MODULE

Expanded Program in
Immunization

For the Ethiopian Health Center Team

Mesfin Addisie, Ato Amsalu Feleke, Ato Melkie Edris, Ato Daniel Mengistu,
Ato Abebaw Eredie, Ato Kassa Woreta, Ato Ebba Abate, Ato Endris Mekonnen,

Funded under USAID Cooperative Agreement No. 663-A-00-00-0358-00.

Produced in collaboration with the Ethiopia Public Health Training Initiative, The Carter Center, the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education.

TABLE OF CONTENTS

TOPIC **PAGE**

PREFACE

The need of teaching materials in addition to the usual text and reference books is increasing as our demands are increasing. Hence, many modules to fill the gap are prepared and being prepared in collaboration with The Carter Center.

Gondar University College of Medical Science has so far produced two modules on Pneumonia in Under Five Children and Malaria Uncomplicated and this is the third on Expanded Program on Immunization (EPI).

EPI is one of the main integrated health services in the country. Expanding this program will decrease the morbidity and mortality due to vaccine preventable diseases.

Basically, this module is prepared for the health center team, but other professionals at the service areas can also use it.

It should be clear that this module is not a substitute for text books, but rather can help students to understand the program in a simplified way and push students to make the teaching student-centered and team approach.

ACKNOWLEDGMENTS

This module is the contribution of many scholars at Gondar University College. Hence, we would like to thank all those who contributed directly or indirectly for the development of this module.

We would like to extend our deep appreciation to Gondar University College and The Carter Center for funding and arranging everything for the completion of the module.

We would like also to extend our heart-felt gratitude for those National and International experts who had spent their precious time on reviewing the whole document, to mention some, Professor Dennis Carlson, Professor Nicholas Cunningham, Dr. Jacobs Troy, and Dr. Endale Tefera of Addis Ababa University.

Alemaya University, Faculty of Health Sciences deserves special thanks for reviewing and giving feed-back on time.

Teda Health Management Training Center staff and the management have to get special thanks for allowing us to use the facilities freely during the process of developing the module.

Special thanks has to go to Ms. Carla Gale, Resident Technical Advisor, and Ato Aklilu Mulugeta, Business Manager, for The Carter Center, A.A. for the support and encouragement to complete the module. Without their support this material could have not been completed.

Finally, the Community Health, Health Officer, Environmental Health, Nursing and Medical Laboratory Technology Departments are highly appreciated to finalize this valuable teaching material through team work.

UNIT ONE

INTRODUCTION

1.1 Purposes and uses of the module

The expanded Program on Immunization (EPI) was launched in 1974 by the World Health Organization (WHO). In 1977 EPI set the following three long-term objectives:

- To reduce morbidity and mortality from six major childhood diseases, i.e. measles, tuberculosis, tetanus, pertussis, poliomyelitis and diphtheria by immunizing all children throughout the world by 1990,
- To promote national self-reliance in delivering immunization services within the comprehensive health service, and
- To promote regional self-reliance in vaccine production and quality control.

The Ethiopian health policy had given emphasis to the prevention and control of major communicable diseases. Thus, in Ethiopia EPI was initiated in 1980. The objective of the National Immunization Policy was to reduce mortality and morbidity in children from the EPI target diseases through the immunization of all children under the age of one. The program had been planned to make immunization services available to 10% of the population in 1980 and to increase immunization access by 10% each year.

Despite various initiatives and campaigns over the years, immunization coverage (DPT_3)[1] in most parts of Ethiopia remains low (41.91%), and this contributes to high morbidity and mortality among children. Some of the factors accounting for under immunization service are:

lack of transportation

ineffective cold chain

shortages of trained health personnel

poor inter-sectoral collaboration

inadequate community involvement and participation.

The main purposes of this module are:

a. To bring a significant change in

UNIT TWO

CORE MODULE

2.1. Pre-test

Before going into the core module, all categories of the Health Center Team should attempt to answer the following the questions.

Instruction: Choose the best answer and write on a separate paper.

1. Crippling is due to
   a) Measles
   b) Pertussis
   c) Tetanus
   d) Poliomyelitis

2. Which of the following is a chronic mycobacterium disease?
   a) Whooping cough
   b) Tuberculosis
   c) Pertusis
   d) Diphtheria

3. In terms of etiological agent, which one of the following is different?
   a) Whooping cough
   b) Poliomyelitis
   c) Tetanus
   d) Tuberculosis

4. Which one of the following EPI target diseases is highly contagious?
   a) Tuberculosis
   b) Poliomyelitis
   c) Measles
   d) Neonatal tetanus

5. Which one of the following is not an EPI target disease in Ethiopia?
   a) Hepatitis
   b) Tuberculosis
   c) Measles
   d) Whooping cough

6. What percentage of the poliovirus infections leads to symptomatic poliomyelitis?
   a) 25% b) 1% c) 50% d) 75%

7. Which one of the following EPI target diseases is targeted for eradication?
   a) Neonatal tetanus
   b) Pertussis
   c) Poliomyelitis
   d) Tuberculosis

8. Which of the following is not a predisposing factor for acquiring neonatal tetanus?
   a) Non-immunized mother
   b) Unclean cutting of the umbilical cord
   c) Application of mud/cow dung on the umbilical stump
   d) Coughing

9. The clinical features of neonatal tetanus include
   a) Board like abdomen
   b) Hunger and crying
   c) Stiffness to touch
   d) All of the above

10. The etiology of diphtheria is
    a) Clostridium tetani
    b) Bordetella pertussis
    c) Polio virus type III
    d) None of the above

11. Which of the following prevention and control methods work for all EPI diseases?
    a) Health education about the importance of immunization
    b) Early diagnosis and treatment
    c) Mass mobilization
    d) All of the above

12. Oral Polio vaccine is
    a) Attenuated microorganism
    b) Killed microorganism
    c) Harmless form of toxin or poison
    d) All of the above

13. The first DPT vaccine should be given at
    a) Birth
    b) 6 weeks of age
    c) 10 weeks of age
    d) 9 months of age

14. The cold chain includes

15. Polio and DPT vaccine should be stored at health centre and out reach sites respectively
    a) Up to 6 months and a week
    b) Up to a month and a week
    c) Up to a week and a month
    d) Up to 9 months and a year.

16. The best acceptable proof of immunization includes
    a) BCG scar on the right shoulder
    b) Immunization card
    c) Mothers oral confirmation
    d) A and B

17. In cases of pertussis infection, the stage which is defined by the gradual decreasing in intensity of the cough is
    a) Catarrhal
    b) Paroxysm
    c) Convalescent

2.3. Learning Activity One: CASE STUDY

Part I

Woizero Kenubish Alemu, who delivered a week ago, came to Kossoyie health post with her male newborn.

The mother complained that her baby is unusually crying, has difficulty of sucking and swallowing. She gave further history that the delivery took place at home and was attended by local traditional birth attendant.

The assistant had used a blade to cut the cord and applied cow-dung. The mother responded that she had no history of any immunization and follow up of antenatal clinic.

Questions

1. What do you think the cause of illness of this child?
2. Why do you ask about immunization and antenatal care?
3. What do you advise to the local traditional birth attendant?

Part II

The Front-line community health worker (CHW) examined the newborn. On physical examination, he found out that the newborn was restless, difficulty of opening the mouth, and unhealed umbilical stump

Questions

1. What is your impression now as to the cause of this child's illness?
2. What measures should be taken by the community health worker to save the baby?

Part III

The CHW advised the mother to take her sick newborn to the nearest health center where you work.

Questions

1. What would you do for this baby?

Part IV

After proper management in the health institutions the baby recovered from his illness. W/ro. Kenubish thanked the health worker and returned home after two weeks. The newborn was in a good condition and the family was very happy.

Unfortunately, after a month, the child became sick again and developed fever, sneezing, running nose, and mild cough. Gradually the cough became worse and was continuous.

Because of this problem, the mother took the newborn to a local “Awaki” (local healer). Then the local healer looked at the child and gave chopped materials. He advised the mother to dissolve in water and give the child to drink. The mother gave the dissolved “medication” but there was no improvement and finally she took him back to the health center.

Questions

1. What is/are your probable impression/s of the infant’s illness?
2. What will be the management of this case?
3. What do you advise to the mother?

2.4. Definition and Epidemiology of EPI Target Diseases

Table 1. Definition of EPI Target Diseases

Ser. No.	Target Disease	Definition
1	**Pertussis / Whooping cough**	An acute bacterial disease of the respiratory tract characterized by intense cough in paroxysms and sometimes with forceful inspiratory gasp and absence of fever, tachypnea, soar throat, hoarseness, etc.
2	**Tetanus**	A neurological disease characterized by generalized increased rigidity and convulsive spasms of skeletal muscles from the bacterial toxin.
3	**Poliomyelitis / Polio**	An acute viral disease with severity ranging from in apparent infection to paralytic disease. It is a crippling disease that can occur in adults but it is mainly commoner in children.
4	**Diphtheria**	An acute bacteria disease of tonsils, pharynx, larynx, and nose. It occasionally affects the conjunctiva, genitalia and can damage the heart.
5	**Measles**	It is a highly contagious acute viral disease characterized by fever, runny nose, cough, irritability, conjunctivitis, lacrimation, enanthema (Koplik's spots) on the buccal and labial mucosa, and maculopapular rash appearing in a shower distribution over a period of 3 days.
6	**Tuberculosis (TB)**	It is a chronic mycobacterial disease with a wide variety of clinical forms, pulmonary tuberculosis being the predominant form.

