

② Five-year EPI-Plus Strategic Plan, Ethiopia, 1996-97 to 2000-01

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(revised: May 1997)

Introduction:

The EPI Programme in Ethiopia is still under construction. Major efforts are needed to progressively and rapidly raise and sustain immunization coverage, building in each Region upon the successful microplanning experience in 1995-1996, and in ways that contribute to the development of basic integrated health services.

In October 1995, the EPI Programme Review concluded that, "if the programme receives strong political and administrative support from the government, and if it can attract and efficiently focus available national and international technical, material and financial resources, it has the potential to meet these challenges and to significantly improve child health services in the country. This further progress will require (1) increased coordination for planning and management between various levels and partners, (2) capacity building in logistics and cold chain (additional staff and training), (3) a major emphasis on improving the quality of management and service provision, (4) increased social mobilization adapted to local conditions, and (5) full-scale implementation of disease surveillance and disease control mechanisms".

All the programme objectives are closely interrelated; in general, efforts are needed to better implement existing strategies, rather than to design new strategies. Additional resources are required, therefore there is a need for a comprehensive plan and budget, to foster consensus on technical issues and seek financial support. This document is also intended as reference and template for Regions to prepare concrete annual work plans for 1996-1997 and beyond (microplanning). Budget tables have been prepared on the basis of the Government of Ethiopia budget cycles, i.e. from July 1st to June 30.

Situation analysis

Ethiopia (total population: 56 million) is one of the poorest countries in the world, with child mortality rates among the highest (estimated at 160 per 1,000 live births), poor infrastructure, difficult communications, little access to basic health care, and low literacy rates. 85% of the total population live in rural, often inaccessible areas, and 15% live in urban areas. The country is undergoing a process of decentralization into a federation of 11 Regions with administrative autonomy, further divided in 71 zones and 559 weredas. Region Health Bureaus are responsible for management of immunization services and disease surveillance matters.

A National EPI Programme Review was conducted in October 1995. Over the last three years, EPI has achieved noticeable progress in the routine immunization of children and childbearing-age women. According to monthly reports of doses administered, and to a nationwide coverage survey conducted in June 1995, coverage with measles vaccine increased from 20% in 1991 to 38% in 1995, and coverage with DPT3/OPV3 increased from 20% in 1991 to 37% in 1994 and 47% in 1995 (Tables). This progress has been achieved through the expansion of static and outreach services, the provision of equipment, vaccines and commodities, training of health staff and social mobilization. UNICEF is providing strong technical and financial support, and has promoted a successful microplanning process at Region and zonal levels. Still, between 6% to 38% of health facilities in each state do not carry immunization activities. Reported TT2+ coverage remains low.

Ethiopia has among the highest documented levels of Vitamin A deficiency in the world today. WHO identifies a country as having a public health problem of Vitamin A deficiency if bitot's spot prevalence is above 0.5%. In the early 1980's bitot's spot prevalence in Ethiopia was reported to be about 0.87%. Surveys in the early 1990' report a 1% prevalence. In 1996, a survey conducted by EHNRI (with UNICEF support) in three regions reports widespread deficiency to the tune of two to twenty times WHO's cutoff for identifying a public health problem. Until recently, Vitamin A deficiency has been recognized as a major cause of nutritional blindness. Recent research, however, has shown that Vitamin A has a major role to play in contributing to infant and young child mortality and morbidity. The International vitamin A Consultative

Group (IVACG) policy statement on Vitamin A states " In population where Vitamin A deficiency is endemic, a 23-34% reduction in (childhood) mortality is expected when Vitamin A status is raised to normal levels". Clinical trials of children hospitalized with measles show that large dose Vitamin A had a beneficial effect on mortality in previously deficient children, with case-fatality ratios reduced on average by 66%. In addition, there is growing evidence of the impact of improved Vitamin A status in reducing duration, severity, and complications associated with both measles and diarrhea. In countries such as Ethiopia, where both the level of the deficiency and the mortality attributable to common childhood diseases such as diarrhea are extremely high, the need for urgent action is obvious.

EPI disease surveillance is not functional and no reliable data are available on the epidemiology of EPI target diseases. From 1990 to 1994, Ethiopia reported annually between 1,000 and 5,000 cases of measles, and between 100 and 200 cases of poliomyelitis. It is recognized that these figures are far lower than reality. Incidence of neonatal tetanus is thought to be high throughout the country. The MOH is currently establishing a General Disease Surveillance System, under the responsibility of the Epidemiology Department, MOH, which will include reporting of EPI target diseases.

The MOH has endorsed the recommendations made by the EPI Review, including, among others, the establishment of a Technical Inter-Agency Coordinating Committee, the preparation of a 5-year national strategic plan of action by June 1996, the development of effective disease surveillance, and the implementation of disease control strategies, in ways which contribute to strengthen integrated and sustainable primary health care services. Other major objectives include: improving the overall management and monitoring of the programme; improving the management and maintenance of cold chain and transportation equipments; ensuring the safety and sterility of injections; providing adequate training and supervision to immunization workers; integrating Vitamin A supplementation within EPI services; eventually, planning for introducing Hepatitis B immunization.

(For further details, please refer to: Report of a Joint National review of the EPI Programme, Department of Family Health, Ministry of Health, October 1995).

Part 1: Routine EPI-Plus Programme

A. Programme Objectives

The following objectives and targets refer to the 1994-1999 Country Programme, Government of Ethiopia, UNICEF; and to the global goals set by the 1990 World Summit for Children.

• Disease Control Objectives

- a) Eradication of poliomyelitis by 2000;
- b) Elimination of neonatal tetanus as a public health problem by 2000;
- c) Reduction of measles incidence by 90% and measles-related mortality by 95% by 2000 (compared with pre-immunization rates);
- d) Virtual elimination of Vitamin A deficiency by 1999;

• Coverage Objectives

- a) Raise immunization coverage (DPT3, measles) to $\geq 80\%$ of children aged < 1 year;
- b) Raise coverage with Vitamin A capsules to 80% of children aged < 5 years;
- c) Raise coverage with 2+ doses of Tetanus Toxoid to 80% of women of childbearing age in selected high-risk areas;

B. Programme strategies

Disease control objectives have in common to require high routine immunization coverage, as the foundation on which additional specific strategies can be based. Long-term lasting impact of disease reduction efforts, particularly for measles and neonatal tetanus, requires that high routine EPI coverage be sustained year after year, which can only be achieved by a mature EPI programme, integrated in a well-developed basic primary health care at the peripheral level. Building such a programme is a long-term and progressive process. Current momentum and support to raise immunization coverage should be used as a driving and motivating mechanism in this building process.

1. Increase coverage and improve quality of routine EPI-Plus services

The main strategies proposed for *increasing routine EPI-Plus coverage* include the following:

1.1. Progressively increase accessibility of immunization services:

- open new vaccination static sites in existing and newly built health facilities, including equipment and manpower (as part of developing basic health infrastructure)
- increase the number of outreach areas and activities, particularly in under-served rural areas, including other integrated interventions as possible.

1.2. Increase public awareness and community participation for immunization services:

- intensify information/communication to increase coverage, with additional efforts towards reaching children currently not reached; produce IEC materials in relevant languages; intensify vaccination activities on special days (e.g., 1-2 days weekly or monthly), to raise coverage and minimize wastage ("getting more children immunized with each vial").
- increase public awareness and demand for vaccines and Vitamin A from the public through IEC (electronic/print media), behavioral change-communication public meetings, health education in health institutions, dissemination of information through schools, dissemination of progress and achievements.
- involve multiple government and non-government sectors, and increase the involvement and support from community, political and religious leaders through seminars, review meetings, direct contacts from health workers at all levels, and provision of leadership and directives from higher political and religious authorities.

1.3. Reduce missed opportunities for immunization and Vitamin A supplementation:

- promote the routine checking of immunization records at every visit to any health facility.
- Promote the recording and checking of Vitamin A supplementation at every visit to health facilities.
- encourage mothers to bring both their child's and their own immunization record at any visit, either for preventive care or for illness, to a health facility.
- make immunization services and Vitamin A supplementation available every working day.
- remind health workers that sick children can and should be immunized.
- remind health workers about the need for Vitamin A supplementation for all children 9 month-5 yrs. every 4-6 months.
- establish a registry system at the health facility, and use community networks for tracing defaulters.

1.4. Improve quality of immunization services:

- improve the availability and user-friendliness of vaccine delivery services, according to local conditions and at the initiative of health workers at local level, with measures such as: assigning additional staff at crowded times, reducing waiting time, taking advantage of market days, respecting scheduled appointments for immunization, etc..).
- increase awareness of health workers, in public and private sectors, through training and review meetings, dissemination of achievements and progress.

1.5. Improve quality of the cold chain and vaccine supply management:

- develop mechanisms for maintenance of cold chain (and injection) equipments at central, regional, wereda and health facility levels.

- initiate user training on refrigerator maintenance through integrated or existing in-service training activities.
- hire a full-time cold chain technician at central level to be responsible for maintaining the central vaccine store equipment, assisting with maintaining regional stores, and training regional cold chain technicians on refrigerator maintenance and repair.
- develop a reliable stock control and distribution system for vaccines (Vitamin A) and injection supplies, at central and regional level, to ensure regular supply, administration of potent vaccines and safe injections, and to reduce wastage.
- implement the policy to use opened vials of vaccines in subsequent immunization sessions ("open vial policy"), to reduce vaccine wastage.
- review and revise (if necessary) the stocking and distribution of vitamin A supplies through the pharmacy department.

