Ministry of Health, Nutrition and Welfare
Government of the Democratic Socialist Republic of Sri Lanka

Comprehensive Multi-year Plan for Immunization

2007-2011

Expanded Programme on Immunization
Directorate General of Health Services

Contents

Acronyms

The following acronyms are used in this document.

AD	auto-disable syringe
AEFI	adverse event following immunization
AFP	acute flaccid paralysis
a TD	adult tetanus and diphtheria vaccine
DT	diphtheria and tetanus vaccine
BCG	bacilli Calmette-Guerin (tuberculosis vaccine)
CMYP	comprehensive multi-year plan
DPDHS	deputy provincial director of health services
DTP	diphtheria-tetanus-pertussis vaccine
DPT1	first dose of diphtheria-tetanus-pertussis vaccine
DPT2	second dose of diphtheria-tetanus-pertussis vaccine
DPT3	third dose of diphtheria-tetanus-pertussis vaccine
EPI	expanded programme on immunization
EVSM	effective vaccine system management
FHB	family health bureau
GAVI	global alliance for vaccines and immunization
GDP	gross domestic product
GNP	gross national product
GTN	global training network
Hep B	hepatitis B vaccine
Hib	hemophilus influenzae type b vaccine
HPV	human papilloma virus
ICC	interagency coordinating committee
JE	Japanese encephalitis vaccine
MCH	maternal and child health
MOH	medical officer of health
MR	measles and rubella vaccine\
INGO	International nongovernmental organization
OPV	oral polio vaccine
PHM	public health midwife
TT	tetanus toxoid
RMSD	regional medical supply division
UNICEF	United Nations Children's Fund
VMAT	vaccine management assessment tool
WHO	World Health Organization

Executive summary

The Expanded Programme of Immunization (EPI) in Sri Lanka is an integral component of the public health system. The main objective of the countries EPI is to reduce mortality and morbidity associated with vaccine preventable diseases. The unique feature of the immunization services in Sri Lanka is that for over three decades, it is integrated with the other primary health care services at all levels. Therefore service providers and other logistics are shared with other public health activities as a routine.

Sri Lanka's national immunization programme is frequently quoted as one of the strongest performers, not only in the region, but also in the world. National EPI programme has an excellent record, with extremely low incidence of EPI diseases and high coverage of all EPI vaccines. However, unless the country pays attention to key issues of programme quality and timely introduction of newer vaccines according to the needs it could lose the advantages it has gained in disease control over the last 30 years.

The EPI is one of the priority public health activities and the government of Sri Lanka has given due attention even during any economic and political crisis.

Sri Lanka has witnessed a rising trend in health expenditure in recent years. Total expenditure in Sri Lanka was Rs. 59.5 billion in 2002, which was a 30 per cent increase over that of 2000.As a percentage of GDP, it was 3.7 per cent in 2000, and 3.8 per cent in 2002. In per capita terms, expenditure on health was Rs 2,499 (US $ 31) in year 2000. This was increased to Rs. 3,152 (US $ 33) in 2002 (14 % increase).The six year period from 1998 (4.8%) to 2003 (4.1%) has seen a marginal decrease in the health expenditure as a percentage of national expenditure. The health expenditure as a percentage of GNP remains in the range of 1.55 to 1.73 over this period without a significant change.

The main source of the government's health expenditure is the consolidated fund and the balance comes as foreign aid. Compared to with the total external funding in to the health sector, the amount of donor funding for immunization is proportionately low. It is of utmost importance to highlight that the immunization programme in Sri Lanka is self funded, as 98% of the cost is born by the Government of Sri Lanka . This demonstrates good evidence of financial sustainability in the past. WHO and UNICEF are the leading international donors supporting and cover the balance two percent. Though, the sharing of government has declined 98% in 2002, to 92% in 2004, the actual amount spent has increased by 1.4 million US$. The GAVI funding during this review period has caused slight decline in government proportion.

Comprehensive Multi year plan (CMYP) for immunization is a key management tool for national immunization programmes, and in recent years managers have been asked to develop different plans to reach different immunization objectives. Developing a CMYP presents an opportunity to consolidate existing plans into a single document that address global, national and sub-national immunization objectives and strategies efficiently, and that also evaluates the cost and financing of

that plan. CMYP articulates the future vision for immunizationprogramme in Sri Lanka.

The expansion of immunization activities, including polio eradication, measles elimination, control of neonatal tetanus, introduction of new vaccines and safer vaccination technologies has increased the need for coordination and a comprehensive response to planning and budgeting for the sustainability of the programme. High cost of all new vaccines will be a real challenge to ensure the balance between the sustainability and the expansion of the programme according to the current need.

By pulling the various pieces together into one process and document, the CMYP makes it easier for immunization programmes to set priorities, plan for implementation, and identify interactions across programmes. At same time by assessing changes in the health sector and the political and economic situation, immunization mangers can anticipate changes in funding flows or methods of service delivery in order to plan for sustainable improvements.

This CMYP document sets out the medium term goals, related objectives, strategies, indicators and associated costs for the period of five years starting from January 2007 to December 2011.

The key areas which are identified to be improved during this period are: Coverage of vaccines administered during first year of life; Coverage of vaccines administered during school going age; Laboratory confirmation of reported EPI target diseases; Availability of adequate cold chain at all levels; routine detail investigation of AEFI at divisional level; EPI vaccine wastage; prevailing disparity in the quality of immunization services within and between districts; inadequate & maldistribution of health personal; Vaccine transport facilities at all levels; EPI related disease surveillance activities; training & research activities related to immunization; introduction of new antigen into the EPI programme; private sector contribution towards immunization; and financial sustainability of the immunization programme.

Sri Lanka is planning to introduce live attenuated JE Hib and MMR vaccines into the national EPI programme from 2007 and 2008 respectively. At present JE vaccination is being carried out in endemic high risk areas, covering 18 districts out of 26 districts in the country. The present epidemiological data has indicated the necessity of expansion of the JE programme into a routine EPI programme to cover the entire country. Introduction of low cost live attenuated vaccine is an optional strategy to reduce the vaccine cost for JE vaccine in future.

The present available data justify the introduction of Hib vaccine into the national EPI programme. The cost of Hib vaccine is very high at present. Sri Lanka will necessarily be looking for donor support. Country is expecting to submit its proposal to the GAVI for funding to Hib vaccination programme. It will require an additional 4 million US$ annually and this will be around 25% of the cost of the total immunization programme. The current plan is to introduce the pentavalant vaccine (Hep.B+DTP+Hib) from 2008 if GAVI provides the funding.

During this five year period Sri Lanka is hoping to get assistance from GAVI-HSS to ensure the quality of national immunization programme.

1. Introduction

1.1 Country profile

1.1.1 Basic facts

Sri Lanka is a small island in the Indian Ocean with a land area of approximately 62,705 square kilometers and a population of 20 million. Topographically the island consists of a south central mountainous region which rises to an elevation of 2,502m and is surrounded by broad lowland plains at an elevation of 0-75 m above sea level. The mean temperature ranges from 26 ^{0} C to 28 ^{0} C in the low country, and from 14 ^{0}C to 24 ^{0} C in the hill country.

Sri Lanka has a parliamentary democratic system of government in which, sovereignty of the people and legislative powers are vested in parliament. The executive authority is exercised by a Cabinet of Ministers, presided by an Executive President. The President and Members of the Parliament are elected directly by the people.

1.1.2 Administrative Division

For the purposes of administration, Sri Lanka is divided into 8 provinces, 25 administrative Districts[26 health districts], and 321 Divisional Secretary areas. The Provincial administration is vested in the Provincial councils, composed of elected representatives of the people.

1.1.3 Population

The population of Sri Lanka for the year 2005 is estimated to be 19.6 million. The average annual growth rate is recorded as 1.1 for the island. Little over half of the population is concentrated in the Western, Central and Southern provinces. These three provinces together make 23.2% of the total land area of the country.

During 2003, Sri Lanka had approximately 307 persons per square kilometer (population density). The district of Colombo has the highest density of 3,410 persons per square kilometer. The districts of Mannar, Vavuniya, Mullaitivu and Monaragala that are remote from the major urban centers have a density less than 100.

1.1.4 Age Composition

One of the most clearly visible features in Sri Lanka's population age composition is the increasing trend in the proportion of the older age groups. The median age which remained around 21.3 years until 1981, has increased to 25.6 by 1994. It could also be observed that the proportion of the population under 18 years of age decreased from 37.4% in 1994 to 32.9% in 2001. On the other hand the proportion of the adult population has increased.

Sri Lanka has pass through the classical phases of demographic transition to reach the third phase of a declining birth rate (28.4 in 1980 to 18.9 in 2003 per 1000 population)and a relatively stable low death rate (5.9 per 10000 population since 2001).

1.1.5 Conflict affected areas

The two decades of civil conflict in the Northern and Eastern parts of the country have resulted in at least 60,000 deaths, many more have been disabled, and at least 800,000 people have been internally displaced. The whole population of Sri Lanka has suffered from the consequences of the conflict, but the North East which make up about 24% of the Sri Lanka's land area, and contain about 10% of its population and the adjacent areas have borne the brunt of the conflict. Livelihoods, particularly for the poor in the conflict-affected areas, have been destroyed. Much of the physical infrastructure and the means of production have been damaged, destroyed, or have deteriorated over time. The conflict has been a constraint to growth, health promotion and poverty reduction. It has not only caused extensive suffering and dislocation but has also sharply reduced the economic contribution of the region to national development, required defence expenditures that became unsustainable, restrained growth in social expenditures, discouraged investment, and stifled tourism.

1.2 The current situation of health sector

1.2.1 Organization of the Health Services

In Sri Lanka, both public and private sectors provide health care. The public sector provides free health care for nearly 60% of the population. The Department of Health Services and the Provincial Health Sector encompass the entire range of preventive, curative and rehabilitative health care provision.
The private sector provides mainly curative care, which is estimated to be nearly 50% of the outpatient care of the population and is largely concentrated in the urban and suburban areas.

Ninety five per cent of inpatient care is provided by the public sector. In addition to the free health services provided by the Department of Health Services, Provincial Councils and the Local Authorities, there are service provisions especially for armed forces and police personnel, and the estate population.

Western, Ayurvedic, Unani, Siddha and Homoeopathy systems of medicine are practiced in Sri Lanka. Of these, western medicine is the main sector catering to the needs of a vast majority of the people.

Sri Lanka possesses an extensive network of health care institutions. As such, the majority of the population has easy access to a reasonable level of health care facilities provided by both state and private sector through extension of services to every corner of the country. Any health care unit can be found on an average not further than 1.4 Km from any home and free government western type of health care services are available within 4.8 Km of a patient’s home.