Table 2. Epidemiology of EPI Target diseases

Disease	Transmission	Predisposing factors	Magnitude and distribution
Pertussis	- Spreads from person to person by droplets, i.e. through coughing or sneezing etc.	- Not being immunized - Overcrowding - Poor ventilation - Malnutrition	- 60,000,000 cases of pertussis occur per year world wide, with more than half a million deaths
Tetanus	- Neonatal tetanus mainly occurs as a result of umbilical cord contamination at birth. - A person may become infected if contaminated soil or dung enters a wound or cut.	- Cutting umbilical cord with non sterile instrument. - Lack of adequate tetanus toxoid (TT) immunization of mothers. - Applying cow dung, mud and other contaminated materials on the umbilical stump. - Home deliveries attended by untrained traditional birth attendants. - Harmful traditional health practices like uvulectomy, tonsillectomy.	- Tetanus occurs worldwide and is endemic in 90 developing countries, but its incidence varies considerably. - Neonatal tetanus is the most common form, which kills approximately 800,000 infants each year. - In developing countries, neonatal tetanus represents about half of all neonatal deaths and about 25% of infant mortality. - In Ethiopia neonatal tetanus accounts for two thirds of all tetanus deaths.
Poliomyelitis	- Feco-oral (main) - Airborne droplets (rare).	- Not being immunized - Poor sanitation and hygienic practices - Overcrowding - Poverty	It occurs in many regions of the developing world. Globally in 2001 were: - 80% decrease in number of polio cases (from 2979 to 480) - 50% decrease in endemic countries (from 20 to 10) - 51 countries in Europe have been polio-free for 3 years. - No wild poliovirus type 2 isolated for the last 2 years.

Table 2. continued …

Disease	Transmission	Predisposing fact

2.5. Characteristics and Management of EPI Target Diseases

2.5.1. Pertussis (Whooping Cough)

Etiologic agent - A gram-negative bacterium called Bordetella pertussis.

Pathogenesis - The organism produces exotoxin and affects the pharynx, larynx, trachea, bronchi, bronchioles and sometimes the alveoli.

Clinical features - Incubation period is 7 – 17 days. The symptoms of classical pertussis last about 6 weeks and are divided into 3 stages.

A. Catarrhal stage

- The onset is insidious,
- Sneezing
- Running nose
- Anorexia
- Malaise
- Night cough

lasts 1- 2 weeks

B. Paroxysmal stage

- Lasts 2-4 weeks following the infection.
- Characterized by rapid consecutive (5-15) cough before a breath is taken and followed by deep hurried inspiration (whoop).
- Post cough vomiting is common at all ages,
- Factors stimulating cough include fright, anger, crying, sneezing, inhalation of irritant, and over distention of the stomach.

C. Convalescent stage

- It begins after 4 weeks of the illness, and is manifested by a decrease in the frequency and severity of the paroxysms of coughing.

Diagnosis

A. Clinical

- The child is well appearing and playful between patoxysms of cough.
- Presence of children with similar illness in the family or vicinity.
- There is no chest finding on physical examination.
- The diagnosis is usually made on the distinctive clinical feature of the cough. To observe the classical type of cough put tongue depressor to stimulate the coughting.

N.B. Not all children with pertussis whoop. Whooping is uncommon in infants < 3 months.

B. Laboratory

- WBC 15000 - 20000/mm^3 (rarely to 50,000/mm^3)
- 60 - 80% Lymphocytes
-

2.5.2. Tetanus

Etiologic agent

A gram positive anaerobic bacterium called Clostridium tetani (Cl.tetani).

Pathogenesis

Tetanus toxin, after germination of the Cl.tetani spores in a contaminated umbilical stump or wound in other parts of the body, is released to the peripheral nerves and circulation. This causes sustained excitatory neuronal discharge and muscle contraction.

Clinical features

Tetanus occurs in several clinical forms. One of the most important manifestations is neonatal tetanus (NNT). Its incubation period is from 1-14 days (in 90% of the cases) but it can last up to 54 days. The period of onset (the time 7t8Tj 4trqnfir279

Diagnosis

Diagnosis of neonatal tetanus is mainly by clinical features.

Prognosis

Indicators of poor prognosis are:

- Incubation period < 7 days
- Period of onset < 48 hrs.
- Presence of spasm
- Autonomic nervous system disturbances like, tachycardia, bradycardia, hypertension, hypotension, arrhythmia.

Complications

- Respiratory arrest
- Laryngeal spasm
- Presence of autonomic nervous system disturbances.

Prevention

- Immunization of children and women.
- Health information on harmful practices
- Training of Traditional Birth Attendants (TTBA).

2.5.3. Poliomyelitis

Etiologic agent - It is caused by polioviruses type I, II and III.

Pathogenesis

- The virus affects the anterior horn cells of the spinal cord and several areas of the brain. Damage may be reversible with recovery, but it may go on to irreversible nuclear destruction where muscle paralysis results.

Clinical features

- Incubation period is 6 – 14 days
- Fever, malaise, headache and muscle pain
- Nausea, vomiting, soar throat and stiffness of the neck and back with or without paralysis.
- Paralysis usually affects the legs, more often one.

Diagnosis

- It is mainly by clinical features.

Management

Acute phase

- Keep the limbs position with cushions
- Apply warm packs
- Provide analgesics
- Active and passive movements are assisted by physiotherapist after the acute phase ended.

Recovery phase

- Continue with full range of passive/active movement of the affected limb every day.

Residual phase

- Regular out patient supervision of physical, social and economic problems if needed.

2.5.4. Diphtheria

Etiologic agent - It is caused by Gram-positive bacterium called Coryne-bacterium diphtheriae.

Pathogenesis

- The bacterium produces exotoxin which causes local tissue inflammation and necrosis. In cases where the pharynx is involved, there are patches of a grayish membrane with a surrounding dull red inflammatory zone, which may cause pharyngeal obstruction.

Clinical features

- The incubation period is usually 2 - 5 days.
- Sore throat which may be followed by stridor.
- Grayish white membrane seen in oropharynx.
- Upper airway obstruction by the membrane.

Diagnosis

- Clinical signs mentioned above
- Microscopy -Gram stain

Management

A. Specific

- Diphtheria antitoxin if the diagnosis is strongly suspected clinically.
- Antimicrobial therapy with penicillin or erythromycin

2.5.5. Measles

Etiologic agent - It is caused by Measles Virus.

Pathogenesis

- The essential lesion of measles is found in the skin; the mucous membranes of the nasopharynx, bronchi, and intestinal tract; and in the conjunctivae.

Clinical features

- The incubation period ranged from 7 - 18 days.
- The initial stage (catarrhal stage) starts with fever, cough, sneezing, running nose and red, runny eyes. Koplik's spots in the mouth occur before the rash.
- A characteristic red blotchy rash appears on the third to 7th day, beginning on the face becoming generalized, lasting 4 – 7 days.

Diagnosis

- It is made mainly by clinical features epidemiological grounds.

Management

- Severe cases only are admitted to the hospital.
- Mothers are advised about care at hom

2.5.6. Tuberculosis

Etiologic agent

- Pulmonary tuberculosis is caused by Mycobacterium tuberculosis. Tuberculosis of the gastrointestinal tract is caused by Mycobacterium bovis.

Pathogenesis

- Tubercle bacilli infect the lung forming a tubercle (lesion).

Diagnosis

- Clinical features
- Laboratory diagnosis

  Sputum smear microscopy using Ziehl Neelson Acid-Fast Staining technique-this is the commonly used laboratory technique

  Culture
- Tuberclin skin testing
- Chest X-ray

Management

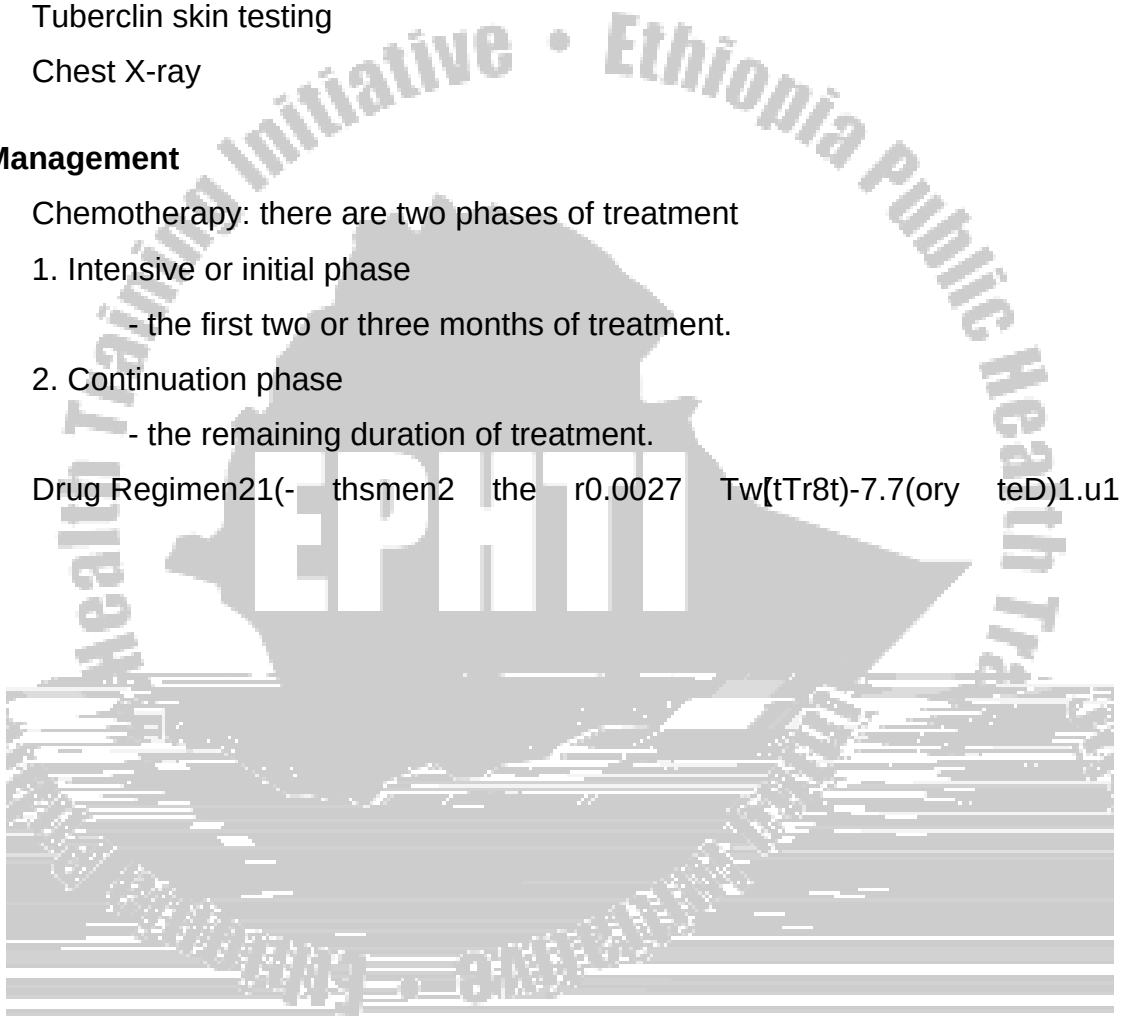
- Chemotherapy: there are two phases of treatment

  1. Intensive or initial phase

     - the first two or three months of treatment.

