of human resources ▪ Critical human resource shortage ▪ Establishment has no post for cold chain technician at district level ▪ High staff attrition ▪ Lack of logistician at national level ▪ No EPI focal person at district level ▪ Competition with well funded programmes

D. NATIONAL PRIORITIES BASED ON SITUATION ANALYSIS

1. Service Delivery (Routine Immunisation)

- Low coverage of HBV3, OPV3 and Measles
- Low TT2+ coverage
- High drop out rate between DTP1-Measles
- Problems with denominators at district level resulting in coverage above 100%
- Inadequate outreach services
- Lack of analysis of routine immunisation data and appropriate interventions at sub-national level
- Absence of EPI policy documents and guidelines at district level

2. Disease Surveillance and Accelerated Disease Control

- Non-submission of reports by some districts
- MNT surveillance not implemented
- Inadequate AFP surveillance
- Inadequate Measles Case Based Surveillance

3. Logistics (cold chain, injection safety and waste disposal)

- No plan on maintenance and replacement of dysfunctional equipment
- No formal policy on injection safety
- Use of unsuitable refrigeration equipment for vaccines
- Inadequate transport

4. Vaccine Supply and Quality

- Unilateral vaccine forecasting by CMS and no forecasting at district level
- Unreliable vaccine supply at national level
- Vaccine stock-outs at all levels
- Lack of stock record cards at district level
- Vaccine wastage not monitored at all levels
- Diluents not matched with vaccines at all levels
- Vaccine Vial Monitor (VVM) not known at district level
- Multi-Dose Vial Policy (MDVP) not well implemented

5. Advocacy, Social Mobilisation and Communication

- Lack of communication plan

6. Health Systems (Management, Human Resources, Financial Resources) and Partnerships

- Critical human resource shortage in health sector
- High staff attrition
- No logistician at national level
- Establishment has no post for cold chain technician at district level
- Competition from multiple and well funded programmes in health
- Strengthening partner coordination by creating and strengthening the ICC

E. NATIONAL OBJECTIVES BASED ON GLOBAL AND REGIONAL GOALS

Global goals (until 2010)	Regional goals (until 2010)	National objectives based on global and regional goals	Milestones
Coverage 1. By 2010 or sooner all countries will have routine immunization coverage at 90% nationally with at least 80% coverage in every district		To increase immunization coverage for all antigens to at least 95% at national and 90% in all districts by 2010	**2006:** **2007:** **2008:** **2009:** **2010:**
Polio 2. By 2005, the world will be certified polio-free		To interrupt polio transmission and maintain polio free status through 2010	**2006:** **2007:** **2008:** **2009:** **2010:**
Measles 3. 90% reduction in infant mortality by 2010 compared to 2000		To maintain measles elimination through 2010	**2006:** **2007:** **2008:** **2009:** **2010:**
MNT 4. Elimination in every district by 2005		To maintain MNT elimination through 2010	**2006:** **2007:** **2008:** **2009:** **2010:**
Hib 6. By 2005, 50% of the poorest countries with high disease burdens and adequate delivery systems will have introduced Hib vaccine		To accelerate introduction of new vaccines and technologies, based on disease burden, by 2010	**2006:** **2007:** **2008:** **2009:** **2010:**

3. OBJECTIVES, TARGETS, AREAS OF ACTION AND SELECTED STRATEGIES

Area of Operation: Service Delivery

Objective	Strategies	Indicators	Targets				
			2006	2007	2008	2009	2010
To increase immunization coverage of all antigens to at least 95% at national and 90% in all districts by 2010	1. Provide integrated routine immunization services 2. Reduce missed opportunities 3. Implement RED approach 4. Increase community demand for immunization 5. Strengthen data management at all levels 6. Regular monitoring and feedback at all levels 7. Dissemination of EPI policy documents and guidelines 8. Vaccinate beyond the traditional antigens and target group 9. Perform operations research and evaluation	1. % BCG coverage 2. % DPT3 coverage 3. % HBV3 coverage 4. %OPV3 coverage 5. % Measles coverage 6. % TT2+ coverage 7. % Coverage for new antigens 8. Drop out rate DPT1 – DPT3 9. Drop-out rate DPT1 – Measles 10. Number of districts with at least 90% coverage for all antigens 11. Number of districts implementing RED 12. Written feedback available at district level 13. EPI guidelines available 14. Research and evaluation reports available					
To introduce new available vaccines and technologies by 2010	1. Assess the disease burden, cost and cost effectiveness of potential new vaccines and technologies 2. Review the long term financing for potential new vaccines and technologies 3. Introduce new vaccines and technologies	1. Report on disease burden and cost effectiveness of new vaccines available 2. Number of districts offering new vaccines and technologies					