1.2.2 National Health Policy

The broad mission of the health policy of Sri Lanka is to achieve the highest attainable health status by responding to people's needs, working in partnership, to ensure access to comprehensive, high quality, equitable, cost-effective and sustainable health services. This is to be achieved by controlling preventable diseases and by health promotion activities.

National health policy is aimed to consolidate what has already been achieved, as well as address new health challenges, such as the increasing prevalence of emerging & re emerging communicable and non-communicable diseases, sexually transmitted infections etc. Though a countrywide network of health facilities has been already developed with health care provided free of cost by the government, relatively underserved geographical areas and population groups still exist. These groups such as the urban and rural extremely poor, estate workers and displaced populations have specific health needs. National strategies include the poverty alleviation program and targeted specific health interventions are design in a way to meet the specific health needs of those disadvantaged groups.

1.2.3 An overview of the current health status

The country's health indicators show a steady improvement over recent decades, particularly in maternal and infant mortality, and life expectancy. The Maternal Mortality Ratio of 1.4/10,000 live births in 2002 is an exceptional achievement for a developing country with an income level of less than US$ 800/capita. The improvement in these indicators is predominantly attributed to the Maternal and Child Care Programme implemented nationally as an integral component of the state health care system. Similarly, the Infant Mortality Rate of 11.2 per 1,000 live births has been

achieved by effective and widely accessible prevention and primary health care strategies including Expanded programme of immunization. However, whilst post-neonatal mortality has declined significantly, prenatal and neonatal mortality remain relatively high. A neonatal mortality rate of 10.6/1,000 suggests continuing problems requiring both increases in financing and improvements in management.

Life expectancy has risen steadily to around 75.4 for females and 70.7 for males (2001), and the fertility rate has declined to around 1.9 - below population replacement level. With the rapid ageing of the population and success in combating the major communicable diseases, the disease burden has started shifting rapidly towards non-communicable diseases including mental diseases, accidents and injuries. The leading causes of death (by percentage of total mortality for year 2003 are ischaemic heart disease (12.5%), diseases of the intestinal tract (10.8%), cerebrovascular disease (9.1%), pulmonary heart disease and diseases of the pulmonary circulation (9.1%), and neoplasms (4.4%). Over time infectious and parasitic diseases have declined in importance, while cardiovascular diseases and homicides have increased in a proportionate manner. In 1996, violence (accidents, suicides and homicides) accounted for 22% of the deaths, while cardiovascular diseases and diabetes accounted for another 24%, which indicates that the epidemiological transition is rapidly in progress.

Nutritional status has improved but remains a serious problem among the poorer and vulnerable communities and, even on average, is unsatisfactory.

The above mentioned trends are based on information related to the whole country and does not reflect the disparities that exist between provinces. But when the provincial or district level figures on infant and maternal mortality rates are compared there seems to be great disparities, part of which may be due to differential underreporting or to the referral of cases. In particular, information on the conflict-affected areas and the estates show the significant variation between and within provinces.

1.2.4 The major future health Challenges

The Sri Lanka health sector has been a successful model of "good outcome at low costs" in the 20th century. The success so far achieved is commendable; however, a failure would loom unless actions are taken to face the rapidly changing scenario from a health transition. Health transition is a historical phenomenon that many developed and developing countries are now experiencing, and Sri Lanka is one such case. Most of the countries share common underlining factors, that is, transition in epidemiologic patterns, change in patient expectation, and societal demand for efficiency of healthcare system management.

The characteristics of such a Sri Lanka disease burden can be explained by three groups of problems.

- Group 1: Continuing Problems - In the developing world, prominent diseases have been infectious and MCH-related diseases. This group of diseases and conditions poses a continuing problem and consists of diseases and conditions that had a high mortality and morbidity in the past but are under fair control now. Yet, pockets exist where mortality and morbidity from these conditions remain high. Vector-borne Diseases, such as Malaria, Dengue and Filariasis continue to affect the population, while nearly a third of preschool children remain malnourished.
- Group 2: Emerging Problems - An emerging problem that has resulted from social changes due to rapid urbanisation, industrialisation and/or the breakdown of traditional society is apparent. This includes traffic accidents, injuries, violence and the surge of homicides in the young age group in recent years. Sri Lanka also faces an emerging problem of HIV/AIDS.
- Group 3: Evolving Problem - An evolving problem is mostly related to a result of change of lifestyles, people's behaviour and stress in daily life that are increasingly been faced by people. This is represented by an increasing propensity of non-communicable diseases such as Cancers, Heart Diseases and Mental disorders. In Sri Lanka, where communicable diseases and MCH-related diseases have been drastically curtailed, early degenerative diseases such as Ischaemic Heart Disease and Cancer have evolved as a major problem and are more visible due to the prolongation of life of its society. Thus, Sri Lanka has to bear a double burden of disease, namely, communicable and non-communicable diseases.

The challenges posed by this health transition have to be faced by a new service delivery system by making changes in its functions. The new health care delivery system should employ an integrated approach with three functional arms, namely: preventive, curative and welfare arms.

Curative services cannot alone establish an efficient and cost-effective health system that is capable of challenging the epidemiological transition. Policy for integration within the preventive area has to be based on tackling the risk factors from foetal stage to old age.

The policy focus on establishment of a comprehensive health care system should also highlight the importance of welfare elements. This is particularly vital to maintain a healthy society for the aged and disabled people. Rehabilitation and social care need to be associated with curative care services and community base programs.

1.2.5 Health related Financial Implications

In order to design a better health system to fit those changing demands, as a result of transition, it is required also to examine a new financial strategy in line with cost-effectiveness under limited resources. A formula, when applied to only countries with GDP per capita lower than US$ 1,000 such as Sri Lanka, indicates that it requires US$ 31 per capita per year for health expenditure. It is almost the same amount that Sri Lanka is actually spending now. While, when a regression formula is used for countries with GDP per capita of more than US$ 10,000, then Sri Lanka would require US$ 530 per capita. Thus, there exists a great difference in health expenditures between two groups categorised by the economic development level. Sri Lanka is presently moving towards a similar disease pattern as high GDP countries, although it can spend more or less US$ 30 per capita that enable it to cover only the traditional target. This implies that Sri Lanka, when providing sufficient health services for the changing priority diseases, will potentially have to shoulder a re-markably greater financial burden.

A similar estimation was carried out through old age fraction over 60. For a shorter life expectancy at birth less than 68, Sri Lanka requires health expenditure 4.87% of GDP on average while, if the formula for countries whose life expectancy of over 68 is used, Sri Lanka requires 5.84% of GDP. Both figures are much more than the current real figure of 3.4%.

A more detailed projection of health expenditure demands in the future revealed that the total health expenditures in 2015 will be Rupees 267-326 billion in a moderate economic growth scenario, compared to Rupees 50-55 billion in 2002. The projected amounts share 4.5-5.0% of GDP, compared to 3.6% in 2003.

A large financing gap exists in the Sri Lankan health sector and now it seems time for Sri Lanka to consider alternative financing mechanism in order to fill the gap or increased financing through existing mechanisms to stop reversals of the good outcome of its health programmes.

1.2.6 Health Financing and resource allocation

Financial resources for health care mainly from the government, which provides the health care needs of the vast majority of the population. Service provision in the public sector is free of cost to the consumer. Private sector contribution has been comparatively small in terms of service provision and financing, but has been growing gradually.

Sri Lanka has witnessed a rising trend in health expenditure in recent years. Total expenditure in Sri Lanka was Rs. 59.5 billion in 2002, which was a 30 per cent increased for that of 2000.

As a percentage of GDP, it was 3.7 per cent in 2000, and 3.8 per cent in 2002. In per capita terms, expenditure on health was Rs 2,499 (US $ 31) in year 2000. This was increased to Rs. 3,152 (US $ 33) in 2002 (14per cent increased)

The six year period from 1998 (4.8%) to 2003 (4.1%) has seen a marginal decrease in the health expenditure as a percentage of national expenditure. The health expenditure as a percentage of GNP remains in the range of 1.55 to 1.73 over this period without a significant change.

In year 2002 total government health expenditure amounted to Rs. 25.8 billion, which was 43 per cent of total financing while the private source finance Rs. 33.7 billion equivalent to 57 per cent.

In 2003, the recurrent government health expenditure as a proportion of the total government health expenditure was nearly 80 percent.

Government financial sources consisted mainly of central government revenue and donor assisted external sources. Out of the total government spending by function, services of curative care account for 65 per cent in 2002. Share of preventive and public health services has remained at 9 per cent

During 2002, foreign aid component of the health expenditure was Rs 1218.2 million. This accounted for 4.5 per cent of the health expenditure. This figure was 10 per cent in 1998. This proportion has decreased over the years.

1.3 Multi year plan for immunization

Comprehensive Multi year plan (CMYP) for immunization is a key management tool for national immunization programmes, and in recent years managers have been asked to develop many different plans to reach many different immunization objectives. Developing a CMYP presents an opportunity to consolidate existing plans into a single document that address global, national and sub-national immunization objectives and strategies efficiently, and that also evaluates the cost and financing of that plan.

The proliferation of immunization activities, including polio eradication, measles elimination, control of neonatal tetanus, introduction of new vaccines and safer vaccination technologies has increased the need for coordination and a comprehensive response to planning and budgeting for the sustainability of the programme. High cost of all new vaccines will be a real challenge to ensure the

balance between the sustainability and the expansion of the programme according to the current need. Unlike the basic EPI vaccines, new vaccines will be available at much higher prices. This implies that a good planning and careful decision making is essential. c-MYP is a tool to fulfil this need.

By pulling the various pieces together into one process and document, the CMYP makes it easier for immunization programmes to set priorities, plan for implementation, and identify interactions across programmes. Same time by assessing changes in the health sector and the political and economic situation, immunization mangers can anticipate changes in funding flows or methods of service delivery in order to plan for sustainable improvements.

1.3.1 The Expanded Programme on Immunization – Sri Lanka

Immunization is a surrogate of primary health care and its functions. Often it is an entry point activity in unreached populations and MCH related services which are evolve around it.

The Expanded programme on Immunization (EPI) has been in operation in the country since 1978. However, immunization activities had been conducted for more than two decades prior to that.

EPI is a national priority programme of the Government of Democratic Socialist Republic of Sri Lanka. It is well recognized in Sri Lanka that immunization is one of the most cost effective interventions for disease prevention. In addition, immunization is also considered an important vehicle for health promotion and other health services addressing morbidity of public health significance in all age groups. In Sri Lanka, immunization is thus recognized as not just an item of national expenditure but truly as a national investment.