  2. Continuation phase

     - the remaining duration of treatment.
- Drug Regimen21(- thsmen2 the r0.0027 Tw[tTr8t)-7.7(ory teD)1.u1 Tc6lmainTc0.d



2.6. Prevention and Control of EPI target diseases

- Health Information about the importance of immunization.
- Proper management and inspection of vaccines.
- Early diagnosis and treatment.
- Ensuring a clean and safe environment.
- Avoid harmful traditional health practices.
-

2. Severe reaction

- Sometimes there is severe local inflammation or deeper abscess.

Immunization Schedule

A. For those who start at birth:

Contact	Age of Child	Vaccines
1st	At birth	BCG and Polio 0
2nd	6 weeks	OPV_1 and DPT_1
3rd	10 weeks	OPV_2 and DPT_2
4th	14 weeks	OPV_3 and DPT_3
5th	9 months	Measles

B. For those who start later

Age of child	Antigens
Less than 6 weeks	BCG and OPV_1
Above 6 weeks	BCG if not given previously OPV (3 doses) DPT (3 doses)
Above 9 months	BCG if not given previously OPV DPT Measles

C. Tetanus toxoid vaccine schedule for women (15 - 49 years)

Dose	Minimum interval	Duration of protection
TT_1	-	0

Health Training Initiative • Ethiopia Public Health Tra
EPHTI

Equipment

Materials that are used in the cold chain include:

- thermometers
- ice packs
- vaccine carriers
- cold boxes
- refrigerators and freezers.

Note: Skilled human power to maintain the cold chain is necessary.

Precautions for vaccines

- All vaccines have to be stored at 0^{o}C to 8^{o}C both at the health center and the outreach unit.
- Storage time for all vaccines is up to a month at the health center/health station and up to 1-2 days at the outreach unit.
- Measles and polio be kept frozen.
- Never freeze DPT or tetanus vaccine.
- Keep diluents with vaccine in refrigerator if there is space.
- If not, refrigerate at least the diluents needed for the following day.

2.9. EPI Delivery Strategies

Static: immunization performed as part of routine activity of the Health units.

Outreach: an immunization approach in which the staffs of health unit go out and administer vaccine to mothers and children in their catchments areas.

Mobile: an immunization approach only single dose vaccination (measles, BCG) in nomadic, settlement areas and mostly used for controlling epidemics of measles.

Campaign: an immunization approach conducted by mobilizing the community, example polio and measles vaccination.

2.10. Indicators

The following are some indicators that show a successful immunization programme:

- BCG scar on the right shoulder.
- Completed immunization card.
- Vaccine storage times and temperatures at health centre and out reach level.

2.11. Immunization Problems

A. Drop Out

A drop out is defined as a child or a woman who failed to return for subsequent doses for which he or she is eligible.

Common causes of missed opportunities are:

- health workers do not know the policy
- health workers screen but tell patients to return later
- health workers only vaccinate women with TT if they are pregnant
- health workers only vaccinate the index child, miss the siblings.
- health workers only open a vial if there are enough clients who need it
- false contraindications to immunization, example not giving polio vaccine to a child with diarrhea.
- logistical problems, such as vaccine shortages, poor clinic organization, and inefficient clinic scheduling
- the failure to administer simultaneously all vaccines for which a child was eligible
- accessibility; time (women carry household responsibilities), distance, cost of transportation
- Acceptability: culture,

2.12. Assessment and Evaluation of EPI Services

The ultimate goal of EPI is not to provide immunizations to all populations but rather it is to significantly reduce the morbidity and mortality from the vaccine preventable diseases. Always priority should be placed on monitoring immunization coverage and disease incidence. This can be found from:

- Health institution reports,

- Surveillance:

It is defined as a regular collecting, compiling, analysis, and interpretation of current data on the frequency of specific diseases (WHO). It is the regular dissemination of acquired information to those responsible for disease control and health service planning.

Purposes of surveillance system include

A. To facilitate the early recognition of changes in the patterns of diseases;
B. To identify changes in environmental and host factors that may lead to an increase in the frequency of the diseases;
C. To monitor the safety and effectiveness of prevention and control measures;

- Survey, cluster survey

The EPI Coverage Survey

Often routine reports are inaccurate and one may have to resort to EPI coverage survey to determine the coverage, and provide additional information. WHO's Expanded Program of Immunization has developed a rapid survey methodology which is valuable not only to determine vaccination coverage, but also reasons underlying for failure to vaccinate children. The main advantage of this methodology is that it can be completed quickly and it's technically much easier to carry out than a simple random sample survey in populations that are not censured.

school, market, etc.) and selects a random direction in which to proceed (usually by spinning a bottle). One then counts the number of houses between the center and the periphery of the selected quarter and selects one house at random, this becomes the starting house. The second household to be visited is the one closest to the first (i.e. the household with the front door nearest to the first door) and so on until you complete the required cluster number.

If any of your households contain more than one child, it is advisable to consider including hem all.

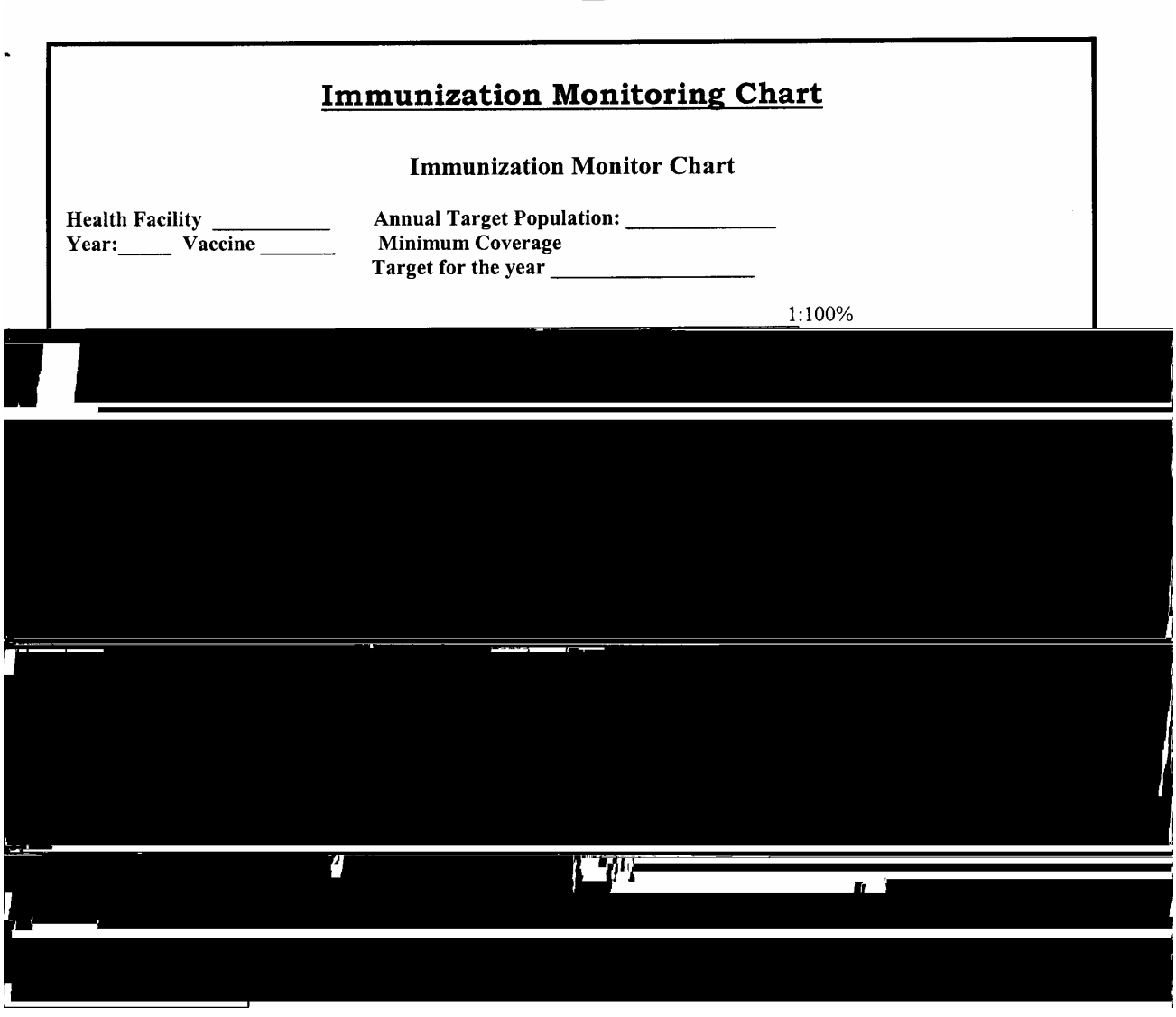
The vaccination status of each child is determined usually by card. Once all 30 clusters have been finished, one will have 210 or up to 300 children.

So, after this procedure, we know where we are in terms of the coverage of vaccination for the target group is concerned. What is next?

In addition to determining coverage, the EPI coverage survey allows one to identify reasons for immunization failure. For all those in the target group who are found not to have been completely vaccinated, the mothers are asked to identify the major reasons why?

Immunization Monitoring Chart

It shows the progress you are making in raising immunization coverage in your catchement areas. This chart enables the number of people you actually immunize each month with your coverage targets.



Immunization Monitoring Chart

Immunization Monitor Chart

Health Facility _____ **Annual Target Population:** _____
Year:_____ **Vaccine** _____ **Minimum Coverage**
Target for the year _____

1:100%

UNIT THREE

SATELLITE MODULES

Satellite Module for Health Officer Students on Expanded Program on Immunization

3.1.1. Introduction

Purpose

This satellite module is prepared for health officer students on EPI. The module emphasizes on some points that are not well described and covered by the core module.