Area of Operation: Accelerated Disease Control and Supplementary Immunisation Activities

Objective	Strategies	Indicators	Targets				
			2006	2007	2008	2009	2010
To improve and sustain measles elimination through 2010	Follow-up campaigns Case-based surveillance	1. % Coverage in follow up campaigns 2. % Districts implementing case-based surveillance 3. Timeliness of reports	N/A	N/A	N/A	95%	N/A
To implement polio SIAs and sustain certification surveillance by 2010	Epidemic preparedness & outbreak response Certification level AFP surveillance & containment	1. % Coverage in SIAs 2. % Districts with certification level surveillance	N/A				
To sustain MNT elimination status through 2010	MNT Surveillance	1. % Districts reporting on MNT					
To strengthen surveillance activities for all vaccine preventable diseases	Strengthen IDSR activities including for Hib, rubella, and other diseases of public health importance	1. No. Districts implementing IDSR 2. Timeliness of reports 3. Completeness of reports 4. Number of Hib sentinel sites					
To strengthen Vitamin A supplementation by 2010	Mass campaigns Routine supplementation	1. % Vitamin A Coverage					
To create appropriate laboratory network for vaccine preventable diseases	1. Commodity security for laboratory reagents 2. Capacity building for laboratory service delivery 3. Expand the existing laboratory network	1. Number of laboratories with stock outs 2. Number of laboratory personnel trained					
To strengthen EPI services for potential pockets of infection, such as displaced populations	1. "Limited" SIA's 2. Provision of routine immunization services as appropriate	1. Availability of immunisation plan for potential pockets of infection					

Area of Operation: Vaccine Quality and Supply

Objective	Strategies	Indicators	Targets				
			2006	2007	2008	2009	2010
To strengthen vaccine management at all levels by 2010	1. Vaccine monitoring 2. Vaccine forecasting 3. Capacity strengthening in vaccine management 4. Introduction of MDVP and VVM based vaccine management 5. Vaccine wastage monitoring	1. No. of months with stock-outs at national level 2. No. of districts using stock cards 3. No. of districts with stock-outs during the year 4. % Districts with matching vaccines and diluents 5. No. of health facilities implementing the Multi-Dose Vial Policy 6. % Wastage for: ▪ DPT ▪ OPV ▪ BCG ▪ Measles ▪ TT ▪ HBV					
Strengthen vaccine safety at all levels by 2010	1. Surveillance and response to Adverse Events following Immunization 2. Procuring vaccines from sources that meet recognised quality standards 3. Quality assurance and regulatory guidance for vaccines and supplies	1. Surveillance and response reports on AEFI 2. Vaccine Arrival Reports 3. Guidelines from DRU					

Area of Operation: Cold chain, logistics and injection safety

Objective	Strategies	Indicators	Targets				
			2006	2007	2008	2009	2010
To strengthen cold chain management and distribution of new cold chain equipment by 2010	Replacement of dysfunctional or inappropriate cold chain equipment	1. No. of new cold chain equipment ▪ Freezers ▪ Refrigerators ▪ Cold boxes ▪ Vaccine carriers 2. No. of health facilities with a functioning recommended type of EPI refrigerator					
To strengthen logistics management at all levels by 2010	Monitoring of logistics at all levels	1. No. of months with stock-outs of injection equipment at national level 2. No. of districts with stock-outs of injection equipment during the year					
To strengthen and maintain safe injections by 2010	Development of policy on injection safety Monitoring use of appropriate injection equipment	1. Policy document on injection safety 2. No. of health facilities using appropriate syringes 3. No. of health facilities utilising correct injection waste disposal methods	0 100%				

Area of Operation: Advocacy, Social Mobilisation and Communication

Objective	Strategies	Indicators	Targets				
			2006	2007	2008	2009	2010
To strengthen advocacy and social mobilisation by 2010	Development of communication plan	1. Communication plan available					

Area of Operation: Health System and Partnerships

Objective	Strategies	Indicators	Targets				
			2006	2007	2008	2009	2010
To strengthen capacity for planning, organisation and management to support EPI service delivery at all levels by 2010	1. Training on MLM 2. Regular monitoring and evaluation of programme performance at all levels 3. Strengthen management of human resources to support EPI service delivery 4. Strengthen motivation of health workers, particularly those in hard to reach areas 5. Build coordination with National Registration for births and deaths registration	1. No. of officers trained on MLM at national level 2. No. of EPI focal persons trained on MLM at district level 3. No. of matrons / PHS trained on MLM at district level 4. Monitoring and evaluation reports		10 24 24			
To strengthen partnerships in child survival by 2010	1. Establish and strengthen a sector-wide ICC for child survival 2. Strengthen coordination of joint support systems such as financing, transport & communication 3. Strengthen coordination of joint interventions such as IDSR, Vitamin A supplementation, and IMCI	1. ICC established 2. No. of ICC meetings per year with minutes available 3. No. of new partners brought into ICC 4. Coordination meetings with IMCI, Malaria, Nutrition, etc	4	4 1	4	4	4