1.6. Strengthen planning, monitoring and supervision mechanisms, including:

- microplanning of activities, logistics and finances at zonal and wereda levels;
- monitoring: monthly routine reports of doses administered (immunization + Vit. A), by wereda, should be tabulated monthly at zonal and Region level. Monthly reports by zone should be tabulated at Region and national level, at least quarterly, for dissemination and feedback.
- regular supervision at Region, zonal and wereda levels aiming at identifying low coverage areas and problem-solving;
- quarterly review meetings, with participation of political authorities and community organizations, for information exchange, feedback, and dissemination of successful activities
- use of maps for planning and monitoring at each level.

1.7. Ensure safe injections in immunization services:

There is increased public awareness that unsterile injections may cause Hepatitis B infection (particularly among young women receiving Tetanus Toxoid), and HIV infection. In addition, subcutaneous abscesses are a common complication of unsterile injections. Rapid increase in coverage, particularly with TT vaccine, results in a fast growing occurrence of unsafe injection practices: adequate quantities of reusable syringes and needles are lacking; use of one syringe with multiple needles is common; sterilization by boiling is often inadequate; steam sterilizers are lacking, or not used by lack of training, or out-of-order by lack of spare parts. It is the duty of the EPI programme to make sure that immunization injections do not cause harm, and that each immunization injection is administered safely with a single sterile syringe and needle. Promoting safe immunization injections may also contribute to improving the safety of other injections in health care services. Various options are available, using reusable equipment with adequate sterilization, disposable equipment with adequate disposal, or combinations of both, with serious logistical and financial implications.

Strategies to ensure safe injection practices include:

- Adequate supply of reusable syringes and needles at national/Region level: One responsible officer should be identified at national/Region level for maintaining inventory and stocks, calculating annual requirements, and scheduling distributions. Annual requirements for syringes and needles should be calculated at national/Region level based on requirements and inventory for each zone. A buffer stock of 20% of the total annual requirements should be maintained at national/Region level.
- Adequate supply of reusable syringes and needles at health facility level. Reusable needles can be sterilized (50) times. Reusable syringes can be sterilized (50-100) times, depending on local water hardness. Average requirements have been estimated, based on actual experience with microplanning in 1995. At least once every year, the total minimum stock of syringes and needles in each health facility should be replaced; old syringes and needles should be returned or destroyed when replaced by new ones; in addition, syringes and needles will be replaced on demand if necessary. A buffer stock of 10% of the annual requirement should be maintained at zonal level. Stocks of syringes and needles should be reported by zones monthly when vaccine requests are made, or at least quarterly. New syringes are packed in individual sterile packages and can be used at once without sterilization (new needles need to be sterilized before use).
- Adequate supply and distribution of steam sterilizers, stoves and spare parts.
- Proper use of steam sterilizers: steam sterilizers may be available but not used, either because of insufficient training, or by lack of spare parts (gaskets, valves), or because reusable syringes and needles are lacking.
- Supervision of injection and sterilization practices should be part of routine management and problem-solving, rather than limited to inspection of equipment and completing check-lists.

1.8. Promote *sustainability of immunization services*, including:

- Strengthen government commitment and support, through establishment of Primary Health Care committees at all levels, chaired by the highest local political authority.
- Increase high-level EPI plus advocacy at national and regional levels to ensure political and financial commitment in support of immunization coverage and disease reduction goals.
- Increase collaboration and support from other departments or institutions (agriculture, education, etc..) for advocacy, motivation through school children, coordination of planned activities.

2. *Measles control*

Measles remains a leading cause of child mortality in Ethiopia (possibly as high as 50,000 to 100,000 deaths annually by conservative estimates), primarily due to low coverage with measles vaccine in the EPI target age-group. Raising coverage with measles vaccine through regular routine EPI services is likely to be one of the most cost-effective of all child survival interventions.

Before measles immunization, large measles outbreaks usually occurred every 1 or 2 years, affecting children between 9 months and two years of age. Almost every child was infected during measles outbreaks, which in Ethiopia would represent about 2

million cases each year (with an estimated 5-10% case-fatality rate). When coverage with measles vaccine is raised, a period of low incidence occurs, followed by a reparation of outbreaks. The outbreaks are smaller, with a longer interval between outbreaks, and affecting children older than 2 years of age. Measles outbreaks occur due to the accumulation of susceptible children, including:

- (1) children too young to be immunized (under 9 months of age).
- (2) children in the target age group (9-23 months) who have not been immunized.
- (3) children older than the target age group (after 2 years of age) who have not been immunized.
- (4) children of any age who have been immunized but who are not protected (vaccine failure).

Most of the measles cases and deaths are in the group of **children 9-23 months who have not been immunized** (Group 2). Most cases **could be prevented** by a timely immunization. In addition, reducing measles transmission in this group also prevents children in the other groups from being exposed. Outbreaks occur in areas with high population density and low coverage (slums), and in areas with difficult access and low coverage. This indicates that the most effective strategy to prevent large numbers of **measles cases and measles deaths is to increase routine measles coverage in high-risk areas**, as soon as possible after 9 months of age.

Strategies to reduce measles cases and measles deaths:

- (1) **Increase routine EPI coverage in low-coverage remote areas.** This requires to expand static and outreach EPI services to remote areas, as part of integrated primary health care services, and to increase the frequency of outreach in areas where immunization has been delivered only 3 or 4 times a year. Measles immunization should be ideally given between 9 and 12 months, but children 12-23 months who have not yet been immunized should also receive measles vaccine. Doses of measles vaccine given to children 12-23 months should be reported separately, so that coverage figures for children under one year can be accurately estimated.
- (2) **Raise and maintain high coverage in urban and densely populated areas,** with emphasis on immunizing children as soon as possible after 9 months of age. IEC/Social mobilization campaigns should be conducted continuously at regular intervals, as part of integrated health services, to remind parents and community leaders of the importance of completing full immunization with measles vaccine soon after 9 months of age.
- (3) **Immunization Days,** if and when conducted, may be used as an opportunity to reach children 9-23 months who have not been immunized previously during routine EPI activities, particularly in selected areas with low coverage. If records are not available or the immunization status is uncertain, there is no risk involved in giving an additional dose of measles vaccine. However, Immunization Days should not replace routine EPI immunization. Where local conditions permit, it is better to develop routine EPI immunization, as part of regular health services, so that children can be immunized as soon as possible after 9 months of age, rather than once a year. It will also decrease the amount of injections to be given during Immunization Days, thus simplifying logistics and record keeping and reducing the risk of unsafe injections. Alternatively, children 9-23 months who have not been immunized can be identified and referred to the next/nearest routine immunization session to receive measles vaccine, or any vaccine needed.

(4) **Additional strategies**

(i) **Surveillance:**

Cases of measles that meet the case definition should be reported as part of routine reporting of EPI target diseases. A case of measles is a child with: FEVER and a RASH lasting 3 or more days, associated with either COUGH, or CORYZA (runny nose), or CONJUNCTIVITIS (red eye). Cases should be reported with their AGE and Immunization Status. This allows to monitor the situation of measles in the country, and to identify priority areas for measles control.

(ii) **Outbreak control:**

Due to the very rapid spread of measles outbreaks in a community, immunization campaigns are generally too little and too late, and not successful in controlling outbreaks. The best strategy to prevent or minimize measles outbreaks is to ensure high coverage in the target age group *before* the outbreak occurs. However, when measles cases are detected in an area, it is recommended to verify immunization coverage and to provide measles immunization to unimmunized children between 9 and 23 months of age. If resources permit, particularly in densely populated areas, vaccinating all children aged 9 months to 5 years may be more successful in controlling the outbreak, if done very early after the start of the outbreak.

(iii) **Vitamin A:**

Distribution of Vitamin A, twice a year, to children 6 months to 5 years, particularly in areas with Vitamin A deficiency, has been shown to substantially reduce measles-associated mortality (as well as mortality from other causes).

3. Neonatal Tetanus elimination: increasing coverage with Tetanus Toxoid for women.

Although reliable estimates of neonatal tetanus (NNT) incidence are lacking, neonatal deaths attributable to neonatal tetanus are known to be common throughout the country. Strategies to reduce neonatal tetanus include (1) immunization with Tetanus Toxoid (TT) vaccine of pregnant women and women of childbearing age, and (2) provision of clean delivery services. Implementation of both strategies faces enormous challenges. Experiences from countries with successful neonatal tetanus elimination programs suggest that: (1) NNT incidence is clustered in high-risk areas rather than uniformly distributed; (2) concentrating efforts in selected high-risk areas induces a more rapid reduction in NNT incidence compared with uniform intervention; (3) providing 3 or more doses of TT vaccine to childbearing-age women in identified high-risk areas is more efficient than routine coverage with 2 doses of TT vaccine to pregnant women alone; (4) the size of the target population of childbearing-age women (15-49 years, estimated as 21% of total population, or 11 millions) makes it technically, logistically and financially impossible to rapidly attain significant coverage nationwide.