Directions

- After completion of the core module, attempt to answer the pre-test question of the satellite module.
- Go through this satellite module and are advised to refer to the core module whenever indicated.
- Attempt to answer the questions on learning activity one.
- After reading the entire satellite module attempt to revise the pre-test questions again as a post-test

3.1.2. Learning Objectives

At the end of the session the student will be able to:

- define immunity
- understand types of immunity
- identify the types of vaccines and their properties
- know the importance and mechanism of cold chain
- identify the major problems of EPI and their solutions
- understand the management of EPI
- assess and evaluate EPI
- identify the roles and tasks of health officer on EPI.

3.1.3. Pretest

Instruction: Answer the following questions before reading the satellite module.

1. Immunity can be
   a. Induced
   b. Natural
   c. All of the above
   d. None

2. Vaccination /Immunization is an example of
   a. Active immunization
   b. Passive immunization
   c. Both
   d. None

3. DPT vaccine is an example of
   a. Live attenuated organisms
   b. Inactivated organisms
   c. Killed suspended organisms
   d. None of the above

4. Toxins are produced only from the serum of human beings.

   True _____ False _____

5. The target population for EPI in Ethiopia are
   a. Under five years of children
   b. All pregnant and non-pregnant women aged 15-49 years
   c. Less than one year children
   d. All men
   e. a + d
   f. b + c

6. BCG vaccine is an example of
   a. Live attenuated organism
   b. Inactivated organism
   c. Killed suspended organism
   d. None of the above

7. Tetanus toxoid should be given only for pregnant women.
   True _____ False _____

Ethiopia Public Health Training Initiative
EPHTI

3.1.6. Immunization problems, solutions and drop out rates calculation Problems

- Reasons for drop out - See core module

Dropout rates calculations

- Over all drop out rate

$$= \frac{\text{Coverage with BCG} - \text{Coverage with measles}}{\text{Coverage with BCG}} \times 100$$

- Drop out rate for a single antigen (e.g. OPV)

$$= \frac{\text{Coverage with } OPV_1 - \text{Coverage with } OPV_3}{\text{Coverage with } OPV_1} \times 100$$

There is a problem whenever the dropout rate is greater than 10%. It is essential to determine why the failure occurred.

- Missed opportunities- See core module
- Culture and Beliefs

  Though the immunization service is accessible, there are some people who are not using the service because of culture and beliefs.
- Lack of geographic access includes lack of transportation facilities and spare parts for vehicles.
- Problems associated with the vaccines

  a) BCG

  Efficacy is uncertain

  b) Pertussis
  - Low immunogenecity
  - Requires 3 doses

- Common minor side effects in 50%
- Rare serious toxicity e.g. Seizures, neurological disorder

c) OPV
   - Thermal instability
   - Poor immunogenecity
   - Requires multiple doses

d) Measles
   - Thermal instability
   - Inadequate immunogenesity when circulating maternal antibodies present.

- Problems of knowing the target population
  - Knowing the target population is important because the necessary vaccines and logistic could be prepared earlier.

- Problems related to the supplies, cold chain and maintenance.
  - Shortages of supplies like syringes, needles, vaccines, ice boxes, vaccine carriers, etc.
  - Maintenance of cold chain equipment is costly and unavailability of spare parts.

- Problem of community involvement
  - Without the involvement of the community EPI program will fail. They are important in the planning, implementation & evaluation process.

Vaccine	No. of children who got the vaccine
BCG	230
DPT_1/OPV_1	200
DPT_2/OPV_2	180
DPT_3/OPV_3	150
Measles	130

Calculate:

1. The overall drop out rate.
2. Drop out rate for DPT.

3.1.7. Management of EPI

Procedures to follow in conducting EPI include:

- Know the catchement area.
- Know the target population through survey.
- Organize and conduct in service training for the staff.
- Allocate resources such as
  - Assign staff,
  - Procure the required amount of vaccines, refrigerator and other supplies,
  - The necessary financial support (budget),
  - Transportation, etc.
- Manage the cold chain
  - Arrangement of vaccines in the refrigerator
  - Use different mechanisms of ensuring the cold chain.
- Identify the strategy to be used and their frequencies.
- Prepare and organize immunization schedule/session
  (e.g. how many out reach sites?)

- Give appropriate information for the clients such as:
  - be specific on the date and time of the next immunization.
  - give the client a written note of the date and time.
  - the place of the next immunization, particularly if you change the previous site.
  - number of visits a child and mother still need in order to be fully immunized
  - side-effects may occur
- Collect and distribute materials for recording and reporting.
- Social mobilization (the clients, community, other sector members, etc.) to create awareness.
- Devise means of monitoring, supervising evaluation, such as
  - Prepare and use monitoring chart.
  - Calculate immunization coverage, drop out rate, etc.
- Identify problems and give solutions.
- Identify those illegible who are not vaccinated and are listed as dropouts.

Learning Activity: Two

Instruction

Fill the boxes by selecting related facts listed from A - D.

Pertussis	Tetanus	Poliomyelitis	Diphtheria	Tuberculosis	Measles

A. Causative agent

A1. Polio Virus
A2. Measles Virus
A3. Bordetella Pertussis
A4. Corynebacterium Diphtheria
A5. Mycobacterium
A6. Clostridium Tetanis

B. Incubation Period

B1. 3 – 5 days
B2. 4 weeks or longer
B3. 6 – 14 days
B4. 1 – 14 days
B5. 7 – 18 days
B6. 7 – 17 days

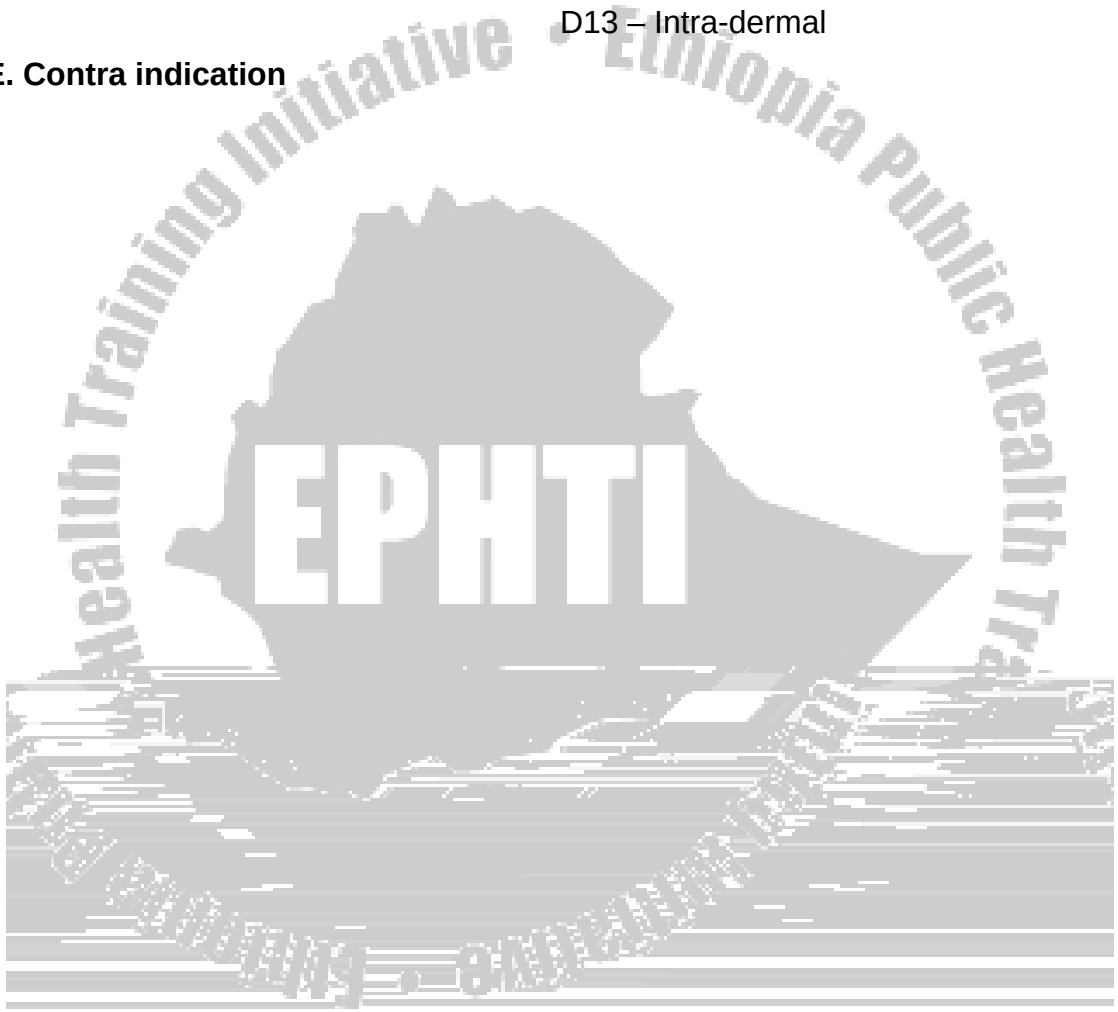
C. Special features

C1 – Whooping cough
C2 – Koplik's Spot
C3 – Toxin production
C4 – Lock jaw
C5 – Muscle paralysis
C6 – Chronic Cough

D. Vaccine (type, administration and schedule)

D1 – DPT vaccine
D2 – Polio vaccine
D3 – Start at 6 weeks
D4 – Start at birth
D5 – Oral drop
D6 – Start at ninth months
D7 – IM injection
D8 – TT vaccine
D9 – Weakened toxin
D10 – Killed organism
D11 – BCG Vaccine
D12 – Live attenuated
D13 – Intra-dermal

E. Contra indication



Health Training Initiative • Ethiopia Public Health Tra
EPHTI

C. Practice Objectives and Activities of Health Officer Students Regarding EPI Target Diseases

Practice Objectives	Activities
Identify catchement area for EPI.	. Visit the area. . Discuss with the community leaders, health workers, and other relevant bodies. . Prepare sketch map.
Identify the target population.	. Conduct survey. . Register the targets and know the number. . Find the total population count from possible sources and make a working estimate of the target population.
Organize the EPI program.	. Plan the program with other members. . Prepare the schedule for vaccination date. . Secure the necessary resources and logistics.
Conduct vaccination.	. Participate in vaccination. . Conduct vaccination campaigns if necessary.
Regular recording and reporting.	. Compile and analyze the data. . Record data. . Report.
Increase community involvement.	. Conduct health education. . Organize and Conduct social mobilization.
Maintain cold chain.	. Regular checkup of temperature of the refrigerator. . Prepare ice pack, cold box, etc. . Learn and practice to maintain the refrigerators and other cold chain equipment.
Monitor and evaluate EPI program.	. Monitor and supervise sessions, cold chain, and availability of resources. . Conduct EPI coverage survey and be involved in surveillance. . Do regular vaccines and supplies inventory.