4. ACTIVITY TIMELINE

Component and key activities	Year				
	2006	2007	2008	2009	2010
1. Service Delivery (Routine Immunisation)					
1. Provide integrated services					
2. Train health workers on RED					
3. Micro planning on RED in districts					
4. Increase community demand					
5. Training on data management					
6. Monitoring immunisation coverage in all districts					
7. Monitor routine supplementation of Vitamin A					
8. Finalise EPI policy document and guidelines					
9. Disseminate EPI policy document and guidelines					
10. Integrated supportive supervision					
11. Written comprehensive feedback to districts					
12. Pilot Hib vaccine					
13. Assess disease burden for new vaccines					
14. Cost effectiveness study on new vaccines					
15. Secure government commitment to fund new vaccines					
16. Pilot new vaccines					
17. Review EPI programme					
18. Conduct operational research					
2. Disease Surveillance and Accelerated Disease Control					
1. Active surveillance in all districts					
2. Active surveillance for AFP, Measles and MNT in all districts					
3. Polio containment					
4. Support sentinel sites for Hib					
5. Measles follow up campaigns					
6. Polio SIAs					
7. Integrate Vitamin A in SIAs					
8. Laboratory supplies for polio/measles					
9. Training of laboratory personnel					
10. Expand laboratory network					
11. Respond to outbreaks					
12. Provide services to displaced populations					

13. Initiate IDSR bulletin					
3. Logistics (cold chain, injection and waste disposal)					
1. Replace dysfunctional or inappropriate equipment					
2. Monitor use of recommended equipment in districts					
3. Monitor logistics management in all districts					
4. Training on cold chain management					
5. Develop policy on injection safety					
6. Disseminate policy document on injection safety					
7. Monitor injection safety practices					
4. Vaccine Supply and Quality					
1. Forecast vaccine requirements					
2. Order and distribute vaccines (bundled supplies)					
3. Quality assurance and regulatory guidance from NRU					
4. Training on vaccine management					
5. Establish MDVP and VVM based vaccine management					
6. Monitor vaccine management and wastage					
5. Advocacy, Social Mobilisation and Communication					
1. Develop communication plan					
2. Include messages for strengthening routine and outreach in plan					
3. Review IEC materials					
4. Disseminate IEC materials					
5. Community meetings					
6. Training family welfare educators					
6. Health System (Human and Financial Resources, Management) and Partnerships					
1. Training on MLM					
2. Monitor programme management					
3. Evaluate programme					
4. Establish ICC					
5. Support ICC meetings					
6. Coordination with IDSR, Nutrition, IMCI and other programmes					
7. Coordination of financing, transport and communication					
8. Coordinate with National Registration Office on births and deaths					
9. Recruit National Logistician					
10. Create positions for EPI focal persons at district level					

5 COSTING AND FINANCING OF THE IMMUNIZATION SYSTEM, 2006 - 2010

5.1 Introduction

Costing, financing and gap analysis information is very important in developing a comprehensive MYP. This information is based on the strategies the program intends to implement, in the context of the health system.

The country immunization system has a large number of components that are integrated into the general health system. These have been included in the costing and financing, as shall be explained below.

5.2 Methodology

The costing is based on information on inputs, and activities needed to implement the respective strategies in the MYP. Examples of the inputs and activities costed are provided in the table below.

System component	Inputs	Activities
Service delivery	Human resources/salaries, outreach per-diems, fuel for transport, operational cost of campaigns…	Training, workshops…
Advocacy and communication	IEC materials (posters…)	Social mobilization, IEC, developing advocacy and communication plan
Surveillance	Surveillance equipment	Surveillance activities (sentinel sites, outbreak investigation…)
Vaccine, supply, quality and logistics	Vaccines, syringes, safety boxes, other injection supplies, cold chain equipment, vehicles, spare parts, incinerators….	Monitoring, vaccine stock management activities
Programme management	Computers, office supplies…	Meetings, planning, research, data management, EPI reviews, cold chain assessment…

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Costing methodology employs all the different costing approaches in the costing tool. Ingredient approach, rule of thumb, and past spending are all used to estimate costs for the different inputs and activities. Ingredient approach is based on applying a unit price to quantities needed, adjusted for a factor representative of % time used for EPI. This is used to estimate costs for vaccines and injection supplies, personnel, transport, vehicles and cold chain equipment, where unit costs, and quantities needed are known. Percentage of time used in immunization was derived based on agreements with the EPI program officers.
Rule of thumb was used to estimate costs particularly for maintenance, where a percentage of costs of fuel were used to estimate maintenance for vehicles.