The recommended TT immunization schedule includes:

<u>Dose</u>	<u>When to give</u>	<u>Expected duration of protection</u>
TT1	first contact	none
TT2	at least 4 weeks later	1-3 years
TT3	at least 6 months later	5 years
TT4	at least one year later (or during next pregnancy)	10 years
TT5	at least one year later (or during next pregnancy)	all childbearing years

In addition to the current policy of providing TT vaccine to pregnant women and women of childbearing age, it is proposed to progressively increase coverage with emphasis on high-risk areas, with a stepwise implementation scheme. In the absence of surveillance data to identify high-risk areas, weredas can be selected on the basis of available information: WBS weredas, weredas with known cases of NNT in hospitals. Gradually as the number of cases decreases and surveillance improves, high-risk areas may be

selected based on actual reported incidence of NNT cases. The basic assumption is to begin in 1996-97 with 20% of target population in high-risk weredas in each state, in which 40% of childbearing-age women (including pregnant women) will receive 2 doses of TT (TT1-TT2). In 1997-98, women who have received TT1-TT2 in 1996-97 will receive TT3, an additional 20% of women will receive TT1-TT2, and an additional 10% of target population in high-risk weredas will be identified and enrolled, with 40% of childbearing-age women receiving TT1-TT2. The same progressive enrollment scheme will be continued in subsequent years, until 60% of the target population have reached 80% coverage. In other weredas, routine coverage with 2 doses of TT to pregnant women will also be progressively increased up to 80% (Table).

4. *Poliomyelitis eradication*

Eradication of poliomyelitis requires the interruption of the transmission of Polio viruses. Strategies include (1) reaching and maintaining high coverage with 3 or 4 doses of Oral Polio virus Vaccine (OPV) in children aged < 1 year through routine EPI services; (2) surveillance for Acute Flaccid Paralysis (AFP) cases, including collection and examination of stool specimens for isolation of Polio viruses; and (3) supplemental immunization activities, known as Immunization Days. The objective of Immunization Days is to administer 2 supplemental doses of OPV, at 4-6 weeks intervals, to all children aged 0-59 months, regardless of previous immunization status.

Planning NIDs on nationwide scale in Ethiopia faces a number of obstacles: basic EPI infrastructure is still lacking in many rural areas; poliomyelitis eradication is not a national priority; capacity and resources are lacking to implement activities of nationwide magnitude. However, NIDs and surveillance are being implemented in all neighboring countries, and the programme is progressing rapidly in the whole African region. Sub-National Immunization Days have been successfully conducted in November-December 1996, in Addis Ababa and 8 other major cities, and have been a useful first step as a planning exercise prior to larger activities; meanwhile, ongoing progress with routine immunization services in rural areas should make it more feasible and more acceptable to progressively expand NIDs in 1997-1998-1999. Following experience in other countries, it is anticipated that successful Immunization Days will have a strong positive impact on health workers morale and community mobilization, on the development of effective monitoring and disease surveillance mechanisms, and will contribute to strengthen primary health care services and routine immunization services.

Part 3 proposes to conduct National Immunization Days in every region, in November-December 1997, as a step towards implementation of supplemental immunization activities aiming at the eradication of poliomyelitis. The proposed activity may combine the distribution of OPV with distribution of Vitamin A supplements to children aged < 5 years, as a way to maximize the health impact of resources invested in logistics, manpower and social mobilization. In addition to OPV and Vitamin A, in selected areas with high population densities and low measles vaccine coverage, it is proposed to screen immunization cards and identify children eligible to receive measles vaccine (children aged 9-23 months without documented evidence of previous measles immunization). These children will either receive measles vaccine on the spot, or be referred to the next routine immunization session.

5. *Vitamin A supplementation*

Recognizing the high levels of Vitamin A deficiency in the country, the Ministry of Health has identified the following strategies for combating the problem:

- Short-term capsule supplementation through EPI-Plus, and MCH programs
- Medium-term food fortification strategy.
- Long-term strategy of dietary diversification and improved horticultural production of vitamin (and mineral) rich fruits and vegetables.

The capsule supplementation program included two strategies:

- * **Universal preventive supplementation** every 4-6 months for all children 9 months to five years of age, and
- * **Disease targeted supplementation** for all children with measles, severe malnutrition and prolonged diarrheas.

For preventive capsule supplementation, the EPI program presents the ideal opportunity for piggy-backing vitamin A capsule delivery on the existing EPI delivery system. Since the most expensive component of a capsule supplementation program is the delivery system, this integration of service delivery is the most cost-effective option. The following EPI contacts are to be used for Vitamin A capsule supplementation:

* **BCG contact:**

For supplementation of the lactating mother with 200,000 IU of Vitamin A within 4-6 weeks of delivery.

* **Measles vaccination contact:**

For supplementation at about 9 months of age with one dose of Vitamin A (100,000 IU). In addition, existing MCH contact are to be used to deliver one high dose (200,000 IU) of Vitamin A to all children 1-5 years old every 4-6 months. All Vitamin A doses are to be recorded on the newly designed child health cards to ensure that children are given due doses, and to avoid any chances of duplicate-dosing.

In areas where the EPI reach is low, or where Vitamin A capsule supplementation through EPI-Plus has been slow on the off-take, the National Immunization Days present another opportunity/channel for delivery of the capsules to children under five. In four of the nine towns where NIDs were piloted in 1996, Vitamin A was successfully distributed with the polio vaccine. Coverage figures of over 100% were reported in the pilot phase. This strategy may continue to be used in the future in areas where coverage rates need to be boosted, or as a kick-start for the "plus" part of the EPI-Plus program. In some regions, consideration is being given to the idea of using the NIDs for capsule delivery of all 1-5 year old children, since no established MCH contacts exist at the moment. However, in the regions where this strategy is adopted, appropriate adjustments will need to be made in the routine capsule supplementation to avoid double-dosing (double doses of vitamin A given one month apart are not unsafe).

The attached table lists the region-wise estimates of Vitamin A capsule needs for the EPI-Plus and MCH programs for the universal preventive supplementation strategy.

C. Areas of action

1. Programme management

- political commitment: increased commitment from regional councils should be actively sought, and should materialize in a gradual increase in financial support to EPI Plus from regional budget.
- staffing: full-time staff should be assigned at regional and zonal level to be responsible for EPI Plus management, including cold chain and logistics maintenance and Vitamin A deficiency control.

- planning, monitoring and evaluation: microplanning, regular monitoring of coverage and activities, and problem-solving supervision, should continue to receive active support.
- funding: alternative sources of external funding should be actively explored, to meet anticipated shortfall in vaccines and operations costs.

2. Information/Communication (to be discussed further)

Social mobilization activities must be reviewed and planned by professionals, using information/communication techniques aiming at *behavioral changes* that can significantly increase coverage and demand for immunization services and Vitamin A deficiency control, and reduce drop-out and missed opportunities.

3. Training (subject to review, as part of microplanning)

Training needs have been estimated as follows, on the basis of past experience (1995 microplanning review), with a projected annual increase of total costs of 10%:

Peripheral level: 25 sessions, 20 participants, 15 days

Mid level: 15 sessions, 20 participants

Cold chain: 1-2 sessions per region, 20 participants, total 15 sessions

Motorcycle & driving: 1-2 sessions per region, 20 participants, total 15 sessions

Sub-national workshops: 4 workshops annually

4. Logistics and supplies (microplanning)

- vaccines: vaccine and Vitamin A requirements and costs have been calculated based on current population estimates (projections from 1994 Census), actual coverage expected with gradual increase from 1995 to 2000, realistic wastage rates, and current unit costs (UNICEF 1997). See Table: EPI Plan of Action, Ethiopia--Sheets 4-5.
- cold chain, injection & sterilization equipment: requirements for equipment have been estimated based on equipment required for planned new sites, and minimum replacement of existing equipment. See EPI Plan of Action, Ethiopia--Sheets 6-8.
- transport equipment and maintenance: the average total cost per year for addition and replacement of trucks, cars and motorcycles has been estimated as 10% of the existing fleet of vehicles (not including spare parts and labor costs). See EPI Plan of Action, Ethiopia--Sheet 11.
- operations: detailed plans and budgets have been prepared, as part of the MOH/UNICEF microplanning, including: maintenance costs for vehicles and cold chain equipment; personnel and transport costs for vaccine distribution/supervision/review meetings; operations costs of static sites (incl. kerosene, electricity, stationeries); and operations costs of outreach sites (incl. per diem and transport). Costs are based on actual expenditures in 1995-1996. See EPI Plan of Action, Ethiopia--Sheet 10.