3.2. Satellite Module for Public Health Nurse Students on Expanded Program on Immunization

3.2.1. Introduction

Purpose and Use

There are six important EPI target diseases that are very serious, and which kill and disable many children. This satellite module is prepared for the public health nurse students with the main goal of enabling them run vaccination program effectively.

Directions

- After completion of the core module go through the satellite module and refer to the core module whenever needed.
- Attempt to read points step by step.
- Attempt to answer questions on learning activity.
- Go through the entire satellite module.

3.2.2. Learning objectives

Upon completion of this module the public health nurse will be able to

Describe the importance of EPI.

State the six vaccine preventable diseases.

Demonstrate comprehensive assessment and list pertinent nursing diagnoses of four vaccine preventable diseases.

Provide holistic nursing care for individual child the EPI target diseases.

Mention essential prevention and control measures.

Define immunization and vaccination.

Explain vaccines and how to administer them.

Organize an out reach sessions.

Conduct health education on immunization sessions.

Evaluate the effectiveness of EPI program.

3.2.3. Pretest (refer the core module)

3.2.4. Causes of the childhood EPI target diseases (refer to the core module)

3.2.5. Clinical features of EPI target diseases (refer to the core module).

3.2.6 Epidemiology of EPI target diseases (refer to the core module)

3.2.7. Learning Activity (refer to the core module).

3.2.8. Client care using the Nursing process

Clients Assessment

Take pertinent and adequate history, subjective and objective data.

Nursing diagnoses

The nursing diagnoses listed below are actual and potential symptomatic patients' problem:

- Ineffective breathing pattern related to EPI targeted diseases.
- Altered body temperature (fever, hypothermia) related to the disease.
- Fluid volume deficit (potential or actual) related to fever, diarrhea and inability to ingest.
- Altered body nutrition related prolonged course of infection.
- Potential for spread of infection to others.
- Knowledge deficit in the control and prevention of EPI target diseases.

Plan

To easy breathing.

To reduced the elevated body temperature to the normal range.

To correct fluid volume deficit.

To maintain nutrition according the body's requirement.

To prevent the potential spread of infection to others.

To give health education on the prevention and control of EPI target diseases.

Nursing Intervention

- Attaining a normal breathing pattern.
  - Turn the patient frequently to drain the secretion and suction when indicated.
  - Encourage mobilization.
  - Encourage a high fluid intake.
  - Evaluate the respiratory rate.
- Attaining normal body temperature
  - Rest
  - Take vital signs
  - Increase fluid intake
  - Give frequent and hygiene.
  - Apply tepid sponge.
- Attaining fluid balance
  - Assess for signs of dehydration
  - Maintain input and output record
- Improving nutritional status
  - Monitoring the nutritional status, weight, height and arm circumference
  - Encourage balanced food intake.
  - Assess food intake and tolerance.
- Preventing the spread of infection
  - Implement an appropriate isolation technique.
  - Wash hands before and after each patient contact.
  - Control dissemination of infection droplets.
  - Ventilate the patient's room.
  - Patient education.

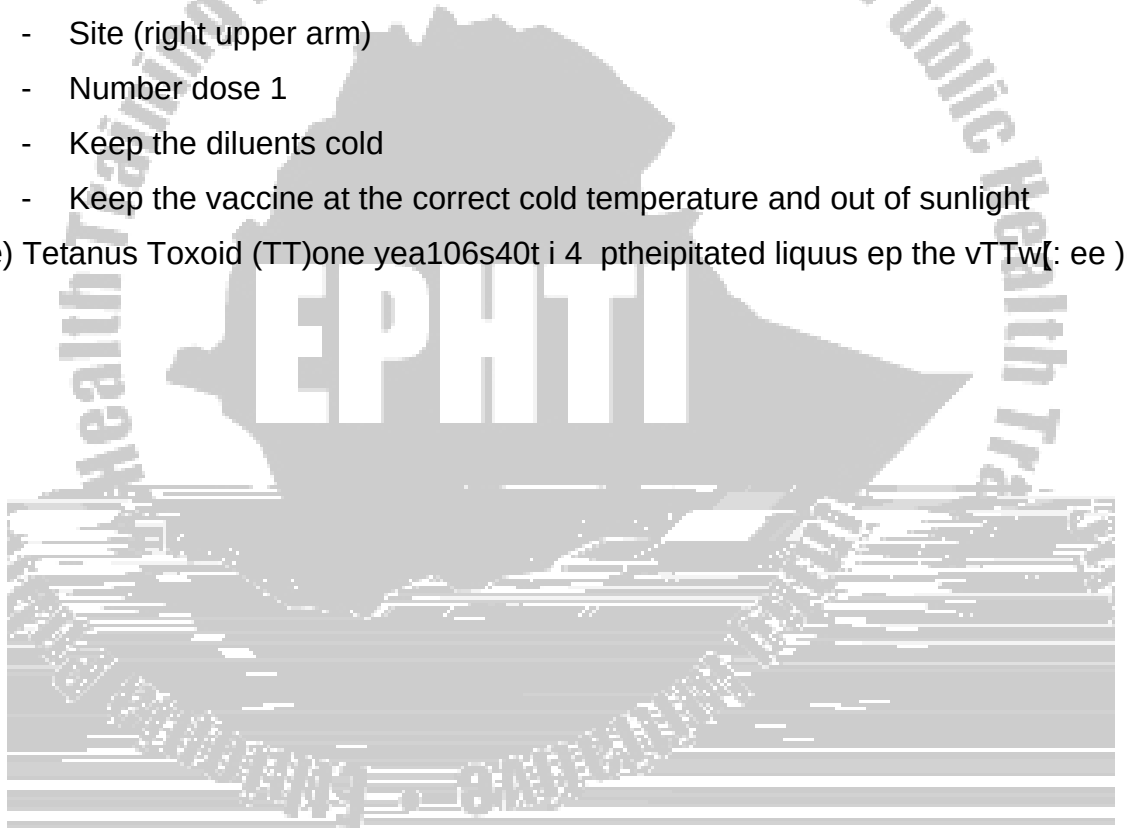
Health Training Initiative • Ethiopia Public Health Tra
EPHTI

- Route IM
- Number of dose 3
- Interval at least 4 weeks apart
- Keep the diluents cold
- Keep the vaccine at the correct cold temperature and out of sunlight

d) BCG (Bacillus Calmette Cuerin)

- Before using it, you must reconstitute it with diluents dose 0.05 ml below one year and 0.1 ml above one year old child
- Check manufacturer instruction
- Route ID
- Site (right upper arm)
- Number dose 1
- Keep the diluents cold
- Keep the vaccine at the correct cold temperature and out of sunlight

e) Tetanus Toxoid (TT)one yea106s40t i 4 ptheipitated liquus ep the vTTw[: ee)((right upper arms



Complications of unsafe Injection

Injections of vaccines are only safe when the correct vaccines are properly administered with sterile equipment.

a) Infections

- Transmission of blood borne pathogens

Examples: Hepatitis B

- HIV/AIDS
- Abscess
- Septicemia

b) Non-infectious

Injuries due to improper injection technique

E.g. nerve damage.

Measures to prevent risks of vaccine compilations

- Equipment and supply selection
- Sterilizing the instruments using the steam sterilizes

The necessary items needed for sterilization

- Steam sterilizer
- Round/square boiling pan
- Stove
- Forceps
- Timer clock
- Fuel or electricity

Prevention of unsafe injection

- Periodic assessment
- Effective training and supervision of health care workers
- The development of a national safe injection policy
- Uninterrupted provision of supplies and equipment

Tasks of PHN at the immunization session

There are several tasks that the public health nurse may have to do at the immunization session:

- Arranging the flow mothers and children at station
- Registering clients
- Weighing clients
- Health education on immunization
- Screening clients
- Treating clients
- Immunizing clients
- Cleaning the site and equipment

Strategies of health education

- Planning a program
- Planning with the community
- Finding a contact person
- Making the program work
- Training people to help you including health education
- Making immunization a good experience for the families
- Giving the community some feedback
- Working with individuals
- Working with groups
- Planning what you teach about
- Being polite and friendly
- Teaching in an interested way
- Use simple words
- Demonstrate something, like role-play.
- Encourage discussion

The role of public health nurse in evaluating the effectiveness of EPI program

Why should you evaluate your work?

Everybody who works in an immunization program needs to evaluate or monitor his/her work. Evaluation is not only for supervisors and program managers, it is also important for a person who gives the vaccine.

The Purposes of evaluation include:

- To know how successful your work is?
- What you need to do to improve your program.
- What help you need from your supervisors.

If you know how well you are doing, you will find your work more satisfying. Then you will enjoy your work more, and you will work better.

Health Training Initiative • Ethiopia Public Health Tra
EPHTI

Health Training Initiative • Ethiopia Public Health Tra
EPHTI

3.3. Satellite Module for Environmental Health Technician Students on Expanded Program on Immunization

3.3.1. Introduction

Purpose and use of the Satellite Module

This satellite module is prepared for Environmental Health Technician students. The satellite module emphasizes only areas that were not covered by the core module.

Direction on how to use this satellite module

- After completion of the core module, go through the satellite module.
- Students are advised to refer the core module whenever indicated.
- After completing the satellite module answer the questions given as pretest at the beginning in the core module.
- Compare your results.

3.3.2. Learning objectives

At the end of the satellite module you will be able to:

- identify the preventive and control measures of EPI targeted diseases.
- state the methods of health education to prevent EPI targeted diseases.
- describe the management and inspection of vaccines under cold chain.
- discuss reasons why vaccines are not effective.