1.3.2 Objectives of preparing CMYP

The main objectives of preparing this CMYP is to,

i) Strengthen the routine immunization programme to ensure the optimum coverage, quality, sustainability and reliability of immunization services.

ii) Effectively introduce newer vaccines and technologies into the routine immunization programme according to the real need to counter the public health consequences of the diseases. Underutilized and new vaccines in pipeline include J.E., HiB, Mumps, Rota, Pneumococal infection and HPV

iii) Integrate immunization programme with other health interventions and surveillance in the health system.

iv) Strengthen the monitoring, evaluation and surveillance systems for the immunization programme

v) Ensure effective and equitable resource planning, mobilization and allocation to sustain and further improve immunization services.

The document sets out the medium term goals, related objectives, strategies, indicators and associated costs for the period of five years starting from January 2007 to December 2011.

2. Situational analysis of immunization programme in Sri Lanka

2.1 Historical perspective

The history of immunization in Sri Lanka goes back to the 19th century. The law relating to compulsory vaccination (against small pox) is referred to in the Vaccination Ordinance of 1886. BCG vaccination and OPV & DPT vaccination was introduced in 1949 and 1961 respectively.

The Expanded Programme on immunization (EPI) established in 1978, has continued to make excellent progress over the past 25 years, most notably in terms of achieving high immunization coverage and disease control. According to the EPI programme all children during first year of life immunize with BCG, OPV, DPT, Hep B and Measles to complete the primary series of vaccination before reaching the age of one year. Other than that older children immunize with DT, MR, aDT, Rubella and pregnant women with Tetanus Toxoid.

During the last few years, based on the disease burden data, new vaccines for selected emerging diseases such as Rubella (1996) Hepatitis B (2003), MR and aDT (2001) have been gradually introduced into the National Immunization Schedule in a phased manner Vitamin A supplementation was added to the program in year 2000

Currently JE vaccine is not a component of National immunization schedule. In 1988 administration of JE vaccine to all children between 1 to 10 years of age in selected high risk areas was initiated. This was gradually expanded to 16 districts over the time depending on the epidemiological data. Currently it is carrying out as a mass campaign in selected period of each year.

In 1995 to 1999, five National Immunization Days were conducted with very high coverage in Sri Lanka in view of eradicating Polio.

Table 1:National Immunization Schedule for EPI vaccines- Sri Lanka

Age	Vaccine	Remarks
DURING FIRST YEAR OF LIFE (INFANCY)		
0-4 weeks	BCG	Before leaving hospital, even within 24 hours of birth. (If a scar is not present re-vaccinate after 6 months up to 5 years).
Soon after the completion of 2nd Month	DTP, OPV & Hep-B* (1st dose)	
4th Month	DTP, OPV & Hep-B* (2nd dose)	Preferably 6-8 weeks after 1st dose
6th Month	DTP, OPV & Hep-B* (3rd dose)	Preferably 6-8 weeks after 2nd dose
9th Month	Measles	Measles vaccine should be administered to all infants as soon as they complete 9 months
IN SECOND YEAR OF LIFE		
About 18 months	DTP (Booster) - 4th dose OPV (Booster) – 4th dose	
PRESCHOOL-GOING AGE		
On completion of 3 years of age	Measles and Rubella (MR)	One dose for all children
SCHOOL-GOING AGE		
At school entry (5 years)	OPV (Booster) – 5th dose DT	One dose for those who have received the primary course of DTP/DT.
In school (10-15 years)	aTd (Adult Tetanus and diphtheria)	One dose for those who have received the primary course of DTP/DT.
	Rubella	One dose of Rubella vaccine should be administered to all children between the ages of 10 and 15 years.
PREGNANT WOMEN		
First pregnancy	Tetanus Toxoid – 1st dose (TT1) after the 12th week of pregnancy Tetanus Toxoid – 2nd dose (TT2) 6-8 weeks after the first dose	Two doses of Tetanus Toxoid should be given during the first pregnancy to prevent Neonatal Tetanus
Subsequent pregnancies	Tetanus Toxoid for the subsequent 3 pregnancies (TT3, TT4, TT5)	One dose of Tetanus Toxoid should be administered during every subsequent pregnancy, up to a maximum of five doses in all (i.e. TT1-TT5)
FEMALES IN THE CHILD-BEARING AGE GROUP		
15-44 YEARS	Rubella	One dose of rubella vaccine to all females between 15 and 44 years of age, who have not been immunized earlier.

2.2 The Programme Objectives

The Sri Lanka's immunization programme is not only one of the strongest performers in the region, but also one of the finest in the world. The government has effectively controlled most traditional vaccine preventable diseases through superior levels of sustained coverage.

The unique feature of the immunization services in Sri Lanka is that for over three decades, it is integrated with the other primary health care services at all levels. Therefore service providers and other logistics are shared with other activities as a routine.

The objectives of the country EPI at present are as follows,

- To reduce mortality and morbidity associated with vaccine preventable diseases – tetanus, whooping cough, childhood tuberculosis, measles, rubella and hepatitis B.
- Elimination of neo-natal tetanus.
- To achieve certification of eradication of poliomyelitis.
- To achieve near hundred percent coverage with BCG, 3 doses of OPV, DPT and hepatitis B and measles of infants by the first birthday.
- To achieve 95% coverage with the 4^{th} and 5^{th} doses of OPV by the 2^{nd} and 5^{th} birthdays respectively.
- To achieve immunization coverage over 95% for MR among 3 years old.
- Prevention and control of all outbreaks of measles, maintaining zero incidences of diphtheria.

By addressing above objectives Sri Lanka expect to eradicate, eliminate or reduce morbidity and mortality associated with vaccine-preventable disease to levels where they are no longer a public health concern.

2.3 Organization and management of the EPI

Epidemiological Unit and the Family Health Bureau (FHB) are jointly responsible for the implementation of the EPI. The Epidemiological Unit is specifically responsible for the policy making, strategic planning & surveillance of EPI diseases, vaccine logistics (procurement, storage and distribution of vaccines), processing of relevant data, monitoring & evaluation of the EPI programme and training of health middle level managers. The FHB is responsible for the procurement and delivery of equipment and other supplies required for the EPI programme including the maintenance of the cold chain. The Family Health Bureau also monitors the implementation of the EPI. These activities are facilitated and coordinated at the provincial and district level by the Provincial Director of Health Services and Deputy Provincial Director of Health Services respectively.

All policy decisions on EPI are endorsed in the National Advisory Committee on communicable diseases chaired by Director General of Health Services. The national EPI programme activities are regularly reviewed at the Inter agency Coordinating Committee (ICC) chaired by Secretary of Health.

Through out the country, the delivery of immunization is being done along with the Maternal and Child Health (MCH) services. MCH programmes are delivered through

fixed and outreach centres. Almost all MCH clinics are conducted by Medical Officers of Health (MOOH) /Divisional Directors of Health Services (DDDHS). In some hospitals, Maternity Homes, and Central Dispensaries, institutional Medical Officers conduct the clinics with the assistance of the field health staff. These institutions function as fixed centers and offer MCH including immunization services. In the estate sector immunization is being carried out in Estate Health Centers.

In addition, private hospitals and general practitioners also provide immunization services to the community. Upon request, the EPI vaccines are provided free of charge to private hospitals and general practitioners. The recipient receive these vaccines free of charge but with a charge for the professional service. \

2.3 Vaccine procurement

Currently the government of Sri Lanka purchases all vaccines used in the EPI except the hepatitis B vaccine which is supplied free of charge by GAVI till 2008. All vaccines are supplied by the Medical Supplies Division of the Ministry of Health. These vaccines are procured through the government-owned State Pharmaceutical Corporation of Sri Lanka. This is carried out through a process of world-wide restricted tenders. The quality of vaccines is assured by obtaining vaccines from prequalified suppliers recommended by WHO for bulk purchase for U.N. Agencies and by looking into the criteria of "good manufacturing practices" as laid down by World Health Organization.

The strict financial guidelines including tender procedures have to be adhered in the procurement process. Although this ensures transparency in purchasing it is a time consuming procedure. There is a risk of disruption of vaccine supply unless adequate supplies are stocked in advance.

2.4 vaccine supply

EPI vaccine supply is coordinate by Epidemiology Unit. As a routine it maintain a buffer stock of EPI vaccine adequate for more than six months at central level, one months at each district level and divisional level. For last few years there is not a single reported incident of lack of EPI vaccine stocks at any level.

2.5 Immunization coverage

Sri Lanka has well established routine national level information system to asses the EPI vaccine coverage. This reporting system starts from the divisional level where the primary health care service is centers. There are 285 health divisions and all these divisions are quarterly sent the report of EPI to the Epidemiology unit, which is the national focal point of the EPI programme. Completeness of this reporting practice is 100%. Based on divisional data, 26 health districts (second administrative level) are also reporting quarterly and this is too 100% complete. The national level immunization information of Table 2 is based on these returns of both divisional and districts. In addition to the government sector, private sector also provided the EPI

service, particularly in urban areas. The reporting from the private sector is poor. Hence the information given in Table 2 is an underestimate of the real situation.

In addition, annually, EPI coverage assessment surveys are conducted in selected DPDHS divisions, especially where low coverage is reported. In 2003, EPI coverage surveys were conducted in Jaffna, Trincomalee and Galle DPDHS divisions and in 2004, in Anuradhapura DPDHS division. Survey report for year 2004 is annex (Annex 1).

Both routine and survey data on immunization coverage shows that the coverage for EPI vaccines during first two years of life is above 90% and for most of them it reaches closer to 100%. With the increasing age, the coverage for vaccines gradually decreased. Poor coverage is reported for tetanus toxoid/ adult diphtheria tetanus (aTd) vaccine among 10 – 15 years old, and rubella among females 8 – 44 years). The high coverage in Jaffna and Trincomalee districts despite the prevailed very difficult service conditions due to civil unrest reflects good performance of the programme.

Vaccines administered at school going age shows relatively poor coverage when compared to that of first two years of life. This may be partly due to inadequate planning of school health activities at the local level and inadequate support from some school authorities.

Table 3 shows the routine immunization coverage by districts. It clearly indicates that there is no marked difference in immunization coverage at district level or based on the geographical distribution. But, when we analyze the divisional level routine coverage and survey data, it is revealed that there were pockets of relatively low coverage areas compared to national level within some districts (annexure 1). These low coverage pockets are located in plantation estate sector, north & east conflict zones and urban slum areas in Colombo.