Part 2: Disease surveillance

A comprehensive plan for developing EPI surveillance activities is being developed, as part of MOH's current plans for General Disease Surveillance (Division of Epidemiology, MOH). Additional national and external resources are required. The attached table outlines the estimated budget requirements for the development of EPI disease surveillance, with the following comments:

- **Staffing:** There is currently no full-time EPI disease surveillance staff at central or Region levels; under current plans from MOH, EPI disease surveillance will be part of general disease surveillance, therefore staff time available for Acute Flaccid Paralysis (AFP) and Neonatal Tetanus (NNT) case investigations, measles outbreak investigation, stool specimen collection, training and supervision, active surveillance in hospitals, etc., will be limited. In addition, according to administrative decentralization, the Region level has responsibility for management, monitoring and supervision. To complete training activities and to achieve effective disease surveillance within the coming years, it seems necessary to assign full-time staff, at central level and in each of the 4 larger Regions. Responsibility for smaller Regions can be distributed between the 4 Region-level officers.
- **Training:** National and Region disease surveillance workshops should be conducted in 1996-1997. Smaller Regions could join one of the larger Regions, or conduct joint workshops, without exceeding 30 participants. Training at lower levels (Zonal and Woreda levels) could be shorter (2-3 days) and combined with other EPI activities (training, review meetings) whenever possible. Vitamin A training should be integrated with the larger EPI training.
- **Vehicles:** Transportation is one critical issue. The road network is poor. At all levels, vehicles affected to child health activities are in short numbers, often disabled, or shared with other programmes. Because surveillance is not a high priority, transport will rarely be available other than on an occasional basis, unless additional vehicles are provided. It is essential to ensure that surveillance staff at Region level will have the ability to frequently visit zones and woredas.
- **Computer & office equipment, central level:** Additional equipment may be required at MOH/central level to support the EPI Unit and the Division of Epidemiology. Additional computer equipment may be required at Region level at a later stage.
- **Laboratory:** Rotary International and JICA have expressed interest in supporting the establishment of a virology laboratory under the Ethiopian Health and Nutrition Research Institute (EHNRI) (plan in separate document).
- **Operational costs:** Limited resources available for EPI operations are reserved in priority for activities to increase accessibility and coverage. Therefore, additional resources are necessary to rapidly achieve functional EPI disease surveillance.

Part 3: National Immunization Days

1. Objectives

- Administer 2 supplemental doses of OPV, at 4-6 weeks intervals, to all children aged 0-59 months, regardless of previous immunization status.
- In selected areas: administer one dose of Vitamin A to all children aged 9-59 months:
Children 9-11 months: 100,000 IU of Vitamin A
Children 12-59 months (1-4 years): 200,000 IU of Vitamin A
(+ second dose 4-6 months later)
- Design social mobilization and delivery strategies for vaccine and Vitamin A to reach the highest possible coverage, with special efforts to reach children at risk of being missed by routine services.
- *In selected areas*, screen immunization records to identify children eligible for other antigens, particularly measles, and refer them to the next routine immunization session (or administer measles vaccine, in selected high-risk areas).

2. Targets and proposed dates.

2.1 Target age-groups and geographic areas

The target population consists of children aged < 5 years (0-59 months). Depending upon resources available and logistical considerations, regions may choose to conduct Immunization Days primarily in all areas covered by static and outreach sites; additional more remote areas should be included, if at all possible, but without undermining the achievements in the main target areas.

2.2 Dates of NIDs

1st round: Friday 7 - Saturday 8 - Sunday 9 November, 1997
2nd round: Friday 12 - Saturday 13 - Sunday 14 December, 1997
(Vitamin A distribution will need to be repeated 4-6 months later, for children aged > 1 year not covered by the EPI-Plus administration).

October through December is the season of lowest incidence of diarrhea; it is also the dry season which is preferable for transportation. These dates do not conflict with major social or religious events, and will allow 5 weeks for planning and logistics between 1st and 2nd rounds. It is hoped that Friday 7 November and Friday 12 December will be declared official holidays, to assist working parents in taking their children to immunization posts. In areas with difficult access (or in urban areas with a large proportion of target children attending day-care centers), immunization activities may start 2-5 days earlier.

In areas where Vitamin A supplementation will be implemented, distribution will take place mainly during the 2nd round, to avoid the risk of children receiving Vitamin A during both rounds. During both rounds, permanent ink markers (or gentian violet) will be used to mark one nail (e.g. left hand index) of children receiving OPV and Vitamin A (to monitor coverage and to prevent overdosage with Vitamin A). Routine distribution of Vitamin A capsules by health facilities will be discontinued during the period prior to and after the Immunization Days (e.g., 1 month before and 1 month after), to prevent children from receiving excessive doses of Vitamin A.

3. Methods and planned activities

3.1 Vaccine supply, distribution and delivery strategies, cold chain

Vaccine requirements for NIDs will be ordered to replace quantities that will be used from existing stocks. OPV with vaccine vials monitors (VVMs) will be used. Distribution to Zones and Woredas will be scheduled according to mechanisms in place for routine.

EPI vaccines distribution. Insulated packing/shipping boxes with ice-packs will be saved to be used as additional cold boxes during NIDs. Additional vaccine carriers and ice-packs will be required, to provide at least one vaccine carrier for each post. Additional vehicles required will be assigned or borrowed from other health services or institutions or NGOs, or rented if necessary.

Vaccine delivery strategies will be planned based on location of existing EPI fixed sites and outreach sites, past EPI experience, and the social structure of the community. The main objectives are to increase the number of immunization sites (fixed posts or mobile teams), to offer easier access compared with routine services, and to provide special outreach services to hard-to-reach groups or areas. The plan should aim at setting up one NIDs fixed post in each Kebele or Peasant Association (the smaller administrative unit). Each NIDs fixed post or mobile team will be responsible for the immunization of, on average, 300 children aged <5 years, which represents approximately twice the number of existing static and outreach sites. The estimated total of posts/teams is 26,000. In localities with health facilities providing routine EPI services (fixed or outreach sites); the NIDs fixed posts will be located at the health facility. In localities without routine EPI services, the NIDs fixed post will be located at the Kebele office, or any other convenient place. Most of the immunization and Vitamin A distribution activity will take place at the fixed posts on the mornings of day 1 and day 2. In the afternoons, staff from the fixed posts will form house-to-house teams to reach children who may not have been brought to the fixed sites. In addition, in each Zone or Woreda, existing health facilities providing routine fixed immunization services will also establish mobile teams to reach children in urban day-care centers during the 1-2 days prior to NIDs, to provide special outreach service to hard-to-reach groups or areas during the 2-5 days prior to NIDs, and to respond to emergencies (vaccine shortage, reported adverse events, etc..).

3.2 Manpower to be involved

Each immunization post will be staffed with a minimum of one health staff plus 2-3 volunteers (2 for immunization/recording, 1 for Vitamin A distribution if applicable). Additional health staff to be enrolled, in addition to existing immunization staff, will be recruited from other health programs and institutions (hospitals, NGOs, etc..). Rotarians will be involved in various parts of the activities, to be defined. Volunteers will be recruited among health students, Red Cross, retired health workers, etc...

Planning, training of volunteers, coordination, problem-solving, supervision, monitoring and reporting will be assured by, on average:

- 2 supervisors in each Woreda
- 4 supervisors in each Zone
- 5-10 managers at Regional level (one for each Zone)

Training will be provided as one-day sessions:

- at regional level, for Zone and Woreda supervisors, 2 and 3 months before NIDs.
- at local level, combined with planning meetings for health staff and volunteers, 1 month and 2 weeks before NIDs.

A simple manual will be distributed as training document and technical reference guideline for health staff and volunteers.

3.3 Planning, monitoring

Planning will be coordinated under the authority of the Head of the Regional Health Bureau, reporting to the Regional Council and to the Ministry of Health. Planning meetings will be held with the Regional Bureau, Zonal EPI coordinators, and other departments or institutions involved. It is expected that each region will prepare its own plan and budget, by zone, and have it officially endorsed by the Regional Council by May-June 1997 at the latest.

Doses of OPV and Vitamin A will be recorded on simple tally sheets, separating children aged < 1 year, 1-4 years, 5 years or more. Total for each post will be forwarded at the end of each round to the Zone and Regional EPI office. Feedback of the achievements by Zone/Region will be publicized as soon as possible. Rewards will be given to foster competition between Kebeles and immunization teams. Estimated coverage figures will be calculated based on reports of doses administered and on population denominators from official sources and agreed upon in advance. A review meeting will be scheduled in the 1-2 weeks after the 1st Round, to gather experience from the 1st Round and adjust strategies for the 2nd Round. Reports will be circulated and results publicized as timely as possible.

Surveillance activities, essential to the long-term evaluation of impact, will be advertised during social mobilization for NIDs, as an opportunity to raise awareness and increase identification, notification and investigation of Acute Flaccid Paralysis (AFP).

3.4 Social mobilization

Planning for social mobilization activities will be initiated 4-6 months prior to the NIDs, with involvement of professional specialists. Activities will be officially announced 4-6 months in advance by high political authorities and public health officials. Messages will be broadcasted daily on TV and radio during 2 weeks before NIDs. In urban areas, megaphones for broadcasting public announcements in the community will be used extensively as the main media for reaching parents at home. Ideally, there should be one megaphone available for each Kebele. Flyers will be distributed to school children to take home, announcing the purpose and dates of the event. Banners and posters will be displayed in public places including health centers, hospitals, private clinics, schools, day-care centers, Kebele offices, market places etc... If possible, posters will be displayed on public buses and taxis. During the 1-2 days before NIDs, teams will visit day-care centers to distribute OPV and Vitamin A to eligible children, and to distribute flyers for children to take home (inviting younger siblings to visit the fixed posts), and to broadcast messages with megaphones in the Kebele's catchment area. Opening ceremonies will be organized and publicized, with participation of prominent local personalities. Other strategies will be designed for rural areas, as appropriate. Communication strategies will include messages regarding early notification and investigation of Acute Flaccid Paralysis (AFP) cases to take advantage of NIDs as a mechanism to raise awareness for disease surveillance and for early rehabilitation of polio cases.