3.3.3. Prevention and control of EPI target diseases

A. Survey and surveillance

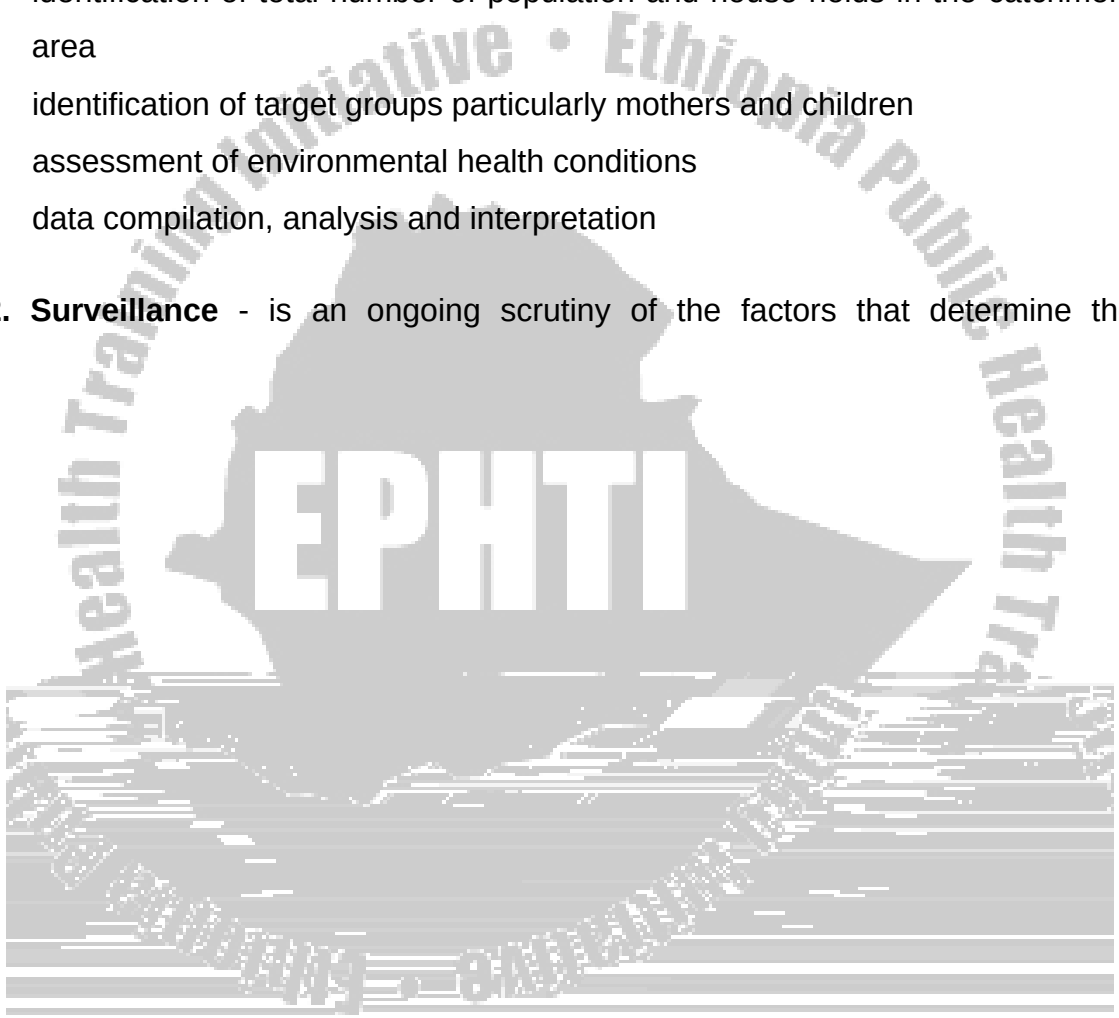
1. Survey –

- there is need to know EPI target groups
- laboratory analysis indicates a danger to health
- there are changes in the health of the community.

Activities under survey are:

- mapping of the catchment areas and house numbering.
- identification of total number of population and house holds in the catchment area
- identification of target groups particularly mothers and children
- assessment of environmental health conditions
- data compilation, analysis and interpretation

2. Surveillance - is an ongoing scrutiny of the factors that determine the



- women coming with children to immunization or regular primary care facilities.
- women coming with or without children to immunization
- community as whole

Ensure clean and safe delivery which can be achieved by:

- clean hands of the birth attendants.
- clean cutting and care of the umbilical stump.
- clean surface where the delivery is performed.

Training and supervision of delivery staffs

- Health workers
- front line health workers (CHW)

Eliminate use of certain traditional practices such as

- cow dung,
- ash,
- contaminated blades,
- Contaminated cord tie.

C. Cold Chain

1. Management and inspection of vaccines

- Read the cold chain record paper about the previous dates and time.
- Record the external thermometer reading of the refrigerator.
- Open the refrigerator.
- Record the internal thermometer reading.
- See the arrangements of vaccines on the shelf inside the refrigerator
- Close the refrigerator.
- Record the thermometer reading of the refrigerator externally and check weather it has increased or not.
- Check the shelf life of vaccines and expiry dates.

2. Vaccine storage times and temperature (refer to the core module)

3. Refrigerators and Freezers

Is vaccine storage space sufficient?

- Is there sufficient air space between the vaccines?
- Have you considered new activities to increase immunization coverage which may raise the maximum stokes needed in the refrigerator?
- Have you remembered to load bottles of water (or icepacks with water) in the refrigerator to keep the refrigerator to cool if the energy source fails?
- Do you have more than one-month supply of vaccine stored in the refrigerator?

Is the temperature efficiently controlled?

Your refrigerator is adequate for vaccine storage only if it can maintain an internal temperature between 0^oC – 8^oC. If the temperature rises above + 8^oC

- Store water bottles or icepacks filled with water in every spare place in the refrigerator, except one half of the volume, which needed for air circulation. This helps stabilize the te

3.3.4. Learning Activity:

Instructions

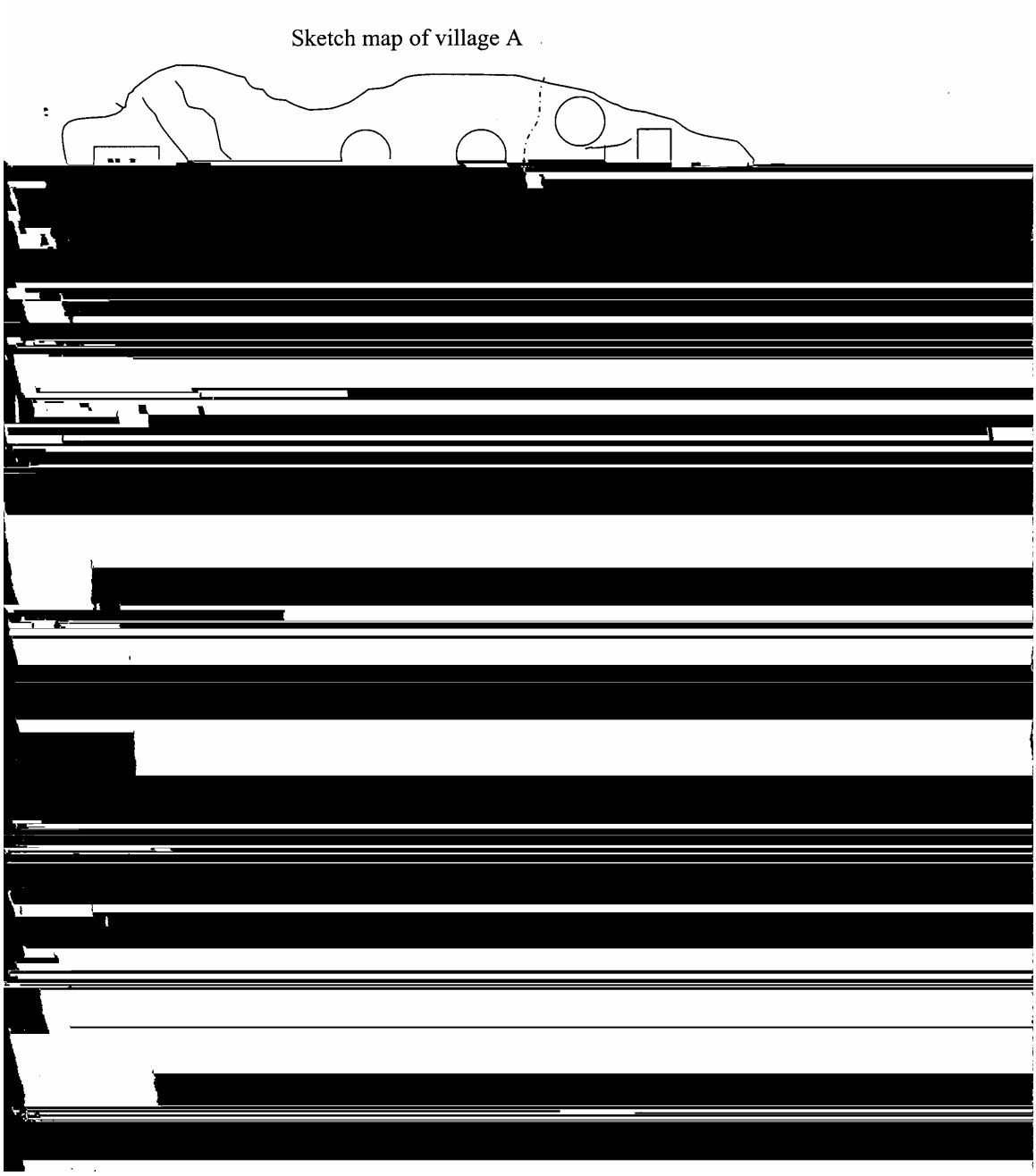
Part II

Specific tasks and roles to be performed

A. Disinfect ion of springs and wells
B. Identification of the causes of poliomyelitis.
C. Check that enough vaccines are available in the refrigerator to cover the monthly supply.
D. Mass mobilization
E. Proper ventilation of residential houses
F. Monitoring of time and tem

3.3.5. Activity two

Based on the sketch map of village A drown below answer the following questions.



3.4. Satellite Module for Medical Laboratory Technology Students on Expanded Program on Immunization

3.4.1. Introduction

Purpose and use of the satellite module

This satellite module is prepared for Medical Laboratory Technology students. It emphasizes only areas that were not covered by the core module.

Directions

- Students are advised to study the core module before going into the satellite module.
- After completing the satellite module answer all the questions given as a pretest at the beginning of the core module.
- Compare your results with that of the previous pretest given.