Past spending was used especially for direct program activities, such as meetings, social mobilization and surveillance activities.

The costing, financing and gap analysis information was collected and analyzed based on the tool by the same name, developed and provided by the Global Alliance for Vaccines and Immunization (GAVI), through the World Health Organization. The tool provides for information to be entered in a structured manner in 2 worksheets. One collected cost information, while the other on financing information. Other worksheets were used to analyze, and present the information.

5.3 Costing of MYP

The information was collected basing on 8 sections:

a) Reference information section, which presents basic country information needed to frame the tool. The basic macro economic information was collated from National Accounts Statistics. This was supplemented by estimates from the WHO World Health Report (2004) for per capita Total Health Expenditure (THE) and Government Health Expenditure as a proportion of THE.
b) Vaccines and injection supplies, where information on quantities and unit costs for different antigens, and supplies were presented. Information was from the Central Medical Stores, and the EPI program. Information on doses of antigens supplied was questionable, with some antigens (measles, and tetanus) having supplied less antigens than were administered. This may be due to some stocks still at the facility.
c) Personnel costs, where information unit costs (salaries, and per diems), and numbers of personnel specific to the program, and those not specific was collated. For those personnel not specific to EPI (district and health facility staff), percentage of time spent on EPI activities was factored to the costs, based on expert information to decide the proportion of costs to apportion to the EPI program. For these lower levels, an average number of personnel were used for the lower level facilities. Information was from the Ministry of Health personnel unit.
d) Vehicles and transport costs were also estimated, using the above methodology. The transport, fuel, and maintenance were costed.
e) Cold chain equipment and its maintenance were also costed using the same methodology. Information was based on the recently concluded cold chain assessment.
f) Operational costs for campaigns were collated from the reports of the measles, and polio campaigns recently completed. This was used to derive cost/child during the campaign
g) Program activities and other recurrent costs were also estimated based on past spending, and estimates of what it would cost for future activities.

h) Information on other equipment needs and capital costs was also included.

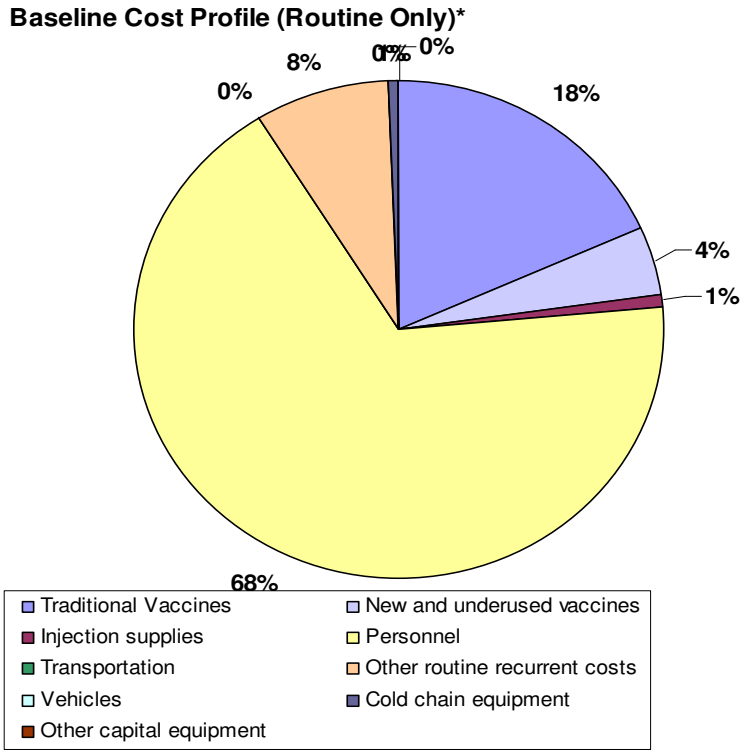
Based on this costing information, the program costs, for the different cost categories, is presented in the table below. Information is based on US$, to limit the implications on foreign exchange fluctuations in proceeding years of the multi year plan.

5.3.1 Baseline year program costs

Expenditures of the program for the year 2004 were estimated, and the results and implications are illustrated below.