Table 2 : National level EPI vaccine and Vit A coverage for year 2005

Vaccine	Target group	Number in Target group	Number of Doses given	Coverage %
BCG	Live births	361,453	344,292	95.3
DPT1	Surviving Infants	357,043	348,781	97.7
DPT3	Surviving Infants	357,043	342,410	95.9
OPV3	Surviving Infants	357,043	341,068	95.5
HepB3	Surviving Infants	357,043	310,030	86.7*
Measles 1	Surviving Infants	357,043	353,281	98.9
Rubella	Surviving Infants	358,511	331,189	92.4
MR	Surviving Infants	358,511	331,189	92.4

Vit A 1	Surviving Infants	357,043	217,914	61.1
TT2+	Pregnant women	361,453	331,705	91.8

*Phase 111 of Hep B introduction was in year 2005.
Source-WHO/UNICEF Joint report- 2005

2.6 Current vaccine preventable disease burden

There are 26 notifiable diseases in Sri Lanka, including the seven EPI target diseases (Polio, Tetanus, Tuberculosis, Whooping cough, Diphtheria, Measles and Rubella). Reporting of all EPI target diseases and AFP cases less than 15 years of age as suspected poliomyelitis, based on clinical ground have been made mandatory in Sri Lanka. The Epidemiological unit is the central coordinating agency for the programme, receiving information about EPI target diseases and AFP cases from the Medical officers of health, as well as medical officers in curative institutions where the patients seek treatment.
On receiving notifications on EPI target diseases or AFP, detailed investigation with laboratory confirmation is supposed to carry out.
Currently Laboratory confirmation is carrying out for all suspected AFP cases, but for the other EPI diseases laboratory confirmation is some what limited due to the limited availability of laboratory facilities. Medical Research Institution in Colombo is the only institution carried out laboratory confirmation of EPI diseases. This is the one area Sri Lanka has to improve further in future.
Objective of any immunization programme are to bring down the morbidity and mortality of vaccine preventable diseases. With the high levels of immunization coverage archived with acceptable quality, not surprisingly the target diseases have declined to low levels and some are not being detected at all, inspite of both active and passive surveillance activities.

High immunization coverage has caused a sharp drop in the incidence of vaccine preventable EPI diseases in Sri Lanka during the past decade. Polio cases have not been reported since 1993. Polio virus transmission has probably ceased. Laboratory confirmed cases of Diptheria and Pertussis were not reported during the last year. Only a three confirmed cases of Measles were reported in 2005. No cases of neonatal tetanus were reported in 2005 and one case each reported in 2003 & 2004 (Table 4). Sri Lanka was not included in 58 priority countries identified by WHO for elimination of neonatal Tetanus. This was based on reliability of our disease surveillance system, high pregnant mothers +TT coverage (91.8%) and percentage of institutional deliveries (95%).This status will be maintained.

Table 3 : Reported incidence of vaccine preventable diseases

Disease	2003	2004	2005
	No Reported	No Reported	No Reported
Diptheria	0	0	0
Pertussis	82	45	0
Neonatal Tetanus	1	1	0
Polio	0	0	0
Measles	65	35	3
Rubella	34	6	16
Total Tetanus	30	32	20

Source Source-WHO/UNICEF Joint report- 2005

2.7 Availability and maintenance of cold chain facility

At present, the cold chain facilities are just adequate to maintain the present routine requirement, but certainly introduction of new vaccines would require additional cold chain facilities at all managerial levels in future.

The vaccine storage facilities at national level are still inadequate. Private cold room facilities are used to store vaccines, when central cold room facility is inadequate, particularly during the supplemental immunization programmse. The ongoing construction of central cold room complex will be completed by January 2007 and instalment of this new cold room will be adequate for future requirements. The government allocated funds for this activity, around 1 million US $. Additional cold rooms will acquired in 2007 with UNICEF assistance.

UNICEF had already installed two cold rooms in two districts and scheduled to install more cold rooms in other districts. This will enhance the vaccine storage capacity at district level. Currently, except for the six health districts all the other districts have WHO pre-qualified vaccine cold rooms.

In addition to the above, the maintenance and replacement of the cold chain facility at the RMSD will require around 150,000 US$ for the next 10 years.

Introduction of new vaccine will require an additional storing capacity at the divisional level. However, introduction of Hib vaccine will be done as a combined vaccine of DTP-HepB-Hib, and therefore it will help to minimize the need for additional storing facility at this level. It is expected to strengthen vaccine storing capacity in divisional level institutions. As there are 285 divisional centres in the country, replacement of present cold chain facilities will be done over a period of 10 years. The additional cost required for strengthening divisional level cold chain facility is around US$ 750,000. Replacement of vaccine transport equipment (vaccine carriers and igloos) will continue every year.

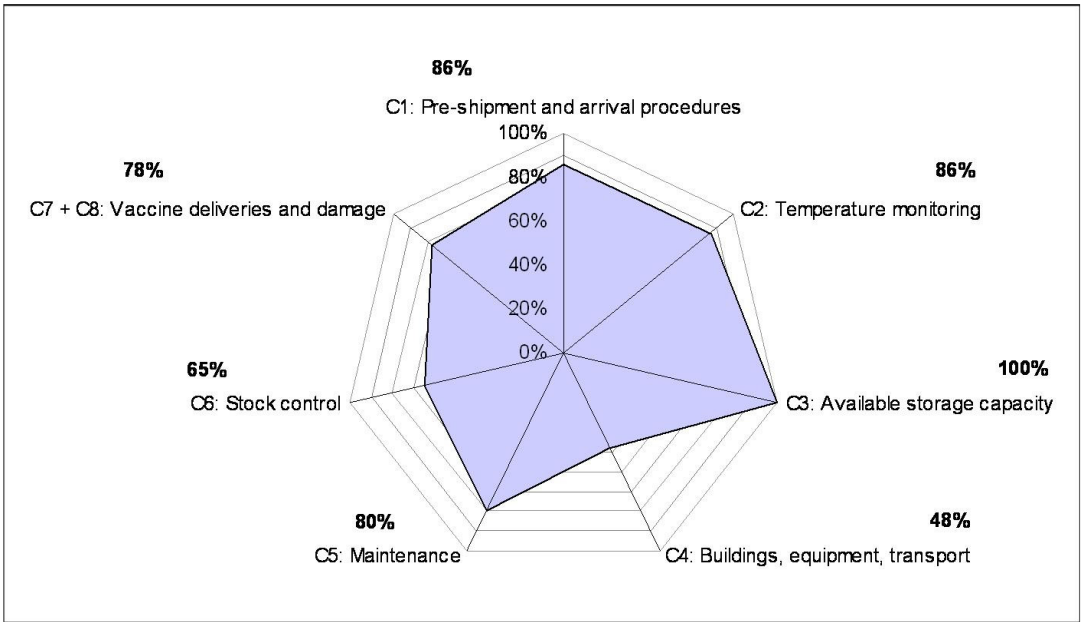
At present the EPI programme spends around 3% of total budget to maintain the cold chain facility and around 1.5% for transport. The cost for the above activities at central level could be reduced by reorganizing the present vaccine storage and transport activities where as for the divisional level it is unlikely to make any significant savings. The reason is that the central level annually spends around 15,000 US$ for storing vaccines at private cold rooms and round the clock vaccine distribution to the 26 district drugs stores (RMSD).

In addition, UNICEF had provided vaccine transport vehicles to the six districts and plans to provide vaccine transport vehicles to all districts in 2006. This will greatly ensure the vaccine distribution at district level.

With the assistance of WHO & UNICEF, effective vaccine store management [EVSM] survey at central vaccine store was carried out in year 2005, and found Sri Lanka primary vaccine store has proven to be managed effectively over the period of 12 months in most of the key areas. Fig 1 shows the summary results. Based on the recommendations, necessary actions have been taken to rectify the identified deficiencies.

With the help of WHO & UNICEF Sri Lanka has conducted vaccine management assessment survey in 2005. The purpose of the VMAT is to investigate knowledge and practice of vaccine management amongst health staff operating at National, sub-national and service delivery level.

Figure 1. EVSM primary vaccine store assessment results, Colombo, Sri Lanka for the period of 1 July 2004 to 30 June 2005



2.8 Ensuring injection safety

2.8.1 Using Auto-Disable Syringes

Reuse of injection equipment is mainly responsible for most of the infections that result from immunization. This can be preventing by using AD syringes. In Sri Lanka introduction of AD syringes into the EPI was done in year 2003 with the support of

GAVI in order to ensure the immunization safety and improve the quality. Currently both EPI and non EPI programmes exclusively use AD syringes.

2.8.2 Sharps management and safe disposal

The current practice is the disposal of sharps at the immunization clinic level. Sharps are collected into the sharps bin and are burned and buried once they are filled. Incineration is a practice in some parts of the world. There are barriers to implement this in Sri Lanka. The most important factor is the initial cost for the construction and the cost for the maintenance of incinerators. The number of incinerators needed, and the distance that will need to travel from the immunization clinic to the incinerator also has to be taken in to consideration. Donor agencies, such as World Bank also disapprove construction of incinerators. It is very unlikely that in coming year there will be a change in the current practice. Another alternative option for this may be use of non-burn methods of immunization waste disposal, which is successfully practised in the certain parts of India. This was also followed during large scale measles campaign in Philippines two years back. In this method needle part of the syringe is separated from the plastic part with the help of needle remover at the point of use at immunization site. Plastic part of the syringe is collected for re-cycling and only needles are disposed through deep burial in safe pits. This approach minimizes the risk of needle stick injury to the vaccinator, and to the community compared to situations when the waste is left in open and not effectively contained. Government of Sri lanka will conduct pilot approaches in five districts and develop a national policy on safe disposal of injection waste.

2.8.3 Adverse events following immunization (AEFI)

Surveillance system of AEFI is an integral part of the EPI in Sri Lanka since 1996.It provides an illustration for other countries in the region. Institutional physicians and the field staff are required to report all AEFIs detected to the area medical of (Central level) and regional Epidemiologist (district level) monthly. Additional information is collected by using detailed investigation form for all serious adverse events. This information is evaluated systematically at district level & central level and remedial measures are taken whenever there is a programme failure. For year 2005 recept of monthly notification reports of AEFI (including zero reports) was nearly 100% for all districts, but detail investigation of selected adverse events were not happen optimally. This is mainly due to limited resources at the divisional level.

Injection site abscess (17.9) and severe local reaction (15.3) were common AEFI reported during year 2005. These AEFI are classified as programme errors and could be prevented with the provision of good immunization practices. Allergic reactions were the commonest AEFI.