3.4.2. Learning objectives

Upon completion of the activities in this satellite module, the students will be able to:

- Describe the basic microbiological procedures for specimen collection, handling, processing, examination or dispatching to a reference laboratory.
- Identify and differentiate the specific bacterial agents from bacteriological specimens.
- Determine some hematological tests

3.4.3. Laboratory Diagnosis

The EPI target diseases are usually diagnosed based on clinical features.

This is because:

- The diseases are a0.46 0Dause:
-

Nevertheless, the health center laboratories can perform Grains stain & investigate microscopically the etiologic agents for pertussis, diphtheria, tetanus for confirmation of cases when requested. The most important role of health center laboratory is to refer microbiological specimens to a reference laboratory for further investigation.

Laboratory investigations of EPI target diseases.

A. Corynebactorium diphtheria

Morphology and staining characteristics

- Gram positive rod
- Non motile
- Non capsulated, non spore former
- Appear in clusters joined at angle like 'Chinese letters'

Specimens

- Throat, nasopharyngeal swab, and other suspected lesions.

Collection of dispatch of specimens

- Using a sterile cotton wool swab a specimen can be collected either from the throat or nasopharynx
- Put it in a sterile container with care not to contaminate the swab.
- To do investigation in the health center laboratory, label the specimen, make a smear, stain and look under the microscope
- To dispatch the specimen to a reference laboratory, put the swab in the appropriate transport media, label and send it as soon as possible.

Staining method – Gram's stain

- Make a smear of the specimen and fix the dried smear.
- Cover the fixed smear with crystal violet stain for 30 seconds.
- Rapidly wash off the stain with clean water.

- Tip of all the water and cover the smear with Lugol's iodine for 30-60 seconds.
- Wash of the iodine with clean water.
- Decolorize rapidly (few seconds) with acetone alcohol.
- Wash immediately with clean water.
-

Collection and dispatch of specimen

- Collect a sample of the pus or infected tissue on a sterile cotton wool swab.
- Make a smear of the sample on a clean slide for Gram stain and examine for typical drumstick spore formers.
- To dispatch, put the specimen in a sterile transport media, label and send it with a request form to reach a reference microbiology laboratory within 6 hours.

D. Polio virus

Characteristics

- Polio viruses are enteroviroses that contain single stranded RNA of positive polarity.
- The virion is naked
- The three serotypes of poliovirus are highly cytopathic to many primary cell cultures and permanent cell lials, causing cell death with changes in cell morphology.

Specimens

Feces, throat swab Stool

Collection and transport of specimens

Stool: Mix about 1 ml of specimen with 9 ml of sterile phosphate buffered saline, and allows to sediment for about 30 minutes (or centrifu 0 1e). T-0.46h

E. Measles Virus

Characteristics

Measles virus is a single stranded RN virus belonging to the family paramyxovirus and genus Morbillivirus.

Collection and transport of specimens

Isolation of the virus from clinical specimens is difficult. The following specimens can be used to diagnose measles.

1. Nasopharyngeal and conjunctiva specimens (at the initial stage of the disease)
2. Stool and urine (at later stages)
3. Cerevrospinal fluid (CSF) and serum

Specimen collection is made strictly following the standard procedures of the World Health Organization (WHO).

Specimens, if not sent to virology laboratory immediately after collection, should be kept in a refrigerator, but never freeze them

The transport medium of choice for measles virus is bovine serum since it contains proteins that are essential to stabilize viral infectivity.

The diagnosis of measles is best done from clinical grounds. However, in laboratories where there are special facilities, the following techniques can be followed:

- Virus isolation using cell cultures and observing cytopathic effects
- Electro microscopic examination of the virus directly form the clinical specimens
- Serological test – a four-fold increase of specific antibody titers in a serum taken 7 – 14 days interval is the basis for diagnosis.
- Histological examination and hybridization of RNA.

F. Mycobacterium Tuberculosis

Morphology and staining characteristics

- Straight or slightly curved rod shaped organism
- Is strictly aerobic acid fast bacilli
- Non spore forming, non capsulated, and non motile
- Acid fastness depends on the waxy envelop mycolic fatty acid of cell wall
- Once stained with primary stain (carbol fuchsin) they resist decolorization by acid alcohols.

Laboratory diagnosis of P. tuberculosis

This is mainly based on the identification of the bacilli M. tuberculosis from different clinical specimens.

Specimens

Sputum, Pleural, peritoneal, and cerebrospinal fluid

Collection and transport of specimens

For reliable lab diagnosis, three sputum samples should be collected properly and submitted. Morning samples are more likely to contain tubercle bacilli. However, it may be difficult for an outpatient to provide three early morning sputum samples. Accordingly, an outpatient usually provides a spot morning spot sputum samples as follows:

- Day one – sample one- “on the spot” sample when the patient first presents himself/herself to the health station
- Day two – Sample two- an early “morning” sample
- Day two – Sample three-another “on the spot” sample in the sam day the morning sample is given.

Laboratory diagnosis: Microscopic examination of Sputum for acid fast bacilli (AFB)

⇒ Ziehl-Neelsen Technique

- Direct method: A small portion of the purulent sputum is transferred to a slide to make a thin smear.

- Concentration technique using a hours hold bleach-“barakina”: This technique kills some normal flora microorganisms, inactivates the virulence of mycobacterium, and also helps to digest the mucous substance that suspends the bacteria and this increases the chnce of positivity.

⇒ Culture

- Lowenstein-Jensen Medium is the ordinary culture media for tubercle bacilli.
- Raised, dry, cream colored colonies of tubercle bacilli are looked for

⇒ Biochemical reaction

- Niacin test is positive

⇒ New techniques

- Molecular probes (DNA probes) – it detects Mycobacterial RNA sequence
- High performance liquid chromatography
- Polymerase chain reaction (PCR)
- Enzyme immunoassay

Roles and Tasks of Medical Laboratory Technicians

A. Knowledge, Objective and Activities Regarding EPI Target Diseases

Objective	Knowledge
• Describe the etiology of EPI target diseases. • State the laboratory diagnostic techniques. • Describe the modes of transmission of EPI target diseases. • Describe the types of vaccines, EPI schedule, route of administration of vaccines, and strategies. • Describe the method of assessment and evaluation of EPI.	• Study the etiologic agents and their general characteristics. • Study the laboratory Methods and procedures. • Study the modes of transmission of EPI target diseases. • Study types of vaccines, EPI schedule, route of administration of vaccines, and strategies. • Study method of assessment and evaluation of EPI.

B. Attitude Objective and Activities of MLT regarding EPI-Target Diseases

Learning Objective	Activities
• Help believe that EPI target diseases are preventable. • Help believe that regular immunization attendance is important for full protection. • Help believe that community participation is important for the success of EPI	• Encourage preventive and control measures using different approaches of health education. • Provide information of EPI schedule. • Convince community leaders, elders and other influential people in the community that community participation is vital for prevention of EPI.

3.5. Satellite Module for Community Health Workers/ Front-Line Health Workers on Expanded Propgram on Immunization

3.5.1. Introduction

This satellite module is prepared by considering important issues that can help the Community Health Workers (CHWs) in the prevention and control of EPI target diseases.

EPI target diseases are common childhood communicable disease that can disable and kill many children.

Being a health agent of the community, your knowledge on EPI and EPI target diseases will save many children's lives. Therefore, this short and precise

Causes of EPI target diseases

In our country, most of the babies born die before they are five years old. These deaths are often due to six deadly diseases:

Measles

Tuberculosis

Tetanus (lock jaw)

Whooping cough (pertussis)

Diphtheria

Poliomyelitis

All of these diseases can be prevented by immunization. Routine immunization

3.6. Take-Home Messages for Caregivers

3.6.1 Short information about EPI

Many children suffer from vaccine preventable diseases.

Children are liable to most of these diseases due to lack of immunity.

Immunizing children will prevent them against these diseases.

Causes and transmission of the six childhood vaccine preventable diseases

These diseases are caused by bacteria and viruses.

Transmissions take place through; droplets inhalation, freco-oral, and contamination of wounds (umbilical stump).

Some signs and symptoms

High body temperature

Can not eat or drink normally

Difficult breathing

Fit

Rash (measles)

Irritable and doesn't like being touched.

Passes little or no urine

Measures to be taken at home

Keep the child cool using cold sponging if there is fever.

Give frequent drinks or sips.

Prevent other children from catching the illness by avoiding contact with cases /isolation/.

Visit the nearby clinic.

Prevention

Report to the CHW or to the nearest health institution if your child is sick

Have your children fully vaccinated.

Understand the advantages of vaccination.

Do not miss your vaccination schedule when the child is sick.

Continue feeding children during sickness.

Women of child bearing age must complete Tetanus Toxoid vaccination, at least 2 vaccination before delivery.

UNIT FOUR

Glossary

Attenuation The act of thinning or weakening, as the alteration of virulence of a pathogenic microorganism by passage through another host species, decreasing the virulence of the organism for the native host and increasing it for the new host

Active immunization Stimulation with a specific antigen to induce an immune response.

Active Immunity

Antigen Any substance capable of inducing a specific immune response and of reacting with the products of that response; i.e. with specific antibody.

Antibody

Cardiomyopathy	A general diagnostic term designating primary myocardial (= the middle and thickest layer of the heart wall, composed of cardiac muscle), disease
Catchment area	The area from which people are sent a particular health institution.
Contagion/contagious	Spread of disease from person-to-person
Contraindication	Any condition which renders a particular line of treatment improper or undesirable.
Convulsion	An involuntary contraction or series of contractions of the voluntary muscles
Enanthema	An eruption upon a mucous surface.
Encepalopathy	Atrophy (= a wasting away), of the brain.
Endemic	A disease that occurs continuously in a particular population, but has no mortality
Epidemic	Appearance of an infectious disease or condition that attacks many people at the same time in the same geographical area.
Exotoxin	A potent toxin formed and excreted by the bacterial cell, and free in the surrounding medium.
Granuloma	A tumor-like mass or nodules of granulation tissue, with actively growing fibroblasts and capillary buds.
Herd immunity	The resistance of a group to attack by a disease to which large proportions of the members are immune.
Hypothermia	Body temperature below the normal
Immunity	The condition of being immune (= resistance to a disease because of the formation of humoral antibodies or the development of cellular immunity), securing against a particular disease.
Immunization	The process of rendering a subject immune, or of becoming immune

Immunogenicity The property enabling a substance to provoke an immune response, or the degree to which a substance possesses this property.