3.5 Budget estimates

The attached Tables present the planning of strategies by region, and the estimated requirements for vaccines, vaccine carriers, manpower, transport, social mobilization, training etc., with corresponding estimated costs.

Financial resources available locally are limited. However, it is expected that some of the resources required may be provided in kind (volunteers from local organizations, vehicles borrowed from health institutions, reduced rates on mass media publicity, etc..)

Vaccines, vaccine carriers, Vitamin A capsules and megaphones are the most essential commodities, not available locally, and which need to be imported. Orders should be placed by May-June at the latest.

Planning tables:

Assumptions:

Population figures used for planning from 1996 onwards are the most recently available population projections published by the Central Statistic Authority (CSA), based on results of the 1994 Housing and Population Census (however, population estimates Region 5--Somali are projections from 1984 Census figures, Central Statistics Authority (CSA), Addis Ababa.

Planned health facilities are based on Health Services Expansion Plan, Ministry of Health.

Number of zones/weredas by state are from: List of weredas, Ethiopia 1996, Ministry of Economic Development and Cooperation (MEDAC), May 1996.

Coverage targets have been proposed to allow a progressive increase, from 1995 actual coverage towards the national targets for year 2000. National targets are average figures and should not be taken as targets at Region level, as some states are able to achieve higher than average while other states achieve lower coverage. It is proposed that each state would set its own coverage targets, starting from 1995 actual Region coverage and increasing progressively towards national targets for year 2000.

The budget year is from 1 July to 30 June (according to MOH budget cycles)

1 US\$ = 6.40 ETB (Ethiopian Birr)

Costs are calculated using 1996 unit costs (including shipping), according to current UNICEF/UNIPAC catalog prices. No inflation is included, so that budget estimates for years 1997 and beyond should be adjusted for inflation. Most calculations assume a 10% annual increase, reflecting the projected increase in the number of static and outreach sites.

Technical assumptions used in calculating vaccine requirements, equipment and supplies, training, etc.. are included below each corresponding table.

Planned health facilities and EPI vaccination sites, by year, Ethiopia, 1996-1997 to 2000-20001

<i>Region</i>	<i>total population</i>	<i>health facilities</i>	<i>static sites</i> <i>(% of health facilities)</i>	<i>outreach sites</i>	<i>ratio</i> <i>static/outreach</i>
01. Tigray	3,358,358		103	693	(est'd) 1 to 6
02. Afar	1,131,437		13	-	
03. Amhara	14,769,360		476	2,906	
04. Oromia	20,012,952		737	3,375	
05. Somali	2,625,688		45	40	
06. Benishangul	492,689		47	135	
07. SNNPRG	11,064,818		394	2,067	
12. Gambella	194,755		26	55	
13. Harari	143,587		13	14	
14. Addis Ababa	2,341,964		43	94	
15. DireDawa	277,245		12	96	
<i>Total 1996-1997</i>	56,412,853	2,473	1,909 (75%)	9,475	1 to 6
<i>Total 1997-1998</i>	57,834,108	3,081	2,003 (65%)	12,100	1 to 6
<i>Total 1998-1999</i>	59,293,419	3,691 ¹	2,400 (65%)	16,800	1 to 7
<i>Total 1999-2000</i>	60,791,884	4,301	2,796 (65%)	22,400	1 to 8
<i>Total 2000-2001</i>	62,328,754	4,911	3,192 (65%)	25,600	1 to 8

total population: projections from 1994 to 2000, from 1994 census reports (Central Statistics Authority)

health facilities: status as of 1995 + 1,000 health posts + 50 health centers + 10 hospitals (annually)
(Health Services Expansion Plan, Ministry of Health, 1996)

Projected population and EPI target age groups, by region, Ethiopia, 1996-97 to 2000-01

Region	total population	<1 year	<5 years	women 15-49 years	pregnant women	% of total
01. Tigray	3,358,358	112,950	550,419	767,072	114,520	0.060
02. Afar	1,131,437	15,260	129,001	243,898	21,271	0.020
03. Amhara	14,769,360	411,874	2,242,783	3,361,279	412,065	0.262
04. Oromia	20,012,952	565,012	3,100,085	4,451,845	616,399	0.355
05. Somali*	2,625,688	70,894	393,853	609,159	76,145	0.047
06. Benishangul	492,689	12,066	74,792	117,157	11,825	0.009
07. SNNPRG	11,064,818	292,570	1,625,156	2,627,748	331,945	0.196
12. Gambella	194,755	4,539	23,780	51,345	4,635	0.003
13. Harari	143,587	2,228	15,064	38,188	2,240	0.003
14. Addis Ababa	2,341,964	35,530	189,184	729,323	36,769	0.042
15. DiteDawa	277,245	5,135	30,744	75,009	5,295	0.005
Total 1996-1997	56,412,853	1,528,058	8,374,861	13,072,023	1,633,109	1
Total 1997-1998	57,834,108	1,566,155	8,580,242	13,471,069	1,673,787	
Total 1998-1999	59,293,419	1,605,257	8,790,921	13,753,357	1,715,538	
Total 1999-2000	60,791,884	1,645,393	9,007,042	14,109,157	1,758,393	
Total 2000-2001	62,328,754	1,686,543	9,228,523	14,474,316	1,802,328	

Total population: projections from 1994 to 2000, from 1994 census reports (Central Statistics Authority)

1996-1997: total population projection for 1997, CSA

Children <1 year: total population x % children <1 year in 1994 census report, by region

Children <5 years: number of children <5 years, projections from 1994 census reports (Central Statistics Authority)

Women 15-49 years: projections from 1994 census reports (Central Statistics Authority)

Pregnant women: total population x Crude Birth Rate (CBR), by region

Figures for 2001 = figures for 2000 + % annual growth rate, by region (taken from 1999 to 2000)

* Somali region: projection from 1984 census + 0.025 annual growth (national average according to 1994 census)

children <1 year: total population x 0.027 (national average)

children <5 years: total population x 0.15 (national average)

women 15-49 years: total population x 0.232 (national average)

pregnant women: total population x 0.029 (national average)

Proposed routine EPI coverage targets, by antigen, by year, Ethiopia, 1996-97 to 2000-01

<i>Region</i>	<i>BCG</i>	<i>Measles</i>	<i>DPT</i>	<i>OPV</i>
01. Tigray	85	70	70	70
02. Afar	20	15	15	15
03. Amhara	80	60	60	60
04. Oromia	85	70	70	70
05. Somali	20	15	15	15
06. Benishangul	35	25	25	25
07. SNNPRG	80	60	60	60
12. Gambella	85	60	60	60
13. Harari	90	65	65	65
14. Addis Ababa	90	85	85	85
15. DireDawa	90	90	90	90
<i>Total 1996-1997</i>	80	65	65	65
<i>Total 1997-1998</i>	85	75	75	75
<i>Total 1998-1999</i>	90	85	85	85
<i>Total 1999-2000</i>	90	90	90	90
<i>Total 2000-2001</i>	90	90	90	90

coverage targets at national level are averages, not to be taken as targets at regional level.
each region/zone to set its own targets, with gradual increase from current coverage towards national objectives.
targets for tetanus toxoid (TT) to be considered separately, as part of *high-risk strategy*, in selected woredas.

Vaccine requirements (doses) for routine EPI (not including NIDs) by year, Ethiopia, 1996-97 to 2000-01

Region	BCG	Measles	DPT	OPV	TT 15-49 years	TT pregnant	TT total
01. Tigray	423,000	174,000	392,000	392,000	203,000	121,000	324,000
02. Afar	14,000	6,000	12,000	12,000	65,000	23,000	88,000
03. Amhara	1,450,000	544,000	1,224,000	1,224,000	888,000	436,000	1,324,000
04. Oromia	2,114,000	871,000	1,958,000	1,958,000	1,176,000	651,000	1,827,000
05. Somali	63,000	24,000	53,000	53,000	161,000	81,000	242,000
06. Benishangul	19,000	7,000	15,000	15,000	31,000	13,000	44,000
07. SNNPRG	1,030,000	387,000	869,000	869,000	694,000	351,000	1,045,000
12. Gambella	17,000	6,000	14,000	14,000	14,000	5,000	19,000
13. Harari	9,000	4,000	8,000	8,000	11,000	3,000	14,000
14. Addis Ababa	141,000	67,000	150,000	150,000	193,000	39,000	232,000
15. DireDawa	21,000	11,000	23,000	23,000	20,000	6,000	26,000
Total 1996-1997	5,379,000	2,186,000	4,917,000	4,917,000	3,452,000	1,725,000	5,177,000
Total 1997-1998	5,858,000	2,585,000	5,815,000	5,815,000	3,557,000	1,768,000	5,325,000
Total 1998-1999	6,357,000	3,002,000	6,755,000	6,755,000	3,631,000	1,812,000	5,443,000
Total 1999-2000	6,516,000	3,258,000	7,331,000	7,331,000	3,725,000	1,857,000	5,582,000
Total 2000-2001	6,679,000	3,340,000	7,514,000	7,514,000	3,822,000	1,904,000	5,726,000

national vaccine requirements estimated based on actual expected coverage and actual observed wastage, rounded to next 1,000 doses

BCG : (children <1 year x 1 dose x target coverage x 4.0 (i.e, 75% wastage)) + 10% contingency

Measles : (children <1 year x 1 dose x target coverage x 2.0 (i.e, 50% wastage)) + 10% contingency

DPT : (children <1 year x 3 doses x target coverage x 1.5 (i.e, 33% wastage)) + 10% contingency

OPV (routine) : (children <1 year x 3 doses x target coverage x 1.5 (i.e, 33% wastage)) + 10% contingency

TT to women 15-49 years: (women 15-49 years in selected high-risk woredas x 5 doses x target coverage x 1.5 (i.e., 33% wastage)) + 10% contingency

TT to pregnant women: (pregnant women in all other woredas x target coverage x 2 doses x 1.5 (i.e., 33% wastage)) + 10% contingency

vaccine requirements by region estimated based on suggested coverage targets by region.