Table 4 : Distribution of reported AEFI by type of Adverse Events 2003 – 2005

Type of AEFI reported	Number reported & % 2003		Number reported & % 2004		Number reported & % 2005	
Injection site abscess	564	23.2	620	21.92	565	17.90
Lymphadenitis	17	0.7	62	2.19	77	2.44
Sever Local Reaction	324	13.3	407	14.39	485	15.36
High Fever	319	13.1	441	15.59	554	17.55
Allergic Reaction	665	27.4	728	25.73	869	27.53
Nodule	66	2.7	71	2.51	106	3.36
Seizures	66	2.7	140	4.95	156	4.94
Arthralgia	15	0.6	12	0.42	5	0.16
Shock	46	1.98	09	0.32	2	0.06
Scream	39	1.6	73	2.58	52	1.65
Encephalopathy	01	0.04	05	0.18	1	0.03
Meningitis	-	-	03	0.11	2	0.06
GBS	-	-	6	0.21	0	0.00
Nephrotic Syndrome					1	0.03
Death					4	0.12
Others	305	12.66	229	7.85	283	8.96
Total	2426	100	2836	100.00	3159	100.00*

* Rounding off effect

2.9 Vaccine wastage

Sri Lanka is having an excellent performance in high immunization coverage in the country. However, vaccine wastage for some antigens is high as it is expected (eg ; BCG wastage is over 70%) and for some other antigens it is higher than the expected level (eg: TT 60%, MR 50%). Vaccine wastage is high for JE, and impact of this is much higher because of its high cost.

In view of reducing the vaccine wastage Sri Lanka has introduced open vial policy from 2005 into the EPI programme. Until up to 2004, in Sri Lanka we did not practice the open vial policy and the opened multidose vaccine vials were discarded at the end of the day. Currently open vial policy is operating for selected liquid vaccines (Polio, DPT,DT and HeB) At present the average wastage for all liquid vaccines is around 20%..and it was around 25 – 40% before implementation of open vial policy. This shows that open vial policy caused significant reduction in vaccine wastage for all liquid vaccines.

Compared to other vaccines Hep B has relatively low wastage (10%). This is mainly because this vaccine is heat stable and open vial policy minimizes the wastage.

Sri Lanka wants to continue its high coverage, while adjusting the programe to meet the financal challenges, particularly due to the increasing cost for the vaccine and public demand for the programme. As the present wastage for some antigens is more than expected, so its essential to take effective steps to reduce vaccine wastage in future.

The issue of vaccine wastage has acquired importance due to high cost of new vaccines. It will be used as an indicator of program efficiency. Two critical requirements for reducing vaccine wastage is to reduce the vial size, ideally one or two dose, and by careful micro planning to ensure adequate number of children to be immunized at each immunization session. The former has implications on cold chain capacities at all levels of storage.

2.10 Quality of the immunization services

High quality of the immunization services is essential to achieve the desired programme objectives and ensure the sustainability. Studies undertaken by the Epidemiological Unit indicate that rates of vaccine preventable disease incidence and coverage in areas with historically unequal access to immunization are now approaching, and in some cases surpassing, those in the rest of the country. However, this remarkable achievement is threatened by recent findings of disparities in the quality of immunization services provided. For example, there is considerable variation between under-served areas and the rest of the country in the reporting in the reporting of adverse events following immunization (2001 average of 55% vs. 79%, respectively). Even within high reporting areas, the 2001 rate of injection site abscess varies widely (range: 22/100,000 to 160/100,000). A loss of confidence in the programme could undermine the achievements to date and impede progress towards consolidation of these gains. World Bank supported Sri Lanka Health Sector Development Project: immunization Subcomponent will focus on improving quality at national level. Under this project the expected outcome will be a major reduction in unintended variation between districts in immunization service quality, as defined by Ministry of Health guidelines. A reduction in AEFI will be used as the primary indicator of quality improvement. Highly motivated and skilled midwives (vaccinators) who provide services from publicly recognized clinics of excellence and whom skilled divisional and district health staff routinely support the expected outputs. Activities of this project already planned and initiated in 2006 and extend up to 2009.

2.10.1 Health personals

Still there are serious disparities in the requirements and supply of several categories of health personals. On top of that there is also a significant imbalance existing in the distribution of human resources for health. Inadequate number of Public Health Midwives (Who act as vaccinators) for field services in some districts was one of the reasons for the low coverage and quality at the local level. Specifically, the number and the rate of Public Health Midwives in the northern province (Jaffna -1.24, Kilinochchi -0.53/per 10,000 population) is extremely low while districts such as Kalutara (3.49/10,000 population) and Hambantota (3.96/10,000 population) have a significantly higher concentration. This figure for national level is 2.54/10,000 population.

The usual practice was to appoint a PHM from the adjacent PHM area to cover duties of the vacant PHM area. However this does not ensure complete coverage of service including household visits that ensure timely vaccination of children.

There is no category of health care workers only for immunization activities in Sri Lank. Therefore, future plans for strengthening human resources in immunization will essentially be a part of strengthening all primary health care services in the country. The Ministry of Health has identified future needs considering all public health demands in the country. The cadre required is approved by the Treasury and therefore the recruitment will continue in phases as it is planned for the next 10 years. The limited training capacity in the country is the main reason for requiring more time to fill the vacancies.

Recruitment of new batches of PHMM during the past several years has improved the service conditions at the field level up to some extent. Recently, additional payments for cover-up duties are also introduced to encourage covering up officers. This will be further improved by the end of 2007 once new recruits of PHMM complete their training and are absorbed in to the cadre.

The Ministry of Health works in co-ordination with INGOO to implement the EPI, especially immunization among hard to reach populations in conflict affected areas. There is much support for health related activities by INGOO working in areas of civil unrest such as the International Committee of the Red Cross, Medicines Sans Frontiers, United Nations High Commission for Refugees, Save the Children's Fund and Redd Barna. They help to conduct mobile immunization clinics by assisting in transport of equipment and vaccine. UNICEF also provides assistance for training of volunteers and for payment of subsistence for volunteers working in these areas. Local NGOO such as Sarvodaya also help in immunization.

2.10.2 Vehicles and Transport

Vehicles and transport are identified as important components of the immunization programme in the country. Poor transport conditions or delaying in distribution can jeopardize the potency of vaccines. Timely access to dependable vehicles is essential. Standard delivery vans lorries are currently being used to distribute vaccines at the central and regional levels. Some of these vehicles are old and unreliable, and regional canters must often resort to borrowing vehicles to distribute vaccines on time.

In addition, anecdotal evidence points strongly and consistently to the need for improved transport capacity at the periphery and within the estate sector, particularly where mobile clinics operate. A comprehensive assessment is required to determine the demand for and the cost of providing appropriate vehicles at the lower levels of the distribution system.. This is the one of the objectives of ongoing World Bank funded Sri Lanka Health Sector Development Project: Immunization Subcomponent.

According to the estimates the vehicle and transport cost will increase from 2% of total budget in 2005 to 4% in 2013. It is around 184,000 US$ for 2005 and 669,000 US$ in 2013.

One of the future challenges is the increasing fuel price in the country. The increased fuel cost in the world market and declined purchasing power due to the depreciation of local currency will necessarily have a huge impact in future.

2.11 Strengthening EPI Surveillance

2.11.1 Epid Net work

The present EPI data management system, particularly in divisional level is manual and time consuming largely due to paper work. This has also caused substantial delay in carrying out surveillance activities. The electronic data network will help to monitor the EPI activities more efficiently and thereby to carry out better planning and management of the country EPI activities. Providing facilities such as computers, communication facilities for improved data management will require an addional fund of around 50,000 US$ annually.

The Ministry of Health has already developed the software package for diseases surveillance. Other than the provision of computer facilities at regional and divisional level which is already in progress in a phase manner, training on data management will be necessary to carry out the surveillance activities.
With the support of CDC, Sri Lanka has already started the training of central level officers on data management, and it is expected to expand this programme to the district and divisional level in future for which the WHO has agreed to fund for the network.

2.12 Strengthening Training & Research Activities

Improved EPI surveillance through providing training and conducting research are important. On the job training for all public health staff is a routine activity to upgrade knowledge and skills in the country. However, it has been identified that special training programmes for field staff on EPI services, particularly on data management requires around 10,000 US$ annually and it is expected to obtain support from the routine country budget of WHO. Review based training is the country future strategy to improve knowledge and experiences.
In addition, to improve the managerial skills of all officers at each level of EPI service delivery is identified as an important activity in the next few years.
Overseas training opportunities for public health staff are important not only to upgrade their knowledge and skills, but also as an incentives to retain them in the public health sector. This is particularly important at national and district level officers, who are reluctant to stay in public health sector due to the less financial benefits compared to the curative sector.

2.12.1 International Collaboration / Global Training Network (GTN) Centre

Sri Lanka is highly concerned in developing collaboration with the international agencies in training, disease surveillance and research activities. This will make on the basis of income generation to the national economy too. This will also help to sustain the country's reputation, and thereby to attract donors for the EPI activities.

Sri Lanka is the regional centre for GTN since 2003. These programs are conducted annually with the support of GTN/WHO. Sri Lanka has well qualified and experienced personnel to conduct these programmes and it is expected to expand the training opportunities to both local and overseas participants. Other than the training opportunity, this will help to develop partnership with research agencies, particularly in the field of research on vaccine efficacy and AEFI.

Sri Lanka has planed to carry out a study to test the safety & immunogenicity of live attenuated JE vaccine with PATH. Finding of this vaccine efficacy trial will necessarily help the country to take a decision on the introduction of live attenuated JE vaccine into the EPI programme in future.

Key officers who are in charged of various aspects of immunization programme are regularly request to take part in WHO international review and assessment teams.

2.13 Introduction of new antigens / combined vaccine into the National EPI programme

Sri Lanka is planning to introduce JE and Hib vaccines into the national EPI programme from 2007 and 2008 respectively.

2.13.1 Expanding JE programme and incorporate into the EPI programme

At present JE vaccination is being done in endemic high risk areas, covering 16 districts out of 26 districts in the country. JE is a one time mass immunization programme, which required around 20% of total immunization budgetary allocation. The high vaccine price (4.5 US$ per dose) and relatively high wastage (25%) are the reasons for this required high cost.

The present epiedemiological data has indicated the necessity of expansion of the JE programme into a routine EPI programme to cover the entire country, particularly due to the reported JE cases in all parts of the country. By the year 2007, this cost will be increased to around 3,966,000 US$ due to the expansion of the JE vaccination programme as a routine EPI to cover the entire island. This will require annually an additional cost of around 2 million US$ (i.e. 10 %- 15% of total budget). This cost will reduce in some extent in subsequent years due to expected declining of the vaccine wastage to 10% by the year 2013. However, to reduce the programme cost by a significant amount, it is necessary to have alternative strategies other than reducing vaccine wastage.

At present Sri Lanka is using inactive JE vaccine, which is more expensive than the live attenuated vaccine. Two doses are given for primary vaccination followed by periodic boosters. The vaccine is associated with a number of adverse effects and has production limitations. Other hand, live attenuated JE vaccine requires only a two doses to reach protection level among the immunized children. However, live attenuated vaccine is not being used widely in global practice and therefore Sri Lanka has been waiting for more evidence-based practice before introduce live attenuated JE vaccine into the national EPI programme. Introduction of low cost live attenuated vaccine is an optional strategy to reduce the vaccine cost for JE vaccine in future. The recent recommendation on safety and efficacy of the live attenuated vaccine by WHO, will lead to use live attenuated vaccine in the country from 2007.