Toxoid	A modified or inactivated exotoxin that has lost toxicity but retains the ability to combine with, or stimulate the production of antitoxin.
Umbilical stump	The part of umbilicus that left after the umbilical cord is cut.
Uvulectomy	Cutting/removal/ excision of the uvula and not a recommended procedure.
Vaccine	Suspension of attenuated or killed micro-organisms (viruses, bacteria, or rickettsiae), administered for prevention, amelioration, or treatment of infectious diseases.
Vaccination	The introduction of vaccine into the body to produce immunity.
Virology	The study of viruses and viral diseases

UNIT FIVE

Abbreviations

AIDS	Acquired Immunodeficiency Syndrome.
BCG	Bacterium Calmette-Guerin
CHWs	Community Health Workers. They are also called Front-line health workers
DPTs	Directly Observed Treatment Short Course
DPT	A combined vaccine for Diphtheria, Pertussis, and Tetanus Toxoids
EPHTI	Ethiopian Public Health Training Initiative
EPI	Expanded Program on Immunization.
GCMS	Gondar College of Medical Sciences
HCl	Hydrochloric acid
HO	Health Officer.
Id	Intradermal
IEC	Information, Education, Communication
IM	Intramuscular
MLT	Medical laboratory technology
NNT	Neonatal Tetanus
OPV	Oral Polio Vaccine
RBC	Red blood cell
RNA	Ribo nucleic acid
Sc	Subcutaneous
TT	Tetanus toxoids
TBA	Traditional Birth Attendant
TTBA	Trained Traditional Birth Attendant
WBC	White Blood Cell
WHO	World Health Organization.

UNIT SIX

REFERENCES

1. Community Health in the 21st Century, Patricia A. Reagan, Jodi Brookins – Fisher, 1997.
2. Control of Communicable Disease in Man, 13th edition, Abram S. Benenson, 1980.
3. Doris Smith Suddarth: The Lippincott Manual of Nursing Practice; 5th edition. J.B. Lippincott company 1991.
4. Epidemiology, A Manual for Students and Health Workers in Ethiopia. Messeret Shiferaw with Haile Fenta, 1990.
5. Eric T. Herfindal and Dick R. Gourley: Textbook of Therapeutics Drug and Disease Management 6th edition. Williams and Wilkins a waverly company 1996.
6. Harrison's Principles of Internal Medicine 13th edition. McGraw-Hill Health professions division 1994.
7. Hoosen M.L., Loening Paediatrics and Child Health Care, Second edition Oxford University Press, Durban, 1988.
8. Immunization in Practice, Modules 1 – 11 Global Programme for Vaccines and Immunization Expanded Programme on Immunization, World Health Organization, Geneva, 1998.
9. Manual on Maternal and Child Health Care, Ministry of Health, Addis Ababa, Ethiopia, 1995.
10. Melkie Edris: Manual on Communicable Diseases 1985.
11. Medical Dictionary, 24th Edition, Dorland's Pocket.
12. Nelson Textbook of pediatrics, 16th edition, Behrman, Kliegman, Jenson.
13. Richard M.Hyde: Oklahama notes; Microbiology and Immunology; 3rd edition Springer Verlag 1992.
14. World Health Forum, An International Journal of Health Development, Volume 19, Number 4, 1998. World Health Organization, Geneva.
15. World Health Organization: Immunization in practice a guide for health workers who give vaccines. Oxford Medical Publications 1989.
16. Ethiopia EPI/AFP News, Disease Prevention and Control, Department & Family Health Department, MOH, March 2002.
17. Cheesbrough M. Medical Laboratory Manual for Tropical. Volume 2, 1991.
18. Mackie and McCartney. Practical Medical Microbiology.Thirteenth edition, Churchil Livingston, New York, 1989.
19. G. Haukenes, L.R. Haaheim, and J.R. Pattison. A Practical Guide to Clinical Virology, New York, 1989.
20. Bradley (1987), Community Health for Student Nurses.

UNIT SEVEN

Annex I

Vaccination Reporting Form

Signature _____ Date from _____ to _____

Place _____

Age group (in months) Vaccines	3-5	6-8	9-11	12-14	Other children	Pregnant women	Vaccination information				
							Doses per bottle	Number per bottle	Total doses supplied	Doses administered	Doses not administered
BCG											
DPT I											
DPT II											
DPT III											
POLIO I											
POLIO II											
POLIO III											
MEASLES											
Tetanus #1											
Tetanus #2											
Others											

Annex II

2.1. Key: For Pre-test Questions on the Core Module (2.1)

1. d
2. b
3. b
4. c
5. a
6. b
7. c
8. d
9. d
10. d
11. d
12. a
13. b
14. d
15. b
16. a
17. c
18. d

2.2. Key: For Pre-test Questions for Health Officer Satellite Module

1. c
2. a
3. c
4. False
5. f
6. a
7. false
8. d
9. a

10. - Health workers do not know the policy
    - Accessibility and acceptability problems
    - Logistics problems
    - Health workers only open a vial if there are enough clients who need it, etc.
11. - Unsure of dates of return
    - Long wait at the vaccination center
    - Negative attitude of some health workers towards the program,
    - Mothers usually busy with other engagement, etc.
12. d
13. d

2.3. Key: For Learning Activity Two: Health Satellite Module

1. Pertussis Box

A3- B. pertusis

B5- 7 – 17 days

C1- Whooping cough

D1- DPT

D3- Start at 6 weeks

D7- IM Injection

D10- Killed organism

E2- Convulsion

E4- Anaphylactic Reaction

4. Diphtheria Box

A4- C. diphtheria

B1- 3 – 5 days

C3- Toxin production

D1- DPT

D3- Start at 6 weeks

D7- IM Injection

D9- Weekend Toxin

E2- Convulsion

E4- Anaphylactic shock

5. Tuberculosis Box

A5- Mycobacterium

B2- 4 weeks or longer

C6- Chronic cough

D4- Start at birth

D11- BCG vaccine

D12- Live attenuated

D13- Intra-dermal

E5- Clinical AIDS

6. Measles Box

5 A0 Convulsion

Annex III

The Authors

Dr Mesfin Addisie is an Assistant Professor and staff of the Department of Community Health, Addis Ababa University (AAU). He obtained his M.D. and M.PH. from AAU, Faculty of Medicine. He has worked in a rural hospital and a health center. He has also been a manager of a Regional Health Bureau and has served as a consultant for Non-Governmental Organizations.

Amsalu Feleke is a lecturer in the Department of Community Health, Gondar College of Medical Science (GCMS). He graduated from the then Gondar Public Health College, (now GCMS) with Diploma in Medical Laboratory Technology and B.Sc. in Public Health. He obtained his M.PH. from Boston School of Public Health, U.S.A. He had worked with several capacities for many years. He was a Laboratory Technician, Public Health Practitioner and Regional Health Department Manager. He had been teaching at Alemaya University in the Faculty of Health Sciences. Currently, he is an instructor in GCMS and Coordinating Field Education and Team Training Program.

Melkie Edris is an Associate Professor in the Department Community Health, GCMS. He graduated from the then Gondar Public Health College with a B.Sc. degree in Public Health. He obtained his MSc. degree in Applied Human Nutrition from the University of Nairobi, Kenya. He had worked in different health institutions and Horticulture Development Corporation, Nura Era Enterprise State Farms as technical and administrative health officer. He had served GCMS as Academic Vice Dean and Acting Dean. Currently, he is an instructor and head of health officer department at the college.

Dr. Yigzaw Kebede is an Associate Professor of Community Health in GCMS. He is a graduate of the same college. He obtained his 2nd degree (MPH) in Addis Ababa University. Now he is instructor in Community Health Department.

Mr. Daniel Mengistu BSN, RN, is an Assistant Lecturer and Head School of Nursing. He obtained his diploma in Comprehensive Nursing from GCMS and BSc. Degree in Nursing form Jimma University. He has been instructing in the School of Nursing, GCS since March 1990.

Abebaw Eredie is a lecturer in the department of nursing, GCMS. He obtained his diploma in comprehensive nursing from GCMS and is M.Sc. in nursing pedagogy from Humboldt University, Berlin Germany. Currently he is an instructor in GCMS, department of nursing.

Takele Tadesse, Assistant lecturer in the Department of Environmental Health of CCMS. He has obtained his diploma is Sanitary Sciences from GCMS and B.Sc. degree in Environmental Health Department and Engineering and Maintenance unit of the college.

Gashaw Andargie, Assistant lecturer in the Department of Environmental Health, GCMS. He obtained his diploma in Sanitary Sciences from Gondar College of Medical Sciences and his B.Sc. in Environmental Health from Jimma University. He was works with several capacities for many years as a sanitarian. Currently, he is a hospital administrator and instructor of GCMS.

Tesfaye Tilaye, Assistant Lecturer in the Department of Environmental Health, GCMS. He obtained his Diploma in Sanitary Science from GCMS and received B.Sc. in Sanitary Science (Environmental Health) from Jimma University. He has been assigned as instructor in GCMS since 1990 and teaching different disciplines in this College.

Ebba Abate is an assistant lecturer and Head of the School of Medical Laboratory Technology, GCMS. He received his Diploma in Medical Laboratory Technology from GCMS and his B.Sc. in Medical Laboratory Technology from Jimma University.

Endris Mekonnen is an assistant lecturer in the School of Medical Laboratory Technology, Gondar College of Medical Sciences. He received his Diploma in Medical Laboratory Technology from Gondar College of Medical Sciences and his B.Sc. in Medical Laboratory Technology from Jimma University.

Kassa Wereta is an assistant lecturer in the Department of Nursing, GCMS. He graduated from GCMS with comprehensive nursing. He obtained his B.Sc. in Health Officer in GCMS. He had worked in different health institutions as health center head. Since 1983 E.C. he has been working in GCMS as nursing instructor.

Mamo Wubshet, Lecturer in the Department of Environmental Health, GCMS. He obtained his diploma in Sanitary Sciences from GCMS, B.Sc. in Environmental Health from Jimma University and his Master of Environmental Engineering in the Netherlands. He had worked with several capacities for many years as a sanitarian, head of the Environmental Health Department for two years and currently he is an instructor in the same department.