Tetanus Toxoid, stepwise implementation of high-risk strategy, Ethiopia, 1996-97 to 2000-01

	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001
Childbearing-age:					
20% target population (a) WIBS, high-risk weredas	40% TT1-TT2	40% TT3 20% TT1-TT2	40% TT4 20% TT3 20% TT1-TT2	40% TT5 20% TT4 20% TT3	20% TT5 20% TT4
10% target population (b) high-risk weredas		40% TT1-TT2	40% TT3 20% TT1-TT2	40% TT4 20% TT3 20% TT1-TT2	40% TT5 20% TT4 20% TT3
10% target population (c) high-risk weredas			40% TT1-TT2	40% TT3 20% TT1-TT2	40% TT4 20% TT3 20% TT1-TT2
10% target population (d) high-risk weredas				40% TT1-TT2	40% TT3 20% TT1-TT2
10% target population (e) high-risk weredas					40% TT1-TT2
doses = women 15-49 yrs. x	0.16	0.24	0.36	0.42	0.42
Pregnant women:					
all other weredas	80% weredas: 40% TT1-TT2	70% weredas: 50% TT1-TT2	60% weredas: 60% TT1-TT2	50% weredas: 70% TT1-TT2	40% weredas: 80% TT1-TT2
doses = pregnant women x	0.64	0.7	0.72	0.7	0.64

1996-1997: 20% of target population (WIBS weredas, high-risk weredas (a): 40% coverage of childbearing-age women (CBW) with TT1-TT2

80% population in other weredas: 40% coverage of pregnant-women with TT1-TT2

1997-1998: 20% of target population (a): 40% TT3 + additional 20% TT1-TT2

10% additional (b): 40% with TT1-TT2

70% population in other weredas: 50% coverage of pregnant women with TT1-TT2

1998-1999: 20% of target population (a): 40% TT4 + 20% TT3 + additional 20% TT1-TT2

10% additional (b): 40% TT3 + additional 20% TT1-TT2

10% additional (c): 40% TT1-TT2

60% population in other weredas: 60% coverage of pregnant women with TT1-TT2

etc...

Vaccine costs for routine EPI (not including NIDs), Ethiopia, 1996-97 to 2000-01 (US Dollars)

Region	BCG	Measles	DPT	OPV	total <1 year	TT	grand total
01. Tigray	33,000	28,000	32,000	41,000	134,000	20,000	154,000
02. Afar	2,000	1,000	1,000	2,000	6,000	6,000	12,000
03. Amhara	110,000	86,000	100,000	128,000	424,000	80,000	504,000
04. Oromia	161,000	137,000	159,000	205,000	662,000	111,000	773,000
05. Somali	5,000	4,000	5,000	6,000	20,000	15,000	35,000
06. Benishangul	2,000	2,000	2,000	2,000	8,000	3,000	11,000
07. SNNPRG	79,000	61,000	71,000	91,000	302,000	64,000	366,000
12. Gambella	2,000	1,000	2,000	2,000	7,000	2,000	9,000
13. Harari	1,000	1,000	1,000	1,000	4,000	1,000	5,000
14. Addis Ababa	11,000	11,000	13,000	16,000	51,000	14,000	65,000
15. DireDawa	2,000	2,000	2,000	3,000	9,000	2,000	11,000
Total 1996-1997	408,000	343,000	400,000	514,000	1,665,000	313,000	1,978,000
Total 1997-1998	445,000	405,000	473,000	608,000	1,931,000	322,000	2,253,000
Total 1998-1999	482,000	471,000	549,000	706,000	2,208,000	329,000	2,537,000
Total 1999-2000	494,000	511,000	596,000	766,000	2,367,000	337,000	2,704,000
Total 2000-2001	507,000	524,000	611,000	785,000	2,427,000	346,000	2,773,000

UNICEF 1996 costs (USD) including shipping (10%) and administrative (6%) costs, rounded up to next 1,000 US Dollars.

BCG: 0.0758 per dose, 20-dose vials w/diluent

Measles: 0.1566 per dose, 10-dose vials w/diluent

DPT: 0.0812 per dose, 10-dose vials

OPV: 0.1044 per dose, 10-dose vials w/droppers

TT: 0.0603 per dose, 10-dose vials

Source: UNICEF, Fax Ref: PROC/HSK/1759, February 4, 1997

Vaccine costs for years 1997-1998 through 2000-2001 calculated at 1996 price, to be adjusted for inflation.

Routine EPI cold chain & injection equipments, Ethiopia, 1996-97 to 2000-01

Region	existing sites	new sites (est'd)	cold boxes	kerosene refrigerators	ice-lined refrigerators	deep freezer	solar refrigerators	spare parts
01. Tigray	103	10	11	15	2	2	6	1
02. Afar	13	6	4	8	2	2	6	1
03. Amhara	443	25	45	45	2	2	6	1
04. Oromia	737	35	75	70	2	2	8	1
05. Somali	17	15	5	16	2	2	6	1
06. Benishangul	47	15	6	18	2	2	6	1
07. SNNPRG	394	25	40	45	2	2	6	2
12. Gambella	24	6	4	8	2	2	6	1
13. Harari	13	5	3	6	2	2	0	1
14. Addis Ababa	43	5	4	8	2	2	0	2
15. DireDawa	12	10	3	11	2	2	0	1
Total 1996-1997	1,846	157	200	250	22	22	50	17
Total 1997-1998	2,003	397	240	500	22	22	50	17
Total 1998-1999	2,400	396	280	520	22	22	50	17
Total 1999-2000	2,796	396	320	550	22	22	50	17
Total 2000-2001	3,192	--	320	150	22	22	50	17

cold boxes = est'd 1 unit for replacement per 10 sites

kerosene refrigerator = 100 units for 5% replacement in existing sites + 1 unit per new site

ice-lined refrigerator = 2 per region annually (average)

deep freezer = 2 per region annually (average)

solar refrigerators = 50 new units annually (average)

spare parts = 2 kits annually per large region (x 6) + 1 kit annually per small region (x 5)

Routine EPI cold chain & injection equipments (cont'd), Ethiopia, 1996-97 to 2000-01

Region	existing sites	new sites (est'd)	vaccine carriers	icepacks	sterilizer A	sterilizer B	kit A	kit B
01. Tigray	103	10	41	615	30	7	284	71
02. Afar	13	6	14	210	10	2	98	24
03. Amhara	443	25	183	2,719	131	29	1,255	314
04. Oromia	737	35	244	3,626	174	38	1,672	418
05. Somali	17	15	35	526	25	6	243	61
06. Benishangul	47	15	8	118	6	1	54	14
07. SNNPRG	394	25	139	2,058	99	22	950	237
12. Gambella	24	6	2	36	2	-	17	4
13. Harari	13	5	2	26	1	-	12	3
14. Addis Ababa	43	5	28	416	20	4	192	48
15. DireDawa	12	10	3	50	2	1	23	6
Total 1996-1997	1,846	157	699	10,400	500	110	4,800	1,200
Total 1997-1998	2,003	397	1,200	15,360	900	110	5,800	1,450
Total 1998-1999	2,400	396	1,300	17,120	900	110	6,700	1,700
Total 1999-2000	2,796	396	1,350	18,480	900	110	7,700	1,900
Total 2000-2001	3,192	--	640	12,800	200	110	7,700	1,900

vaccine carriers = 2 per 10 existing sites + 2 per new sites

icepacks = 8 per vaccine carrier + 24 per cold box

sterilizer A = 100 for replacement in existing sites + 2 per new sites

sterilizer B = 50 for replacement in existing sites + 60 for new health centers and hospitals

syringe/needle kit A = 3 kits A per health post = 3 x 80% of all sites (existing + new)

syringe/needle kit B = 3 kits B per health center or hospital = 3 x 20% of all sites (existing + new)