2.12.2 Introduction of Hib Vaccine into the EPI

The present available data, particularly from the country's national children hospital has alerted the possible increasing trend of Hib infections in future in the country. The clinicians have highlighted the need for Hib vaccination programme .Findings of burden of disease study of Haemophilias Influenza B in Sri Lanka (2005) has further strengthened the need of introducing the Hib vaccine. New position paper on Hib by WHO too highlighted the importance of introduction of Hib vaccine. According to WHO Hib is estimated to cause at least 3 million cases of serious disease every year as well as approximately 386000 deaths. Although cases occur world wide, the burden of Hib disease is most significant resource poor countries. Vaccines are the only public health tool capable of preventing the majority of cases of serious Hib illness. WHO now recommends use of Hib vaccine even if local disease burden data is either unavailable or difficult to establish.

Though the increasing need and demand are there, Sri Lanka will need time to prepare to implement Hib into EPI, and at this time it is scheduled to commence in 2008. Before introduction of Hib immunization programme, it is necessary to strengthen the surveillance on Hib diseases in the country. In view of that Meningitis has included in to the disease notification list from 2005. At present, Sri Lanka is using separate vaccines for both DTP and Hep B immunizations, but the introduction of Hib will be operationally easier with the combined vaccine of DTP-HepB-Hib. There are many reasons, such as giving 3 antigens separately may affect the compliance, and its require additional workload to the staff, need additional storage (cold chain) facility. Use of combined vaccine will also reduce the amount needed for injection safety supply and thereby reduce the issues in disposing used syringes in immunization programme in the country.

The cost of Hib vaccine is very high at present. Sri Lanka will necessarily be looking for donor support, like it was for the hepatitis B. The present GAVI funding for introduction of hepatitis B will end by the year 2007. Therefore, Sri Lanka will submit its proposal to the GAVI for funding to introduce Hib vaccination programme. Introduction of Hib vaccine will require an additional US$4 million annually and this will be around 25% of the cost of the total immunization programme. For the calculation of total annual cost for Hib vaccine 10% vaccine wastage has been considered. Therefore, as it is in JE immunization programme, alternative strategies will be used to provide possible reduction of the estimated costs in future.

GAVI financing for introduction of Hib vaccine requires co-payment by the eligible countries. Sri Lanka has been identified in the group of countries which should contribute a minimum of 43 cents per dose as government contribution in first year of the funding. This is expected to increase each year till last year of the c-MYP with ultimate goal of reaching a threshold of $1.65 per dose by the year 2015. Sri Lanka will start its contribution at 43 cents per dose in first year and increase it by 10% each year. The proposed co payment contributions will be 43 cents, 47 cents, 52 cents, 57 cents and 63 cents respectively for five years' period. Higher contribution by the government is not being considered at present since we will like to monitor the industry dynamics at price reduction of pentavalent vaccine. With more interest shown by manufacturers from developing countries and likely competition, we expect a steep fall in price of pentavalent vaccine in coming years.

2.12.3 Introduction of MMR Vaccine into the EPI

At present, MR is included in the EPI and given at the age of 3 years. The present available surveillance data has shown sporadic outbreaks of mumps in the country. However, limited information is available on mumps epidemiology in the country. Mumps has included to the disease notification list from 2005 and disease epidemiology will be closely monitored. This will help to understand the real need for mumps immunization programme. The Ministry of Health is considering the need to carry out a burden study for mumps.

The cost of MMR vaccine is around 1.3 US$ per dose and for MR vaccine it is 0.5 US$ per dose. Introduction of MMR will additionally require around 350,000 US$. This is considering the present birth cohort. Therefore, Sri Lanka will necessarily be looking for donor support, as it was for the Hib. As Sri Lanka is planning to introduce Hib in 2008, it is unlikely that the introduction of MMR will be under taken before 2009.

2.13 Risks and challenges identified

2.13.1 Expansion of vaccination

Suggested expansion and incorporation of Japanese Encephalitis Hib and MMR immunization into EPI increases the vaccine requirement. This will impose an extra cost to the EPI. After GAVI withdraws its funding for Hepatitis B vaccine in 2007/2008, the Government has to bear the cost of this vaccine too. However, in view of our decision to go for pentavalent vaccine, this issue has been incorporated into co-payment requirement. There are no additional cost implications on injection supplies for the same reason. Increased cost of all vaccines will be a real challenge to ensure the balance between the sustainability and the expansion of the programme according to the current need.

2.13.2 Increased transport cost

The cost for fuel at the regional and divisional levels is financed by the Provincial administration. The allocation is for the total primary health care activities and there is no separate allocation for the immunization programme. With the increasing cost of fuel, the purchasing power is reduced. This could have an adverse effect on the supervisory activities of the immunization programme at the grassroots level.

2.13.3 Devalued Rupee

Devaluation of the Rupee against foreign currency has continued to occur during the recent past and is expected to continue further. This has also influenced on the fuel price. Increase in the price for other relevant services and supplies including vaccines made the total programme cost further high.

2.13.4 Anti-vaccine lobby

There is a growing trend of anti-vaccine lobby in certain parts of the world. Although this is not a threat in Sri Lanka, close vigilance and timely identification of such a move is necessary for an effective counter activity in future.

2.14 Private sector collaboration

The Government of Sri Lanka firmly supports the free health service as a national policy. Therefore, introduction of user fee will not be in consideration as a strategy to reduce the EPI cost in future. Alternatively, the government will support to increase the private sector contribution into EPI.

At present, government provides vaccines free of charge to the General Practitioners (GP) and private hospitals to carry out immunization activities, the target population receiving the immunization through the private sector being 1%. There is an increasing trend of utilization of private sector health service in the country and assumes the same trend may prevail for the immunization service in future. Therefore strengthening private sector service will reduce the government burden on EPI services in future and thereby minimize the service cost and save the resources.

If the present service coverage of 1% can be increased to 5% in next ten years, it will help to reduce the government cost by a significant amount, which can be diverted into the other EPI activities, where the fund is not secured. The most challenging fact is to maintain the quality of the service provided by the private sector. Any diversity to the quality of the programme will negatively affect the country EPI programme. eg: increased AEFI reported from the private sector will no doubt damage the national EPI programme. Therefore continuous quality control of the private sector service is essential. This is the one reason that the government provides the vaccine free of charge at present. However, once the public are used to the private sector immunization service, the government may consider charging vaccine cost (buying cost) from the service providers while keeping the monitoring of the programme. The important fact here is not only to reduce government cost on EPI, but also the possible effects of such private sector coverage into the national economy. If the private sector motivates to procure costly single dose combined vaccine, this will affect to the national economy in foreign exchange. Therefore to develop a strategy for private sector to buy vaccines from the government will be desirable.

Table 5: Situational analysis of routine EPI by system components

System components	indicators	National		
		2003	2004	2005
Routine coverage	DTP3 coverage	99%	97%	95.9%
	% of districts with > 80% coverage by 18 months for all antigen (Total Districts-26)	100%	100%	100%
	National DTP1–DTP3 drop-out rate	3%	1%	1.8%
	Percentage of districts with drop-out rate DTP1–DTP3 > 10	Nil	Nil	Nil
	% of districts with > 80% coverage of +TT	-	100%	92%
New vaccines	HepB3 coverage (based on number of District introduced)	93.8%	98%	100%
Routine surveillance	% of surveillance reports received at national level from districts compared to number of reports expected	100%	100%	100%
	AFP rate/100,000 children under 15 years of age	1.68	1.91	2.04
Cold chain/ Logistics	Percentage of districts with adequate numbers of functional cold chain equipment	90%	90%	95%
Immunization safety	Percentage of districts that have been supplied with adequate (equal or more) number of AD syringes for all routine immunizations	32%	60%	100%
Vaccine supply	Was there a stock-out at national level during the last year?	No	No	No
	If yes, specify duration in months	NA	NA	NA
	If yes, specify which antigen(s).	NA	NA	NA
Communication	Availability of a plan	No	No	No
Financial sustainability	What percentage of total routine vaccine spending was financed using government funds? (including loans and excluding external public financing)	100%	100%	100%
Linking to other health interventions	Were immunization services systematically linked with delivery of other interventions (malaria, nutrition, child health) established	Yes, with MCH	Yes, with MCH	Yes, with MCH

System components	indicators	National		
		2003	2004	2005
Human resources availability	No. of health workers/vaccinators per 10 000 population (Public Health Midwives).	254	266	…….-
Management planning	Are a series of district indicators collected regularly at national level?(Y/N)	Yes	Yes	Yes
NRA	Number of functions conducted	-	-	-
ICC	Number of meetings held last year	04	04	02
Waste disposal	Availability of a waste management plan	No	No	No
Programme efficiency	Vaccine wastage monitoring at national level for all vaccines	Yes	Yes	Yes
	Timeliness of disbursement of funds to district and service delivery level			

3. Future Budget requirements

In addition to the vaccines that are already in use, new vaccines that may be considered for scale-up / introduction in Sri Lanka are JE, hIB MMR, (pentavalent) and possibly Rotavirus and Pneumococcal vaccines based on their availability and affordability. HPV vaccine is not being considered at present. We will, however, like to review the immunization policy 3 years later, somewhere during mid course of proposed MYP. Following is an estimate of various scenarios involving introduction of one or more of the above vaccines and the cost implications:

3.1 Scenario Analysis

The cost analysis is done based on two alternative scenarios:

Scenario 1

Routine + Hep.B mono (2007)+Penta(2008)+JE+MR+Rubella

Scenario 2

Routine + Hep.B mono (2007)+Penta(2008-)+JE+MMR(2009)+Rubella

There are some additional assumptions that have been made for the cost calculations.

Government of Srilanka has already introduced Hepatitis B Monovalent vaccine in all 26 districts in 2005. The plan is to introduce the Pentavalent vaccine (Hep.B+DTP+HiB) from 2008 if GAVI provides the funding. Another scenario is the introduction of Pentavalent vaccine (Hep.B+DTP+HiB) and MMR from 2009 and this would also depend on the future GAVI funding.

All other newer vaccines such as JE, Rubella, MR and MMR are proposed to be covered through domestic resources. Mumps has just been made a notifiable disease in Sri Lanka and the MMR vaccine is proposed to be provided from 2009 depending on the disease burden data and availability of funds.

For the costing exercise, the costs of vaccines are derived from the latest available UNICEF price list.

Cost projections are undertaken using the cMYP tool after taking into account the costs of salaries, allowances, campaigns and program goals with proposed new and underused vaccine introductions. Based on these assumptions, the itemized annual costs have been calculated and are given in Table 1 across the two scenarios. The consolidated costs are shown in Table

.