Baseline Indicators (2004)	2004
Total Immunization Expenditures	$3,797,706
Campaigns	$1,120,101
Routine Immunization only	$2,677,605
per capita	$1.5
per DTP child	$61.3
% Vaccines and supplies	23.6%
% National funding	61.7%
% Total Health Expenditures	0.76%
% Gov. Health Expenditures	1.26%
% GDP	0.03%
Total Shared Costs Specific Costs	$17,095,518
% Shared health systems cost	82%
TOTAL	$20,893,224

Total expenditures attributed to immunization were estimated at US$ 20 million, of which 82% were shared, while only 18% were specific to the program. The graph below illustrates the cost profile, by major expenditure category



Of these expenditures specific expenditures, just over US$ 1 million was spent on campaigns, while the routine immunization expenditures were at over US$ 2.6 million. This represents a per capita expenditure of US$ 1.5 on immunization, and US$ 61.3 per DTP child. This is high in comparison to other countries, and is a function of:

1. The costs of commodities are high as the prices are negotiated by the country alone
2. The low population density makes the cost of reaching each child higher than in other countries

This however, represents under 1% of total health expenditure, and 1.3% of the Government health expenditure.. This is also a very low expenditure as compared to countries of a similar disease burden. If resource allocation is to be modified based on impact on disease burden, then there is scope for increasing resources to the immunization program.

Vaccines and supplies represent only 23.6% of this total routine immunization expenditure, with the personnel representing over 68% of the total routine program expenditure.

Comparison of these expenditures, with estimated costs of the program during the time of the MYP by cost category is presented in the table below.

	Expend-itures	Future Resource Requirements					
Cost Category	**2,004**	**2,006**	**2,007**	**2,008**	**2,009**	**2,010**	**Total 2006 - 2010**
Routine Recurrent Cost	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**
Vaccines (routine vaccines only)	609,089	941,651	978,536	1,018,564	1,062,449	1,097,239	5,098,438
Traditional Vaccines	490,366	779,472	812,628	848,839	888,821	919,617	4,249,377
New and underused vaccines	118,722	162,178	165,908	169,724	173,628	177,621	849,061
Injection supplies	23,798	39,491	40,844	42,430	44,039	45,432	212,237
Personnel	1,807,036	1,999,149	2,210,418	2,254,626	2,299,718	2,345,713	11,109,624
Salaries of full-time NIP health workers (immunization specific)	655,946	721,263	768,477	783,847	799,524	815,514	3,888,626
Per-diems for outreach vaccinators/mobile teams	288,233	293,997	299,877	305,875	311,992	318,232	1,529,974
Per-diems for supervision and monitoring	862,857	983,888	1,142,063	1,164,904	1,188,202	1,211,966	5,691,024
Maintenance and overhead	64,263	66,214	67,539	68,890	1,170	1,194	205,007
Cold chain maintenance and overheads	63,659	64,933	66,231	67,556	464	473	199,657
Maintenance of other capital equipment	604	1,282	1,308	1,334	707	721	5,350
Building overheads (electricity, water…)							
Short-term training	34,238	44,348	45,235	46,139	47,062	48,004	230,788
IEC/social mobilization	49,010	49,891	50,889	83,679	61,822	54,004	300,285
Disease Surveillance	50,305	128,590	131,162	133,785	136,461	139,190	669,187

	Expend-itures	Future Resource Requirements					
Cost Category	**2,004**	**2,006**	**2,007**	**2,008**	**2,009**	**2,010**	**Total 2006 - 2010**
Routine Recurrent Cost	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**
Programme Management	25,565	26,609	61,067	27,684	28,237	88,806	232,403
Subtotal Recurrent Costs	**2,663,304**	**3,295,943**	**3,585,689**	**3,675,797**	**3,680,959**	**3,819,581**	**18,057,969**
Routine Capital Cost							
Vehicles							
Cold chain equipment	13,696						
Other capital equipment	605	13,315					13,315
Subtotal Capital Costs	**14,301**	**13,315**					**13,315**
Campaigns							
Polio	1,120,101		1,197,037				1,197,037
Vaccines	117,856		123,736				123,736
Other operational costs	1,002,245		1,073,300				1,073,300
Measles					1,478,626		1,478,626
Vaccines and supplies					51,527		51,527
Other operational costs					1,427,098		1,427,098
Subtotal Campaign Costs	**1,120,101**		**1,197,037**		**1,478,626**		**2,675,662**
Other Costs							
Shared Personnel Costs	17,081,225	17,422,850	17,771,307	18,126,733	18,489,268	18,859,053	90,669,211
Shared Transportation Costs	14,293	14,579	14,870	15,168	15,471	15,780	75,868
Subtotal Optional	**17,095,518**	**17,437,429**	**17,786,177**	**18,141,901**	**18,504,739**	**18,874,834**	**90,745,079**
GRAND TOTAL	**20,893,224**	**20,746,686**	**22,568,903**	**21,817,698**	**23,664,323**	**22,694,415**	**111,492,025**
Routine (Fixed Delivery)	**19,461,016**	**20,428,773**	**21,059,880**	**21,499,404**	**21,861,290**	**22,363,279**	**107,212,626**
Routine (Outreach Activities)	**312,108**	**317,913**	**311,986**	**318,294**	**324,408**	**331,135**	**1,603,736**
Campaigns	**1,120,101**		**1,197,037**		**1,478,626**		**2,675,662**