Costs of routine EPI cold chain & injection equipments, Ethiopia, 1996-97 to 2000-01 (US Dollars)

year	cold boxes	kerosene refrigerators	ice-lined refrigerators	deep freezers	solar refrigerators	spare parts	(1) subtotal
total 1996-1997	78,000	475,000	45,000	45,000	345,000	51,000	1,039,000
total 1997-1998	93,000	950,000	45,000	45,000	345,000	51,000	1,529,000
total 1998-1999	109,000	988,000	45,000	45,000	345,000	51,000	1,583,000
total 1999-2000	124,000	1,045,000	45,000	45,000	345,000	51,000	1,655,000
total 2000-2001	124,000	285,000	45,000	45,000	345,000	51,000	895,000

	vaccine carriers	icepacks	sterilizer A	sterilizer B	kit A	kit B	(2) subtotal	(1+2) grand total
total 1996-1997	26,000	9,000	81,000	22,000	111,000	45,000	294,000	1,340,000
total 1997-1998	45,000	13,000	146,000	22,000	134,000	54,000	414,000	1,950,000
total 1998-1999	49,000	14,000	146,000	22,000	155,000	63,000	449,000	2,040,000
total 1999-2000	50,000	15,000	146,000	22,000	178,000	71,000	482,000	2,140,000
total 2000-2001	24,000	11,000	33,000	22,000	178,000	71,000	339,000	1,240,000

unit costs (WHO/UNICEF, Product Information Sheet 1994), US Dollars (total rounded to next 1,000 US Dollars)

item:	PIS ref. no.:	unit cost:	+ 15% shipping:
cold box:	11-850-51	336.00	386.00 (Electrolux RCW 25, 20.7 L.)
kerosene refrigerator:	11-216-10	1,654.00	1,900.00 (Sibir V 240 KE kerosene/electric)
icelined refrigerator/freezer:	11-530-20	1,772.00	2,040.00 (Electrolux TCW 1151, refrigerator/freezer)
solar refrigerator:		6,000.00	6,900.00
vaccine carrier 2.8 L.:	11-350-05	32.00	37.00
icepack 0.6 L., set of 24:	11-350-54	30.00	35.00
icepack 0.4 L., each:	11-850-85	0.70	0.80
sterilizer A:	99-078-00	141.00	162.00 (incl. stove)
sterilizer B:	99-079-00	173.00	200.00 (incl. stove)
syringe/needle kit A:	99-070-00	20.00	23.00
syringe/needle kit B:	99-071-00	35.00	37.00
spare parts kit:	(estimated)		3,000.00 (spare parts for refrigerators & sterilizers)

EPI training sessions, Ethiopia, 1996-1997 to 2000-2001 (US Dollars)

Region	zones/weredas	peripheral	mid-level	cold chain	motorcycle & driving	subnational workshops	training materials	total
01. Tigray	5/36	3,800	2,700	2,300	2,300	2,400	1,200	14,500
02. Afar	5/30	1,300	1,000	800	800	900	500	4,900
03. Amhara	10/114	16,400	11,800	9,900	9,900	10,500	5,300	63,500
04. Oromia	12/181	22,200	16,000	13,400	13,400	14,200	7,100	86,100
05. Somali	9/47	3,000	2,100	1,800	1,800	1,900	1,000	11,300
06. Benishangul	5/28	800	400	400	400	400	200	2,200
07. SNNPRG	11/80	12,300	8,900	7,400	7,400	7,900	4,000	47,600
12. Gambela	4/8	300	200	200	200	200	100	900
13. Harari	3/3	200	200	100	100	200	100	700
14. Addis Ababa	6/28	2,600	1,900	1,600	1,600	1,700	900	10,100
15. DireDawa	1/4	400	300	200	200	200	100	1,200
Total 1996-1997	71/559	62,500	45,000	37,500	37,500	40,000	20,000	242,500
Total 1997-1998	71/559	68,300	49,500	41,300	41,300	44,000	22,000	266,800
Total 1998-1999	71/559	75,700	54,500	45,500	45,500	48,400	24,200	293,500
Total 1999-2000	71/559	83,300	60,000	50,100	50,100	53,300	26,700	322,900
Total 2000-2001	71/559	91,700	66,000	55,200	55,200	58,700	29,400	355,200

zones/weredas: source: list of woredas, MEDAC, May 1996 (including special zones and special woredas)

(estimated costs based on 1995-1996 microplanning experience; distribution by region estimated based on relative population)

peripheral level: 1 session (est'd).

20 participants x ((DSA 24 ETB x 15 days) + (transport R/T 100 ETB)) (1 US dollar = 6.40 ETB)

6 facilitators x ((DSA 32 ETB x 15 days) + (transport R/T 100 ETB)) (1 US dollar = 6.40 ETB)

mid level: 300 participants (20 participants x 15 sessions) total 3,000 USD per session (incl. facilitators).

cold chain: 1 to 2 sessions per region, total 15 sessions x 2,500 USD per session.

motorcycle & driving: 1 to 2 sessions per region, total 15 sessions x 2,500 USD per session.

subnational workshops: 4 subnational workshops, estimated cost 10,000 USD per workshop.

training materials: 600 participants x 30 USD (est'd)

EPI programme management & operation, Ethiopia, 1996-1997 to 2000-01 (US Dollars) (1 US Dollars = 6.40 ETB)

Region	zones/weredas	maintenance	distribution / supervision / review meetings	static sites	outreach	total
01. Tigray	5/36	21,200	23,300	8,400	23,900	76,600
02. Afar	5/30	7,200	7,900	2,900	8,100	25,800
03. Amhara	10/114	93,300	102,200	36,700	104,800	336,700
04. Oromia	12/181	126,300	138,400	49,700	142,000	456,300
05. Somali	9/47	16,600	18,200	6,600	18,700	59,900
06. Benishangul	5/28	3,200	3,500	1,300	3,500	11,300
07. SNNPRG	11/80	69,900	76,500	27,500	78,500	252,300
12. Gambella	4/8	1,300	1,400	500	1,400	4,500
13. Harari	3/3	1,000	1,000	400	1,100	3,300
14. Addis Ababa	6/28	14,800	16,200	5,900	16,700	53,400
15. DireDawa	1/4	1,800	2,000	700	2,000	6,400
Total 1996-1997	71/559	356,000	390,000	140,000	400,000	1,286,000
Total 1997-1998	71/559	392,000	429,000	154,000	440,000	1,415,000
Total 1998-1999	71/559	432,000	472,000	170,000	484,000	1,557,000
Total 1999-2000	71/559	476,000	520,000	187,000	533,000	1,713,000
Total 2000-2001	71/559	524,000	572,000	206,000	587,000	1,885,000

maintenance: car = 3,000 ETB per car annually x estimated 300 cars in 1996 (labor costs, not including spare parts)
 motorcycle = 1,200 ETB per motorcycle annually x est'd 1,050 motorcycles
 refrigerators = 1,000 ETB per zone annually (labor costs)
 cold rooms = est'd 10,000 ETB annually x 5 cold rooms (electricity + routine servicing + labor costs, not including major repair or replacement)

distribution, supervision, review meetings: all costs combined (incl. fuel):

center to region, quarterly: (2 persons x 6 days x DSA 25 ETB) + (.4 ETB x 1,000km) x 11 regions x 4 quarters = 14,960 ETB
 region to zone, monthly (2 persons x 4 days x DSA 25 ETB) + (.4 ETB x 500 km) x 71 zones x 12 months = 340,800 ETB
 zone to wereda, monthly: (2 persons x 2 days x DSA 25 ETB) + (.4 ETB x 100km) x 560 wereda x 12 months = 940,800 ETB
 wereda to health facility monthly: (1 person x 1 day x DSA 25 ETB) + (30 ETB transport) x 1800 health facilities x 12 months = 1,188,000 ETB

static sites: average 600 ETB per static site x 1,800 sites (including kerosene, electricity, stationeries) = 1,080,000 ETB

outreach: average session cost 42 ETB x 1,800 static sites x 6 outreach sites x 6 sessions (including perdiem, mobility) = 425,000 ETB

projected annual increase: 10%

EPI transport, Ethiopia, 1996-1997 to 2000-2001 (US Dollars)

Region	existing trucks/cars	trucks	cars	motorcycles	spare parts			total
01. Tigray	2/9	11,000	27,000	17,000	17,000			72,000
02. Afar	0/6	4,000	10,000	6,000	17,000			37,000
03. Amhara	4/70	45,000	118,000	71,000	17,000			251,000
04. Oromia	7/89	61,000	160,000	96,000	17,000			334,000
05. Somali	0/0	8,000	21,000	13,000	17,000			59,000
06. Benishangul	0/6	2,000	4,000	3,000	17,000			26,000
07. SNNPRG	5/44	34,000	89,000	53,000	17,000			193,000
12. Gambella	0/5	1,000	2,000	1,000	17,000			21,000
13. Harari	0/4	1,000	2,000	1,000	17,000			21,000
14. Addis Ababa	0/18	3,000	19,000	12,000	17,000			56,000
15. DireDawa	0/4	1,000	3,000	2,000	17,000			23,000
Total 1996-1997	27/255	170,000	450,000	270,000	187,000			1,077,000
Total 1997-1998		187,000	495,000	297,000	206,000	-	-	1,185,000
Total 1998-1999		206,000	545,000	327,000	227,000	-	-	1,305,000
Total 1999-2000		227,000	600,000	360,000	250,000	-	-	1,437,000
Total 2000-2001		250,000	660,000	396,000	275,000	-	-	1,581,000

total existing trucks: 27 (including 9 trucks at central level); total existing cars: 255.

cars, trucks motorcycles: annual costs estimated as 10% of existing fleet for addition and replacement = 3 trucks, 25 cars, 105 motorcycles (annually)

distribution of total costs by state estimated based on population size; projected 10% annual increase.

	number	1996 unit cost, USD (incl. shipping)	
trucks:	3	55,000	7 tons, 4 x 4 (Model fiat-IVECO 80-17W or equivalent)
cars:	25	18,000	Toyota Hi-Lux Model LN 106 L PRMRS diesel
motorcycles:	105	2,500	Yamaha DT75
spare parts motorcycles:	11	5,200	1 lot per region annually
spare parts cars:	11	6,300	1 lot per region annually
spare parts trucks:	11	5,000	1 lot per region annually
spare parts total:	11	17,000	
fuel, maintenance:			included under management and operations costs