Table 6: Summary Cost Projection across two scenarios in million US$

(in million US $)

Scenario 1: Routine + Hep.B mono (2007)+Penta(2008-)+JE+MR+Rubella

Cost category	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Routine Recurrent Cost	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**
Traditional Vaccines	$579,305	$952,004	$703,629	$703,144	$689,816	$693,014
New and underused vaccines	$2,144,748	$3,718,151	$6,403,208	$6,460,353	$6,544,338	$6,629,414
Injection supplies	$618,473	$922,944	$586,788	$600,266	$610,861	$620,077
Personnel	$10,080	$10,282	$10,487	$10,697	$10,911	$11,129
Transportation	$0	$2,346	$2,393	$2,441	$2,490	$2,539
Maintenance and overhead	$1,333,845	$2,115,513	$1,730,544	$1,859,536	$2,009,503	$1,859,970
Short-term training	$15,000	$56,100	$13,525	$58,366	$16,236	$17,224
IEC/social mobilization	$13,400	$3,060	$5,202	$5,306	$0	$33,122
Disease Surveillance	$19,500	$59,670	$61,904	$71,101	$73,605	$76,182
Programme Management	$33,000	$312,248	$67,626	$68,979	$75,770	$77,286
Other routine recurrent costs	$10,000	$0	$0	$0	$0	$0
Sub total	**$4,777,352**	**$8,183,719**	**$9,617,117**	**$9,872,413**	**$10,066,173**	**$10,053,024**

recurrent costs						
Routine Capital Cost						
Vehicles	$0	$25,500	$0	$0	$0	$0
Cold chain equipment	$0	$1,790,610	$65,545	$58,897	$103,372	$83,358
Other capital equipment	$0	$317,475	$193,775	$197,650	$228,664	$67,625
Subtotal Capital Costs	**$0**	**$2,133,585**	**$259,320**	**$256,547**	**$332,036**	**$150,983**
Campaigns						
Polio	$0	$0	$0	$0	$97,724	$0
Measles	$0	$0	$0	$0	$109,745	$0
Subtotal Campaign Costs	**$0**	**$0**	**$0**	**$0**	**$207,469**	**$0**
Other Costs						
Shared Personnel Costs	$5,012,584	$5,112,835	$5,215,092	$5,319,394	$5,425,782	$5,534,297
Shared Transportation Costs	$183,434	$187,103	$190,845	$194,662	$198,555	$202,526
Subtotal Optional	$5,196,018	$5,299,938	$5,405,937	$5,514,056	$5,624,337	$5,736,824
GRAND TOTAL	**$9,973,369**	**$15,617,242**	**$15,282,373**	**$15,643,016**	**$16,230,016**	**$15,940,830**

Scenario 2: Routine + Hep.B mono (2007)+Penta(2008-JE+MMR(2009)+Rubella

Cost category	2006	2007	2008	2009	2010	2011
Routine Recurrent Cost	**US$**	**US$**	**US$**	**US$**	**US$**	**US$**
Traditional Vaccines	$579,305	$893,461	$703,629	$703,144	$689,816	$693,014
New and underused vaccines	$2,144,748	$3,718,151	$6,403,208	$7,033,913	$7,125,354	$7,217,983
Injection supplies	$618,473	$922,944	$586,788	$600,266	$610,861	$620,077
Personnel	$10,080	$10,282	$10,487	$10,697	$10,911	$11,129
Transportation	$0	$2,346	$2,393	$2,441	$2,490	$2,539
Maintenance and overhead	$1,333,845	$2,115,513	$1,730,544	$1,859,536	$2,009,503	$1,859,970
Short-term training	$15,000	$56,100	$13,525	$58,366	$16,236	$17,224
IEC/social mobilization	$13,400	$3,060	$5,202	$5,306	$0	$33,122
Disease Surveillance	$19,500	$59,670	$61,904	$71,101	$73,605	$76,182
Programme Management	$33,000	$312,248	$67,626	$68,979	$75,770	$77,286
Other routine recurrent costs	$10,000	$0	$0	$0	$0	$0
Sub total recurrent costs	**$4,777,352**	**$8,093,774**	**$9,617,117**	**$10,445,973**	**$10,647,189**	**$10,641,593**
Routine Capital Cost						
Vehicles	$0	$25,500	$0	$0	$0	$0
Cold chain equipment	$0	$1,790,610	$65,545	$58,897	$103,372	$83,358
Other capital equipment	$0	$317,475	$193,775	$197,650	$228,664	$67,625
Subtotal Capital Costs	**$0**	**$2,133,585**	**$259,320**	**$256,547**	**$332,036**	**$150,983**
Campaigns						
Polio	$0	$0	$0	$0	$97,724	$0
Measles	$0	$0	$0	$0	$109,745	$0
Subtotal Campaign Costs	**$0**	**$0**	**$0**	**$0**	**$207,469**	**$0**
Other costs						
Shared Personnel Costs	$5,012,584	$5,112,835	$5,215,092	$5,319,394	$5,425,782	$5,534,297
Shared Transportation Costs	$183,434	$187,103	$190,845	$194,662	$198,555	$202,526
Subtotal Optional	$5,196,018	$5,299,938	$5,405,937	$5,514,056	$5,624,337	$5,736,824
GRAND TOTAL	**$9,973,369**	**$15,527,298**	**$15,282,373**	**$16,216,575**	**$16,811,031**	**$16,529,399**

Table 7 Total costs scenario over six years from 2006-2011

Consolidated Scenario Analysis	2006	2007	2008	2009	2010	2011
Scenario 1: Routine + Hep B mono(2007) + Pentavalent (2008) +JE+MR+Rubella	$9,973,369	$15,617,242	$15,282,373	$15,643,016	$16,230,016	$15,940,830
Scenario 2: Routine + Hep B mono(2007) + Pentavalent (2008) +JE+ MMR(2009) +Rubella	$9,973,369	$15,527,298	$15,282,373	$16,216,575	$16,811,031	$16,529,399

3.2 Sources of secure/probable funding

In this section, the various sources of funding are discussed under secure and probable scenarios.

The Government of Srilanka is committed to the strengthening of the immunization programme in Sri Lanka. All the vaccines excluding Hep B is funded by the government. The Government will introduce the JE as part of the EPI from 2008.

All other newer vaccines such as JE, Rubella, MR and MMR are proposed to be covered through domestic resources. Mumps has just been made a notifiable disease in Sri Lanka and the MMR vaccine is proposed to be provided from 2009 depending on the disease burden data and availability of funds.

GAVI: GAVI provides funding for the Hepatitis B monovalent and also provides AD syringes. They are committed to fund the pentavalent in the coming years but with co-payment requirements. The cost implications for the Government and GAVI separately has been covered in the prescribed application and costing format of GAVI.

The estimated secure and probable funding sources are described in Tables 2 and 3. It can be seen from Table 2 that the major source of secure funding continues to be the Government of Srilanka. The GAVI vaccine fund contributes significantly over 2004-2007, but for the coming years the funds are not secure.

However, under probable sources of funding, apart from the government, which continues to be the most important source, World Bank, WHO and UNICEF are main sources of probable fund.

Table 8: Estimated secure funding sources and gaps

Scenario 1

In dollars

Secure funding	**2007**	**2008**	**2009**	**2010**	**2011**
National Government	6,014,204	3,922,716	3,986,074	4,205,973	4,056,570
World Bank	412,845				
UNICEF					
WHO					
GAVI	430,897				
Total secure fund	6,857,946	3,928,716	3,986,074	4,205,973	4,056,570
Total resource requirement	10,317,304	9,876,436	10,128,960	10,605,679	10,204,007
Funding gap	3,459,358	5,953,721	6,142,886	6,399,706	6,147,437

Scenario 2

In dollars

Secure funding	**2007**	**2008**	**2009**	**2010**	**2011**
National Government	5,811,234	3,922,716	4,559,634	4,786,989	4,645,139
World Bank	412,845				
UNICEF					
WHO					
GAVI	430,897				
Total secure fund	6,654,976	3,922,716	4,559,634	4,786,989	4,645,139
Total resource requirement	10,227,359	9,876,436	10,702,520	10,792,576	10,792,576
Funding gap	3,572,384	5,953,721	6,142,886	6,399,706	6,147,437

Table 9: Estimated secure and probable funding sources and gaps

Scenario 1

In dollars

Secure and probable funding	**2007**	**2008**	**2009**	**2010**	**2011**
National Government	6,014,204	3,922,716	3,986,074	4,205,973	4,056,570
World Bank	412,845	247,355	296,872	0	0
UNICEF	1778370	28091	20694.06	140355.7	122111.3
WHO	34662.5	49052.9	43038.35	78882.3	60256.4
GAVI	430897	4330143	4386435	4443459	4501224
Total secure and probable fund	8,670,979	8,577,357	8,733,144	9,097,334	8,807,787
Total resource requirement	10,317,304	9,876,436	10,128,960	10,398,209	10,204,007
Funding gap	1,646,325	1,299,079	1,395,846	1,508,345	1,396,220

Scenario 2

In dollars

Secure and probable funding	**2007**	**2008**	**2009**	**2010**	**2011**
National Government	5,811,234	3,922,716	4,559,634	4,786,989	4,645,139
World Bank	412,845	247,355	296,872	0	0
Unicef	1778370	28091	20694.06	140355.7	122111.3
WHO	34662.5	49052.9	43038.35	78882.3	60256.4
GAVI	430897	4330143	4386435	4443459	4501224
Total secure and probable fund	8468008	8,577,358	9,306,674	9,678,350	9,396,356
Total resource requirement	10227359	9,876,436	10,702,520	10,979,225	10,792,576
Funding gap	1759351	1,299,079	1,395846	1,508,345	1,396,220

Table 10 Combined scenario

In dollars

Scenarios		2007	2008	2009	2010	2011
Scenario 1	Total Programme requirement	10,317,304	9,876,436	10,128,960	10,398,209	10,204,007
	Total Secure and Probable funding	8,670,979	8,577,357	8,733,114	9,097,334	8,807,787
	Funding gap	1,646,325	1,299,079	1,395,846	1,508,345	1,396,220
	Funding Gap as %	16	13	14	14	14
Scenario 2	Total resource requirement	10,227,359	9,876,436	10,702,520	10,979,225	10,792,576
	Total Secure and Probable funding	8,468,008	8,577,358	9,306,674	9,678,350	9,396,356
	Funding gap	1,759,351	1,299,079	1,395,846	1,508,345	1,396,220
	Funding gap as %	17	13	13	13	13