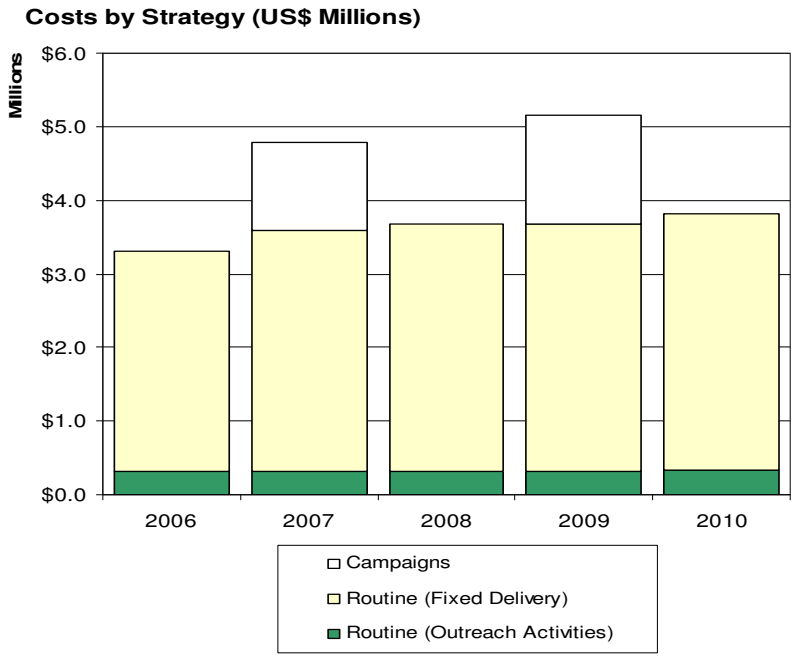
The personnel costs represent costs related to per diems for supervision, monitoring and outreach related activities, in addition to the emoluments for the full time program staff. Vaccines and injection supplies represented 23% of the total expenditures.

Over the years of the MYP, the trends in the total program costs are largely following this pattern. He total costs for the program during this period of the MYP shall be just over US$ 100 million, with just over 85% again due to the shared costs. Of the program specific costs, over US$ 26 million shall be spent on the EPI routine program, while US$ 2,7 million shall be spent on campaigns.

There are significant increases in costs during years when supplemental immunization activities are planned, and in periods where investments will be needed, particularly for personnel to support the EPI activities (2007). Capital investments, particularly vehicles don't represent a significant cost for the

program. This is because these are pooled for many programs, and unlike personnel, the proportion of time spent on EPI related activities is estimated to be rather small.

The illustration of these total costs by delivery strategy is also illustrated below.



The main strategy that will be used will be through fixed site delivery, as is at present. The outreach activities will contribute under 10% of the total program costs. Campaigns in the years when they will be held will be a significant campaign strategy.

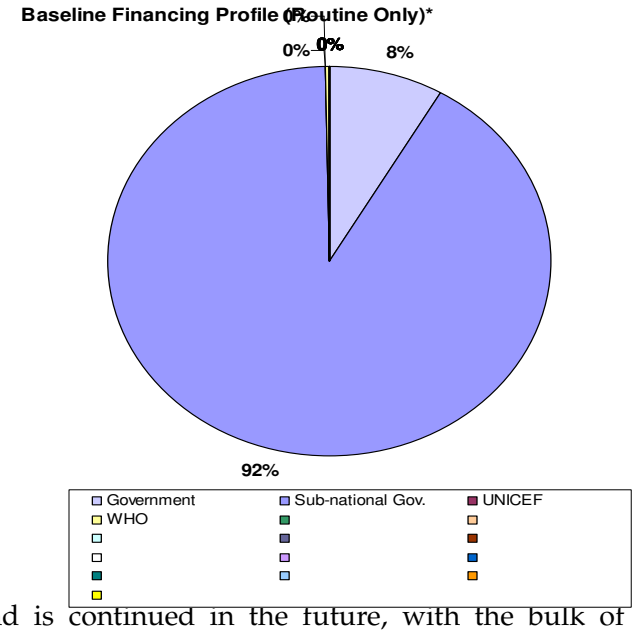
Further illustration of these program costs, by system component is shown below