Communication, social mobilization, EPI Ethiopia, 1996-1997 to 2000-2001 (US Dollars)

Region	zones/weredas	meetings	materials	mass media				total
01. Tigray	5/36							22,000
02. Afar	5/30							8,000
03. Amhara	10/114							95,000
04. Oromia	12/181							128,000
05. Somali	9/47							17,000
06. Benishangul	5/28							4,000
07. SNNPRG	11/80							71,000
12. Gambella	4/8							2,000
13. Harari	3/3							1,000
14. Addis Ababa	6/28							15,000
15. DireDawa	1/4							2,000
Total 1996-1997	71/559							360,000
Total 1997-1998	71/559							396,000
Total 1998-1999	71/559							436,000
Total 1999-2000	71/559							480,000
Total 2000-2001	71/559							528,000

meetings: estimated annual cost, per region

material: design, production, printing of IEC materials (posters, banners, flyers etc..)

mass media: estimated cost of air time (TV, radio), newspaper announcements, etc.

total cost, including meetings, production of materials, mass media, from 1995-1996 microplanning-(breakdown by cost category not available)

Budget summary, routine EPI (not including NIDs), Ethiopia, 1996-1997 to 2000-2001 (US Dollars)

Region	EPI vaccines (without TT)	TT vaccine	cold chain & injection	training	management & operation	transport	communication & mobilization	total
01. Tigray	134,000	20,000	80,000	14,500	76,600	72,000	22,000	419,100
02. Afar	6,000	6,000	27,000	4,900	25,800	37,000	8,000	114,700
03. Amhara	424,000	80,000	351,000	63,500	336,700	251,000	95,000	1,601,200
04. Oromia	662,000	111,000	476,000	86,100	456,300	334,000	128,000	2,253,400
05. Somali	20,000	15,000	63,000	11,300	59,900	59,000	17,000	245,200
06. Benishangul	8,000	3,000	12,000	2,200	11,300	26,000	4,000	66,500
07. SNNPRG	302,000	64,000	263,000	47,600	252,300	193,000	71,000	1,192,900
12. Gambella	7,000	2,000	5,000	900	4,500	21,000	2,000	42,400
13. Harari	4,000	1,000	4,000	700	3,300	21,000	1,000	35,000
14. Addis Ababa	51,000	14,000	56,000	10,100	53,400	56,000	15,000	255,500
15. DireDawa	9,000	2,000	7,000	1,200	6,400	23,000	2,000	50,600
Total 1996-1997	1,665,000	313,000	1,340,000	242,500	1,286,000	1,077,000	360,000	6,283,500
Total 1997-1998	1,931,000	322,000	1,950,000	266,800	1,415,000	1,185,000	396,000	7,465,800
Total 1998-1999	2,208,000	329,000	2,040,000	293,500	1,557,000	1,305,000	436,000	8,168,500
Total 1999-2000	2,367,000	337,000	2,140,000	322,900	1,713,000	1,437,000	480,000	8,796,900
Total 2000-2001	2,427,000	346,000	1,240,000	355,200	1,885,000	1,581,000	528,000	8,362,200

Costs for 1997-1998 to 2000-2001 are calculated at 1996 prices, to be adjusted for inflation.

Budget summary, routine EPI (not including NIDs), Ethiopia, 1996-1997 to 2000-2001 (Ethiopian Birrs, 1 US Dollar = 6.40 ETB)

<i>Region</i>	<i>EPI vaccines (without TT)</i>	<i>TT vaccine</i>	<i>cold chain & injection</i>	<i>training</i>	<i>management & operation</i>	<i>transport</i>	<i>communication & mobilization</i>	<i>total</i>
01. Tigray	858,000	128,000	512,000	93,000	491,000	461,000	141,000	2,683,000
02. Afar	39,000	39,000	173,000	32,000	166,000	237,000	52,000	735,000
03. Amhara	2,714,000	512,000	2,247,000	407,000	2,155,000	1,607,000	608,000	10,248,000
04. Oromia	4,237,000	711,000	3,047,000	552,000	2,921,000	2,138,000	820,000	14,422,000
05. Somali	128,000	96,000	404,000	73,000	384,000	378,000	109,000	1,570,000
06. Benishangul	52,000	20,000	77,000	15,000	73,000	167,000	26,000	426,000
07. SNNPRG	1,933,000	410,000	1,684,000	305,000	1,615,000	1,236,000	455,000	7,635,000
12. Gambella	45,000	13,000	32,000	6,000	29,000	135,000	13,000	272,000
13. Harari	26,000	7,000	26,000	5,000	22,000	135,000	7,000	224,000
14. Addis Ababa	327,000	90,000	359,000	65,000	342,000	359,000	96,000	1,636,000
15. DireDawa	58,000	13,000	45,000	8,000	41,000	148,000	13,000	324,000
<i>Total 1996-1997</i>	10,656,000	2,004,000	8,576,000	1,552,000	8,231,000	6,893,000	2,304,000	40,215,000
<i>Total 1997-1998</i>	12,359,000	2,061,000	12,480,000	1,708,000	9,056,000	7,584,000	2,535,000	47,782,000
<i>Total 1998-1999</i>	14,132,000	2,106,000	13,056,000	1,879,000	9,965,000	8,352,000	2,791,000	52,279,000
<i>Total 1999-2000</i>	15,149,000	2,157,000	13,696,000	2,067,000	10,964,000	9,197,000	3,072,000	56,301,000
<i>Total 2000-2001</i>	15,533,000	2,215,000	7,936,000	2,274,000	12,064,000	10,119,000	3,380,000	53,519,000

Costs for 1997-1998 to 2000-2001 are calculated at 1996 prices, to be adjusted for inflation.

Vitamin A capsule requirements for Universal Preventive Supplementation Strategy by region (based on projected population and target age groups)
Ethiopia, 1996-97 to 2000-1

Region	Population					Number of capsules (50,000 IU)@				Cost (USD)
	total population	<1 year	<5 years	1-5 years	Pregnant w.	<1 year	1-5 years	Lactating w.	Total	
01. Tigray	3,358,358	112,950	550,419	437,469	114,520	226,000	3,500,000	459,000	4,185,000	51,000
02. Afar	1,131,437	15,260	129,001	113,741	21,271	31,000	910,000	86,000	1,027,000	13,000
03. Amhara	14,769,360	411,874	2,242,783	1,830,909	412,065	824,000	14,648,000	1,649,000	17,121,000	206,000
04. Oromia	20,012,952	565,012	3,100,085	2,535,073	616,399	1,131,000	20,281,000	2,466,000	23,878,000	287,000
05. Somali*	2,625,688	70,894	393,853	322,959	76,145	142,000	2,584,000	305,000	3,031,000	37,000
06. Benishangul	492,689	12,066	74,792	62,726	11,825	25,000	502,000	48,000	575,000	7,000
07. SNNPRG	11,064,818	292,570	1,625,156	1,332,586	331,945	586,000	10,661,000	1,328,000	12,575,000	151,000
12. Gambella	194,755	4,539	23,780	19,241	4,535	10,000	154,000	19,000	183,000	3,000
13. Harari	143,587	2,228	15,064	12,836	2,240	5,000	103,000	9,000	117,000	2,000
14. Addis Ababa	2,341,964	35,530	189,184	153,654	36,769	72,000	1,230,000	148,000	1,450,000	18,000
15. DireDawa	277,245	5,135	30,744	25,609	5,295	11,000	205,000	22,000	238,000	3,000
Total 1996-1997	56,412,853	1,528,058	8,374,861	6,846,803	1,633,109	3,057,000	54,775,000	6,533,000	64,365,000	773,000
Total 1997-1998	57,834,108	1,566,155	8,580,242	7,014,087	1,673,787	3,133,000	56,113,000	6,696,000	65,942,000	792,000
Total 1998-1999	59,293,419	1,605,257	8,790,921	7,185,664	1,715,538	3,211,000	57,486,000	6,863,000	67,560,000	811,000
Total 1999-2000	60,791,884	1,645,393	9,007,042	7,361,649	1,758,393	3,291,000	58,894,000	7,034,000	69,219,000	831,000
Total 2000-2001	62,328,754	1,686,543	9,228,523	7,541,980	1,802,328	3,374,000	60,336,000	7,210,000	70,920,000	852,000

Total population: projections from 1994 to 2000, from 1994 census reports (Central Statistics Authority)

1996-1997: total population projection for 1997, CSA

Children <1 year: total population x % children <1 year in 1994 census report, by region

Children <5 years: number of children <5 years, projections from 1994 census reports (Central Statistics Authority)

Children 1-5 years: number of children <5 years minus number of children <1

Women 15-49 years: projections from 1994 census reports (Central Statistics Authority)

Pregnant women: total population x Crude Birth Rate (CBR), by region

Figures for 2001 = figures for 2000 + % annual growth rate, by region (taken from 1999 to 2000)

@ No. Capsules <1 year = Population <1 year x (1 dose) x (2 capsules)

No. Capsules 1-5 years = population 1-5 years x (2 doses) x (4 capsules)

Total no. capsules = No. capsules for <1 years + 1-5 years = lactating women

cost = 500 capsules = 6.00 USD, including shipping