4. National level problems and objectives related to immunization programme

Description of problem/Areas to improve	**NIP Objectives**
1.Coverage of BCG, 3 doses of OPV, DPT ,hepatitis B, measles and vit A of infants by the first birthday is around 95%.	Achieve near 100% coverage for BCG, 3 doses of OPV, DPT, hepatitis B, measles and vit A of infants by the first birthday by 2010.
2.Vaccines administered at school going age (DT, atd, Rubella) shows relatively poor coverage compared to infant immunization coverage.	Achieve near 90% coverage for vaccine administered at school going age by 2010.
3.Availability of limited facilities to carry out laboratory confirmation of EPI target diseases	Provide of laboratory confirmation for all reported cases of EPI target diseases by 2011.
4. Availability of limited cold chain maintenance facilities at provincial and divisional levels.	Provide adequate cold chain facilities at all three levels by 2010.
5. Non availability of proper Sharps management and safe disposal policy & system.	Introduce proper sharp management and safe disposal policy & system in five selected urban districts by 2011.
6. Lack of compliance of detail investigation of AEFI at divisional level.	Achieve over 90% coverage for detail investigation of AEFI at divisional level by 2010.
7. Relatively high vaccine wastage reported for some EPI vaccines.	Reduce vaccine wastage to 10% for all liquid EPI vaccines by 2011. Reduce vaccine wastage to 20 - 25% for all other EPI vaccines (except BCG) by 2011

8. Prevailing disparity in the quality of immunization services within and between districts.	Significantly reduce unintended variation of quality of immunization services within and between districts by 2011.
9. Inadequate and mal -distribution of health personals who are involved in immunization activities at divisional level.	Provide minimum number of required health personals to carry out immunization activities at divisional level by 2010.
10. Inadequate transport facilities at all levels to carry out immunization activities.	Provide adequate transport facilities to all levels by 2011.
11. EPI related disease Surveillance activities at all levels need further strengthening.	Further Strengthening of EPI related disease Surveillance activities at all levels by 2011.
12. Training & Research Activities related to immunization need further strengthening.	Further strengthening of Training & Research Activities related to immunization by 2011.
13. Introduction of new antigens into the EPI programme.	Introduce JE vaccine into the National EPI programme by 2008. Introduce Hib vaccine into the National EPI programme by 2009. Strengthen the surveillance activities for diseases for which vaccines are currently available (Mumps, Pneumococal meningitis).
15. The population receiving the immunization through the private sector being 1% of the total.	Increase the target population (who can afford) receiving quality immunization through the private sector to 3% by 2011.
16.Inconsistant financial sustainability of the immunization programme.	Ensure un-interrupted financial support to EPI programme.

5. Objectives Strategies and key activities of multi year plan

Objective	Strategy	Key activities
1. Achieve near 100% coverage for BCG, 3 doses of OPV, DPT, hepatitis B, measles and vit A of infants by the first birthday by 2010.	Using a combination of approaches to reach everyone under one year of age to get age appropriate immunization.	1. Sustain high vaccination coverage, where it has been achieved.
		2. Identify both district and divisional level low coverage areas (causality assessment).
		3. Develop and implement strategies both at district & divisional level to immunize all children less than one year of age.
		4. Supervisory follow-up in priority districts & divisions.
		5. Conduct quarterly EPI reviews at district level and provide feed back.
2. Achieve 90% coverage for vaccine administered at school going age by 2010	Using a combination of approaches to reach everyone at school going age to get age appropriate immunization .	1. Sustain high vaccination coverage, where it has been achieved.
		2. Identify both district and divisional level low coverage areas (causality assessment).

		3.Develop and implement strategies both at district & divisional level to immunize all school going children.
		4. Supervisory follow-up in priority districts & divisions.
		5. Joint planning with education department.
		6. Conduct quarterly EPI reviews at district level and provide feed back.
3. Provide laboratory confirmation for all reported cases of EPI target diseases by 2011.	Strengthening laboratory capacity through the expansion of prevailing laboratory net work	1. Expand the existing laboratory net work up to provincial level.
		2 .Assure training & availability of equipment, reagents and quality control procedures at provincial level.
		3. Provide regular national, district and divisional level feedback

4. Provide adequate cold chain facilities at all three levels by 2010.	Reorganizing the cold chain facilities at all three levels to cater the need.	1. Annual assessment of the available cold chain maintenance facilities at each level.
		2. Establishment of 26 RMSDs with adequate cold room facilities.
		3. Replace 10% of cold chain equipment at divisional level every year.
		4. Introduce electronic data loggers to district and divisional level vaccine storage equipments.
		5. Establishment of a mechanism to monitor the temperature records of data loggers at all three levels
5. Introduce proper sharp management and safe disposal policy/system to the five selected urban districts by 2011.	Establishing a network of incinerators and waste management system in five selected districts.	1. Finalize national sharps waste management policy.
		2. Conduct need assessment
		3. Selection of five needy districts.
		4. Provide adequate number of incinerators and other logistics to the selected 5 districts.

6. Achieve over 90% coverage for detail investigation of AEFI at divisional level by 2010.	Strengthening of current divisional level AEFI investigation process.	1. Provide Comprehensive refresher training for all staffs including AEFI.
		2. Review the AEFI situation during the quarterly district reviews.
		3. Provide regular national, district and divisional level feedback
7. Reduce vaccine wastage to 10% for all the liquid EPI vaccines by 2011. . Reduce vaccine wastage to 20 - 25% for all the other EPI vaccines by 2011.	Developing & implementing targeted programme to reduce vaccine wastage.	1. Carry out a Causality assessment to find out reasons for vaccine wastage
		2. Ensure implementation of open vial policy.
		3. Rescheduling of clinic sessions at divisional level.
		4. Procurement of combined form of vaccine vials.
		5. Carry out annual EPI reviews in each district with special emphasis on vaccine wastage.
		6. Improve the supervisions at all levels.

8. Significantly reduce unintended variation at quality of immunization services within and between districts by 2011.	Using a combination of approaches to identify and correct unintended variation within and between districts in immunization service quality.	1. Conduct 1-2 district level EPI surveys annually using WHO 30 cluster method.
		2. Conduct district level EPI reviews quarterly with divisional level managers.
		3. Conduct National level EPI reviews quarterly with district level managers.
		4. Conduct annual audit to identify available logistics to carryout immunization activities at divisional level [need assessment].
		5. Determine priority districts and divisions for logistic distribution.
		6. Carry out supervisory follow-up in priority districts and divisions.
		7.Prepare micro-plan for all districts.
		8. Identify the in-service training need.

		9. Prepare comprehensive in –service training plan .
		10. Conduct on the Job skill building training for PHC staff.
		11. Development of performance based incentive scheme.
		10. Development of EPI data management software.
		11. Strengthen coordinating and management capacity at central level.
		12. Strengthen coordinating and management capacity at district level.
9. Provide adequate number of required skilled health personals to carry out immunization activities at divisional level by	Improving human resource management in immunization programme.	1. Make an audit of available human resources at central, district and divisional level.

2010.		2. Estimate cadre requirement of all categories of health workers for EPI programme for next 5 years.
		3.Develop recruitment plan with budget.
		4 Determine priority districts and divisions for filling vacancies.
		5. Develop a rational vehicle replacement plan.
10. Provide adequate transport facilities to all levels by 2011.	Ensuring timely distribution of vaccines and adequate supervisory visits at all three levels.	1. Hire or purchase vehicles for vaccine transport
		2. Hire or purchase vehicles for supervisory visits.
		3. Determine priority districts and divisions for provision of vehicles. 4. Development of a feasible replacement plan for the vehicles.
11. Further Strengthening of EPI related disease Surveillance activities at all levels.	Ensuring optimally functioning surveillance system for EPI diseases.	1. Expand the existing EPI surveillance system.
		2. Improve the supervisions at all levels

		3. Establish sentinel sites at each district for EPI target disease surveillance.
12. Further strengthening of Training & Research Activities related to immunization by 2011.	Promoting research and training activities related to immunization.	1. Produce local evidence to influence and prioritize public investments in new vaccines and technologies. 2. Produce local evidence to improve the quality of immunization.
		3. Train regional /international health staff on AEFI by local experts with WHO collaboration.
13. Introduce live JE vaccine into the National routine EPI programme by 2008.	Ensuring effective and sustainable introduction of live JE vaccine to the EPI schedule.	1. Obtain approval from the National Advisory committee.
		Prepare estimates.
		3. Obtain treasury approval for the estimates.
		4. Procure live JE vaccine.
		5. Educate/train district and divisional level programme managers and other stakeholders regarding the JE vaccine.

		6. Develop key messages to the Public.
		7. Incorporate JE vaccine into the routine EPI information system
14. Introduce Hib vaccine into the National EPI programme by 2008.	Ensuring effective and sustainable introduction of Hib vaccine to the EPI schedule	1. Justify the introduction of Hib vaccine in to the EPI.
		2. Obtain approval from the National Advisory committee.
		Prepare estimates.
		4. Obtain treasury approval for the estimates.
		Procure Hib vaccine.
		6. Educate/train district and divisional level programme managers and other stakeholders regarding the Hib vaccine.
		7. Develop key messages to the Public.

		8. Incorporate Hib vaccine into the routine EPI information system
15. Introduce MMR vaccine into the National EPI programme by 2009	Ensuring effective and sustainable introduction of MMR vaccine to the EPI schedule	1. Justify the introduction of MMR vaccine in to the EPI.
		2. Obtain approval from the National Advisory committee
		3. Prepare estimates
		4. Obtain treasury approval for the estimates
		5. Procure MMR vaccine
		6.Educate/train district and divisional level programme managers and other stakeholders regarding the MMR vaccine.
		7. Develop key messages to the Public.
		8. Incorporate MMR vaccine into the routine EPI information system

16. Strengthen the surveillance activities for diseases for which vaccines are currently available (Mumps, Pneumococal meningitis).	Justifying the introduction of new vaccines.	1. Conduct target disease burden studies.
		2. Strengthen the routine disease surveillance activities.
		3. Establish sentinel sites for Rota, Mumps, and Pneumococcus surveillance.
17. Increase the target population (who can afford) receiving the quality immunization through the private sector to 3% by 2011.	Strengthening the private sector partnership.	1. Establishing a monitoring system to ensure the quality of immunization programme by the private sector.
		2. Obtaining the approval from the Ministry of Health to recover the vaccine cost from the General Practitioners, who were given vaccine free of charge Currently.
		3. Promote general Practitioners to use government procured vaccines.

		4. Introduce national EPI guidelines to the private sector institutions that are involved in immunization.
18. Ensure adequate and sustainable financial support to EPI programme by 2011.	1. Introducing separate Budget line for immunization programme.	1. Obtain the approval from the Secretary Health for a special budget line for immunization programme.
		2. Obtain the approval from the Treasury.
		3. Regularize the proposed budget line into the Ministry of health budget through Parliamentary budget proposal.
	2. Improving the national government funding flows.	
	3. Increasing access to the external donor funds.	