	Future Resource Requirements					
	2006	2007	2008	2009	2010	Total 2006 - 2010
MYP Components	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**
Vaccine Supply and Logistics	994,456	1,143,117	1,060,994	1,158,016	1,142,671	5,499,253
Service Delivery	19,547,140	21,182,668	20,511,556	22,279,788	21,269,744	104,790,896
Advocacy and Communication	49,891	50,889	83,679	61,822	54,004	300,285
Monitoring and Disease Surveillance	128,590	131,162	133,785	136,461	139,190	669,187
Programme Management	26,609	61,067	27,684	28,237	88,806	232,403
Grand Total	**20,746,686**	**22,568,903**	**21,817,698**	**23,664,323**	**22,694,415**	**111,492,025**

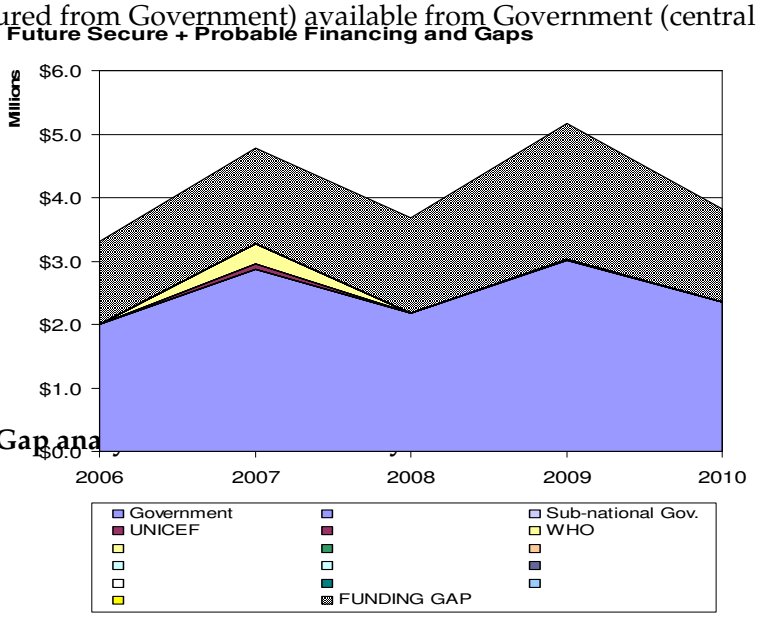
We see service delivery as the key cost driver, responsible for almost all the program costs. Vaccine supply and logistics represent approximately US$ 1 million out of the total program costs.

5.4 Financing of MYP

Estimates of financing available for the program to enable it implement its strategies was also estimated. Analysis of the 2004 expenditure shows that the main financing is from the Government (central, and local), with some limited amounts from the multilateral partners; WHO and UNICEF. This is illustrated below.



This trend is continued in the future, with the bulk of secure and probable financing for the routine program (minus the shared program costs, all of which are secured from Government) available from Government (central and local).



5.5 Gap ana

The composition of the funding gap is illustrated in the table below.

Composition of the funding gap	2006	2007	2008	2009	2010	2006 - 2010
Vaccines and injection equipment						
Personnel						
Transport						
Activities and other recurrent costs	$222,829	$227,286	$263,604	$245,345	$241,197	$1,200,260
Logistics (Vehicles, cold chain and other equipment)	$13,315					$13,315
Campaigns		$71,055		$679,098		$750,153
Total Funding Gap*	**$236,144**	**$298,341**	**$263,604**	**$924,443**	**$241,197**	**$1,963,729**

We see that the funding gap is largely driven by program activities and other recurrent costs, and uncertainty of funds for the planned campaigns. The available financing gap for the program is a function of the difficulty in estimating available funds, particularly for IEC/social mobilization, surveillance and training activities, as the actual activities to be carried out for these cost categories is not clear. These will be elaborated at the subsequent annual plans

5.6 Costing and financing of different program options

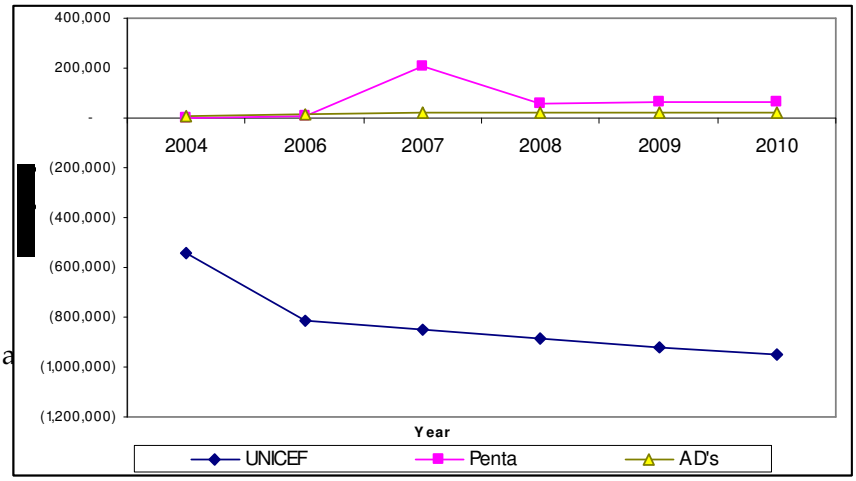
The above costing and financing information is based on the planned strategies the program is implementing, within the existing system and framework. Some different options to strengthen the strategy delivery, or system use are possible. We present cost implications of these. Key amongst these options are:

a) Introduction of a Hib vaccine into the program (to have a pentavalent vaccine of DTP-HBV-Hib, instead of DTP, and HBV vaccines)
b) Use of UNICEF negotiated prices, instead of present procurement systems for commodities (vaccines, and injection supplies)
c) Use of AD syringes

Implications on the routine program costs are presented in the table below

Cost implications due to above options on the EPI routine recurrent program costs

This a



Cost implications due to above options on the EPI routine recurrent program costs

		2004	2006	2007	2008	2009	2010	Total 2006/10
Baseline program costing	Vaccines (routine vaccines only)	609,089	941,651	978,536	1,018,564	1,062,449	1,097,239	5,098,438
	Injection supplies	23,798	39,491	40,844	42,430	44,039	45,432	212,237
	Subtotal Recurrent Costs	2,663,304	3,295,943	3,585,689	3,675,797	3,680,959	3,819,581	18,057,969
Use of UNICEF prices	Vaccines (routine vaccines only)	65,678	122,166	125,808	129,898	134,297	137,995	650,164
	Injection supplies	26,637	44,491	46,018	47,803	49,612	51,172	239,095
	Subtotal Recurrent Costs	2,122,733	2,481,459	2,738,135	2,792,504	2,758,379	2,866,077	13,636,554
	Additional cost	*(540,572)*	*(814,484)*	*(847,554)*	*(883,293)*	*(922,580)*	*(953,504)*	*(4,421,415)*
Introduction of Hib vaccine	Vaccines (routine vaccines only)	609,089	947,065	1,196,028	1,085,077	1,135,440	1,171,968	5,535,578
	Injection supplies	23,798	39,491	33,765	35,188	36,640	37,862	182,945
	Subtotal Recurrent Costs	2,663,304	3,301,357	3,796,101	3,735,068	3,746,551	3,886,741	18,465,817
	Additional cost	-	*5,414*	*210,412*	*59,271*	*65,592*	*67,160*	*407,849*
Use of AD syringes	Vaccines (routine vaccines only)	609,089	941,651	978,536	1,018,564	1,062,449	1,097,239	5,098,438
	Injection supplies	32,960	57,303	59,265	61,510	63,782	65,678	307,538
	Subtotal Recurrent Costs	2,672,467	3,313,754	3,604,110	3,694,877	3,700,702	3,839,827	18,153,270
	Additional cost	*9,163*	*17,812*	*18,421*	*19,080*	*19,743*	*20,246*	*95,301*

The use of UNICEF prices will provide the program cost savings of over US$ 4 million over the course of the MYP. On the other hand, the introduction of the Hib vaccine (supplied through the UNICEF system at US$ 3.65 a dose) will only lead to an increase in expenditure of US$ 400,000. on the other hand, the introduction of AD syringes, purchased at UNICEF prices, would lead to an increase in the program costs of under US 100,000 for the time of the MYP. These program cost increases due to either of Hib introduction, and/or AD syringe introduction will not be seen if the program commences purchase of commodities through UNICEF, enabling it to take advantage of the negotiated product prices which are much lower than the prices it is paying for the vaccines, and injection supplies. There would be no additional costs to the program due to introduction of the Hib vaccine, and/or AD syringes if these were accompanied by purchasing of vaccines using the UNICEF system and prices. Such a strategy would need a comparison of the benefits of use of AD syringes, and/or Hib vaccine, against the cost of purchasing based on the internationally negotiated prices.